

Serie KTXR

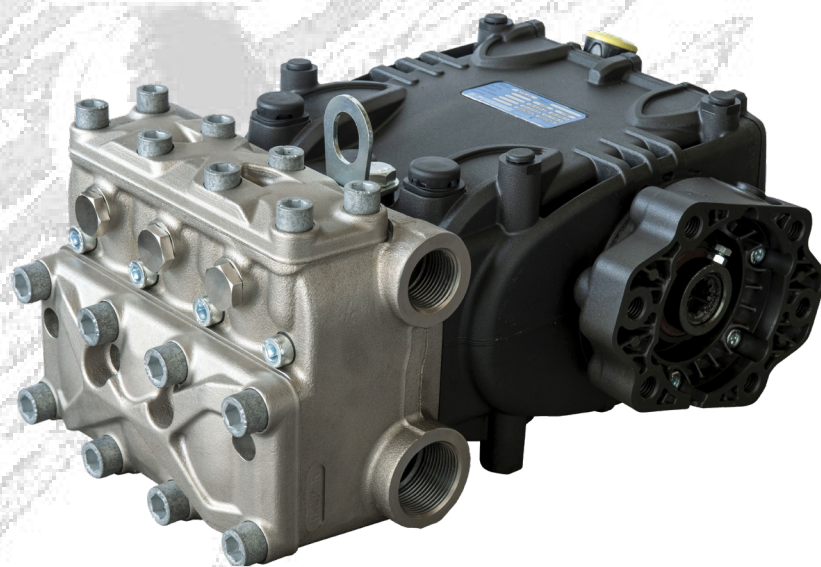


**INTERPUMP
GROUP**



Pratissoli

KTXR



Manuale di riparazione
Repair Manual
Manuel de réparation
Reparaturanleitung
Manual de reparación
Manual de reparação
Руководство по ремонту
維修手冊
Tamir kılavuzu

دليل الإصلاح

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1 INTRODUCTION

This manual describes the instructions for repair of the KTXR LOW-PRESSURE version pump and should be carefully read and understood before any intervention on the pump. Proper pump operation and duration depend on the correct use and maintenance.

Interpump Group disclaims any responsibility for damage caused by negligence or failure to observe the standards described in this manual.

1.1 DESCRIPTION OF SYMBOLS

Read the contents of this manual carefully before each operation.



Warning Sign



Read the contents of this manual carefully before each operation.



Danger Sign

Wear a protective goggles.



Danger Sign

Wear protective gloves before any operation.

2 REPAIR GUIDELINES



2.1 REPAIRING MECHANICAL PARTS

Mechanical parts must be repaired after the oil has been removed from the casing.

To remove the oil it is necessary to remove: the oil dipstick ① and the plug pos. ②, Fig. 1.

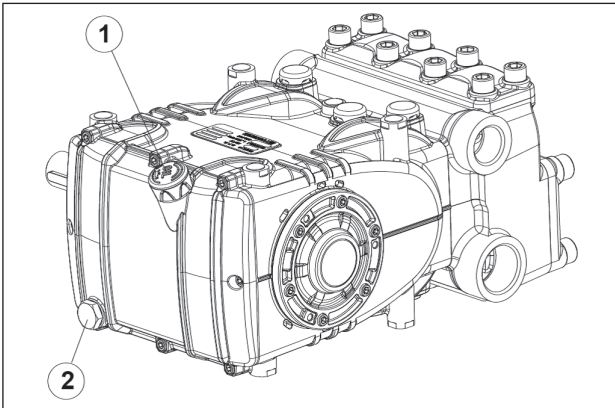


Fig. 1



The used oil must be poured into a suitable container and consigned to an authorized recycling center. It absolutely must not be discarded into the environment.

2.1.1 Disassembly of the mechanical part

The operations described must be performed after removing the hydraulic part, ceramic pistons and splash guards from the pump (par. 2.2.3, 2.2.5).

Remove in the following order:

- the pump shaft tab
- the rear cover
- the con-rod cap as follows:
unscrew the cap fixing screws, remove the con-rod caps with their lower half-bearings (Fig. 2) paying attention to the numbered sequence during disassembly.

To avoid possible errors, caps and con-rod shanks have been numbered on one side (Fig. 2/a, pos. ①).

