# *SK Series*

## Use and Maintenance Manual

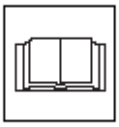
INDEX

# 1. INTRODUCTION

This manual contains the instructions for the use and maintenance of the SK pump. It must be carefully read and understood before the pump is used.
The proper functioning and lifetime of the pump depends on correct use and proper maintenance.
Interpump Group declines all responsibility for damage caused due to negligence and/or failure to observe the instructions described in this manual.
Upon delivery, check that the pump is undamaged and complete.
Report any problems before installing and starting the pump.

# 2. SYMBOL DESCRIPTION

**Warning Signal**



**Carefully read the contents of the manual before every operation.**

**Danger Signal**
Danger of electrocution.

**Danger Signal**
Use a protective mask.

**Danger Signal**
Use protective goggles.

**Danger Signal**
Put on protective gloves before every operation.

**Danger Signal**
Use safety boots

# 3. SAFETY

### 3.1 General safety warnings

Improper use of pumps and high-pressure systems, and/or failure to observe the installation and maintenance instructions, can cause serious injury to persons and/or damage to property. Anyone preparing to assemble or use high-pressure systems must have the necessary skills to do so, must be aware of the characteristics of the components to be assembled/used, and must adopt all possible precautions necessary to ensure maximum levels of safety in any operating condition. No reasonably applicable precaution must be omitted in the interests of safety, either by the installer or the operator.

### 3.2 Essential safety elements in the high-pressure system.

1. The pressure line must always have a safety valve.
2. The components of the high pressure system, particularly for systems that operate predominantly outdoors, must be adequately protected from rain, cold and heat.
3. The electrical parts of the system, as well as being adequately protected from water sprays, must meet the standards specified in the regulations currently in force.
4. High-pressure pipes must be correctly dimensioned for the maximum operating pressure of the system, and must always and only be used within the range of working pressures indicated by the maker of the pipe.
1. These precautions must be observed for all other accessories of the system which are connected in any way with high pressure.
5. The ends of high-pressure pipes must be sheathed and anchored to a solid structure, to prevent dangerous whiplashes in the event of bursting or breakage of the connections.
6. Suitable protective casings must be installed at the pump transmission systems (junctions, belts and pulleys, auxiliary power take-offs).

### 3.3 Safety during operation.

The environment or area within which a high-pressure system operates must be clearly indicated and access prohibited to unauthorised personnel and, as far as possible, it must be restricted and/or fenced off.
Personnel who are authorised to access this area must be trained in advance on how to conduct themselves in this area, and they must be informed of the risks deriving from defects or malfunctions of the high-pressure system.
Before starting the system, the Operator is required to verify that:

1. The high-pressure system is correctly fed by a minimum pressure of 5-7 bar (metered in the head flange).
2. The pump inlet filters are perfectly clean; we recommend inserting a device (any type) that indicates the level of congestion.
3. The electrical parts are adequately protected and in perfect working order.
4. The high-pressure pipes do not show any evident signs of abrasion and the fittings are in perfect order.

Any anomaly or reasonable doubt that may arise before or during operation must be immediately reported and checked by qualified and authorised personnel. In such cases the pressure must immediately be brought down to zero and the high-pressure system must be stopped.

### 3.4 Instructions for using nozzles.

1. The operator must always put his/her health and safety, and also the health and safety of third parties that may be directly affected by the operator's actions, above all else and above any other interest. Everything the operator does must be dictated by good sense and responsibility.
2. The operator must always wear a hard hat with a protective visor, impermeable clothing, and suitable boots that will provide a good grip on the floor when it is wet.

*Note: proper clothing provides good protection from water sprays, but not from the direct impact of a water jet or from sprays at extremely close range. In such circumstances further protection will be necessary.*

3. It is good practice to work in teams of at least two persons, so as to provide each other with immediate assistance if necessary, and to take over from each other during long and demanding tasks.
4. Access to the work area reached by the radius of action of the jet must be absolutely prohibited, and the area itself must be free from objects which, if inadvertently hit by the pressure jet, could cause damage and/or create dangerous situations.
5. The water jet must always, and only, be pointed in the direction of the work area. This rule also applies when conducting tests or preliminary checks.
6. The operator must always pay attention to the trajectory of the debris removed by the water jet. Where necessary, adequate bulkheads must be installed by the operator to protect anything that could be accidentally exposed.
7. While working, the operator must not be distracted for any reason whatsoever. Any persons needing to access the operational area must wait for the operator to suspend activities on his/her own initiative, and then make their presence known immediately.
8. For reasons of safety, it is essential that all members of the team are always completely aware of each other's intentions, in order to prevent dangerous misunderstandings.
9. The high pressure system must not be started and brought up to pressure without all members of the team first being in position and the operator having already directed the nozzle towards the work area.

