

# ***KF Series***



## **Repair Manual**

## INDEX

<b>1. INTRODUCTION</b>	<b>3</b>
<b>2. REPAIR INSTRUCTIONS</b>	<b>3</b>
2.1 Crank Mechanism Repair .....	3
2.1.1 Crank mechanism disassembly .....	4
2.1.2 Crank mechanism assembly .....	5
2.1.3 Disassembly / Assembly of bearings and shims .....	6
2.2 Fluid End Repair .....	8
2.2.1 Disassembly of the head - valve units .....	8
2.2.2 Head assembly - valve units .....	9
2.2.3 Disassembly of the head - seals .....	10
2.2.4 Piston unit disassembly .....	12
2.2.5 Head assembly - seals - piston unit.....	12
<b>3. SCREW CALIBRATION</b>	<b>13</b>
<b>4. REPAIR TOOLS</b>	<b>14</b>

## 1. INTRODUCTION

This manual describes the instructions for repairing KF 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.

The Interpump Group 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 pos. ①, and then the plug, pos. ②, fig.1.

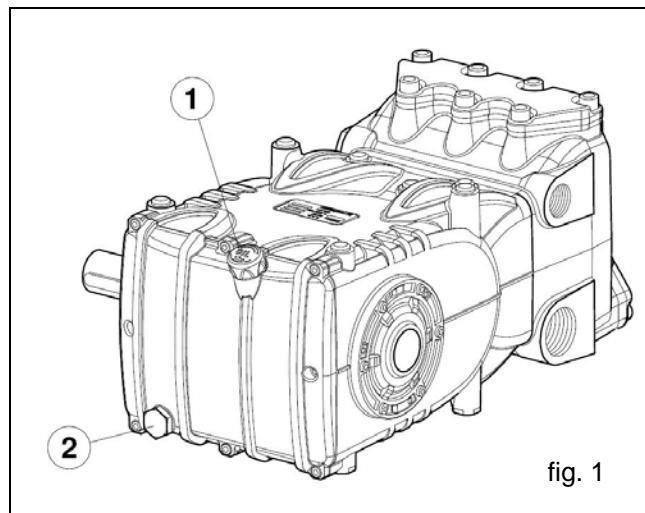


fig. 1



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

### 2.1.1 Crank mechanism disassembly

The correct sequence is the following:

A) Disassemble:

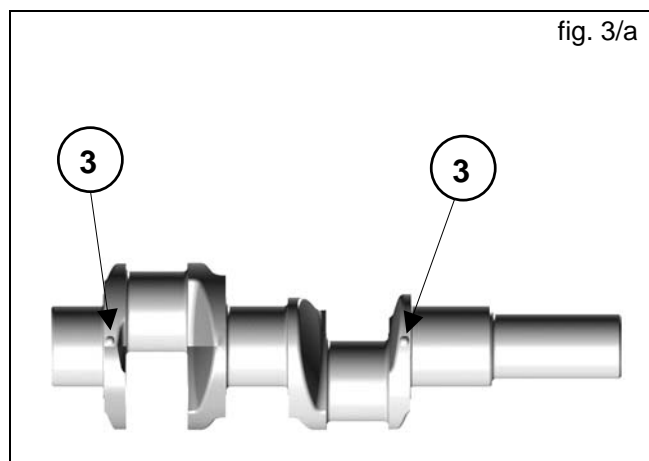
- pump shaft key
- rear cover
- connecting rod cap
- side covers, using n°3 wholly threaded M6x 50 screws, inserting them in the apposite holes as shown in fig. 2



B) Push the piston guides and connecting rods forward in order to facilitate the lateral extraction of the pump shaft.

Two marks are visible on the crank shaft<sup>3</sup>, as shown in fig. 3 and in fig. 3/a; they must be turned towards the operator in order to facilitate extraction.

NB: to extract the piston guide it is necessary to remove the ceramic piston and wiper first.