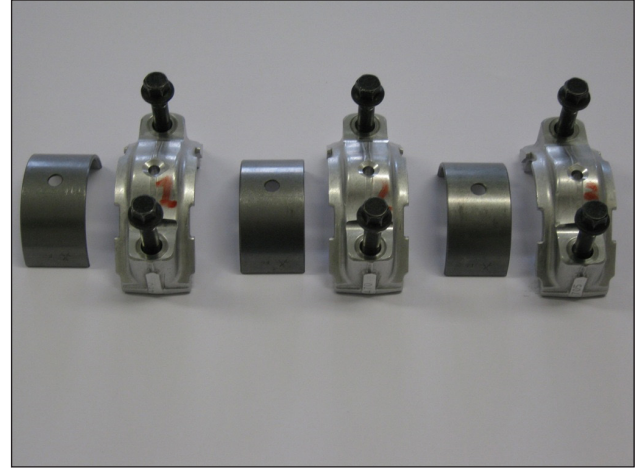


Fig. 2

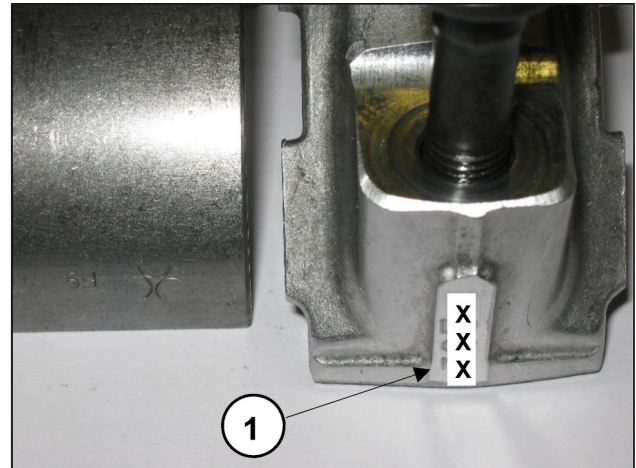


Fig. 2/a

- the side covers using for extraction 3 fully threaded M6x50 screws, inserting them in the threaded holes as indicated in Fig. 3.



Fig. 3

- Push the piston guides forward with their con-rods to facilitate side extraction of the pump shaft as shown in Fig. 4.



Fig. 4

- Remove the pump shaft
- Complete disassembly of the con-rod units by removing them from the pump casing and removing the piston guide pins.
- Remove the pump shaft seal rings using common tools.
- Remove the piston guide seal rings as described below: Use the extractor code 26019400 (Fig. 5, pos. ①) and the gripper code 27503800 (Fig. 5, pos. ②). Insert the gripper as far as possible onto the seal ring with the aid of a hammer (Fig. 5/a), subsequently screwing the extractor to the gripper, and use the extractor hammer (Fig. 5/b) until the ring to be replaced is removed (Fig. 5/c).

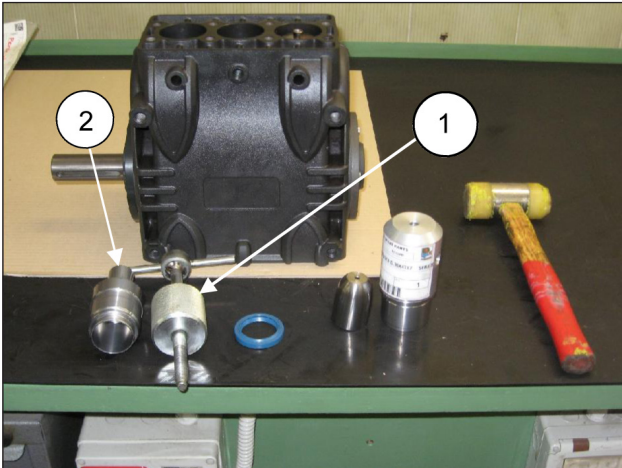


Fig. 5



Fig. 5/a



Fig. 5/b



Fig. 5/c

2.1.2 Reassembly of mechanical parts

After having checked that the casing is clean, proceed with assembly of the mechanical part as described below:

- Assemble the upper and lower half-bearings in their seats in the con-rods and caps.



Make sure that the reference marks on the upper (Fig. 6, pos. ①) and lower (Fig. 6/a, pos. ②) half-bearings are positioned in their respective seats in the con-rod and cap.

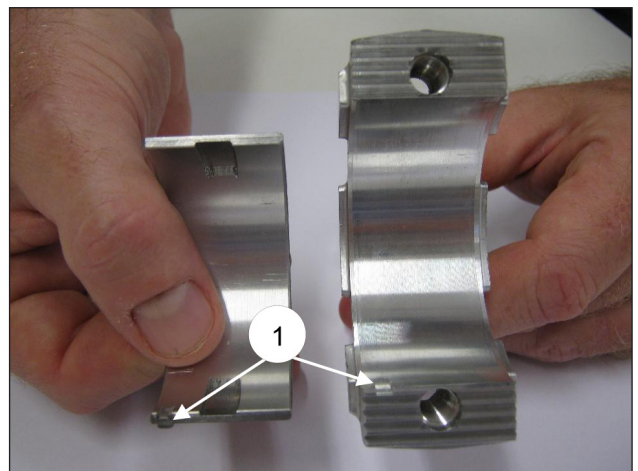


Fig. 6

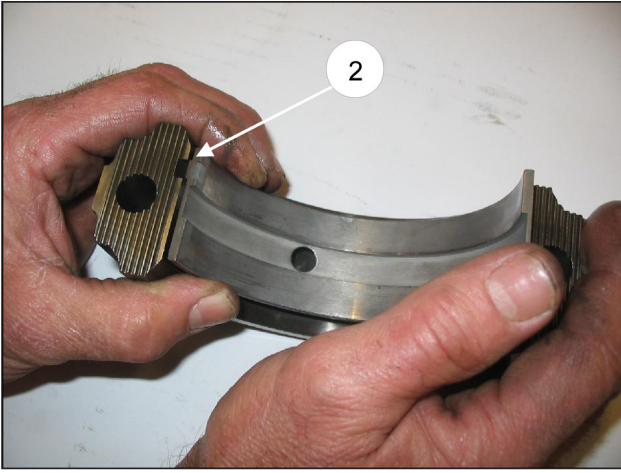


Fig. 6/a

- Insert the piston/con-rod guide units into the pump casing, directing the numbering on the con-rod shank towards the top of the casing.