**3.5 Safety during system maintenance**

1. Maintenance of the high-pressure system must be carried out at the time intervals specified by the maker, who is legally responsible for the entire assembly.
2. Maintenance must always be carried out by authorised specialist personnel.
3. The pump and the various different components must be assembled and dismantled exclusively by authorised personnel using the proper equipment, in order to prevent damage to the components and especially to the connections.
4. To guarantee total reliability and safety, only ever use original spare parts.

## 4. PUMP IDENTIFICATION

Every pump has a rating plate bearing the following information:

Pump model and version
Serial number
Max RPM
Power consumption HP – kW
Pressure in bar – P.S.I.
Flow in l/min – RPM

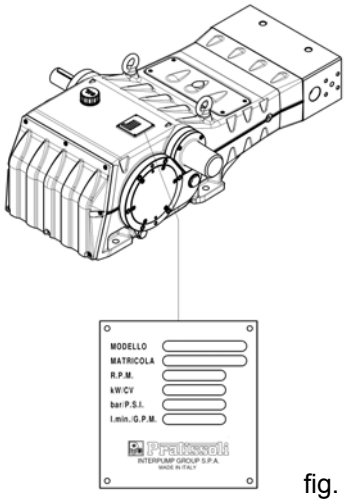



fig. 1

**The model, version and serial number must always be specified when ordering spare parts.**

## 5. TECHNICAL CHARACTERISTICS

| Model | RPM | Flow rate | | Pressure | | Power | |
|---|---|---|---|---|---|---|---|
| | | l/min | Gpm | bar | psi | kW | Hp |
| SK 20 | 1500 | 43 | 11.4 | 1500 | 21750 | 123 | 168 |
| | 1750 | 44 | 11.6 | 1500 | 21750 | 126 | 171 |
| SK 22 | 1500 | 52 | 13.7 | 1300 | 18850 | 129 | 176 |
| | 1750 | 53 | 14.0 | 1300 | 18850 | 132 | 179 |
| SK 24 | 1500 | 62 | 16.4 | 1100 | 15950 | 130 | 177 |
| | 1750 | 63 | 16.6 | 1100 | 15950 | 132 | 180 |
| SK 26 | 1500 | 73 | 19.3 | 900 | 13050 | 126 | 171 |
| | 1750 | 74 | 19.6 | 900 | 13050 | 127 | 173 |
| SK 28 | 1500 | 84 | 22.3 | 800 | 11600 | 128 | 175 |
| | 1750 | 86 | 22.7 | 800 | 11600 | 132 | 179 |
| SK 30 | 1500 | 96 | 25.4 | 700 | 10150 | 128 | 175 |
| | 1750 | 98 | 25.9 | 700 | 10150 | 131 | 178 |

## 6. DIMENSIONS AND WEIGHT

For dimensions and weight please see fig. 2.

