SS70- SN70 - SW70

INTERPUMP GROUP

Use and Maintenance Manual
Repair Manual

Contents

1 INTRODUCTION

This manual describes the instructions for use and maintenance of the SS70, SN70 and SW70 pumps. It should be carefully read and understood before using 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.
Upon receipt, check that the pump is intact and complete. Report any faults before installing and starting the pump.

2 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
Danger of electrocution.

Danger Sign
Wear a protective mask.

Danger Sign
Wear protective goggles.

Danger Sign
Put on protective gloves before each operation.

Danger Sign
Wear appropriate footwear

3 SAFETY

3.1 General safety warnings

Improper use of pumps and high pressure systems as well as non-compliance with installation and maintenance standards can cause serious damage to people and/or property. Anyone assembling or using high pressure systems must possess the necessary competence to do so, knowing the characteristics of the components to be assembled/used and taking all the necessary precautions to ensure maximum safety in all conditions of use.
In the interest of safety, both for the Installer and the Operator, no reasonably applicable precaution should be omitted.

3.2 Essential safety in the high pressure system

1. The pressure line must always be provided with a safety valve.
2. High pressure system components, particularly for systems that operate primarily outside, must be adequately protected from rain, frost and heat.
3. The electrical control system must be adequately protected against sprays of water and must meet specific regulations in force.
4. The high pressure pipes must be properly sized for maximum operating pressure of the system and always and only used within the operating pressure range specified by the Manufacturer of the pipe itself. The same rules should be observed for all other auxiliary systems affected by high pressure.
5. The ends of high pressure pipes must be sheathed and secured in a solid structure, to prevent dangerous whiplash in case of bursting or broken connections.
6. Appropriate protective casing must be provided in pump transmission systems (couplings, pulleys and belts, auxiliary power outlets).

3.3 Safety during work

The room or area within which the high pressure system operates must be clearly marked and prohibited to unauthorized personnel and, wherever possible, segregated or fenced to ensure restricted access. Personnel authorized to access this area should first be instructed how to operate within this area and informed of the risks arising from high pressure system defects or malfunctions.
Before starting the system, the Operator is required to verify that:

1. The high pressure system is properly powered, see chapter 9 par. 9.5.
2. The pump suction filters are perfectly clean; it is appropriate to include a device indicating the clogging level on all devices.
3. Electrical parts are adequately protected and in perfect condition.
4. The high pressure pipes do not show signs of abrasion and the fittings are in perfect order.
5. In relation to the application, use and environmental conditions, during the operation the outer surfaces of the pump may reach high temperatures. Therefore we recommend to take precautions to avoid contact with hot parts.

Any fault or reasonable doubt that may arise before or during operation should be promptly reported and verified by qualified personnel. In these cases, pressure should be immediately cleared and the high pressure system stopped.

3.4 Rules of conduct for the use of lances

1. The operator must always place his safety and security first, as well as that of others that may be directly affected by his/her actions, or any other assessments or interests. The operator's work must be dictated by common sense and responsibility.
2. The operator must always wear a helmet with a protective visor, waterproof gear and wear boots that are appropriate for use and can ensure a good grip on wet floors.

Note: *appropriate clothing will protect against sprays of water but not from direct impact with jets of water or very close sprays. Additional protections may therefore be necessary in certain circumstances.*

3. It is good practice to organize personnel into teams of at least two people capable of giving mutual and immediate assistance in case of necessity and of taking turns during long and demanding operations.

4. The work area jet range must be absolutely prohibited to and free from objects that, inadvertently under a pressure jet, can be damaged and/or create dangerous situations.
5. The water jet must always and only be pointed in the direction of the work area, including during preliminary tests or checks.
6. The operator must always pay attention to the trajectory of debris removed by the water jet. Where necessary, suitable guards must be provided by the Operator to protect anything that could become accidentally exposed.
7. The operator should not be distracted for any reason during work. Workers needing to access the operating area must wait for the Operator to stop work on his/her own initiative, after which they should immediately make their presence known.
8. It is important for safety that all team members are always fully aware of each other's intentions in order to avoid dangerous misunderstandings.
9. The high pressure system must not be started up and run under pressure without all team members in position and without the Operator having already directed his/her lance toward the work area.

3.5 Safety during system maintenance

1. High pressure system maintenance must be carried out in the time intervals set by the manufacturer who is responsible for the whole group according to law.
2. Maintenance should always be performed by trained and authorized personnel.
3. Assembly and disassembly of the pump and the various components must only be carried out by authorized personnel, using appropriate equipment in order to prevent damage to components, in particular to connections.
4. Always only use original spare parts to ensure total reliability and safety.

4 PUMP IDENTIFICATION

Each pump has an identification label see pos. ① of Fig. 1 showing:

- Pump model and version
- Serial number
- Max revs
- Absorbed power HP - kW
- Flow rate l/min - Rpm

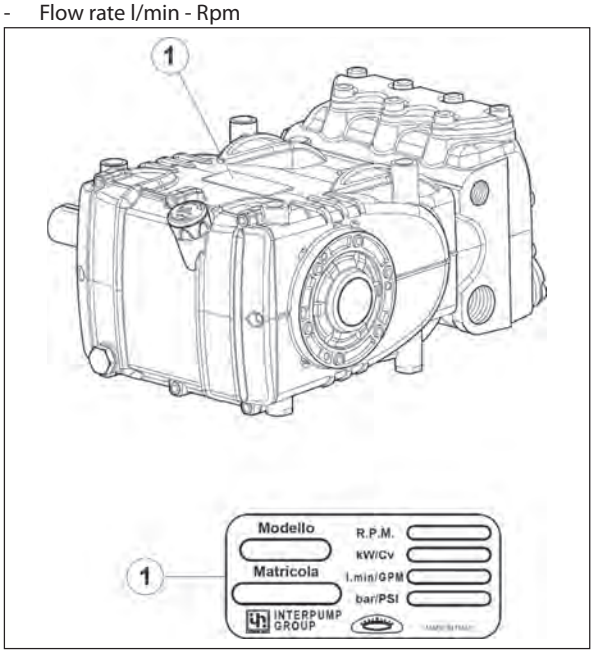


Fig. 1

Model, version and serial number must always be indicated when ordering spare parts.

5 TECHNICAL CHARACTERISTICS

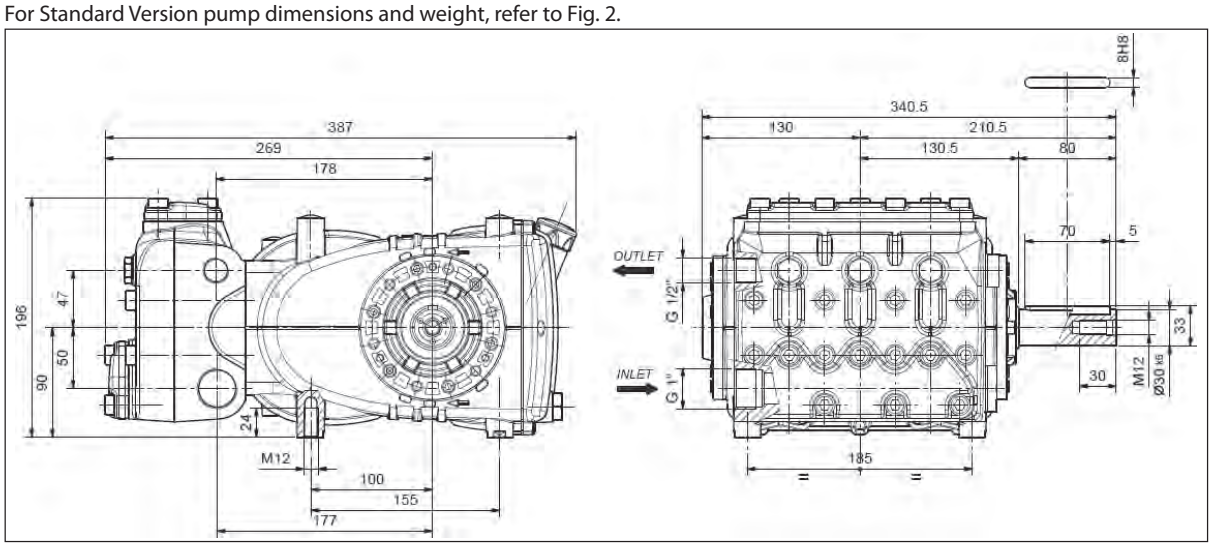
Model	Rpm	Flow rate		Pressure		Power	
		l/min	Gpm	bar	psi	kW	HP
SS 7030	1450	30	7.9	200	2900	11.7	16
SS 7037	1450	37	9.7	200	2900	13.9	19
SS 7045	1450	45	11.9	200	2900	17.6	24
SS 7061H	1450	61	16.1	150	2175	17.6	24
SS 7070H	1450	70	18.5	130	1885	17.6	24
SS7091H	1450	100	26.4	100	1450	19.1	26

Model	Rpm	Flow rate		Pressure		Power	
		l/min	Gpm	bar	psi	kW	HP
SN 7030	1450	30	7.9	300	4350	18.4	25
SN 7037	1450	37	9.8	250	3620	18.4	25
SN 7045	1450	45	11.9	210	3050	18.4	25
SN 7061	1450	61	16.1	150	2170	18.4	25
SN 7070 / SN 7070-F	1450	70	18.5	130	1885	18.4	25
SN7091	1450	100	26.4	100	1450	18.4	25

Model	Rpm	Flow rate		Pressure		Power	
		l/min	Gpm	bar	psi	kW	HP
SW 7091H	1450	100	26.4	100	1450	19.1	26

6 DIMENSIONS AND WEIGHT

For Standard Version pump dimensions and weight, refer to Fig. 2.



Dry weight 43 kg.

Fig. 2

7 OPERATING INSTRUCTIONS

SS70 pumps have been designed to operate with filtered water (see par. 9.7) and at a maximum temperature of 85 °C, with the head and all the components in contact with the fluid made of AISI 316L plus special high and low pressure energized seals.
SN70 pumps have been designed to operate with filtered water (see par. 9.7) and at a maximum temperature of 85 °C, with the head made of AISI 420 and all the components in contact with the fluid made of AISI 316L plus special high and low pressure energized seals.
SW70 pumps have been designed to operate with filtered sea water (see par. 9.7) and at a maximum temperature of 85 °C, with the head and all the components in contact with the fluid made of AISI 316L plus special high and low pressure energized seals.
Other liquids can be used only upon approval by the ***Technical*** or ***Customer Service Departments***.

7.1 Water temperature

The permissible water temperature is 40 °C.
However, the pump can be used with water up to a temperature of 85 °C.
In this case, it is best to consult the ***Technical*** or ***Customer Service Department***.

7.2 Maximum pressure and flow rate

The rated specifications stated in our catalog are the max. that can be obtained by the pump. **Independently** of the power used, the maximum pressure and rpm indicated in the specification label can never be exceeded unless upon prior authorisation by our ***Technical*** or ***Customer Service Departments***.

7.3 Minimum operating speed

The minimum rotating speed of the pump is 200 rpm, any lower minimum speed must be expressly authorized by our ***Technical*** or ***Customer Service Departments***.

7.4 Sound emission

The sound pressure detection test was performed according to Directive 2000/14 of the European Parliament and Council (Machinery Directive) and EN-ISO 3744-2010 with class 1 instrumentation.
A final detection of sound pressure must be performed on the complete machine/system.
Should the operator be located at a distance of less than 1 meter, he will have to use appropriate hearing protection according to current regulations.

7.5 Vibration

The detection of this value shall be carried out only with the pump set up on the plant and at the performance declared by the customer. Values must be in accordance with regulations.

7.6 Brands and types of oils recommended

The pump is supplied with oil suitable for room temperatures from 0 °C to 30 °C.
Some types of recommended oil are indicated in the table below, these oils have additives to increase corrosion resistance and fatigue resistance (DIN 51517 part 2).
Alternatively you can also use Automotive Gear SAE 85W-90 oil for gearing lubrication.

Manufacturer	Lubricant
Agip	AGIP ACER220
ARAL	Aral Degol BG 220
BP	BP Energol HLP 220
Castrol	CASTROL HYSPIN VG 220 CASTROL MAGNA 220
DEA	Falcon CL220
elf	ELF POLYTELIS 220 REDUCTELF SP 220
Esso	NUTO 220 TERESSO 220
FINA	FINA CIRKAN 220

Manufacturer	Lubricant
FUCHS	RENOLIN 212 RENOLIN DTA 220
Mobil	Mobil DTE Oil BB
Shell	Shell Tellus Öl C 220
SRS	Wintershall Ersolon 220 Wintershall Wiolan CN 220
TEXACO	RANDO HD 220
TOTAL	TOTAL Cortis 220

Check the oil level and top up if necessary using the oil dipstick pos. ①, Fig. 3.

The correct checking of the oil level is made with the pump not running, at room temperature. The oil change must be made with the pump at working temperature, removing: the oil dipstick, pos. ①, and then the plug pos. ②, Fig. 3.
The oil check and change must be carried out as indicated in the table in Fig. 14 chapter 11.
The quantity required is ~ 2 liters.