To facilitate pump shaft insertion (without the tab), it is essential to repeat the operation performed during disassembly, pushing the piston/con-rod guide units as far down as possible (par. 2.1.1).

- Before assembling the side cover on the PTO side, check the conditions of the radial ring lip seal and relative contact area on the shaft.

If replacement is necessary, position the new ring using the tool (code 27904500) as indicated in Fig. 7.



If the pump shaft shows diametrical wear in the area of contact with the lip seal, in order to prevent the grinding operation, it is possible to reposition the ring in abutment with the cover as shown in Fig. 7.

Before assembling the side covers, make sure there are O-rings on both of them and shim rings on the indicator side cover only.

To facilitate filling of the first section and relative fitting of the covers on the casing, it is recommended to use 3 partially-threaded M6 x 40 screws, (Fig. 8, pos. ①) to then complete the operation with the screws supplied (M6x16).

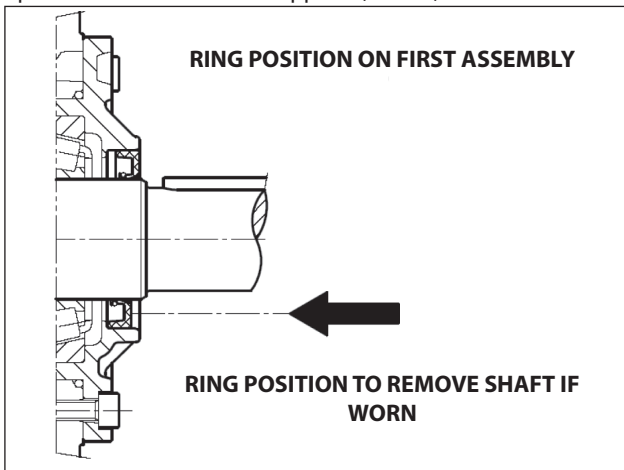


Fig. 7

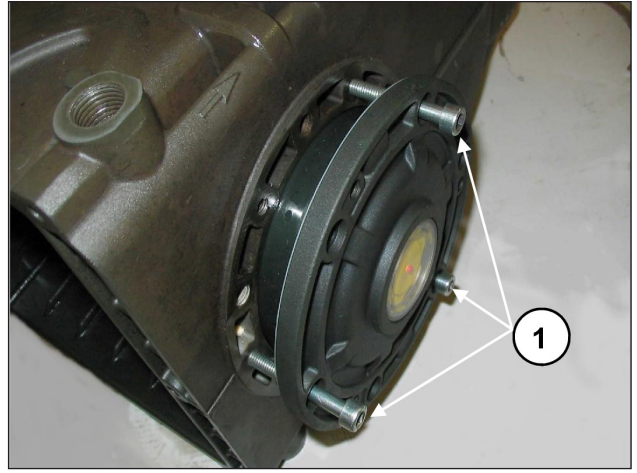


Fig. 8



- Couple the con-rod caps to their shanks, referring to the numbering (Fig. 9, pos. ①).

Note the correct assembly direction of the caps.

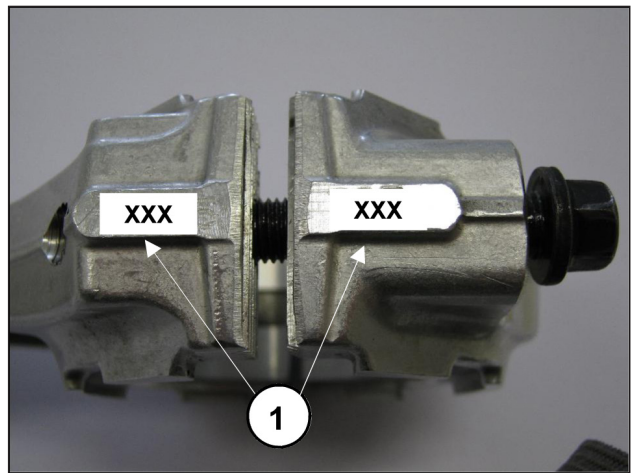


Fig. 9

- Fasten the caps to their respective con-rod shanks by means of M8x1x42 screws (Fig. 10) lubricating both the underhead and the threaded shank, proceeding in two different stages:



1. Manually turn the screws until they begin to tighten
 2. Tightening torque **30 Nm**
- Alternatively, ensure:
1. Pre-tightening torque **10-15 Nm**
 2. Tightening torque **30 Nm**



Fig. 10

- After having completed tightening operations, check that the con-rod head has a side clearance in both directions.