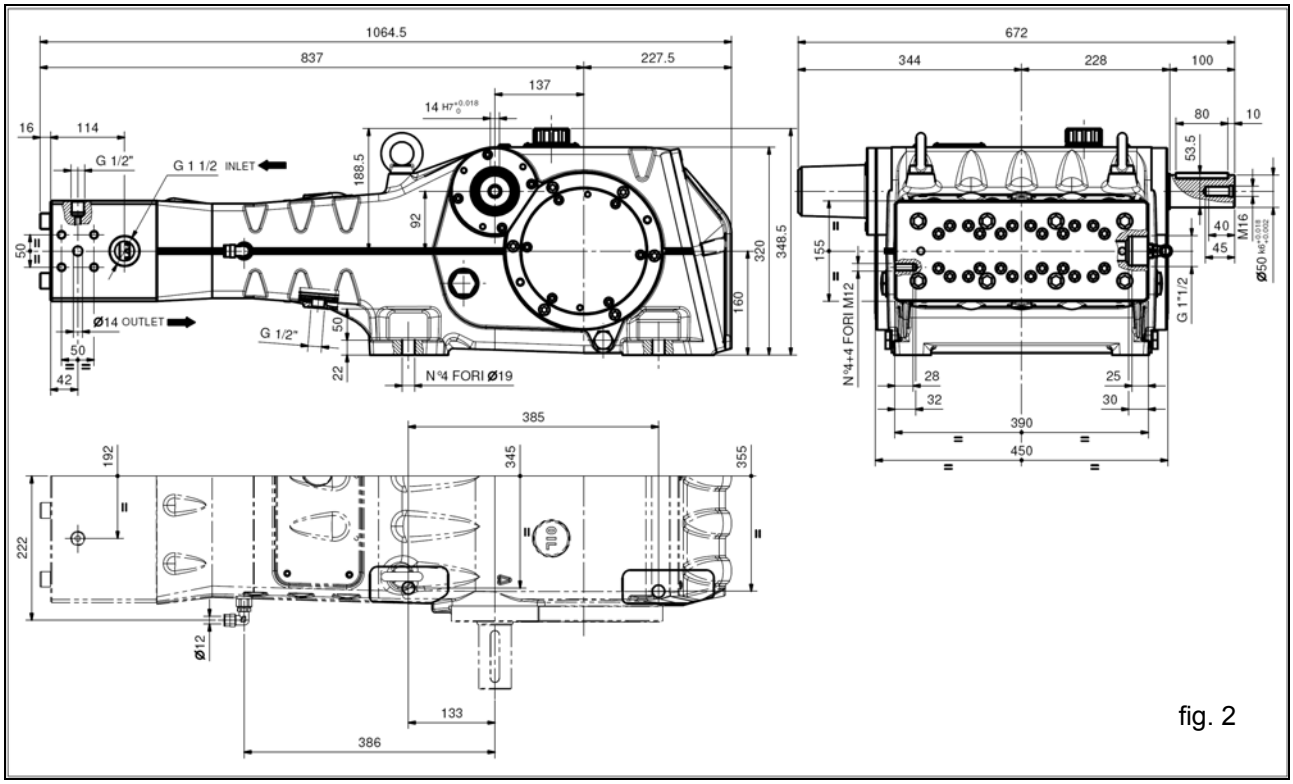



fig. 2

FORI = HOLES

## 7. INSTRUCTIONS FOR USE

The SK pump is designed to work with filtered water (see paragraph 9.6) and at a maximum temperature of 30°C.
Other liquids can only be used if previously approved by the ***Technical Office or Customer Assistance Service.***

***/*ater temperature.**
naximum water temperature permitted is 30°C.

**7.2 Maximum flow and pressure.**
The performance figures given in the catalogue are for the maximum performance levels that the pump can provide. **Independently** of the power used, the maximum pressure and RPM indicated on the plate cannot be exceeded unless explicitly authorised by the ***Technical Office or Customer Assistance Service.***

**7.3 Running at minimum speed**
Any running speed other than the one specified in the performance table (see section 5) must be explicitly authorised by the ***Technical Office or Customer Assistance Service.***

**7.4 Recommended brands and types of oil**

The pump is delivered with oil suitable for use in ambient temperatures of from 0°C to 30°C.
Some recommended types of oil are given in the table below. These are oils combined with additives to increase protection from corrosion and resistance to fatigue (to DIN 51517 part 2).
Alternatively, Automotive SAE 85W-90 lubricant oils for gearing can be used.

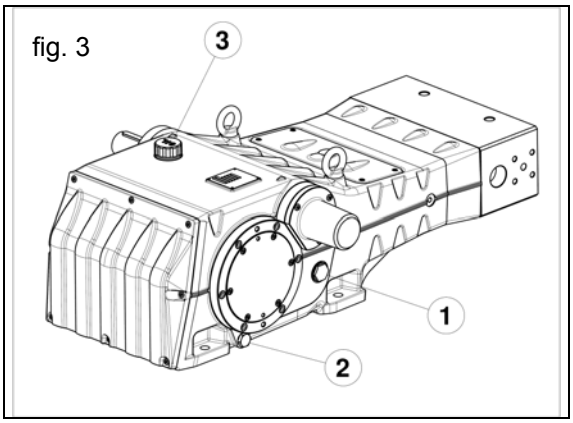
| Hersteller<br>Manufacturer<br>Producteur | Schmieröl<br>Lubricant<br>Lubrifiant |
|---|---|
| Agip | AGIP ACER 220 |
| ARAL | Aral Degol BG 220 |
| BP | BP Energol HLP 220 |
| Castrol | CASTROL HYSPIN VG 220, CASTROL MAGNA 220 |
| DEA | Falcon CL 220 |

| Hersteller<br>Manufacturer<br>Producteur | Schmieröl<br>Lubricant<br>Lubrifiant |
|---|---|
| elf | ELF POLYTELIS 220, REDUCTELF SP 220 |
| Esso | NUTO 220, TERESSO 220 |
| FINA | FINA CIRKAN 220 |
| FUCHS | RENOLIN 212, RENOLIN DTA 220 |
| Mobil | Mobil DTE Oil BB |

| Hersteller<br>Manufacturer<br>Producteur | Schmieröl<br>Lubricant<br>Lubrifiant |
|---|---|
| Shell | Shell Tellus Öl C 220 |
| SRS | Wintershall Ersolan 220, Wintershall Wiolan CN 220 |
| TEXACO | RANDO HD 220 |
| TOTAL | TOTAL Cortis 220 |

Check the oil level with the oil level lights located on the sides ①, fig.3.
If necessary, top up via the oil plug ③, fig.3.
To correctly check the oil level the pump must be at ambient temperature. To change the oil the pump must be at operating temperature, and is done by removing the plug pos.②, fig.3.
Checking and changing the oil must be done as shown in section 11.
The quantity necessary is ~14 litres.