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

### 2.1.2 Crank mechanism assembly

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

- A) Thoroughly fit the piston guide seals into their seat on the crankcase as shown in fig. 5/a, using the apposite tool (cod.27904900).
- B) Introduce the pre-assembled piston 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 piston guide / connecting rod unit, as indicated in section B, paragraph 2.1.1, and shown in fig. 4.



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 apposite tool (cod. 27904800) as shown in fig. 5.

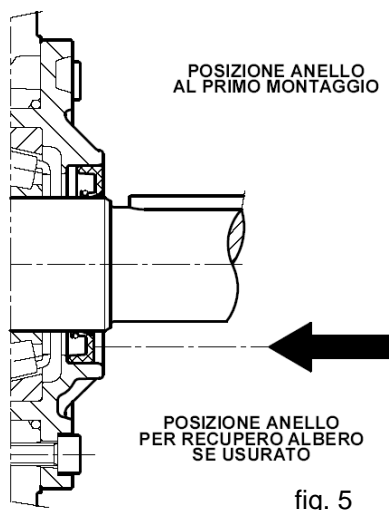


fig. 5

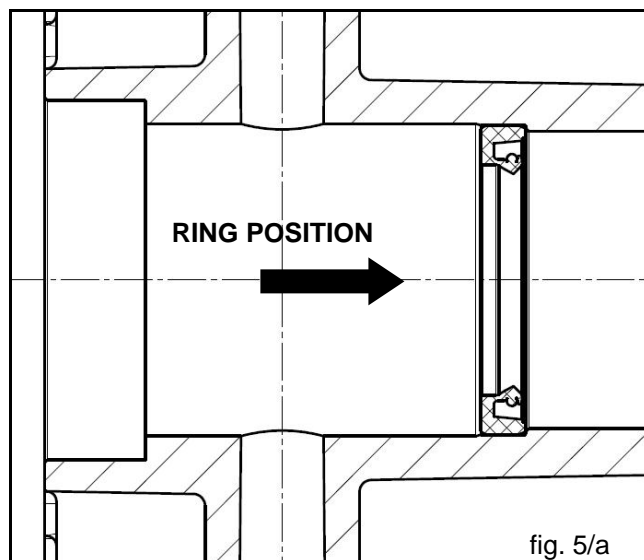


fig. 5/a

Posizione anello al primo montaggio	Ring position at first assembly
Posizione anello per recupero albero se usurato	Ring position for worn shaft recovery



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 to use N°3 screws M6 x 40, and then finish the operation with the screws supplied (M6x18) 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 6 - 8 Nm
2. Pre-fastening torque 25 - 28 Nm
3. Fastening torque 38 Nm



E) Install the rear cover positioning the oil dipstick hole upward.

F) Fill the crankcase with oil as indicated in the use and maintenance manual in 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 indications 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 races for wear; if all parts are in good conditions, 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 side flange + shaft + engine side flange), check that the shaft's rolling torque - with the connecting rods free - is at least 4 Nm, Max 7 Nm.

To position the two side covers on the crankcase, initially use N°3 screws M6x40 as shown in fig. 6, and then the fastening screws.

The shaft's rolling torque (with connecting rods coupled) must not exceed 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 - 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 apposite rings. The driving operation can be facilitated by heating the relevant parts at a temperature ranging between 120° - 150° C (250° - 300° F), 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	N° 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	1
	0.10	1
From: 0.56 to: 0.60	0.25	2
From: 0.61 to: 0.70	0.35	1
	0.25	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 4 Nm and 7 Nm.  
 F) If the torque value is correct, connect the rods to the crankshaft; otherwise, redefine 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:



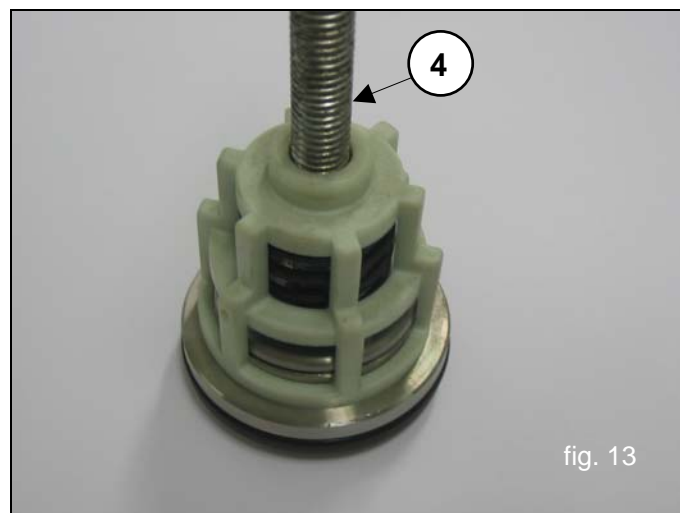


- A) Unfasten the 7 M12x35 valve cover screws, and remove the cover, fig. 12.
- B) Extract the valve plugs using a slide hammer (cod. 26019400), fig. 12.
- C) Extract the valve units using the same slide hammer used for the valve plugs (cod. 26019400); it is applied to the M10 hole of the valve guide.



If the extraction of the delivery and suction valve units is particularly difficult (for example due to incrustations caused by prolonged pump inactivity), use the extraction tool (cod. 27516900 combined with the tool cod. 26019400).

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 (pos. 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 use and maintenance manual.

At each valve inspection, replace all valve unit and valve plug OR 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.

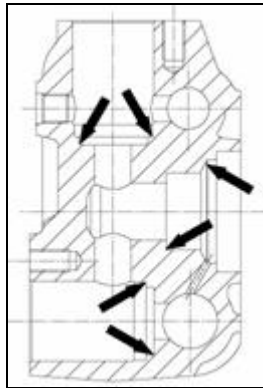


fig. 14

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

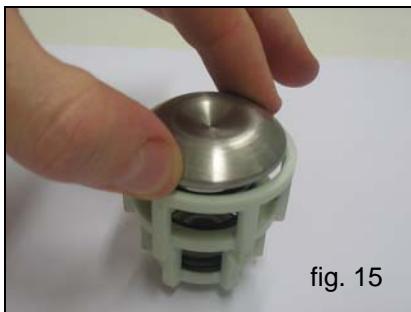


fig. 15

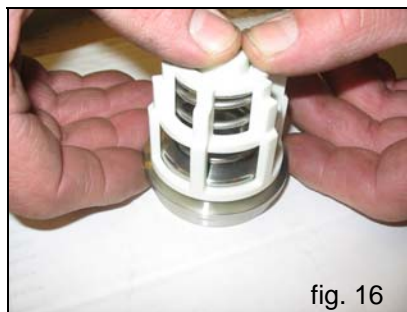


fig. 16

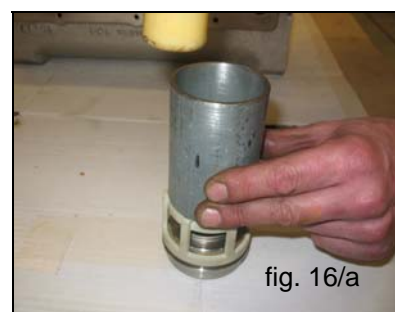


fig. 16/a

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 M12x35 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 use and maintenance manual.

A) Unfasten the M12x150 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 pos. ⑤; be careful not to damage the seats.