- Insert the new piston guide seal rings as far as possible into the relative seat on the pump casing (Fig. 11), following the procedure described: use the tool code 27904200 composed of a tapered bush and a buffer. Screw the tapered bush into the hole in the piston guide (Fig. 11/a), insert the new seal ring on the buffer as far as it will go (determined by the height of the buffer) into its seat on the pump casing (Fig. 11/b), remove the tapered bush (Fig. 11/c).

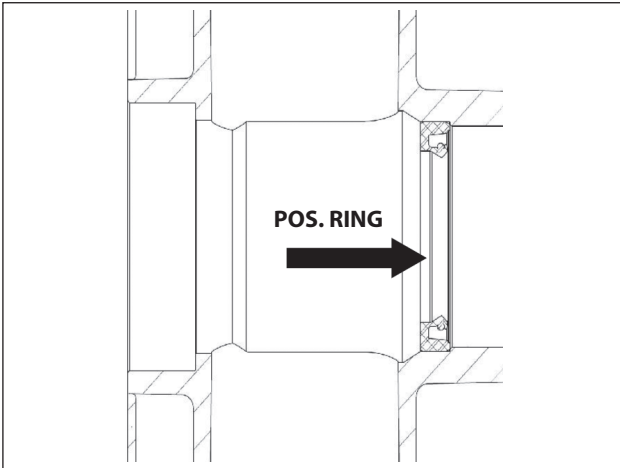


Fig. 11



Fig. 11/b



Fig. 11/a



Fig. 11/c

- Mount the rear cover complete with the O-ring, positioning the dipstick hole upward.
- Insert oil in the casing as indicated in the **use and maintenance manual**.

2.1.3 Reduction classes

TABLE OF REDUCTIONS FOR BEND SHAFTS AND CON-ROD HALF-BEARINGS			
Recovery classes (mm)	Upper Half-Bearing Code	Lower Half-Bearing Code	Grinding on the shaft pin diameter (mm)
0.25	90922100	90922400	Ø39.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	90922200	90922500	Ø39.50 0/-0.02 Ra 0.4 Rt 3.5

2.1.4 Disassembly / Reassembly of bearings and shims

The type of bearings (taper roller) ensures the absence of axial clearance on the bend shaft. The shims are defined to meet this necessity. For disassembly / reassembly and for any replacements, carefully observe the following directions:

A) Disassembly / Reassembly of the bend shaft without replacement of the bearings

After having removed the side covers as indicated in par. 2.1.1, check the conditions of the rollers and their relative tracks. If all parts are in good condition, clean the components carefully with a degreaser and redistribute lubricant oil uniformly.

The previous shims can be reused, taking care to insert them only under the indicator side cover.

Once the complete unit is mounted (Indicator side flange + shaft + motor side flange), check that the rotation torque of the shaft - with the con-rod disconnected - is a minimum 4 Nm and 6 Nm.

To transition the two side covers closer to the casing, it is possible to use 3 M6x40 screws for the first positioning phase, as already indicated above Fig. 8, and the screws provided for final fastening.

Shaft rotation torque (with the con-rod connected) should not exceed 8 Nm.

B) Disassembly / Reassembly of the bend shaft with replacement of the bearings

After removing the side covers, as described above, remove the outer ring nut on the bearings from its seat on the covers, using an appropriate extractor as shown in (Fig. 12 and Fig. 12/a).

Remove the inner ring nut on the bearings from the two ends of the shaft, again using an appropriate extractor or, alternatively, a simple "pin punch" as shown in Fig. 13.



Fig. 12

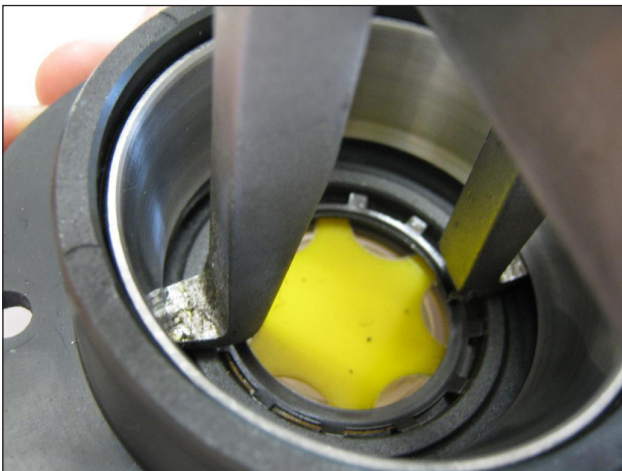


Fig. 12/a



Fig. 13

The new bearings can be mounted cold with a press or rocker, supporting it on the lateral surface of the ring nuts involved in press fitting with the rings. The fitting operation could be facilitated by heating the parts involved at a temperature between 120° - 150°C (250° - 300°F), making sure that the ring nuts are fully fitted in their respective seats.



Never exchange the parts of the two bearings.