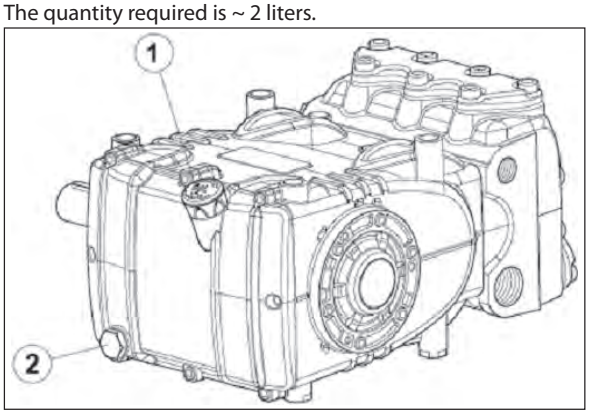
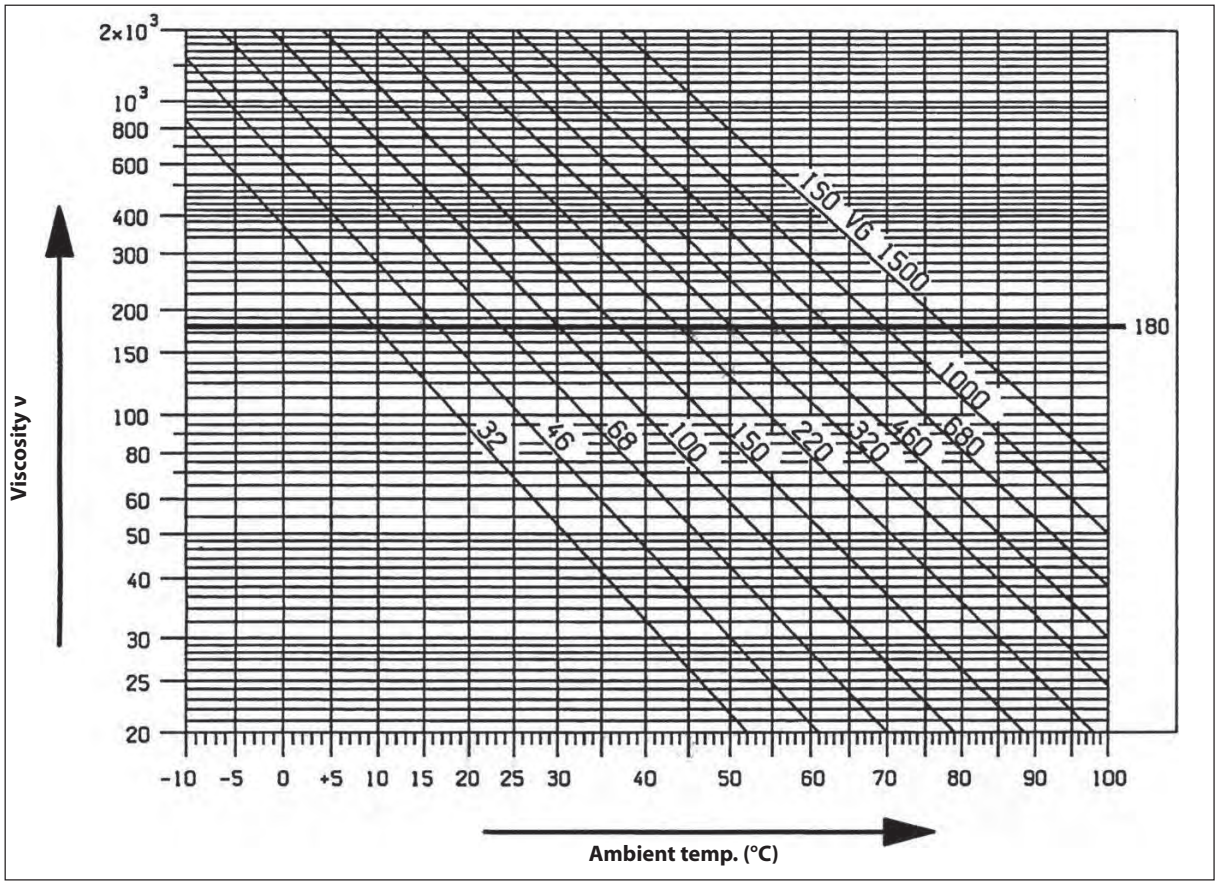


Fig. 3

In any case the oil must be changed at least once a year, as it is degraded by oxidation.

For a room temperature other than between 0 °C - 30 °C, follow the instructions in the following diagram, considering that oil must have a minimum viscosity of 180 cSt.

Viscosity / Room Temperature diagram
mm^2/s = cSt



The used oil must be poured unto a suitable container and consigned to an authorized recycling center. Do not release used oil into the environment under any circumstances.

8 PORTS AND CONNECTIONS

The SS70, SN70 and SW70 series pumps (see Fig. 4) are equipped with:

① 2 "IN" inlet ports 1" Gas.
Line connection to any of the two ports is indifferent for proper pump functioning. The unused ports must be hermetically closed.

② 2 "OUT" outlet ports 1/2" Gas.

③ 3 service ports 1/4" Gas; usually used for the pressure gauge.

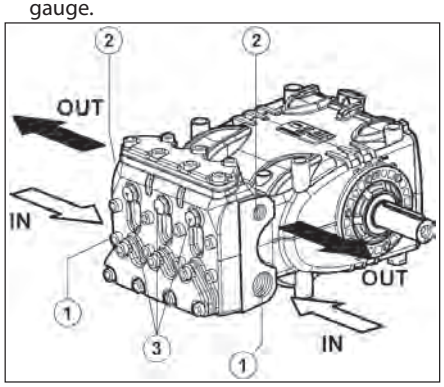


Fig. 4

9 PUMP INSTALLATION

9.1 Installation

The pump must be fixed horizontally using the M12 threaded support feet. Tighten the screws with a torque of 80 Nm.
The base must be perfectly flat and rigid enough as not to allow bending or misalignment on the pump coupling axis/transmission due to torque transmitted during operation.
The unit cannot be fixed rigidly to the floor but must interposed with vibration dampers.
For special applications contact the ***Technical*** or ***Customer Service Departments***.

Replace the oil filling hole closing service plug (red) positioned on the rear casing cover. Check the correct quantity with the oil dipstick.
The oil dipstick must always be reachable, even when the unit is assembled.

The pump shaft (PTO) must not be rigidly connected to the drive unit.
The following types of transmission are recommended:

- Hydraulics by flange, for proper application consult with our ***Technical*** or ***Customer Service Departments***.
- V-belts.
- Universal joint (comply with the maximum working angles recommended by the manufacturer).
- Flexible coupling.

9.2 Rotation direction

The rotation direction is indicated by an arrow located on the casing near the drive shaft.
From a position facing the pump head, the rotation direction will be as in Fig. 5.

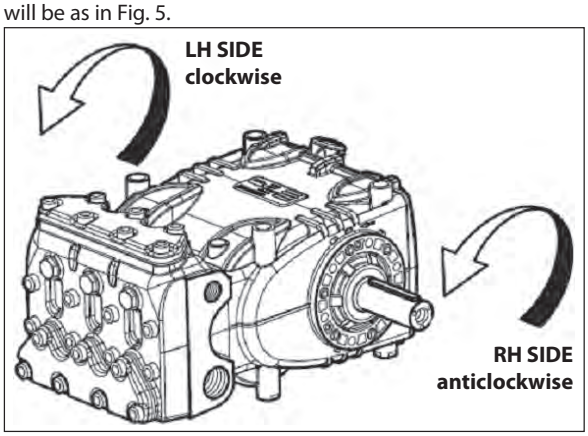


Fig. 5

9.3 Version change

The pump version is defined as right when:
Observing the pump facing the head side, the pump shaft must have a PTO shank on the right side.
The pump version is defined as left when:
Observing the pump facing the head side, the pump shaft must have a PTO shank on the left side.
Note. The version shown in Fig. 5 is right.

The version can only be modified by trained and authorized personnel and carefully following the instructions below:

1. Separate the hydraulic part from the mechanical part as indicated in chapter 2 par. 2.2.3 of the ***Repair manual***.
2. Turn the mechanical part 180° and reposition the rear casing cover in such a way that the oil dipstick is turned upward. Reposition the lifting bracket and relative hole closing plugs in the upper part of the casing. Finally, properly reposition the specification label in its housing on the casing.

Make sure that the lower casing draining holes in correspondence with the pistons are open and not closed from the plastic plugs provided for the previous version.

3. Unite the hydraulic part to the mechanical part as indicated in chapter 2 par. 2.2.5 of the ***Repair manual***.

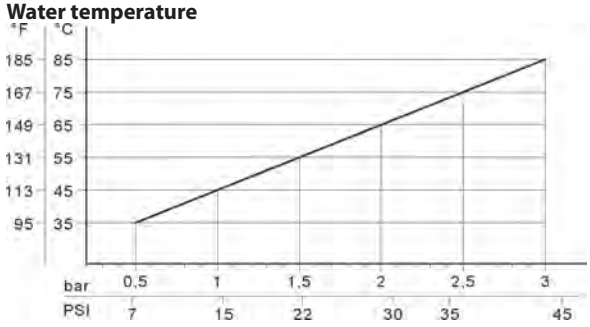
9.4 Hydraulic connections

In order to isolate the system from vibrations produced by the pump, it is advisable to make the first section of the duct adjacent to the pump (both suction and outlet) with flexible piping. The suction hose must be sufficiently rigid to prevent deformation due to the negative pressure exerted by the action of the pump.

9.5 Pump supply

A positive head of at least 0.20 metres is required for the best volumetric efficiency with the fluid at ambient temperature (see par. 9.6).
While with the fluid at high temperature max. 85 °C, observe the diagram below that defines the minimum supply pressures according to the different temperatures.

Water temperature



Head

For negative prevalence contact our *Technical* or *Customer Service Departments*.

9.6 Suction line

For smooth operation of the pump, the suction line must have the following characteristics:

1. Minimum internal diameter as indicated in the graph in par. 9.9 and in any case equal to or exceeding that of the pump head.

Localized restrictions should be avoided along the piping, as these can cause pressure drops resulting in cavitation. Avoid 90° elbows, connections with other piping, restrictions, reverse gradients, inverted U-curves and Tee connections.

2. The layout must be made so as to ensure a minimum positive head under all operating conditions of 0.20 m (0.02 bar) and a maximum one of 80 m (8 bar) measured on the pump supply; this minimum value applies for cold water with temperature up to 20 °C, for higher temperatures refer to the specific graph (par. 9.5). The pumps can also operate with a lower supply pressure, under certain operating conditions expressly authorized by our ***Technical*** or ***Customer Service Departments***.
3. Completely airtight and constructed to ensure a perfectly hermetic seal through time.
4. Prevent the pump from emptying when it is stopped, including partial emptying.
5. Do not use 3 or 4-way hydraulic fittings, adapters, swivel joints, etc. as they could jeopardize pump performance.
6. Do not install Venturi tubes or injectors for detergent suction.
7. Avoid use of foot valves or other types of unidirectional valves.
8. Do not recirculate the by-pass valve drain directly to the suction line.
9. Provide for proper guards inside the tank to prevent that water flow from the bypass and the tank supply line can create vortexes or turbulence near the pump supply pipe port.
10. Make sure the suction line is thoroughly clean inside before connecting it to the pump.

9.7 Filtration

1 filter must be installed on the pump suction line, positioned as indicated in Fig. 6 and Fig. 6/a.

With a manually activated control valve

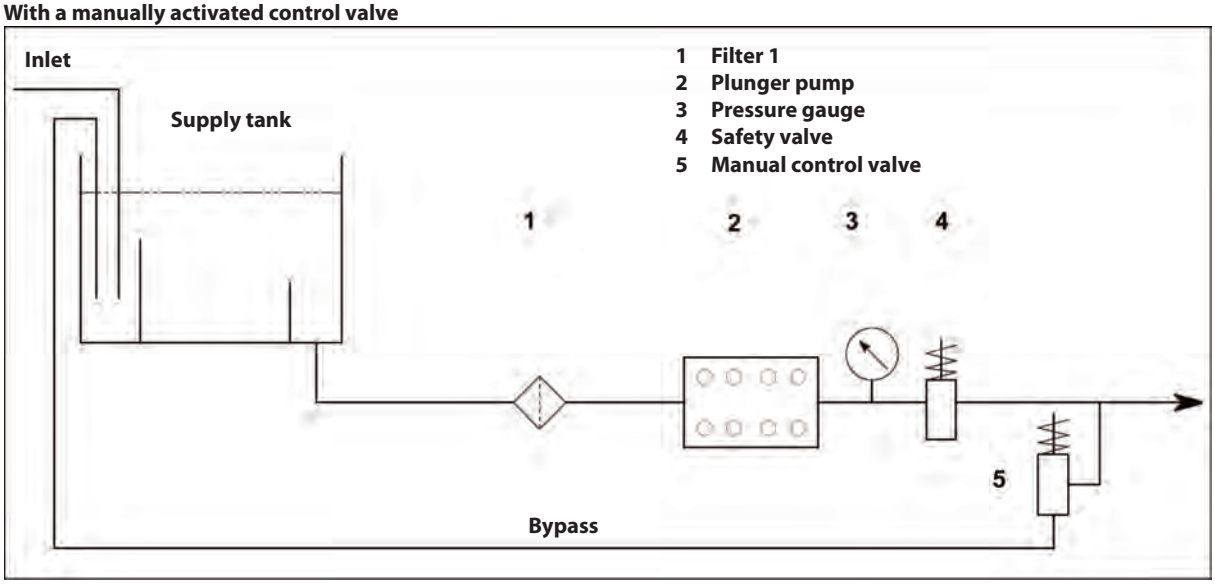


Fig. 6

With pneumatic control valve

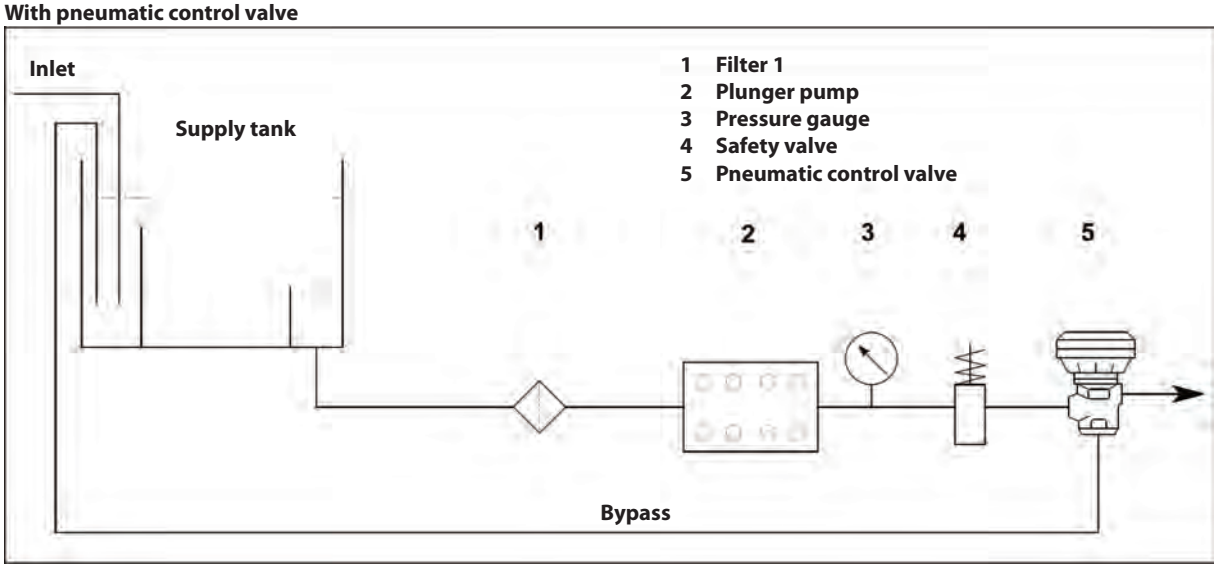


Fig. 6/a

The filter, which is to be installed as close to the pump as possible, must be easily inspectable and have the following specifications:

1. Minimum flow rate at least 3 times the nominal flow rate of the pump.
2. Inlet/outlet port diameters no smaller than the inlet port diameter of the pump.
3. Filtration grade between 200 and 360 µm.