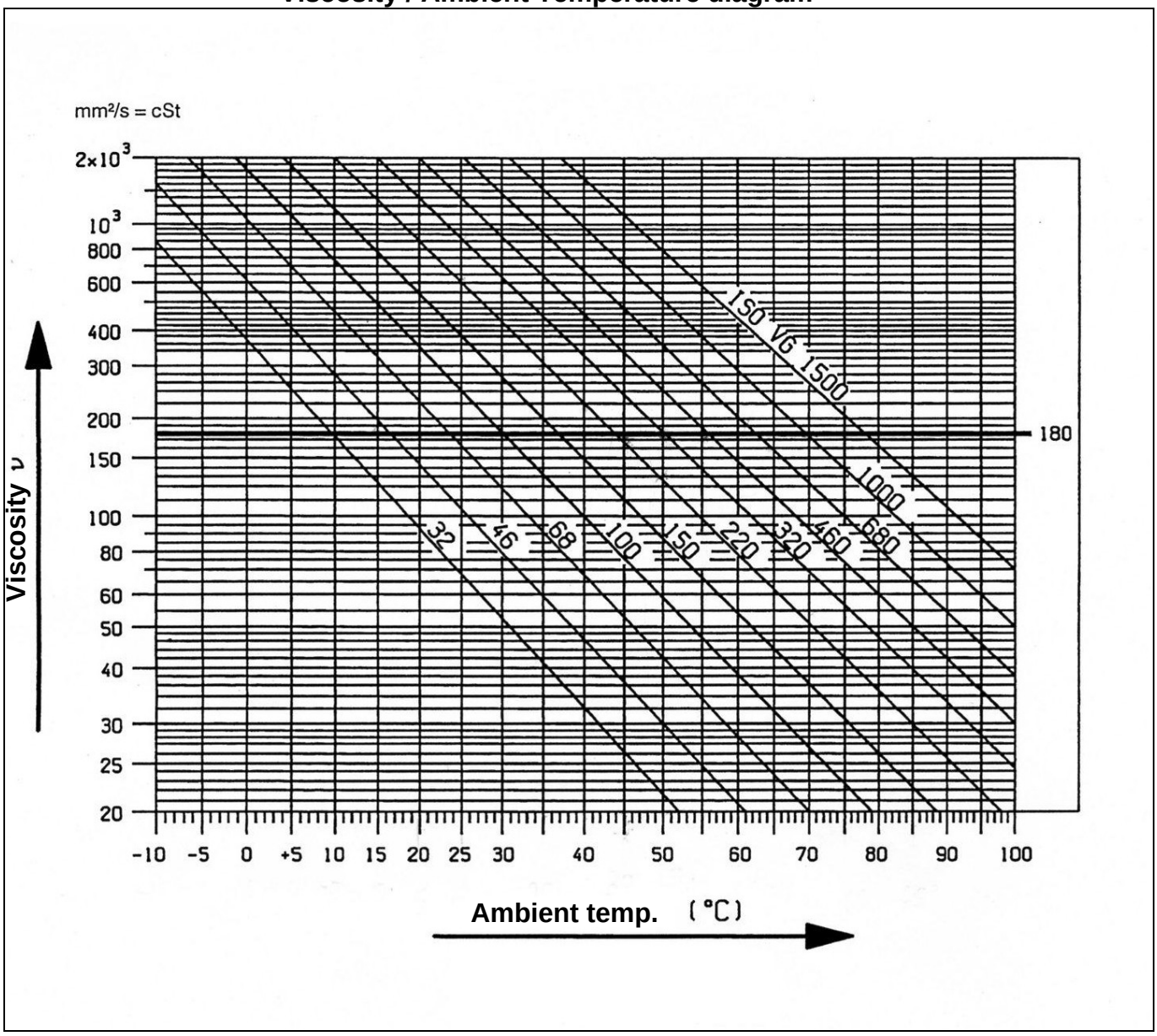
fig. 3



**The oil must always be changed at least once a year** because it can deteriorate due to oxidation.

For ambient temperatures other than 0°C to 30°C, follow the indications in the diagram below, bearing in mind that the oil must have a minimum viscosity of 180 cSt.

**Viscosity / Ambient Temperature diagram**




**The spent oil must be placed in a suitable container and disposed of properly at an authorised centre. Do not under any circumstances discard it in the environment.**

## 8. PORTS AND CONNECTIONS

The SK series of pumps have (see fig.4):

① 2 inlet ports, "IN", 1”1/2 Gas.
For the pump to work properly, it does not matter which of the two ports the line is connected to. Unused ports must be hermetically sealed.

② 2 outlet ports, “OUT”, Ø14 mm.

③ 2 service ports, 1/2” Gas. These can be used for the pressure gauge and safety valve.

④ 1 "DRAIN" port, fitted with an orientable 90° quick-fit connection for polyamide pipes of Øe 12 mm. This port allows recovery of the drainage from the cooling circuit seal packing, and it must be connected to the drain, taking care to ensure there is no counterpressure.