Determining the shim pack:

Perform the operation while the piston/con-rod guide units are assembled, the con-rod caps are disconnected and the con-rods are pushed downwards. Insert the pump shaft without tang in the casing, checking that the PTO shank comes out from the provided side.

Fasten the flange on the P.T.O. side to the crankcase, being careful with the lip of the sealing ring, according to the procedure described above and tighten the fixing screws to the prescribed torque.

Then feed the flange on the indicator side without shims in the carter and start to move it closer, manually screwing the M6x40 service screws in equally, with small rotations such as to move the cover in slowly and correctly.

At the same time, check, by rotating it manually, that the shaft turns freely.

Continuing the procedure in this way, a sudden increase in hardness during shaft rotation will soon be experienced.

Then stop the cover movement and completely loosen the fixing screws.

With the aid of a feeler gauge, measure the clearance between the side cover and pump casing (Fig. 14).



Fig. 14

Proceed to determine the shim pack, using the table below:

Detected 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



Fig. 15

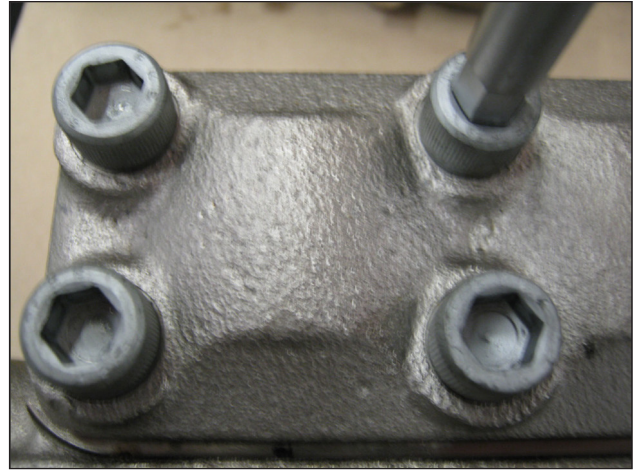


Fig. 16/a

Once the type and number of shims have been determined using the table, check the following: assemble the shim pack on the indicator side cover centering (Fig. 15), secure the cover to the casing, following the procedure in par. 2.1.2, and tighten the screws to their recommended torque.

Check that the shaft rotation stall torque is between 4 Nm and 6 Nm.

If this torque is correct, connect the connecting rods to the crankshaft and continue to the next steps, otherwise redefine the shim pack by repeating the operations.

2.2 REPAIRING HYDRAULIC PARTS

2.2.1 Disassembly of the head-valve units

Operations are limited to inspection or replacement of valves, if necessary and, however, at the intervals indicated in the "PREVENTIVE MAINTENANCE" table in chapter 11 of the *use and maintenance manual*.

The valve units are assembled inside the head.

Operate as follows to extract them:

- Unscrew the 8 M14x40 suction valve cover fixing screws and the 8 M12x35 outlet valve cover fixing screws (Fig. 16 and Fig. 16/a); using the extractor hammer code 26019400 combined with tool 27726200 extract:
- The KTXR24 - KTXR28 pump suction and outlet valve plugs (Fig. 17);
- Extract the KTXR24 - KTXR28 pump suction and outlet valve units using a simple tool as indicated in (Fig. 18);

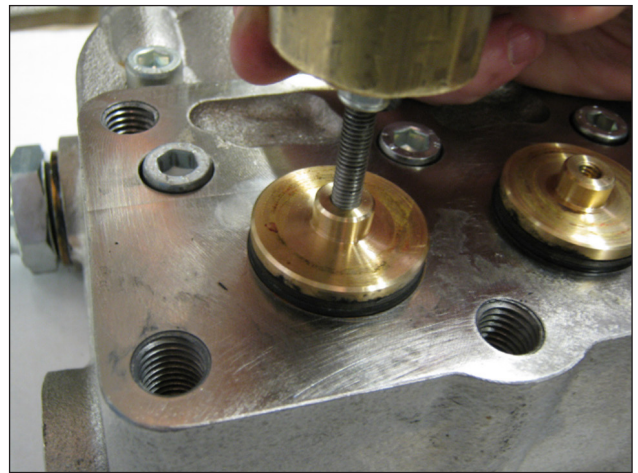


Fig. 17

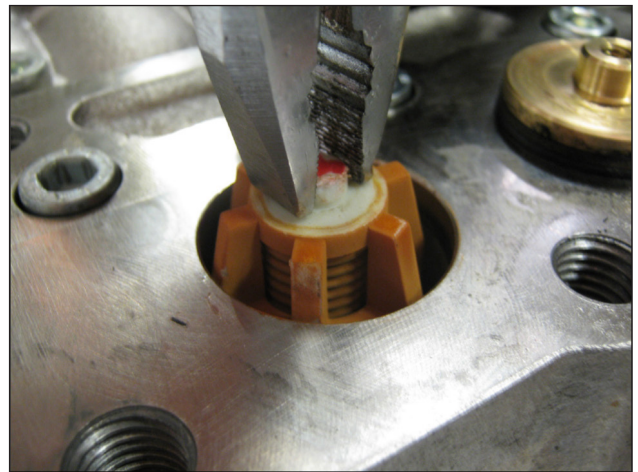


Fig. 18



Fig. 16

The suction and outlet valve units dismantling can be carried out by levering with simple tools (Fig. 19).