For smooth pump operation, regular filter cleaning is necessary, planned according to the actual use of the pump in relation to the quality of water used and actual clogging conditions.

9.8 Outlet line

For correct design of the outlet line comply with the following installation prescriptions:

1. The internal diameter of the pipe must be sufficient to ensure correct fluid velocity, see graph in par. 9.9.
2. The first section of the line connected to the pump outlet must be a flexible hose, in order to isolate vibration produced by the pump from the rest of the system.
3. Use high pressure pipes and fittings to ensure high safety margins in all operating conditions.
4. The outlet line must always be provided with a Max. pressure valve.
5. Use pressure gauges capable of withstanding the pulsating loads typical of plunger pumps.
6. During the design stage, keep in mind the line pressure drops that lead to a pressure reduction at the user with respect to the pressure measured on the pump.
7. For those applications where pulses produced by the pump on the outlet line may prove harmful or unwanted, install a pulsation dampener of sufficient size.

9.9 Calculation of the internal diameter of the duct pipes

To determine the internal diameter of the duct, refer to the following diagram:

Suction duct

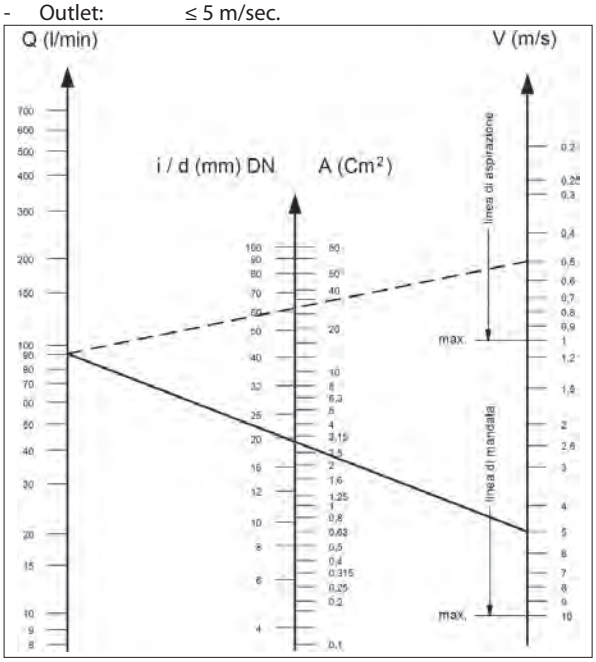
With a flow rate of ~ 91 l/min and a water velocity of 0.5 m/sec. The graph line joining the two scales meets the central scale showing the diameters, corresponding to a value of ~ 62 mm.

Outlet duct

With a flow rate of ~ 91 l/min and a water velocity of 5 m/sec. The graph line joining the two scales meets the central scale showing the diameters, corresponding to a value of ~ 19.5 m.

Optimal speeds:

- Suction: ≤ 0.5 m/sec.
- Outlet: ≤ 5 m/sec.



The graph does not take into account pipe resistance, valves, load loss produced by the length of the ducts, the viscosity of the liquid pumped or the temperature itself.
If necessary, contact our ***Technical*** or ***Customer Service Departments***.

9.10 V-belt transmission

The pump can be controlled by a V-belt system.
For this pump model, we recommend use of 2 XPB belts (16.5x13 serrated). Use an XPC profile only for long durations.
Both the characteristics and transmissible power of each belt can be verified in the diagram in Fig. 7, in relation to the number of rpm normally declared by the manufacturer.

Minimum duct pulley diameter (on pump shaft): ≥ 160 mm. The radial load on the shaft must not exceed 3000 N (value necessary for Layout definition). The transmission is considered adequate if the load is applied to a maximum distance a=30 mm from the shaft shoulder (P.T.O) as shown in Fig. 10.

For dimensions differing from those specified above, contact our ***Technical*** or ***Customer Service Departments***.

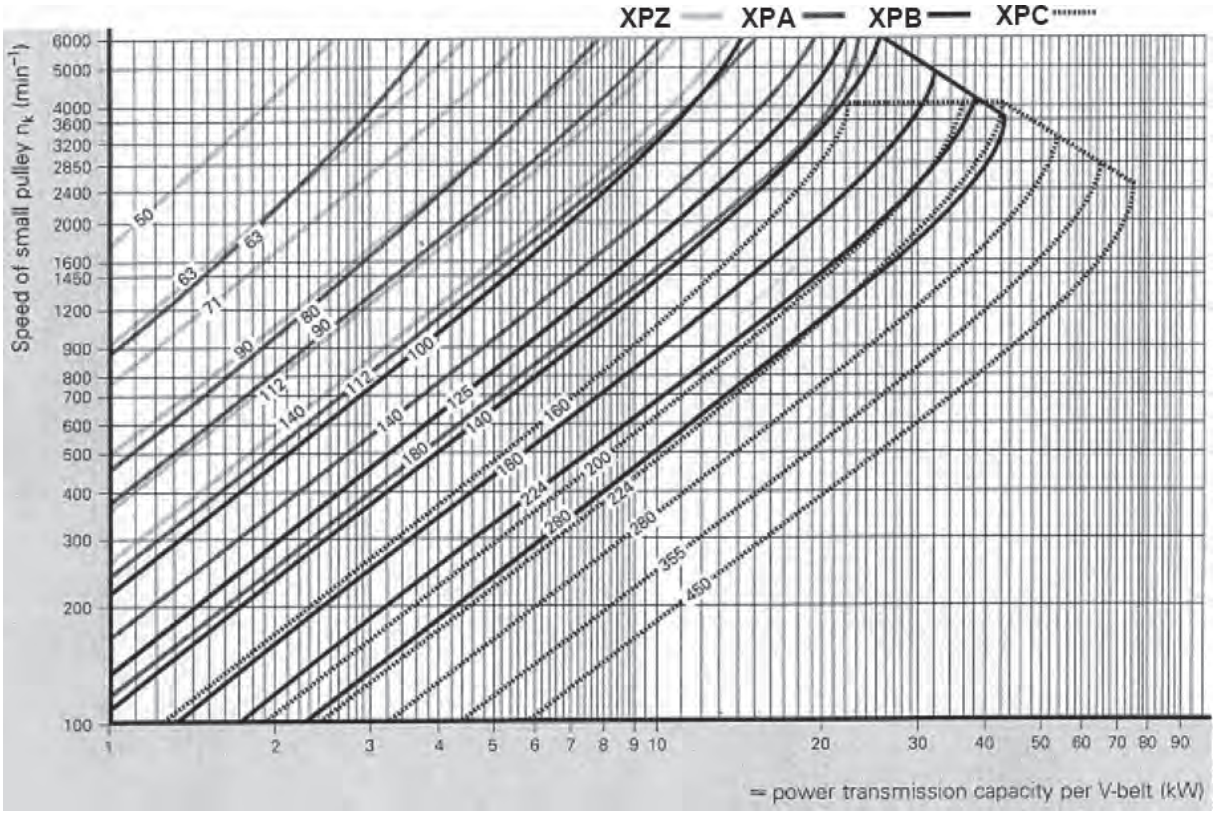


Fig. 7

9.11 Transmission definition

To prevent irregular radial loads on the shaft and the relative bearing, follow these directions:

a) Use pulleys with V-belts with the size of the groove required/recommended by the manufacturer of belt used. In the absence of directions, follow Fig. 8 and the table in Fig. 9.

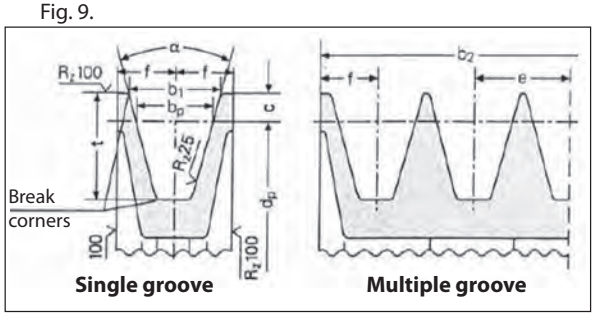


Fig. 8

Dimensions (in mm)

Belt section as per DIN 7753 part 1 and B.S. 3790		DIN symbol symbol B.S./ISO		XPB/SPB SPB	XPC/SPC SPC
Belt section as per DIN 2215 and B.S. 3790		DIN symbol symbol B.S./ISO		17 B	22 C
Pitch width			b_w	14.0	19.0
Increased grooving width $b_1 \approx$		α = 34°		18.9	26.3
		α = 38°		19.5	27.3
			c	8.0	12.0
Distance between grooving			and	23 ± 0.4	31 ± 0.5
			f	14.5 ± 0.8	20.0 ± 1.0
Increased grooving depth			t_{min}	22.5	31.5
α	34°	by primitive diameter	d_w	from 140 to 190	from 224 to 315
	38°	narrow-section V-belts DIN 7753 part 1		> 190	> 315
α	34°	by primitive diameter	d_w	from 112 to 190	from 180 to 315
	38°	classic section V-belts DIN 2215		> 190	> 315
Tolerance for α = 34°-38°				± 1°	± 30'
Pulleys for b2 by grooving number z b2 = (z-1) e + 2 f			1	29	40
			2	52	71
			3	75	102
			4	98	133
			5	121	164
			6	144	195
			7	167	226
			8	190	257
			9	213	288
			10	236	319
			11	259	350
			12	282	381
Minimum pulley diameter must be respected. Do not use laminated V-belts.					Fig. 9

b) Use high performance belts – for example **XPB** instead of **SPB** – as a lower quantity of belts for the same transmitted power may be necessary and a consequent shorter resulting distance compared to the shaft shoulder (P.T.O) "a" of Fig. 10.

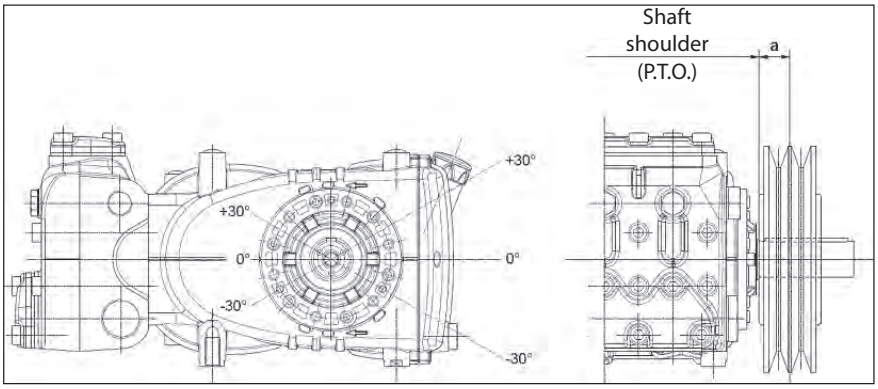


Fig. 10

c) Pull the belts according to manufacturer instructions. Excessive pulling can cause reduced bearing life and wear out the pulley prematurely. Pulling depends on different variables as indicated in par. 9.12.

d) Belt length has a natural tolerance ≥ ± 0.75%. For this reason, the 2 belts must be purchased as a pair.

e) Follow the direction of the belt pull as shown in Fig. 9 for other needs, contact our ***Technical*** or ***Customer Service Departments***.

f) Take care of the alignment of the driving pulley and driven pulley grooves.

9.12 Definition of static pull to apply on belts

Static pull depends on:

a) The wheelbase between the two pulleys (belt length).
b) The load due to static pull of the belt.
c) The number of belts.
d) The winding angle of the smallest pulley.
e) Average speed.
f) Etc.

The diagram in Fig. 11 for belts with an XPB profile in relation to the wheelbase indicates the correct tensioning Tc (belt sag with a dynamometer load of 71 N).

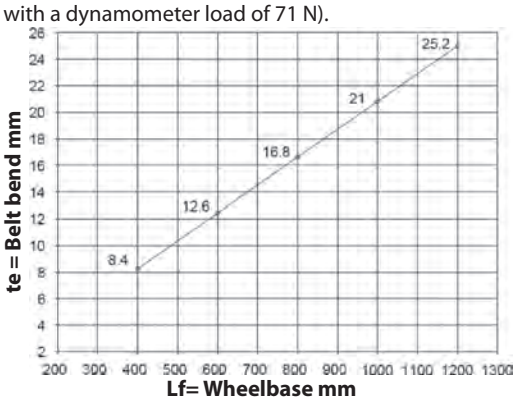
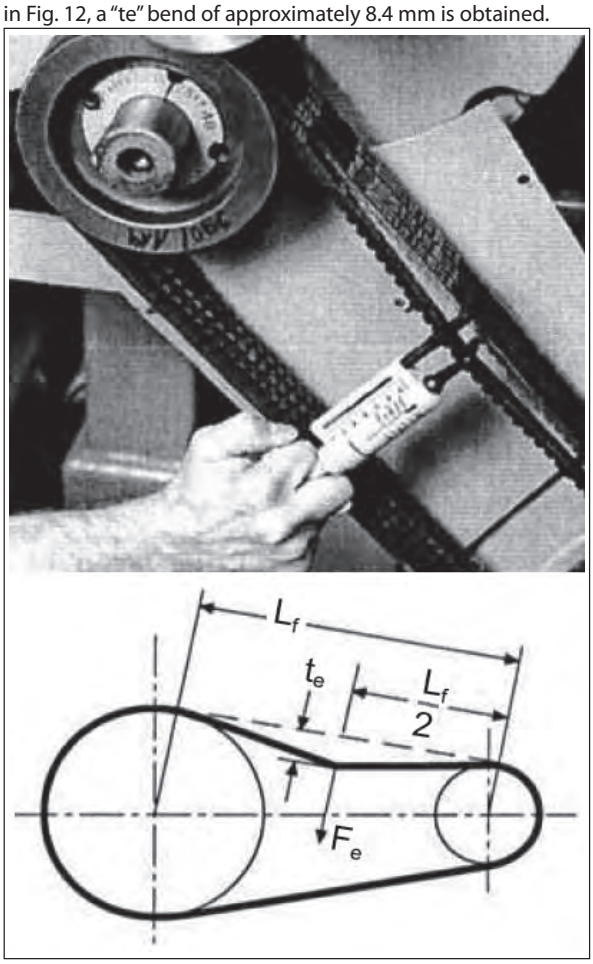


Fig. 11

Conclusion: with a wheelbase of 400 mm and with a dynamometer, loading the belt branch with 75 N as indicated in Fig. 12, a "te" bend of approximately 8.4 mm is obtained.