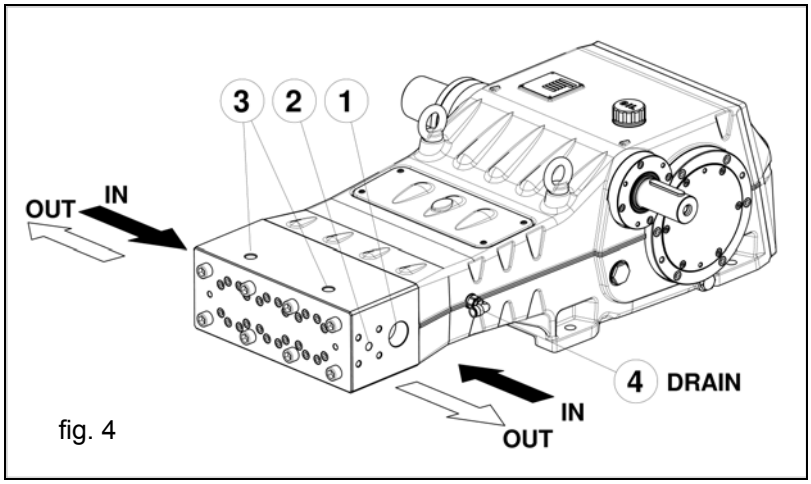


fig. 4

### 8.1 Conical seal pads / ferrules

SK pumps are provided with 4 steel conical pads, for use in the corresponding outlet ports of the pump (see fig.5) or in the optional connection flanges, to ensure the connection seal. While the seat of the pump's outlet port is already machined to accept the conical pad, if it is necessary to make the connection for the outlet connection or the closing plug, these must be specially machined as shown in fig. 5/a.

**At every disassembly, the conical pads must be replaced.**

**PASTIGLIA = PAD**
**TAPPO = PLUG**
**TESTATA POMPA = PUMP HEAD**

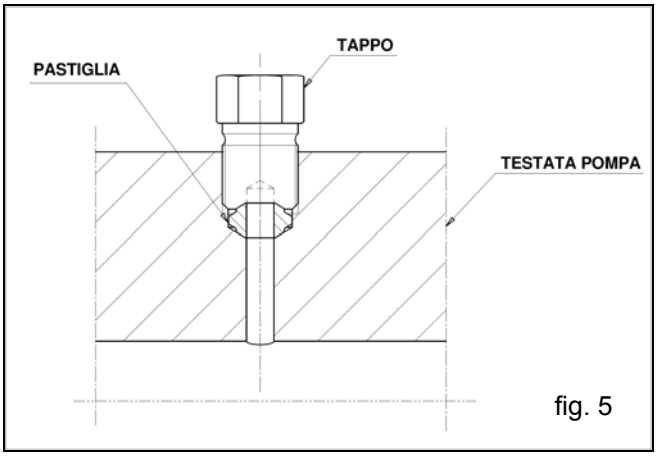


fig. 5

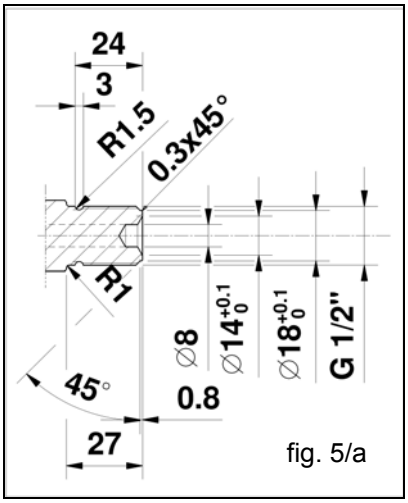


fig. 5/a

# 9. PUMP INSTALLATION

### 9.1 Installation

The pump must be fixed in a horizontal position, using the drilled Ø19 support feet.
The base must be perfectly flat and sufficiently rigid to not permit flexion and de-alignment on the pump/transmission coupling axis as a result of the torque transmitted during operation.

On the pump two lifting eyebolts are installed to facilitate installation, as shown in the figure below.

**The pump shaft (PTO) must not be rigidly connected to the propulsion group.**
We recommend the following transmission types:

- Flexible coupling.
- Cardan coupling (follow the maximum working angles recommended by the makers).

### 9.2 Direction of rotation

The direction of rotation is indicated by an arrow positioned near the power take-off (PTO) shaft.
If you stand in front of the pump head, the direction of rotation should be as in fig.6.