Fig. 19



If the suction and outlet valve seats remain stuck on the head (for example scaling due to a prolonged pump inactivity), operate as follows:

Suction and outlet valves

KTXR24 - KTXR28 versions use tools code 26019400, code 27513700 (Fig. 20);

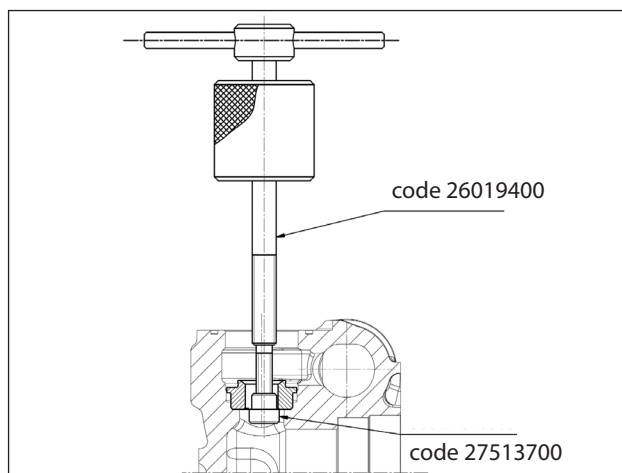


Fig. 20

2.2.2 Reassembly of the head – valve units



Pay particular attention to the conditions of the various components and replace if necessary, and at the intervals indicated in the "PREVENTIVE MAINTENANCE" table in chapter 11 of the **use and maintenance manual**.

At every valve inspection, replace all O-rings and all anti-extrusion rings both in the valve units and on the valve plugs.



Before repositioning the valve units, thoroughly clean and dry the relative seats in the head as shown in (Fig. 21).

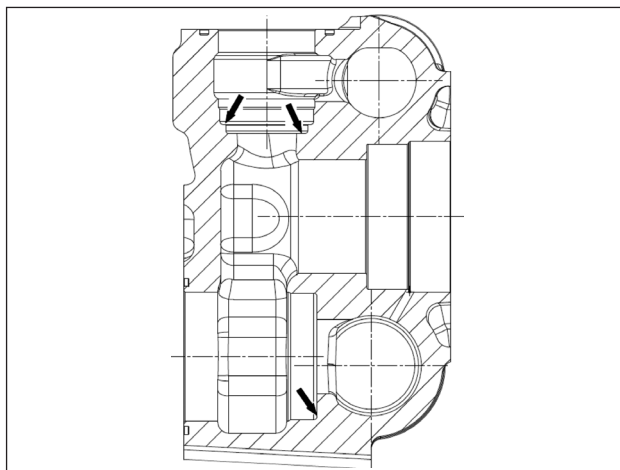


Fig. 21

To reassemble the various components, perform the operations listed above in reverse order to par. 2.2.1. Reassemble the valve unit (Fig. 22) to facilitate insertion of the valve guide in the seat, use a hammer, acting on the whole circumference (Fig. 23).



Fig. 22



Fig. 23



Insert the suction and outlet valve units, checking that they are fully inserted in the head seat.

Then apply the valve covers and calibrate the respective M14x40 screws (suction valve cover) and M12x35 (outlet valve cover) screws, for the values of the torques and tightening sequences follow the instructions in chapter 3.

2.2.3 Disassembly of the head – seals

Replacement of the seals is necessary from the moment you begin to detect water leaks from the drainage holes provided on the back of the pump casing, and at the intervals indicated in the "PREVENTIVE MAINTENANCE" table in chapter 11 of the *use and maintenance manual*.

A) Unscrew the M10x110 head fixing screws as indicated in (Fig. 24).



Fig. 24

B) Separate the head from the pump casing.

C) Separate the seal support from the liner, remove the spring (pos. ①, Fig. 25), the spring ring and scraper ring (pos. ①②, Fig. 25/a) to access the pressure seals (pos. ①, Fig. 26).



Fig. 25



Fig. 25/a

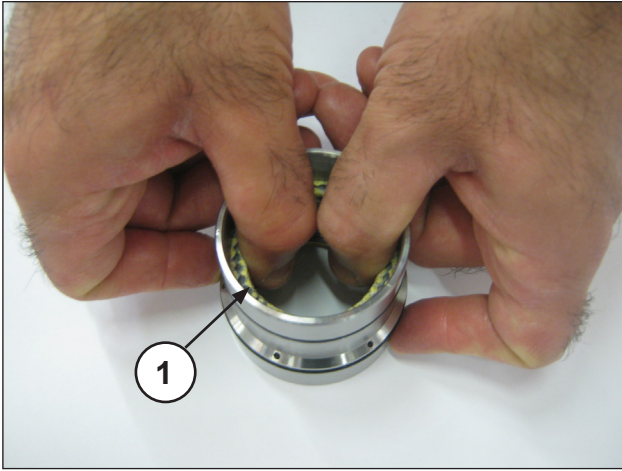


Fig. 26

To remove the low pressure seal, remove the seeger ring (pos. ①, Fig. 27) and the seal ring (pos. ①, Fig. 28).