Lf = Wheelbase
te = Belt bend
Fe = 75 N Dynamometer load

Fig. 12

Note$_1$. Unless otherwise stated by the supplier of the belts, control of proper pull and its relative re-tensioning should be performed after no less than 30 minutes of motion necessary for the normal adjustment of the belts. Best performance and durability will be achieved with proper tensioning.
Note$_2$. In case of necessity or for routine maintenance, never replace a single belt but the complete set.

9.13 Transmission of power from the second PTO

Upon request, the SS70, SN70 and SW70 series pumps can be supplied with auxiliary PTO on the side opposite of the drive (Transmission of power from the second PTO).
Transmission can be carried out:

- By means of the V-belts.
- By means of the joint.

By means of the V-Belts, withdrawable Max Torque is:
20 Nm which corresponds to:
2.3 HP at 800 rpm;
4.1 HP at 1450 rpm.
By means of the joint, withdrawable Max Torque is:
40 Nm which corresponds to:
4.6 HP at 800 rpm;
8.2 HP at 1450 rpm.

By means of the V-belt, the transmission is considered suitable if: belt pull is applied at a max distance of 18 mm with from the bend shaft shoulder (see Fig. 13). Min diameter of pulley to be used = Ø 100 mm.

With transmission by means of the joint, pay particular attention to perfect alignment so that no transverse forces are generated on the pump shaft.

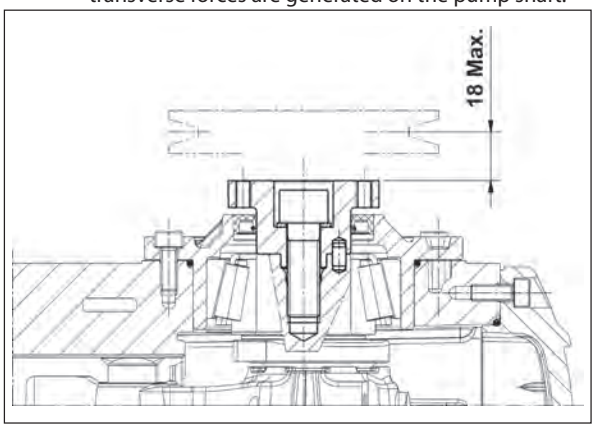


Fig. 13

For applications differing from those specified above, contact our ***Technical*** or ***Customer Service Departments***.

10 START-UP AND OPERATION

10.1 Preliminary checks

Before start-up, ensure that:

The suction line is connected and pressurized (see par. 9.4 - 9.5 - 9.6) the pump must never run dry.

1. The suction line ensures a hermetic seal over time.
2. Any shut-off valves between the supply source and the pump are fully open. The outlet line is free discharge, to permit rapid expulsion of the air present in the pump manifold and therefore facilitate fast priming.
3. All suction and outlet fittings and connections are properly tightened.

4. The coupling tolerances on the pump/transmission axis (half-joint misalignment, Cardan joint tilt, belt pulling, etc.) remain within limits required by the transmission manufacturer.
5. Oil in the pump casing is at level, verified with a dipstick (pos. ①, Fig. 14) and exceptionally with a level indicator (pos. ②, Fig. 14).

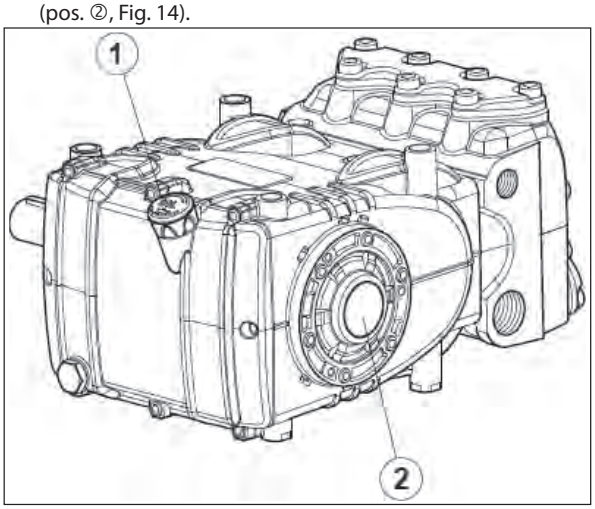


Fig. 14

In case of prolonged storage or long-term inactivity, check proper functioning of the suction and outlet valves.

10.2 Start-up

1. At first start-up, verify that the rotation direction and the supply pressure are correct.
2. Start-up the pump without any load.
3. Check that the supply pressure is correct.
4. Check that the rotation rpm during operation does not exceed the nominal rpm of the pump.
5. Let the pump run for a period of no less than 3 minutes, before putting it under pressure.
6. Before each pump stop, reset pressure by means of the control valve or with any relieving devices and reduce to a minimum rpm (activation with combustion motors).

11 PREVENTIVE MAINTENANCE

For pump reliability and efficiency, comply with maintenance intervals as shown in the table of Fig. 15.

PREVENTIVE MAINTENANCE	
Every 500 hours	**Every 1000 hours**
Check oil level	Change oil
	Check / Replace*: Valves Valve seats Valve springs Valve guides
	Check / Replace*: H.P. seals L.P. seals

Fig. 15

* To replace, follow instructions contained in the ***repair manual***.

12 PUMP STORAGE

12.1 Long-term inactivity

If the pump is started for the first time after a long period from the date of shipment, before operation check the oil level, inspect the valves as specified in chapter 10, then follow described start-up procedures.

12.2 Method for filling pump with anti-corrosion emulsion or anti-freeze solution

Method for filling pump with anti-corrosion emulsion or anti-freeze solution using an external diaphragm pump based on the layout shown in par. 9.7, between pos. ① and pos. ② of Fig. 6 and Fig. 6/a:

- In place of the service tank, use a suitable container containing the solution to be pumped.
- Close the filter drainage, if open.
- Make sure that the hoses to be used are clean inside and spread grease on their connections.
- Connect the high pressure exhaust pipe to the pump.
- Connect the suction pipe to the diaphragm pump.
- Connect the suction pipe between the pump head and the diaphragm pump.
- Fill the service container with solution/emulsion.
- Insert the free ends of the suction pipes and the high pressure exhaust pipe inside the container.
- Switch on the diaphragm pump.
- Pump the emulsion until it exits from the high pressure exhaust pipe.
- Continue pumping for at least another minute.
- Stop the pump and remove the previously connected pipes.
- Clean, grease and plug the connections on the pump head.

The characteristics of the emulsion can be strengthened if necessary by adding, for example, Shell Donax.

13 PRECAUTIONS AGAINST FROST

Follow the instructions in Chapter 12 in areas and times of the year at risk of frost (see par. 12.2).

In the presence of ice, do not run the pump for any reason until the circuit has been fully defrosted, in order to avoid serious damage to the pump.

14 WARRANTY CONDITIONS

The guarantee period and conditions are contained in the purchase agreement.
The guarantee will in any case be invalidated if:

a) The pump is used for purposes other than the agreed purposes.
b) The pump is driven by an electric motor or internal combustion engine having performance values exceeding those shown in the table.
c) The safety devices provided are uncalibrated or disconnected.
d) The pump has been used with accessories or spare parts not supplied by Interpump Group.
e) Damage has been caused by:
   1) improper use
   2) failure to follow maintenance instructions
   3) any use different from that described in the operating instructions
   4) lack of sufficient flow rate

5) defective installation
6) improper positioning or sizing of pipes
7) unauthorized design modifications
8) cavitation.

15 OPERATING FAULTS AND THEIR POSSIBLE CAUSES

The pump does not produce any noise upon start-up:
- The pump is not primed and is running dry.
- No suction water.
- Valves are jammed.
- The outlet line is closed and does not allow the release of air present in the pump manifold.

Pump pulsates irregularly:
- Air suction.
- Insufficient supply.
- Bends, elbows, fittings on the suction line are choking the passage of liquid.
- Suction filter is dirty or too small.
- The booster pump, where installed, is supplying insufficient pressure or flow rate.
- The pump is not primed due to insufficient head or the outlet is closed during priming.
- The pump is not primed due to valve jamming.
- Worn valves.
- Worn pressure seals.
- Imperfect functioning of the pressure control valve.
- Problems on the transmission.

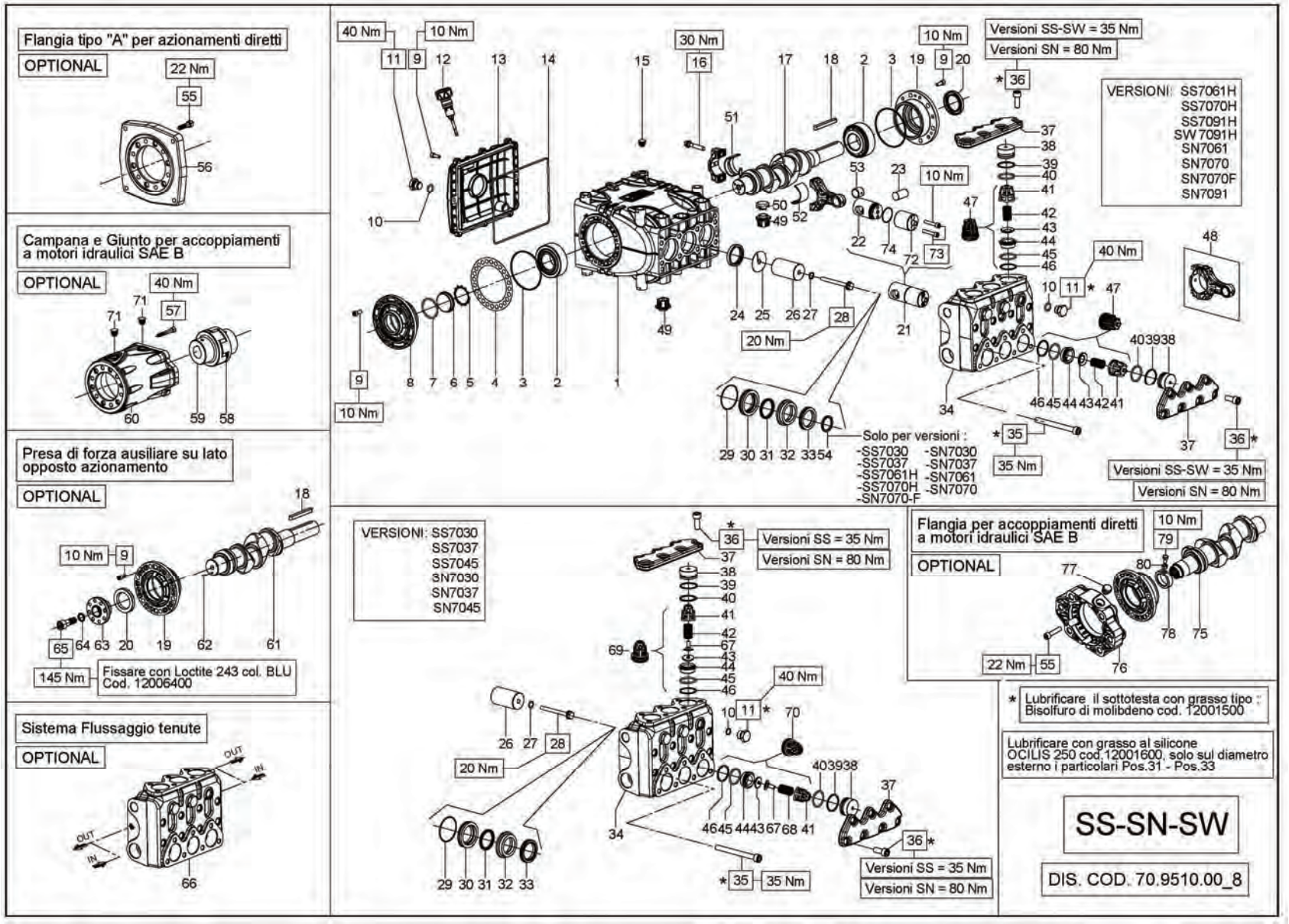
The pump does not supply the nominal flow rate/excessive noise:
- Insufficient supply (see various causes as above).

- Pump speed is below the rated speed;
- Excessive internal leakage of pressure control valve.
- Worn valves.
- Excessive leakage from the pressure seals.
- Cavitation due to:
  1) Improper sizing of suction ducts/undersized diameters.
  2) Insufficient flow rate.
  3) High water temperature.

The pressure supplied by the pump is insufficient:
- The user flow (nozzle) is or has become greater than the pump capacity.
- Insufficient revolutions per minute.
- Excessive leakage from the pressure seals.
- Imperfect functioning of the pressure control valve.
- Worn valves.

Pump overheats:
- The pump is working in overpressure conditions or pump rpm is higher than the nominal value.
- Oil in the pump casing is not at level or not the recommended type as detailed in chapter 7 (see par. 7.6).
- Excess belt tension or joint or pulley alignment is incorrect.
- Excessive pump tilt during operation.

Vibrations or hammering on pipes:
- Air suction.
- Faulty operation of pressure control valve.
- Valves malfunction.
- Non-uniformity of transmission motion.