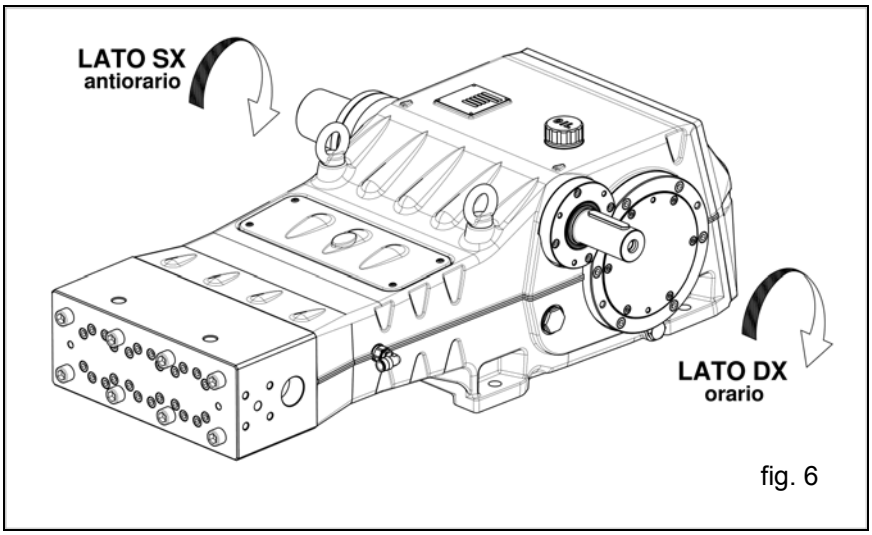



fig. 6

LATO SX = LEFT SIDE
antiorario = anticlockwise
LATO DX = RIGHT SIDE
orario = clockwise

The power take-off can be taken from either side of the pump.
Generally the pump is supplied with the PTO shank for the right-hand side (see fig.6)
To get the power off-take from the left hand side, the shaft end cover must be taken off and remounted on the right hand side of the pump (see 2.1.1 in the repair manual).
Vice-versa, the lug must be removed from the right hand side and inserted in the shank of the left hand side.

**9.3 Hydraulic connections**
To isolate the plant from the vibrations produced by the pump, we recommend building the first section of pipe adjacent to the pump (for both intake and outlet) with flexible piping. The solidity of the intake section must be enough to prevent deformation caused by the depression produced by the pump.

**9.4 Pump supply**
SK pumps require a positive water head ($NPSH_r$) of between 5 and 7 bar at the pump head entrance.
The booster supply pump must have a flow rate at least double that of the rated flow rate of the piston pump, and a minimum pressure of 5 bar.
These supply conditions must be respected for any and all working regimes.
The booster pump must be independently actuated of the piston pump.

**The booster pump must always be started before the piston pump**.
**We recommend installing a pressure switch on the supply line downstream of the filters, to protect the pump.**

**9.5 Inlet line**
For the pump to function well, the inlet line must have the following specifications:

1. Minimum internal diameter as specified by the chart in 9.8 and in any case greater than or equal to that of the pump head.

1. Prevent localised restrictions along the pipe line, as they may cause loss of load with consequent cavitation. At all costs, do not use 90° elbow corners, connections with other pipes, bottlenecks, counterslopes, overhead "U" curves, or "T" connections.
2. The layout must be designed to avoid cavitation.
3. It must be completely hermetic and built in such a way as to ensure perfect seals over time.
4. Avoid situations where stopping the pump can result in emptying, even if only partial.
5. Do not use hydraulic fittings, 3 or 4 way connections, adaptors, swivel joints etc. because they could prejudice the pump's performance.
6. Do not install Venturi pipes or injectors for detergent intake.
7. Avoid the use of foot valves or other types of one-directional valve.
8. Do not recirculate the discharge of the by-pass valve directly to the intake.
9. Have bulkheads in the tank to prevent the water flows coming from the by-pass and from the tank supply line from creating vortices or turbulence near the pump supply pipe port.
10. Make sure that, before being connected to the pump, the inlet line is absolutely clean inside.
11. Install the pressure gauge for checking the pressure of the booster pump near the inlet port of the piston pump, and always install the gauge downstream of the filters.

### 9.6 Filtration

The level of filtration permitted for this series of pumps must be max. 20 μm (micron). Normally this is obtained via a battery of at least three filters, positioned as shown in fig. 7.