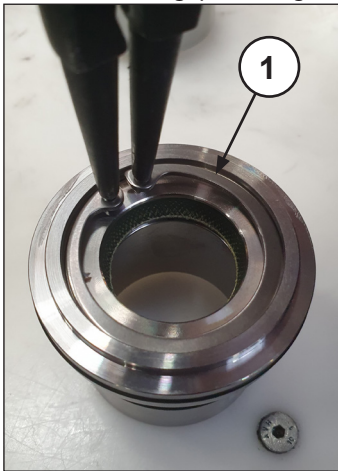


Fig. 27



Fig. 28

2.2.4 Assembly of the support - seal unit

Proceed with reassembly following the reverse order indicated in par. 2.2.3.



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.

Install the O-rings on the packings support (pos. ①, Fig. 29 and pos. ①, Fig. 29/a).

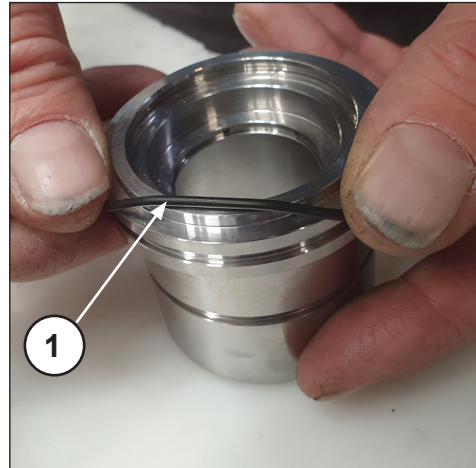


Fig. 29



Fig. 29/a

Insert the bush onto the packings support and then insert the seal into the bush (pos. ① ②, Fig. 30) paying attention to the mounting direction which requires that the sealing lip be set forward (towards the head). Push the seal into place with appropriate pad (pos. ①, Fig. 30/a) and check that the assembly has been done correctly (pos. ①, Fig. 30/b).

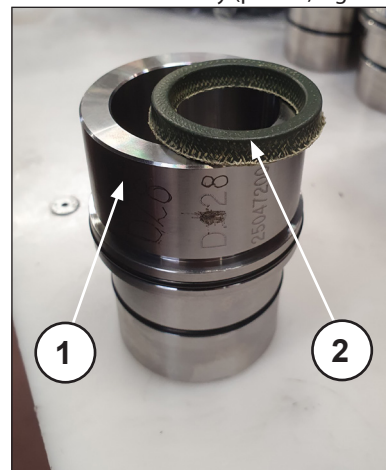


Fig. 30

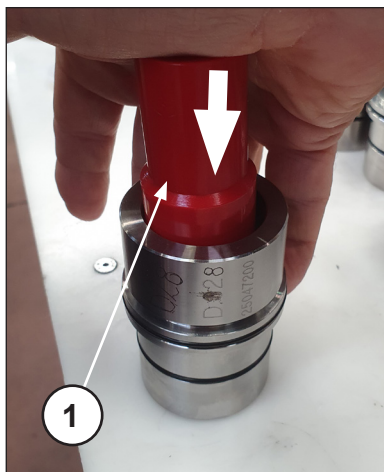


Fig. 30/a

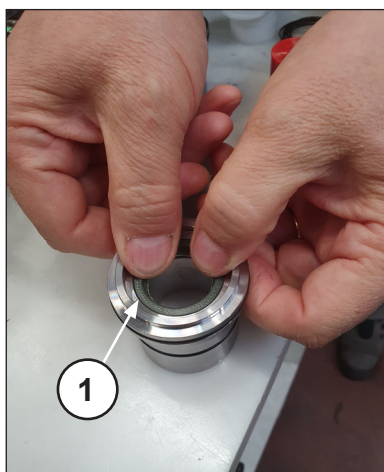


Fig. 30/b

Next, insert the seal retaining ring (pos. ①, Fig. 31) and seeger ring (pos. ①, Fig. 32).



Fig. 31

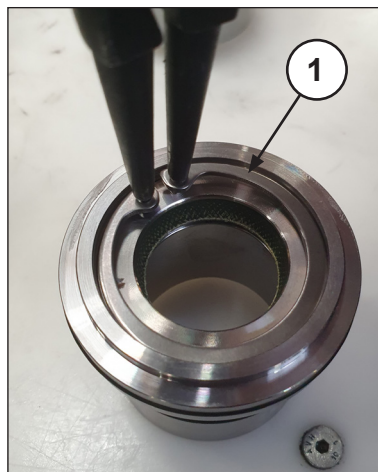


Fig. 32

Install the back-up ring (pos. ①, Fig. 33), the three packings, making sure the notches are at 120° from each other (pos. ①, Fig. 34), the packing scraper ring and the spring ring (pos. ①②, Fig. 35).