Flangia tipo "A" per azionamenti diretti
OPTIONAL
22 Nm
55
56
Campana e Giunto per accoppiamenti a motori idraulici SAE B
OPTIONAL
40 Nm
57
71
60
59
58
Presa di forza ausiliare su lato opposto azionamento
OPTIONAL
18
10 Nm
9
65
64
63
20
19
62
61
145 Nm
Fissare con Loctite 243 col. BLU Cod. 12006400
Sistema Flussaggio tenute
OPTIONAL
OUT
IN
66
40 Nm
10 Nm
30 Nm
Versioni SS-SW = 35 Nm
Versioni SN = 80 Nm
VERSIONI: SS7061H
SS7070H
SS7091H
SW 7091H
SN7061
SN7070
SN7070F
SN7091
20 Nm
Solo per versioni :
-SS7030 -SN7030
-SS7037 -SN7037
-SS7061H -SN7061
-SS7070H -SN7070
-SN7070-F
35 Nm
VERSIONI: SS7030
SS7037
SS7045
SN7030
SN7037
SN7045
Versioni SS = 35 Nm
Versioni SN = 80 Nm
Flangia per accoppiamenti diretti a motori idraulici SAE B
OPTIONAL
22 Nm
55
* Lubrificare il sottotesta con grasso tipo : Bisolfuro di molibdeno cod. 12001500
Lubrificare con grasso al silicone OCILIS 250 cod.12001600, solo sul diametro esterno i particolari Pos.31 - Pos.33
SS-SN-SW
DIS. COD. 70.9510.00_8

KIT RICAMBIO – SPARE KIT		SS7030 (D.20)	SS7037 (D.22)	SS7045 (D.24)	SS7061H (D.28)	SS7070H (D.30)	SS7091H (D.36)	SW7091H (D.36)
A	Kit tenute pompanti – Plunger packing kit	KIT 0238	KIT 0202	KIT 2170	KIT 2119	KIT 2204	KIT 0212	KIT 2444
B	Kit valvole d'aspirazione – Inlet valves kit	KIT 2120			KIT 2040			
C	Kit valvole di mandata – Outlet valves kit	KIT 2121						
D	Kit tenute complete – Complete seals kit	KIT 2211	KIT 2212	KIT 2171	KIT 2122	KIT 2213	KIT 2041	KIT 2445
E	Kit bronzine bielle – Conrod bushing kit	KIT 2156						

SS7030 SS7061H
SS7037 SS7070H
SS7045 SS7091H
SW7091H

POS	CODE CODICE	DESCRIPTION DESCRIZIONE	KIT	NR. PCS.
1	70.0100.22	CARTER POMPA		1
2	91.8477.00	CUSCINETTO RULLI		2
3	90.3915.00	OR D. 80.60x2.62 NBR 70SH 3318	D	2
4	70.2200.81	SPESSORE DI RASAMENTO 0.10 mm.		-
	70.2203.81	SPESSORE DI RASAMENTO 0.25 mm.		
5	90.0756.00	ANELLO D'ARRESTO J45	D	1
6	70.2118.01	SPIA LIVELLO OLIO		1
7	90.3877.00	OR D. 39.34x2.62 NBR 70SH 3156	D	1
8	70.1501.22	COPERCHIO LATERALE LATO SPIA		1
9	99.1852.00	VITE M6x16 UNI 5931		20
10	90.3833.00	OR D. 13.95x2.62 NBR 70SH 3056 - SS7091H	D	1÷3
	90.3585.00	OR D. 10.82x1.78 NBR 70SH 2043	D	3
11	98.2100.66	TAPPO G 3/8"x13 - SS7091H		1÷3
	98.2046.00	TAPPO G 1/4"x13		3
12	98.2115.00	TAPPO CON ASTA D. 21.5x70.0		1
13	70.1600.22	COPERCHIO CARTER		1
14	90.3942.00	OR D. 190.17x2.62 NBR 70SH 3750	D	1
15	98.2005.00	TAPPO PER FORO D. 15		5
16	99.3123.00	VITE SERRAGGIO BIELLA		6
17	70.0200.35	ALBERO A GOMITI C. 23		1
18	91.4900.00	LINGUETTA 8.0x7.0x70.0		1
19	70.1500.22	COPERCHIO LATERALE LATO PTO		1
20	90.1668.00	ANELLO RAD. D. 35.0x52.0x7.0	D	1
22	70.0501.15	GUIDA PISTONE		3
23	97.7420.00	SPINOTTO D. 18x36		3
24	90.1677.00	ANELLO RAD. D. 36.0x47.0x6.0/7.5	D	3
25	96.7099.00	ROSETTA D. 10.0x45.0x1.0		3
26	70.0400.09	PISTONE D. 20x63		3
	70.0401.09	PISTONE D. 22x63		
	70.0402.09	PISTONE D. 24x63		
	70.0403.09	PISTONE D. 28x63		
	70.0404.09	PISTONE D. 30x63		
	70.0405.09	PISTONE D. 36x63		
27	90.3671.00	OR D. 11.00x2.00 NBR 90SH	D	3
28	70.2218.66	VITE FISSAGGIO PISTONE		3
29	90.3626.00	OR D. 50.52x1.78 NBR 70SH 2200	D	3
30	70.0815.66	ANELLO DI FONDO D. 20		3
	70.0816.66	ANELLO DI FONDO D. 22		
	70.0813.66	ANELLO DI FONDO D. 24		
	70.0811.66	ANELLO DI FONDO D. 28		
	70.0814.66	ANELLO DI FONDO D. 30		
	70.0810.66	ANELLO DI FONDO D. 36 -SS		
	70.2279.66	ANELLO DI FONDO D. 36 - SW		

POS	CODE CODICE	DESCRIPTION DESCRIZIONE	KIT	NR. PCS.
31	90.2250.00	ANELLO TEN. ALT. D. 20.0x26.15 LP	A-D	3
	90.2300.00	ANELLO TEN. ALT. D. 22.0x26.15 LP	A-D	
	90.2350.00	ANELLO TEN. ALT. D. 24.0x30.15 LP	A-D	
	90.2381.00	ANELLO TEN. ALT. D. 28.x34.15 LP	A-D	
	90.2759.50	ANELLO TEN. ALT. D. 30.0x36.15 LP	A-D	
	90.2400.00	ANELLO TEN. ALT. D. 36.0x42.15 LP - SS	A-D	
	90..2802.00	ANELLO TEN. ALT. D. 36.0x44.0x6.5 LP - SW	A-D	
32	70.2236.66	ANELLO INTERMEDIO D. 20		3
	70.2238.66	ANELLO INTERMEDIO D. 22		
	70.2226.66	ANELLO INTERMEDIO D. 24		
	70.2220.66	ANELLO INTERMEDIO D. 28		
	70.2235.66	ANELLO INTERMEDIO D. 30		
	70.2217.66	ANELLO INTERMEDIO D. 36 - SS		
	70.2278.66	ANELLO INTERMEDI O D. 36 - SW		
33	90.2262.00	ANELLO TEN. ALT. D. 20.0x35.0x9.0 HP	A-D	3
	90.2310.00	ANELLO TEN. ALT. D. 22.0x35.0x9.0 HP	A-D	
	90.2364.00	ANELLO TEN. ALT. D. 24.0x35.0x11.5 HP	A-D	
	90.2380.00	ANELLO TEN. ALT. D. 28.0x45.0x9.0 HP	A-D	
	90.2771.00	ANELLO TEN. ALT. D. 30.0x45.0x9.0 HP	A-D	
	90.2410.00	ANELLO TEN. ALT. D. 36.0x48.0x8.0 HP	A-D	
34	70.1253.36	TESTATA POMPA D. 20		1
	70.1240.36	TESTATA POMPA D. 22-24		
	70.1252.36	TESTATA POMPA D. 28-30		
	70.1254.36	TESTATA POMPA D. 28-30 - NPT		
	70.1235.36	TESTATA POMPA D. 36		
	70.1236.36	TESTATA POMPA D. 36 - NPT		
35	99.3818.00	VITE M10x110 UNI 5931		8
36	99.3670.00	VITE M10x25 UNI 5931		14
37	70.2215.36	COPERCHIO VALVOLE		2
38	70.2216.66	TAPPO VALVOLE - SS7061H SS7070H SS7091H		6
	70.2221.66	TAPPO VALVOLE - SS7030 SS7037 SS7045		
39	90.5180.00	ANELLO ANTIEST. D. 32.4x36.5x1.5	D	6
40	90.3865.00	OR D. 29.82x2.62 NBR 70SH 3118	D	6
41	36.2047.05	GUIDA VALVOLA - SS7061H SS7070H SS7091H		6
	36.2097.51	GUIDA VALVOLA - SS7030 SS7037 SS7045		
42	94.7450.00	MOLLA Dm. 16.0x27.5 - SS7061H SS7070H SS7091H		6
	94.7401.00	MOLLA Dm. 12.0x17.0 - SS7030 SS7037 SS7045		3
43	36.2010.76	VALVOLA SFERICA - SS7061H SS7070H SS7091H		6
	36.2098.66	VALVOLA SFERICA - SS7030 SS7037 SS7045		
44	36.2070.66	SEDE VALVOLA - SS7061H SS7070H SS7091H		6
	36.2094.66	SEDE VALVOLA - SS7030 SS7037 SS7045		
45	90.3865.00	OR D. 29.82x2.62 NBR 70SH 3118	B-C-D	6
46	90.5178.00	ANELLO ANTIEST. D. 31.0x35.5x1.5	B-C-D	6
47	36.7154.01	GR. VALVOLA - SS7061H SS7070H SS7091H	B-C	6

POS	CODE CODICE	DESCRIPTION DESCRIZIONE	KIT	NR. PCS.
48	70.0305.01	BIELLA COMPLETA		3
49	70.2225.51	TAPPO CARTER		6
50	71.2259.51	CAPPUCCIO TAPPO CARTER		3
51	90.9220.00	SEMIBOCCOLA TESTA BIELLA - SUP.	E	3
52	90.9223.00	SEMIBOCCOLA TESTA BIELLA - INF.	E	3
53	90.9100.00	BOCCOLA PIEDE BIELLA		3
54	70.2237.66	DISTANZIALE PER TENUTA D. 20-22		3
	70.2222.66	DISTANZIALE PER TENUTA D. 28-30		
67	36.2101.51	GUIDA INTERNA VALV. - SS7030 SS7037 SS7045		6
68	94.7397.00	MOLLA Dm. 11.4x20.0 - SS7030 SS7037 SS7045		3
69	36.7167.01	GR. VALV. DI MAND. - SS7030 SS7037 SS7045	C	3
70	36.7166.01	GR. VALV. D'ASPIRAZ. - SS7030 SS7037 SS7045	B	3
72	70.0502.66	STELO GUIDA PISTONE		3
73	99.1925.00	VITE M6x35 5931		6
74	90.3528.00	OR D. 29.00x1.50 NBR 70SH	D	3
		CON FLANGIA "A" – WITH DIRECT DRIVE FLANGE		
55	99.3084.00	VITE M8x30 UNI 5931		6
56	10.0673.20	FLANGIA MOTORE IDR. TIPO A		1
		MOTORE IDR. SAE-B – SAE-B HYDR. MOTOR DRIVE		
57	99.3136.00	VITE M8x45 UNI 5931		6
58	10.0755.47	ELEMENTO ELASTICO GIUNTO Di. 46		1
59	10.7430.01	GIUNTO ELASTICO D. 30x25.4		1
60	10.0752.20	FLANGIA MOTORE IDRAULICO SAE-B		1
71	98.2060.00	TAPPO PER FORO D. 15		2
		PDF AUSILIARIA – AUXILIARY PTO		
9	99.1854.00	VITE M6x16 UNI 5931		6
18	91.4900.00	LINGUETTA 8.0x7.0x70.0		1
19	70.1500.22	COPERCHIO LATERALE LATO PTO		1
20	90.1668.00	ANELLO RAD. D. 35.0x52.0x7.0		1
61	70.0205.35	ALBERO A GOMITI C. 23 D.PTO		1
62	97.6152.00	SPINA CILINDRICA D. 5.0x10.0		1
63	70.2234.54	DISP. PRESA DI FORZA AUSILIARIA		1
64	96.7160.00	ROSETTA D. 12.0x18.0x1.0		1
65	99.4295.00	VITE M12x35 UNI 5931		1
		CON SISTEMA FLUSHING – FLUSHING SYSTEM		
66	-	TESTATA FLUSHING		1
		MOTORE IDR. SAE-B – SAE-B HYDR. MOTOR DRIVE		
55	99.3084.00	VITE M8x30 5931		6
75	70.0208.35	ALBERO A GOMITI C. 23 HYP SAE-B		1
76	10.0853.22	FLANGIA MOTORE IDR. SAE-B		1
77	90.2065.00	TAPPO PER FORO D. 17		1
78	70.2267.71	ANELLO PER ALBERO D. 30 HYDR.PACK		1
79	70.2270.34	VITE M6x12 CON INCAVO COMPLETA		1
80	92.2025.00	DADO M6x5 5588		1

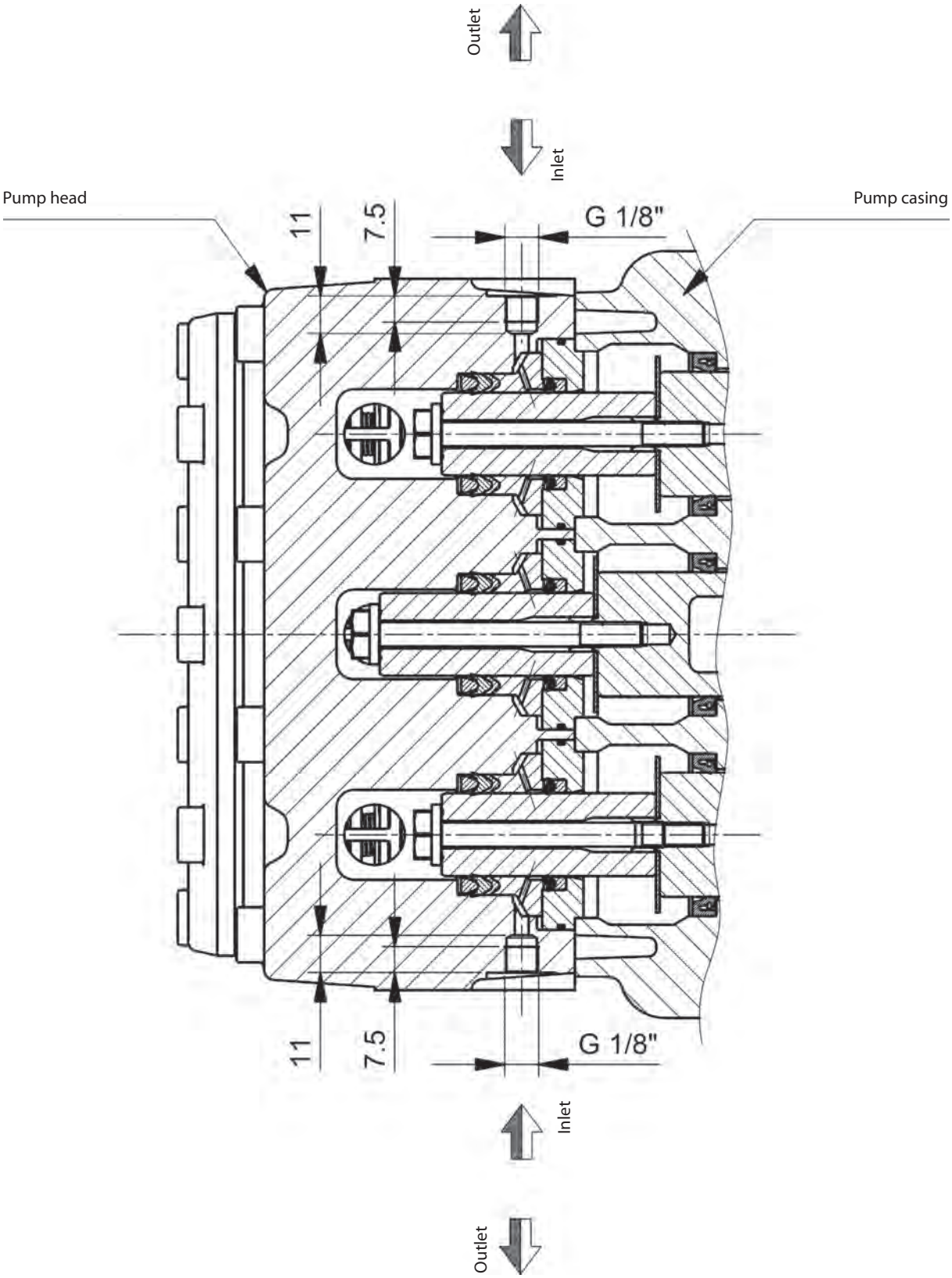
KIT RICAMBIO – SPARE KIT		SN7030	SN7037	SN7045	SN7061	SN7070	SN7091
A	Kit tenute pompanti – Plunger packing kit	KIT 238	KIT 202	KIT 2170	KIT 2119	KIT 2204	KIT 212
B	Kit valvole d'aspirazione – Inlet valves kit	KIT 2000	KIT 2000	KIT 2000	KIT 2030	KIT 2030	KIT 2030
C	Kit valvole di mandata – Outlet valves kit	KIT 2001	KIT 2001	KIT 2001			
D	Kit tenute complete – Complete seals kit	KIT 2211	KIT 2212	KIT 2171	KIT 2122	KIT 2213	KIT 2041
E	Kit bronzine bielle – Conrod bushing kit	KIT 2156 (STD) - 2157 (+0,25) - 2158 (+0,50)					