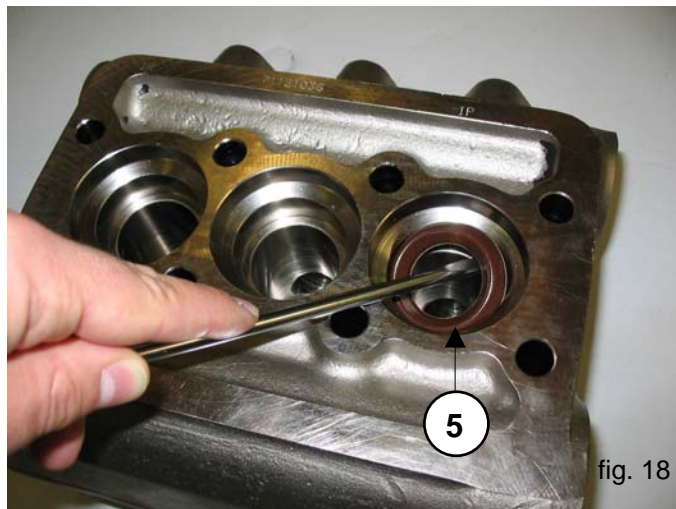
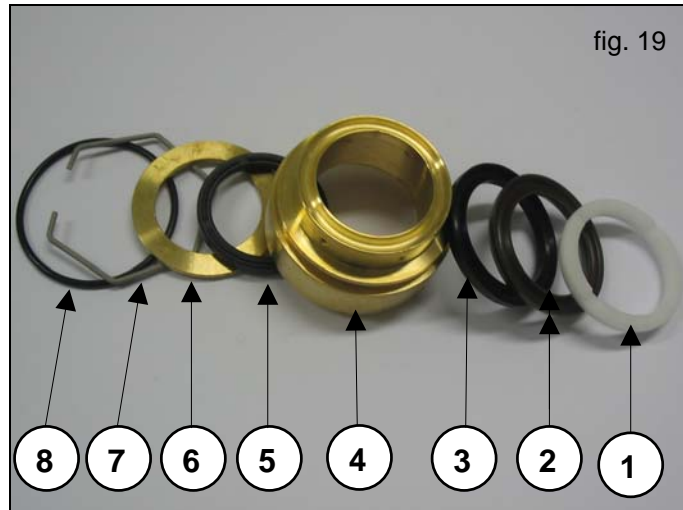


fig. 18



Pay careful attention to the order of sealing pack disassembly as shown in fig. 19, composed of:

1. Head ring
2. HP seal
3. Restop ring
4. Packings support
5. LP seal
6. Sealing ring
7. Circlip
8. OR ring



#### 2.2.4 Piston unit disassembly

The piston unit does not require periodical maintenance. Service interventions are limited to visual inspections only.

For piston unit extraction, operate as follows:

A) Unfasten the M 7x1 piston screws as shown in fig. 20.



B) Check for wear; replace them if necessary.



At each disassembly, all piston unit OR rings must be replaced.

#### 2.2.5 Head assembly - seals - piston unit

Reassemble the various components by inverting the operations previously listed in paragraph 2.2.3, paying careful attention to the following:

- A) Sealing pack: respect the same order followed during disassembly.
- B) Lubricate components ②③⑤ with silicone grease type OCILIS cod. 12001600; this operation is also considered necessary in order to facilitate the settling of the seal lip on the piston.
- C) For correctly assembling the HP seals in their related seats on the head without damaging the lips, use the apposite tools depending on the pumping assembly diameters as indicated in Chapter 4.
- D) Reassemble the pistons by fastening the screws with an apposite torque wrench, respecting the fastening torque value indicated in Chapter 3.
- E) Assemble the head: for fastening torque values and fastening sequences, respect the indications of Chapter 3.