Fig. 33

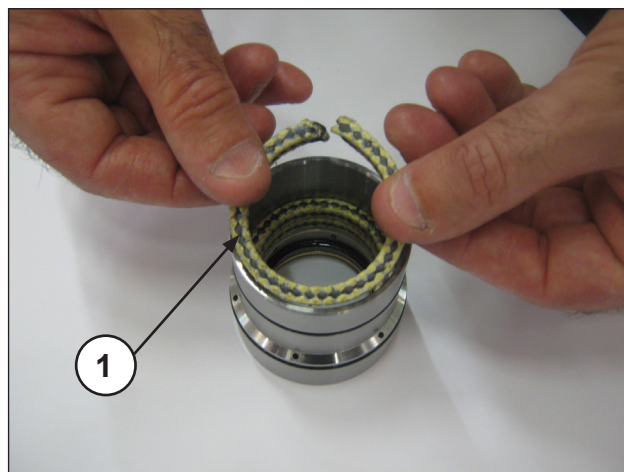


Fig. 34



Fig. 35

2.2.5 Disassembly of the piston unit

The piston unit does not require any routine maintenance. Maintenance is limited to visual checks only. To extract piston units: Loosen the M 7x1 piston fixing screws as indicated in (Fig. 36)



Fig. 36

Check and verify their conditions, replace if necessary.



At every disassembly, all O-rings on the piston unit must be replaced.

2.2.6 Reassembly of the head – seals – piston unit

To reassemble the various components, perform the operations listed above in reverse order to par. 2.2.3, taking particular care with the following:

- A) Seals pack: respect the same order used during disassembly operations.
- B) Lubricate the components ②③⑤ with OCILIS silicone grease code 12001600. This operation is deemed necessary to facilitate the lip seal adjustment on the piston.
- C) Reassemble the pistons, tightening the screws with a torque wrench, respecting the tightening torque value as indicated in chapter 3.
- D) Reassemble the head as follows:
 1. Using two screws – service pins (code 27726000), fasten the casing as indicated in (Fig. 37). Position the complete head, making sure that it is centred only on the central piston.
 2. Complete operations, following the tightening procedure. For the values of the torques and tightening sequences follow the instructions in chapter 3.



Fig. 37

3 SCREW TIGHTENING CALIBRATION

Screw tightening must only be performed with a torque wrench.

Description	Exploded view position	Tightening torque Nm
Cover fixing screws	20	10
Oil discharge plug	12	40
Piston fixing screws	66	20
Con-rod cap fixing screws	31	30*
Screws fixing cover of Suction valve	62	120***
Screws fixing cover of Outlet valve	64	180***
Head fixing screws	63	40**
"A" type flange fixing screws	71	30
SAE C drawbar coupling fixing screws	74	30
2nd PTO flange fixing screws	62	145****

* The con-rod cap fixing screws must be tightened simultaneously, respecting the phases indicated on page 18.

** The head fixing screws exploded view pos. 63 must be tightened with a torque wrench respecting the order shown in the diagram in Fig. 38.

*** The valve cover fixing screws exploded view pos. 62 and pos. 64 must be tightened with a torque wrench respecting the order shown in the diagram in Fig. 38.

**** To secure the 2nd PTO flange, use Loctite 243 Blue Code 12006400.

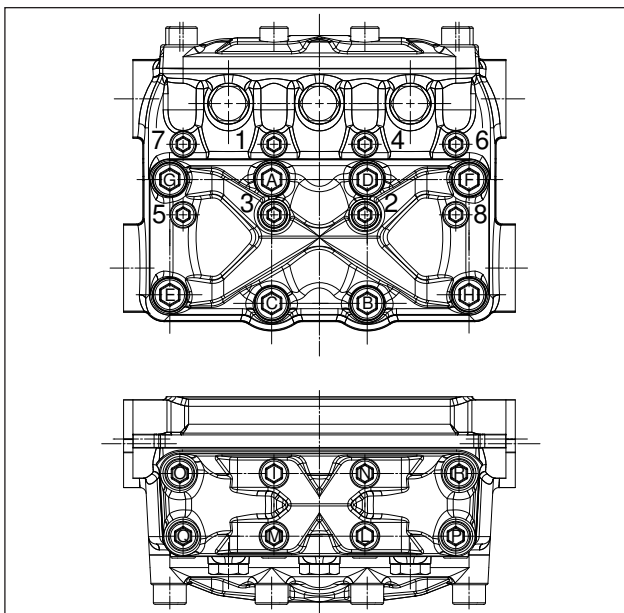


Fig. 38

4 REPAIR TOOLS

Pump repairs can be facilitated by special tools coded as follows:

For assembly steps:

Pump shaft oil seal	code 27904500
Piston guide oil seal	code 27904200
Head	code 27726000
LP seals $\varnothing 24$	code 26134600 code 25114300
LP seals $\varnothing 28$	code 26134600 code 25047200

For disassembly steps:

Suction/outlet valves KTXR24 - KTXR28 versions	code 26019400 code 27513700
Outlet valves	code 26019400
Valve plugs	code 26019400
Piston guide oil seal	code 26019400 code 27503800



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