SN7030 SN7061
SN7037 SN7070
SN7045 SN7091

POS	CODE CODICE	DESCRIPTION DESCRIZIONE	KIT	NR. PCS.
1	70.0100.22	CARTER POMPA		1
2	91.8477.00	CUSCINETTO RULLI CON. 33207		2
3	90.3915.00	OR D. 80.6x2.62 NBR SH. 70 3318	D	2
4	70.2200.81	SPESSORE DI RASAMENTO 0.1 mm.		-
	70.2203.81	SPESSORE DI RASAMENTO 0.25 mm.		
5	90.0756.00	ANELLO SEEGER D. 45	D	1
6	70.2118.01	SPIA LIVELLO OLIO		1
7	90.3877.00	OR D. 39.34x2.62 NBR SH. 70 3156	D	1
8	70.1501.22	COPERCHIO LATERALE LATO SPIA		1
9	99.1854.00	VITE M6x16 UNI 5931		20
10	90.3833.00	OR D. 13.95x2.62 NBR SH. 70 3056 - SN7091	D	1÷4
	90.3585.00	OR D. 10.82x1.78 NBR SH. 70 2043	D	3
11	98.2099.00	TAPPO G 3/8"x13 - SN7091		1÷4
	98.2047.00	TAPPO G 1/4"x13		3
12	98.2115.00	TAPPO CON ASTA D. 21.5x70		1
13	70.1600.22	COPERCHIO POSTERIORE CARTER		1
14	90.3942.00	OR D. 190.17x2.62 NBR SH. 70 3750	D	1
15	98.2005.00	TAPPO PER FORO D. 15		5
16	99.3123.00	VITE SERRAGGIO BIELLA		6
17	70.0200.35	ALBERO A GOMITI C.23		1
18	91.4900.00	LINGUETTA 8x7x70 UNI 6604		1
19	70.1500.22	COPERCHIO LATERALE LATO PTO		1
20	90.1668.00	ANELLO RAD. D. 35x52x7	D	1
22	70.0500.15	GUIDA PISTONE		3
23	97.7420.00	SPINOTTO D. 18x36		3
24	90.1677.00	ANELLO RAD. D. 36x47x6/7.5	D	3
25	96.7099.00	ROSETTA D. 10x45x1		3
26	70.0400.09	PISTONE D. 20x95		3
	70.0401.09	PISTONE D. 22x95		
	70.0402.09	PISTONE D. 24x62		
	70.0403.09	PISTONE D. 28x62		
	70.0404.09	PISTONE D. 30x95		
	70.0405.09	PISTONE D. 36x62		
27	90.3671.00	OR D. 11x2	D	3
28	70.2218.66	VITE FISSAGGIO PISTONE		3
29	90.3626.00	OR D. 50,52x1,78 NBR SH. 70 2200	D	3
30	70.0815.66	ANELLO DI FONDO D. 20		3
	70.0816.66	ANELLO DI FONDO D. 22		
	70.0813.66	ANELLO DI FONDO D. 24		
	70.0811.66	ANELLO DI FONDO D. 28		
	70.0814.66	ANELLO DI FONDO D. 30		
	70.0810.66	ANELLO DI FONDO D. 36		
31	90.2250.00	ANELLO TEN. ALT. D. 20x26,15 LP	A-D	3
	90.2300.00	ANELLO TEN. ALT. D. 22x26,15 LP	A-D	
	90.2350.00	ANELLO TEN. ALT. D. 24x30,15 LP	A-D	
	90.2381.00	ANELLO TEN. ALT. D. 28x34,15 LP	A-D	
	90.2759.50	ANELLO TEN. ALT. D. 30x36,1 LP	A-D	
	90.2400.00	ANELLO TEN. ALT. D. 36x42,15 LP	A-D	
32	70.2236.66	ANELLO INTERMEDIO D. 20		3
	70.2238.66	ANELLO INTERMEDIO D. 22		
	70.2226.66	ANELLO INTERMEDIO D. 24		
	70.2220.66	ANELLO INTERMEDIO D. 28		
	70.2235.66	ANELLO INTERMEDIO D. 30		
	70.2217.66	ANELLO INTERMEDIO D. 36		
33	90.2262.00	ANELLO TEN. ALT. D. 20x35x9 HP	A-D	3
	90.2310.00	ANELLO TEN. ALT. D. 22x35x9 HP	A-D	
	90.2364.00	ANELLO TEN. ALT. D. 24x35x11,5 HP	A-D	
	90.2380.00	ANELLO TEN. ALT. D. 28x45x9 HP	A-D	
	90.2771.00	ANELLO TEN. ALT. D. 30x45x9 HP	A-D	
	90.2410.00	ANELLO TEN. ALT. D. 36x48x8 HP	A-D	
34	70.1200.36	TESTATA POMPA D. 20		1
	70.1230.36	TESTATA POMPA D. 20 - NPT		
	70.1201.36	TESTATA POMPA D. 22-24		
	70.1231.36	TESTATA POMPA D. 22-24 - NPT		
	70.1249.36	TESTATA POMPA D. 28-30		
	70.1250.36	TESTATA POMPA D. 28-30 - NPT		
	70.1247.36	TESTATA POMPA D. 36		
	70.1248.36	TESTATA POMPA D. 36 - NPT		
35	99.3818.00	VITE M10x110 UNI 5931		8
36	99.3671.00	VITE M10x25 UNI 5931		14
37	70.2100.36	COPERCHIO VALVOLE		2
38	70.2216.66	TAPPO VALVOLE - SN7061 SN7070 SN7091		6
	70.2221.66	TAPPO VALVOLE - SN7030 SN7037 SN7045		
39	90.5180.00	ANELLO ANTIEST. D. 32.4x36.5x1.5	D	6
40	90.3865.00	OR D. 29.82x2.62 NBR SH. 70 3118	D	6
41	36.2047.05	GUIDA VALVOLA - SN7061 SN7070 SN7091		6
	36.2097.51	GUIDA VALVOLA - SN7030 SN7037 SN7045		
42	94.7450.00	MOLLA Dm. 16x27,5 - SN7061 SN7070 SN7091		6
	94.7401.00	MOLLA Dm. 12x17 - SN7030 SN7037 SN7045		3
43	36.2010.76	VALVOLA SFERICA - SN7061 SN7070 SN7091		6
	36.2099.66	VALVOLA SFERICA - SN7030 SN7037 SN7045		
44	36.2048.66	SEDE VALVOLA - SN7061 SN7070 SN7091		6
	36.2038.66	SEDE VALVOLA - SN7030 SN7037 SN7045		
45	90.3865.00	OR D. 29,82x2,62 NBR SH. 70 3118	D	6
46	90.5178.00	ANELLO ANTIEST. D. 31x35.5x1.5	D	6
47	36.7154.01	GR. VALVOLA - SN7061 SN7070 SN7091	B-C	6
48	70.0305.01	BIELLA COMPLETA		3
49	70.2225.51	TAPPO CARTER		6
50	71.2259.51	CAPPUCCIO TAPPO CARTER		3
51	90.9220.00	SEMIBOCCOLA TESTA BIELLA - SUP.	E	3
	90.9221.00	SEMIBOCCOLA TESTA BIELLA +0.25 - SUP.	E	
	90.9222.00	SEMIBOCCOLA TESTA BIELLA +0.50 - SUP.	E	
52	90.9223.00	SEMIBOCCOLA TESTA BIELLA - INF.	E	3
	90.9224.00	SEMIBOCCOLA TESTA BIELLA +0.25 - INF.	E	
	90.9225.00	SEMIBOCCOLA TESTA BIELLA +0.50 - INF.	E	
53	90.9100.00	BOCCOLA PIEDE BIELLA		3
54	70.2237.66	DISTANZIALE PER TENUTA Ø 20-22		3
	70.2222.66	DISTANZIALE PER TENUTA Ø 28-30		
67	36.2101.51	GUIDA INTERNA VALV. - SN7030 SN7037 SN7045		6
68	94.7397.00	MOLLA Dm. 11,4x20 - SN7030 SN7037 SN7045		3
69	36.7134.01	GR. VALV. DI MAND. - SN7030 SN7037 SN7045	C	3
70	36.7133.01	GR. VALV. D'ASPIRAZ. - SN7030 SN7037 SN7045	B	3
		CON FLANGIA "A" – WITH DIRECT DRIVE FLANGE		
55	99.3084.00	VITE M8x30 UNI 5931		6
56	10.0673.20	FLANGIA MOTORE IDRAULICO TIPO A		1
		MOTORE IDR. SAE-B – SAE-B HYDR. MOTOR DRIVE		
15	98.2060.00	TAPPO PER FORO Ø 15		2
57	99.3136.00	VITE M8x45 UNI 5931		6
58	10.0755.47	ELEMENTO ELASTICO GIUNTO D. 46		1
59	10.7430.01	GIUNTO ELASTICO D. 30x25.4		1
60	10.0752.20	FLANGIA MOTORE IDRAULICO SAE-B		1
		PDF AUSILIARIA – AUXILIARY PTO		
9	99.1854.00	VITE M6x16 UNI 5931		6
18	91.4900.00	LINGUETTA 8x7x70 UNI 6604		1
19	70.1500.22	COPERCHIO LATERALE LATO PTO		1
20	90.1668.00	ANELLO RAD. D. 35x52x7		1
61	70.0205.35	ALBERO A GIMITO C.23 D.PTO		1
62	97.6152.00	SPINA D. 5x10		1
63	70.2234.54	DISPOSITIVO DOPPIA PTO SERIE 70		1
64	96.7160.00	ROSETTA D. 12x18x1		1
65	99.4295.00	VITE M12x35 UNI 5931		1
		CON SISTEMA FLUSHING – FLUSHING SYSTEM		
66	70.1251.36	TESTATA POMPA D. 28-30 FLUSHING		1

17 FLUSHING CIRCUIT DIAGRAM OF USE

Adhere to the following values for proper system operation:
minimum circuit flow rate 4 l/min, maximum fluid pressure 6 bar



18 DECLARATION OF INCORPORATION

DECLARATION OF INCORPORATION

(In accordance with Annex II of European Directive 2006/42/EC)

The manufacturer **INTERPUMP GROUP S.p.A. - Via E. Fermi, 25 - 42049 - S. ILARIO D'ENZA - Italy DECLARES** that the product identified and described as follows:

Designation:	Pump
Type:	Reciprocating plunger pump for high pressure water
Trademark:	INTERPUMP GROUP
Model:	SS70 - SN70 - SW70 series

Is found to comply with the Machinery Directive 2006/42/EC
Standards applied: UNI EN ISO 12100 - UNI EN 809

The pump identified above meets all the essential safety and health protection requirements as listed in section 1 of Annex I of the Machinery Directive:
1.1.2 - 1.1.3 - 1.1.5 - 1.3.1 - 1.3.2 - 1.3.3 - 1.3.4 - 1.5.4 - 1.5.5 - 1.6.1 - 1.7.1 - 1.7.2 - 1.7.4 - 1.7.4.1 - 1.7.4.2 and the relevant technical documentation has been compiled in accordance with Annex VII B.

In addition, following a motivated request the manufacturer undertakes to provide a copy of the relevant pump technical documentation in the manner and terms to be defined.

The pump should not be put into service until the plant to which the pump is to be incorporated has been declared in accordance with the provisions of the relevant directives and/or standards.

Person authorized to compile the technical file — Name: Maurizio Novelli
Address: INTERPUMP GROUP S.p.a. - Via E. Fermi, 25 - 42049 - S. ILARIO D'ENZA (RE) - Italy

Person authorised to draw up the declaration: The manager:

Reggio Emilia - January 2017

Ing. Massimiliano Bizzarri

SS70 - SN70 - SW70

INTERPUMP GROUP

Repair Manual

Contents

1 INTRODUCTION

This manual describes the instructions for repairing SS70 - SN70 -SW70 pumps
It must be carefully read and understood before any intervention on the pump.
Proper pump operation and duration depend on 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 protective goggles.

Danger Sign
Put on protective gloves before each operation.

2 REPAIR GUIDELINES

2.1 REPAIRING MECHANICAL PARTS

Mechanical parts must be repaired after the oil has been removing from the casing.
To remove the oil it is necessary to remove: the oil dipstick ① and the plug pos. ②, Fig. 1.

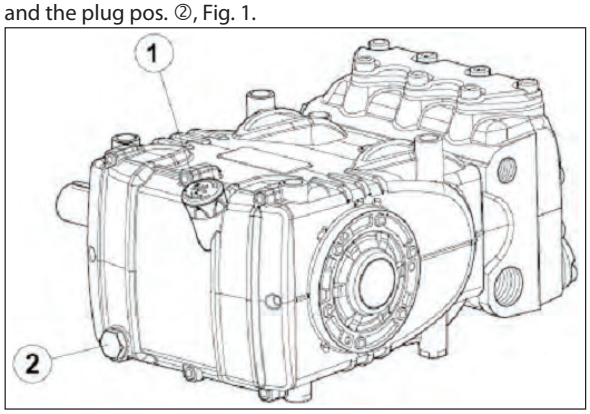


Fig. 1

The used oil must be poured unto a suitable container and consigned to an authorized recycling center.
Do not release used oil into the environment under any circumstances.