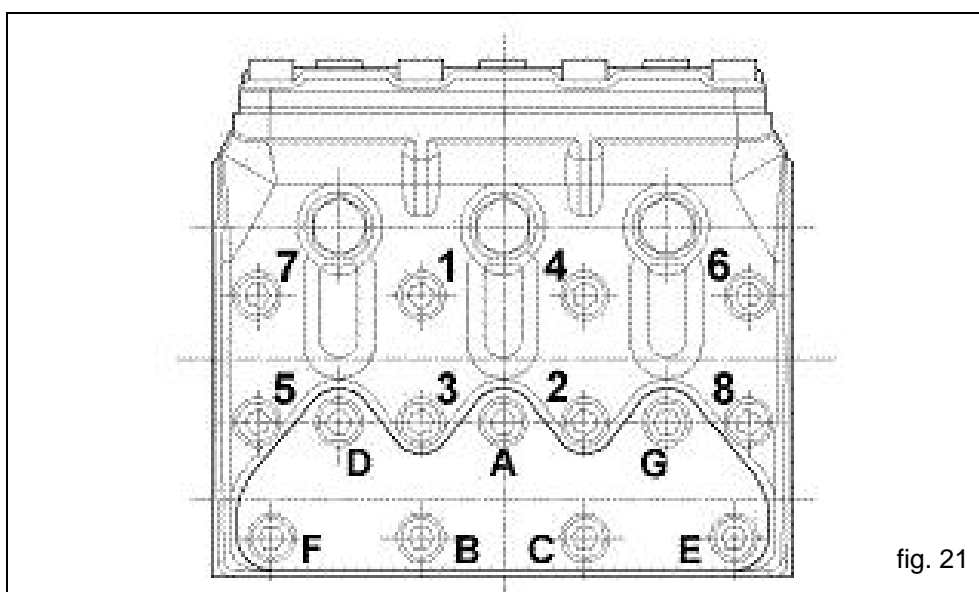
### 3. SCREW CALIBRATION

Description	Exploded view position	Material	Fastening Torque Nm
Cover fastening screws	9	8.8	10
Piston fastening screws	29	AISI 416	20
Conrod caps fastening screws	16	12 R	38*
Head fastening screws	39	12.9	80**
Valve cover screws	40	12.9	120***
Lifting bracket fastening screws	56	8.8	100
Oil discharge plug	11	Nickel-plated brass	40
Delivery duct plug	58	AISI 316L	40

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

\*\* The head screws, exploded position 39, must be fastened using a torque wrench, lubricating the threaded stem with molybdenum disulphide grease cod.12001500, respecting the order shown in the scheme in fig.21.

\*\*\* The valve cover screws, exploded position 40, must be fastened using a torque wrench, lubricating the threaded stem with molybdenum disulphide grease cod.12001500, respecting the order shown in the scheme in fig.21.



## 4. REPAIR TOOLS

Pump repair may be facilitated by using the apposite tools codified as follows:

### For assembly:

Gasket bush	Øe 45 ; H.P. alternative sealing ring Ø 28x45x5.5/5	cod. 27473000
Gasket bush	Øe 45 ; H.P. alternative sealing ring Ø 30x45x7.5/4.5	cod. 27473000
Gasket bush	Øe 48 ; H.P. alternative sealing ring Ø 36x48x6/3.5	cod. 27473300
Gasket bush	Øe 55 ; H.P. alternative sealing ring Ø 40x55x7.5/4.5	cod. 27473100
Gasket bush	Øe 36 ; L.P. alternative sealing ring Ø 28x36x5.5	cod. 27470900
Gasket bush	Øe 38 ; L.P. alternative sealing ring Ø 30x38x5.	cod. 27471000
Gasket bush	Øe 44 ; L.P. alternative sealing ring Ø 36x44x5.5	cod. 27471100
Gasket bush	Øe 48 ; L.P. alternative sealing ring Ø 40x48x5.5	cod. 27471300
Pump shaft oil seal stopper		cod. 27904800
Piston guide oil seal stopper		cod. 27904900

### For disassembly:

Suction / Delivery valves	cod. 26019400
Suction and delivery valve plug	cod. 27516900
Piston guide oil seal	cod. 26019400
	cod. 27503900



### Copyright

The Copyright of these operating instructions is property of the Interpump Group.  
The instructions contain technical descriptions and illustrations that may not be electronically copied or reproduced, entirely or in part, nor distributed to third parties in any form without authorised written consent.

Offenders will be prosecuted according to the laws in force.

Cod. 71980703 - Cod.IE 2860000013 - 06/11/2007  
The data contained in this document may undergo  
change without prior notice.

**PRATISSOLI a brand of INTERPUMP GROUP SPA**

42049 S.ILARIO - REGGIO EMILIA (ITALY)

Tel. **+39 - 0522 - 904311** Fax **+39 - 0522 - 904444**

E-mail: [info@ipratissolipompe.com](mailto:info@ipratissolipompe.com)

<http://www.pratissolipompe.com>