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, 2.2.4).
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).

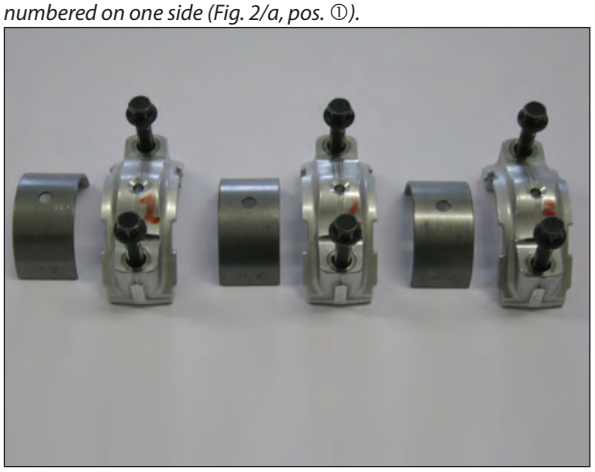


Fig. 2

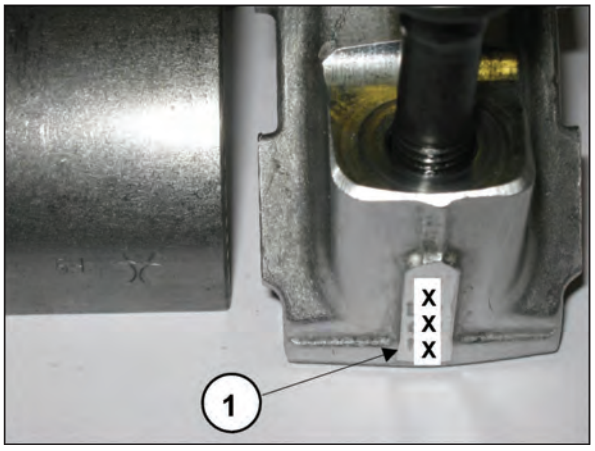


Fig. 2/a

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

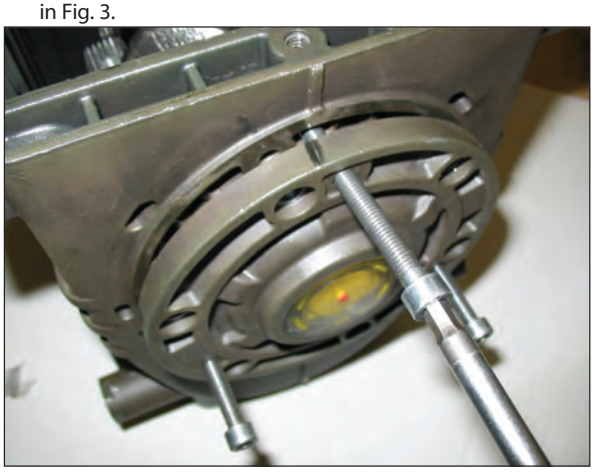


Fig. 3

- 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 pliers 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).

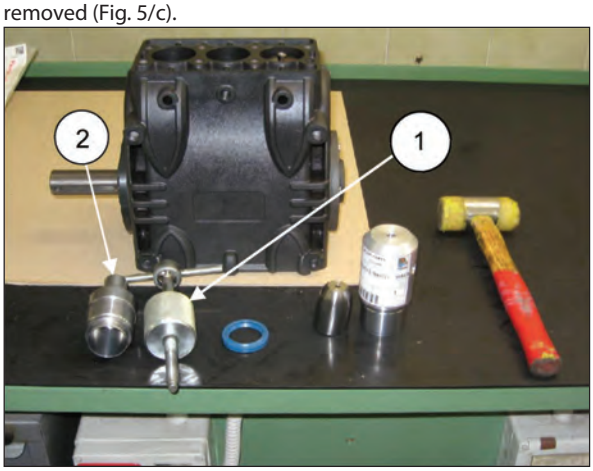


Fig. 5

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.

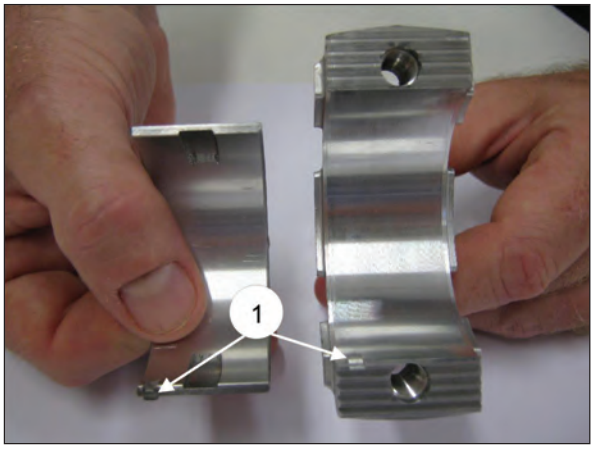


Fig. 6

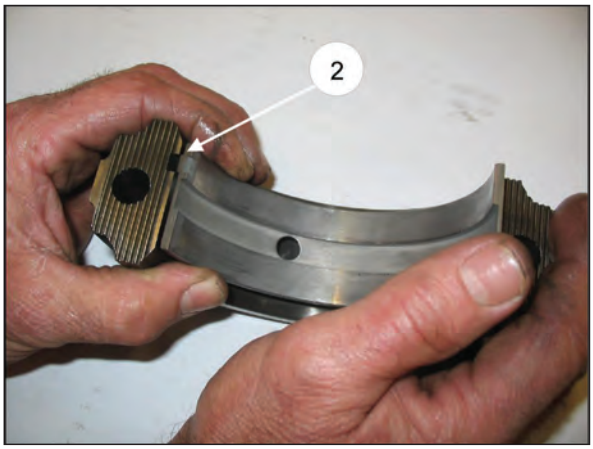


Fig. 6/a

- 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, taking care not to damage the piston guide seal rings.

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 a tool (code 27904500) as shown 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).

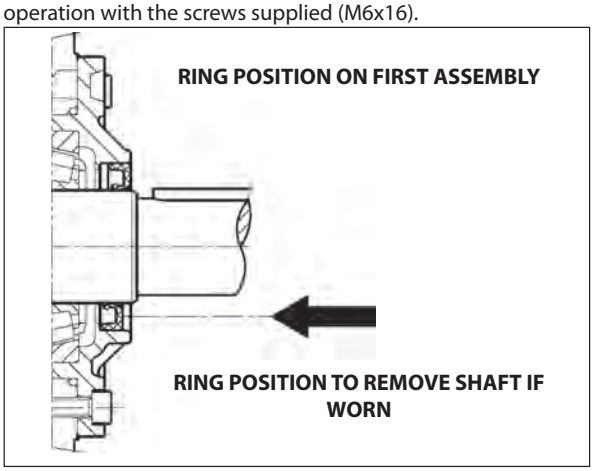


Fig. 7

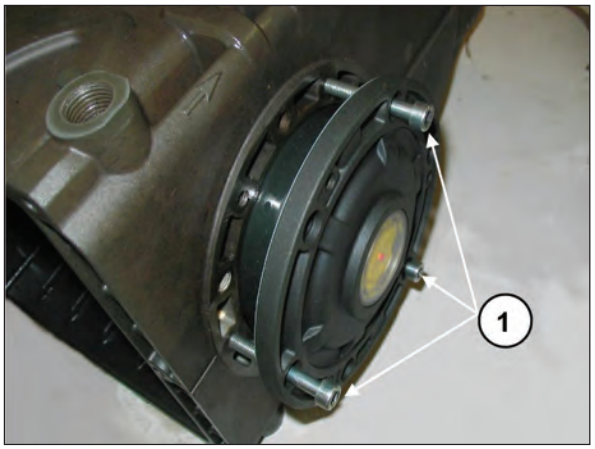


Fig. 8

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

Note the correct assembly direction of the caps.

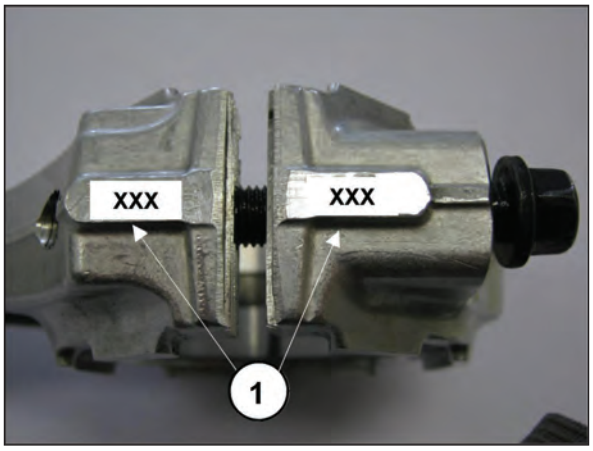


Fig. 9

- 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).

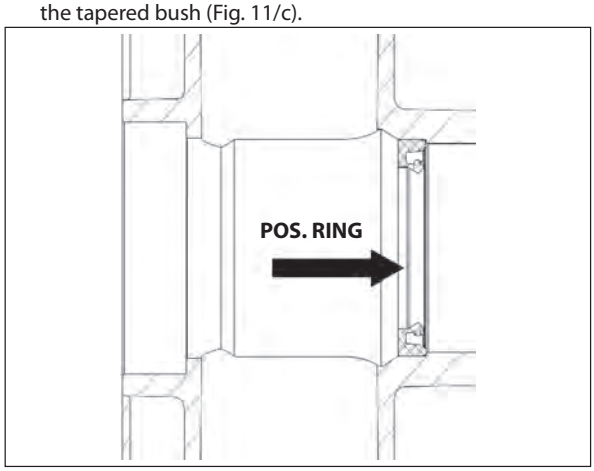


Fig. 11

Fig. 11/a

Fig. 11/b

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	Ø 39.75 0/-0.02 Ra 0.4 Rt 3.5
0.50	90922200	90922500	Ø 39.50 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 (indicator side flange + shaft + motor side flange) is assembled and the cover screws have been tightened to the recommended torque, check that the rotation torque of the con-rod shaft - with the con-rod disconnected - is between 4 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 indicated above, and the screws provided for final fastening.
The shaft rotation torque (with the con-rods 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

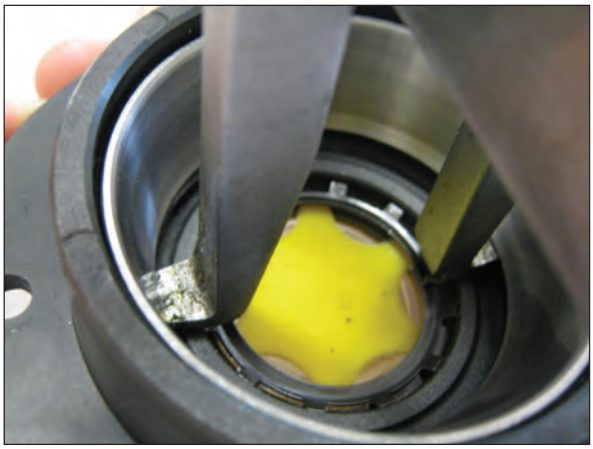


Fig. 12/a

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° and 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 tab into the casing, making sure the PTO shank comes out of the correct side.
Secure the PTO side flange to the casing, taking care with the lip seal as described previously and tighten the fixing screws to the recommended 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 that the shaft rotates freely by turning it manually.
Continuing the procedure in this way, a sudden increase in hardness during shaft rotation will soon be experienced.
At this point, halt the forward movement of the cover and loosen the fixing screws completely.
With the aid of a feeler gauge, measure the clearance between the side cover and pump casing (see 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

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 con-rods to the bend shaft and to the next stages. If it is not, redefine the shim pack, 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.
Proceed as follows to extract the valve units:

Fig. 16

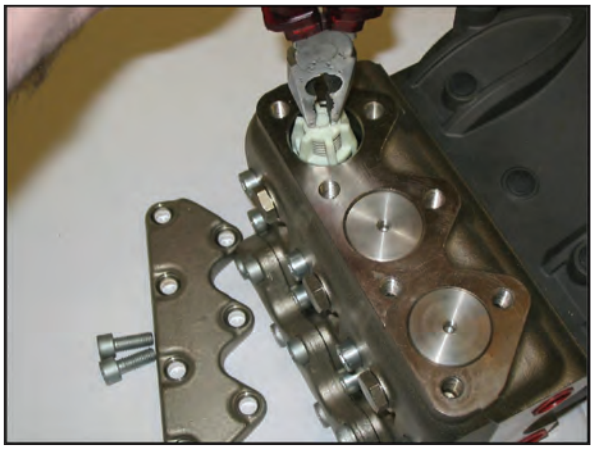


Fig. 16/a

- Unscrew the 7 M10x25 valve cover fixing screws and remove the covers (Fig. 16, Fig. 16/a).
- Remove the valve plugs by means of an extractor hammer (code 26019400, Fig. 16).
- Remove the valve units using pliers (Fig. 16/a).

If the suction and outlet valve seats remain stuck on the head (for example because of incrustations due to prolonged lack of use of the pump), proceed as follows:

- use the extractor hammer used for the valve plugs (code 26019400 combined with the tool code 27513700), as shown in Fig. 16/b.

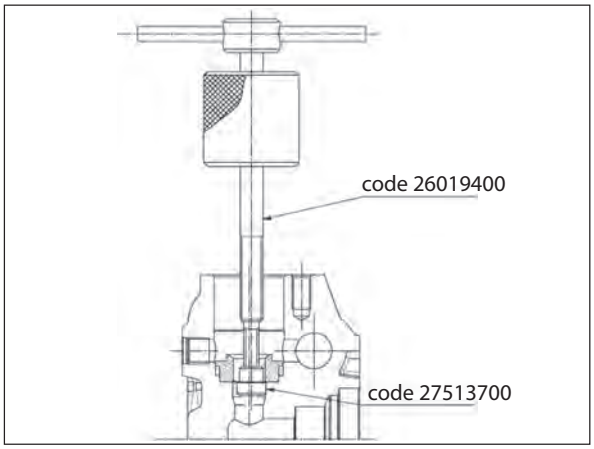


Fig. 16/b

Basic tools as indicated in Fig. 17 are enough to separate the components of the suction/delivery valves. A M8 screw of adequate length can also be used as an extractor to separate the valve cage from the valve seat Fig. 17/a, pos. ①.

Fig. 17

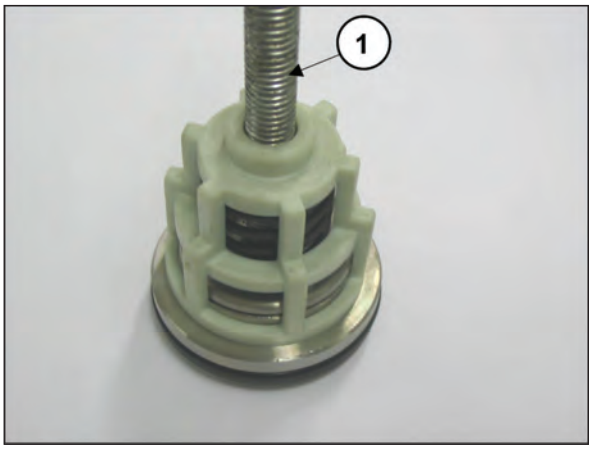


Fig. 17/a

2.2.2 Reassembly of the head – valve units

Do not invert the springs on the suction valve units with those on the exhaust valve units as in some models these are not interchangeable.

Pay particular attention to the conditions of the various components and replace them 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. 18.

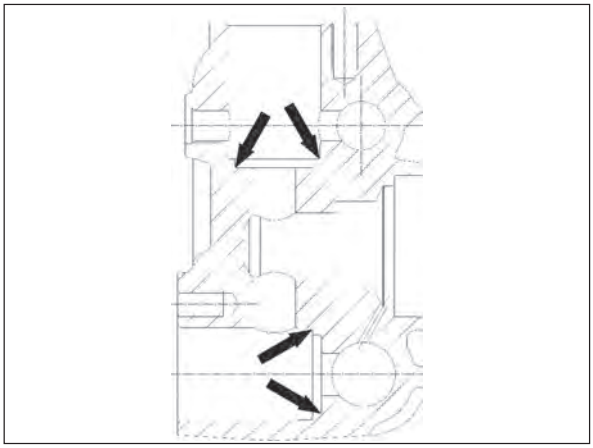


Fig. 18

To reassemble the various components, perform the operations listed above in reverse order to par. 2.2.1.
To facilitate insertion of the valve guide in its housing, you can use a bush resting on the horizontal guide planes and use a hammer acting on the whole circumference (Fig. 19/a).

Fig. 19

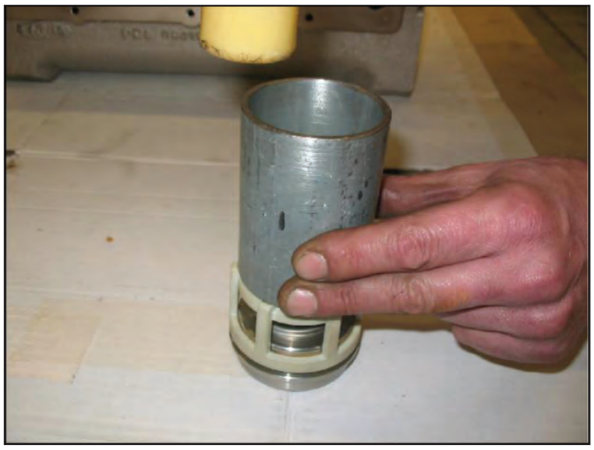


Fig. 19/a

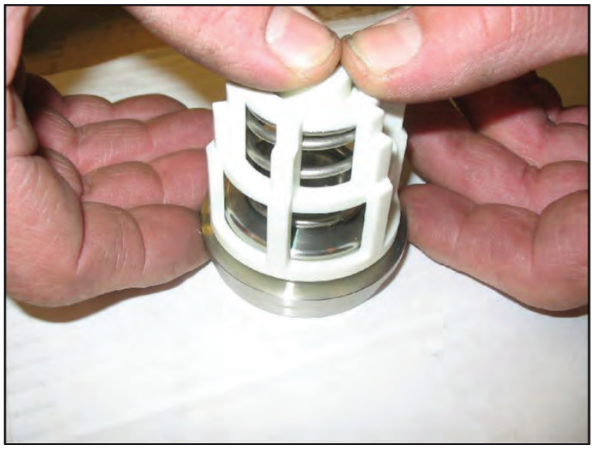


Fig. 19/b

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 M10x25 screws with a torque wrench at the specified torque.

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. 20.

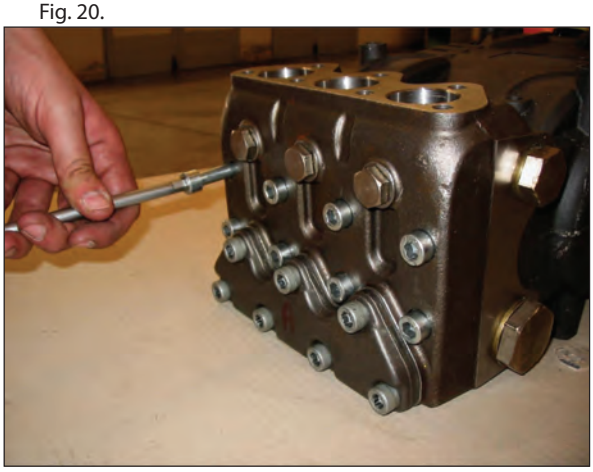


Fig. 20

B) Separate the head from the pump casing.

C) Extract the high pressure seals from the head and the low pressure ones from the support, using simple tools as indicated in Fig. 21, being careful not to damage the respective housings.

Fig. 21

Pay attention to the order of seal pack disassembly as indicated in Fig. 21 composed of:

1. Bottom ring
2. O-ring
3. L.P. seal ring
4. Intermediate ring
5. H.P. seal ring

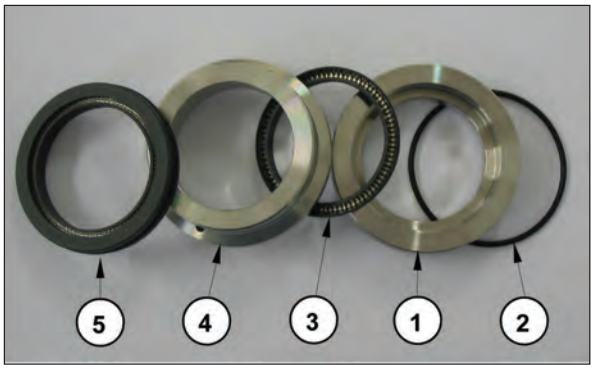


Fig. 22

2.2.4 Disassembly of the piston unit

The piston unit does not require any routine maintenance. Maintenance is limited to visual checks only.
Proceed as follows to extract piston units:

A) Unscrew the piston fixing screws as indicated in Fig. 23.

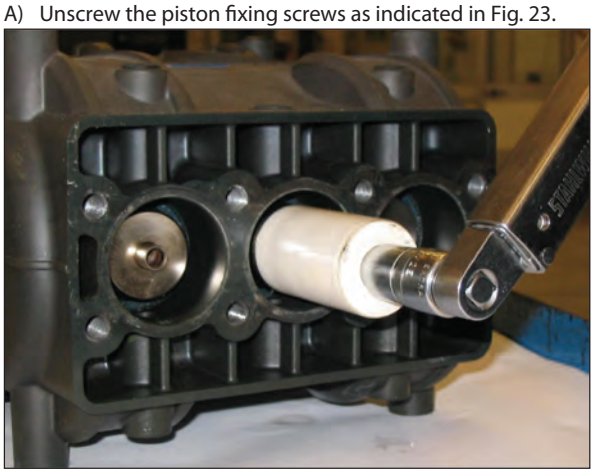


Fig. 23

B) Check and verify their conditions, replace if necessary.

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

2.2.5 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 ③⑤ components with OCILIS 250 silicone grease code 12001600 on the external diameter only.

C) For correct assembly of HP seals in their housing on the head using the specific tools as indicated in chapter 5.

D) Remount the piston, tightening the screws with a torque wrench, respecting the tightening torque value.

E) Assembling the head: for the values of the torques and tightening sequences follow the instructions contained in chapter 3.

3 SCREW TIGHTENING CALIBRATION

Description	Exploded view position	Tightening torque Nm
Covers fixing screw	9	10
Piston fixing screw	28	20
Con-rod cap fix. screw	16	30*
Valve cover fix. screw - SS - SW	36	35**
Valve cover fix. screw - SN	36	80**
Head fixing screw	35	35***
Type "A" flange fix. screw	55	22
Screw fix. Coupl.SAE C	57	40
Screw fix. PTO 2nd Flange	65	145****

* The con-rod cap fixing screws must be tightened respecting the phases indicated on page 16.
** The head fixing screws must be tightened with a torque wrench, lubricating the underhead, respecting the order in Fig. 24.
*** The valve cover fixing screws must be tightened with a torque wrench, lubricating the underhead, respecting the order in Fig. 24.
**** The PTO 2nd flange fixing screw must be tightened with a torque wrench, using Loctite 243 Blue.

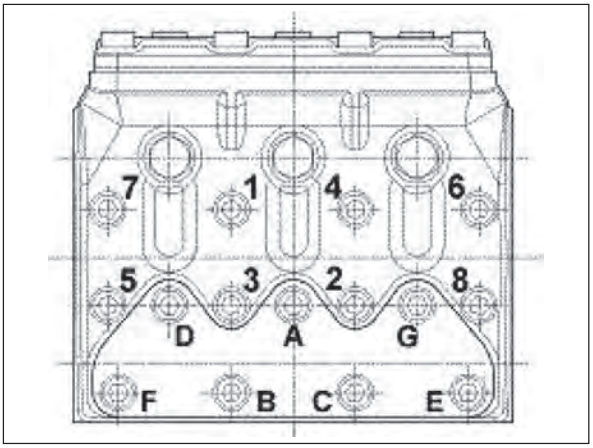


Fig. 24

4 REPLACING THE CON-ROD FOOT BUSH

During maintenance, if it becomes necessary to replace the con-rod foot bush, proceed as follows:

When removing the worn bushing, take great care not to damage or scratch the seat on the con- rod.

Perform cold press fitting of the new bush. During this operation, ensure that:
- the lubrication hole coincides with the corresponding hole on the con-rod;
- the cutting junction is directed as shown in Fig. 25.

Then perform mechanical processing. The dimensions and tolerances shown in Fig. 25 MUST be respected.

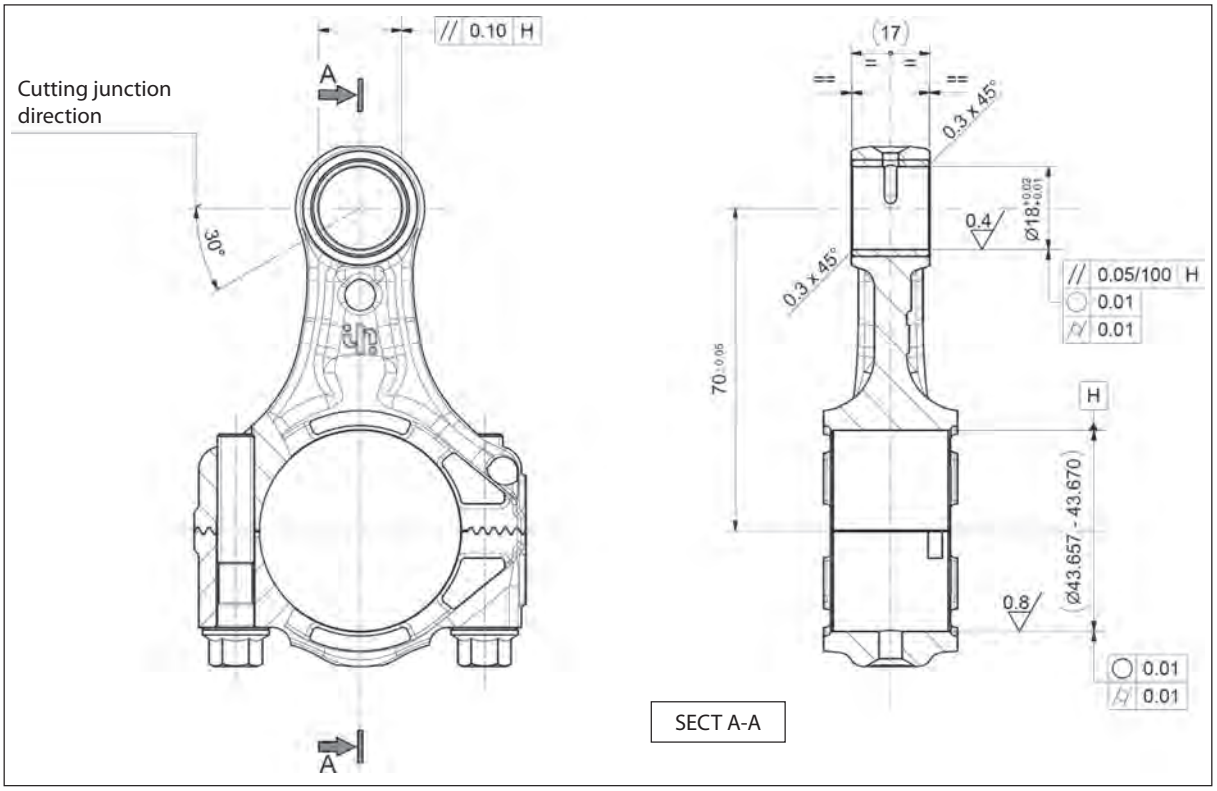


Fig. 25

5 REPAIR TOOLS

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

For assembly phases:

Seal bush extØ 35; HP alternative seal ring Ø 20x35x9	code 26134600
	code 27465600
Seal bush extØ 35; HP alternative seal ring Ø 22x35x9	code 26134600
	code 27465600
Seal bush extØ 35; HP alternative seal ring Ø 24x35x11.5	code 26134600
	code 27465600
Seal bush extØ 45; HP alternative seal ring Ø 28x45x9	code 26406300
	code 27465700
Seal bush extØ 45; HP alternative seal ring Ø 30x45x9	code 26406300
	code 27465700
Seal bush extØ 48; HP alternative seal ring Ø 36x48x8	code 26406300
	code 27465800
Buffer for pump shaft oil seal	code 27904500
Buffer for piston guide oil seal	code 27904200

For disassembly phases:

Seal gripper extØ 35; HP alternative seal ring Ø 20x35x9	code 26019400
	code 26093400
Seal gripper extØ 35; HP alternative seal ring Ø 22x35x9	code 26019400
	code 26093500
Seal gripper extØ 35; HP alternative seal ring Ø 24x35x11.5	code 26019400
	code 26093600
Suction/outlet valve seats	code 26019400
	code 27513700
Suction/outlet valve plug	code 26019400
Piston guide oil seal extraction gripper	code 26019400
	code 27503800