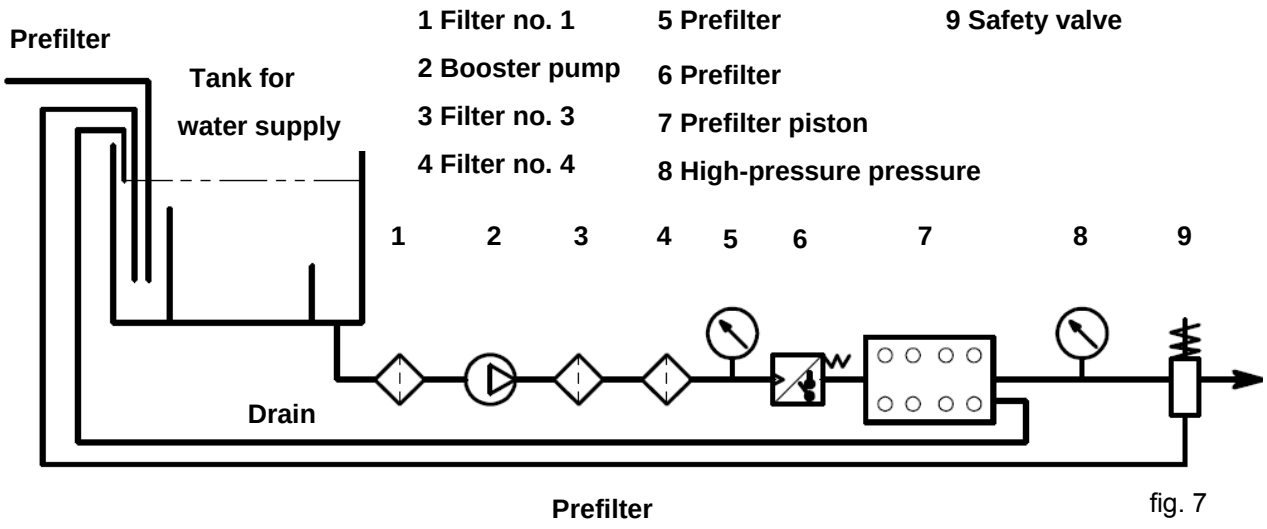



fig. 7

The filters must be installed as near as possible to the pump. They must be easily accessible for inspection and they must have the following specifications:

1. Flow rate minimum 3 times greater than the pump's rated flow rate.
2. Diameter of the entry/exit apertures not less than the diameter of the pump's inlet port.
3. Filtration grade:

   Filter no. 1: 250 μm
   Filter no. 2: 100 μm
   Filter no. 3: 20 μm

**For the pump to operate efficiently, the filters must be cleaned periodically. The cleaning frequency should be planned to complement the actual use of the pump, and it should also take into account the quality of the water used and the effective congestion conditions.**

**To guarantee the supply pressure required (see 9.4) install a pressure switch.**

### 9.7 Outlet line

For a correctly-installed outlet or delivery line, follow these specifications:

1. The internal diameter of the pipe must be sufficient to ensure the correct speed of the fluid. See the chart in 9.8.
2. The first section of pipe connected to the pump must be flexible, to isolate the vibrations produced by the pump from the rest of the system.
3. Use pumps and fittings made for high-pressure use, which guarantee ample safety margins in all operating conditions.
4. Install a safety valve on the outlet line.
5. Use pressure gauges that are designed to withstand the pulsing loads typical of piston pumps.
6. In the design phase, take account of load loss on the line, which translates to a drop in usage pressure from the pressure measured at the pump.
7. For applications where the pulsations produced by the pump on the outlet line would be damaging or undesired, install a suitably-dimensioned pulsation damper.

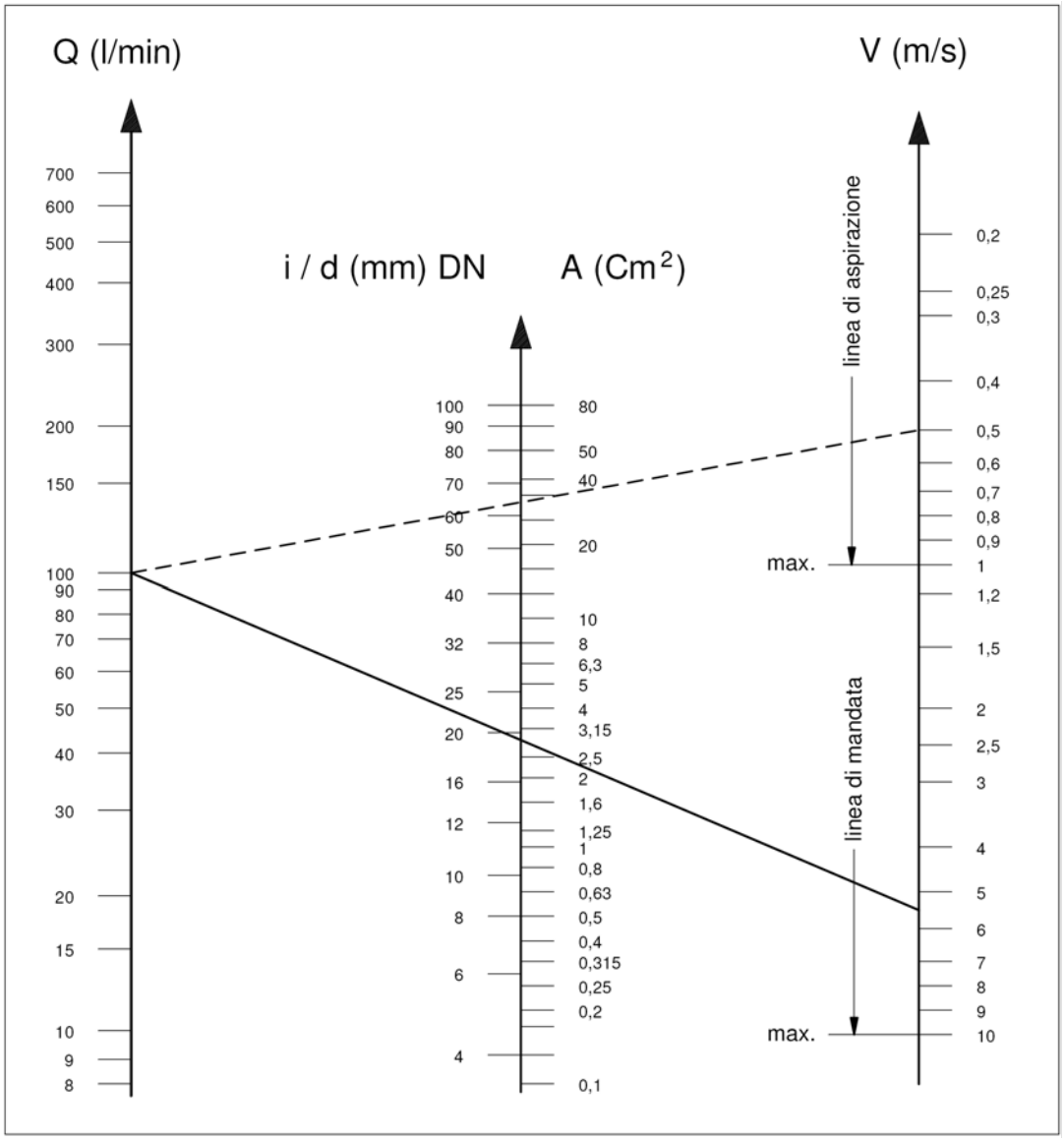
**9.8 Calculation of the internal diameter of the pipes in the pipelines.**
To determine the internal diameter of the pipeline, refer to the following diagram:

**Inlet pipeline**
With a flow rate of ~ 99 l/min and a water speed of 0.5 m/sec. The line in the chart joining the two outside scales meets the centre scale, indicating the diameters, at a value corresponding to ~ 65 mm.

**Outlet pipeline**
With a flow rate of ~ 99 l/min and a water speed of 5.5 m/sec. The line in the chart joining the two outside scales meets the centre scale, indicating the diameters, at a value corresponding to ~ 19 mm.

**Optimal speeds:**

- Inlet: ≤ 0.5 m/sec.
- Outlet: ≤ 5.5 m/sec.




linea di aspirazione = inlet line
linea di mandata = outlet line

The chart does not consider: the resistance of the pipes, the valves, the load loss produced by the engthof the pipelines, the viscosity of the liquid pumped or the liquid's temperature.
f necessary contact the Technical Office or Customer Assistance Service.

# 10. START- UP AND OPERATION

### 10.1 Preliminary checks

Before starting up the pump make sure that:

**The inlet line is connected and is under pressure (see section 9): the pump must NEVER operate dry.**

1. The inlet line guarantees a hermetic seal over time.
2. All interception valves (if present) between the source of the water supply and the pump are completely open. The outlet line is open, to allow the air in the pump head to exit quickly and so favour rapid priming.
3. All fittings and connections, both inlet and outlet, are properly fastened.
4. The coupling tolerances on the pump/transmission axis (de-alignment of half-couplings, inclination of Cardan joint etc.) are within the limits specified by the maker of the transmission.
5. The oil in the pump casing is at the correct level, verified using the oil level lights located on the sides of the casing (pos. 1 fig.8).

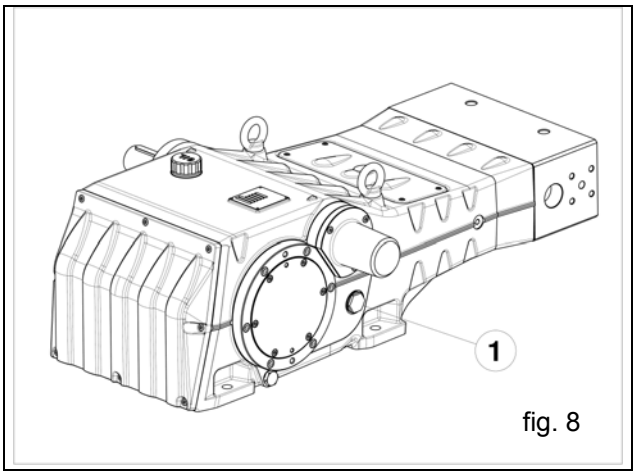



fig. 8

**If the pump has been in storage or inactive for a lengthy period, ensure the inlet and outlet valves are working properly.**

### 10.2 Startup

1. At the first startup, verify that the direction of rotation is correct.
2. Check the pump's water supply is correct.
3. Start the pump with no load.
4. Verify that when operating, the rotation speed does not exceed the rated speed.
5. Allow the pump to operate for not less than 3 minutes before putting it under pressure.
6. Before stopping the pump, always bring the pressure down to zero first, using the control valve or (if present) relief devices.

**10.3 Cooling circuit seal packing**

During operation, some water from the cooling circuit seal packings will be discharged from port 1 (fig. 9). The drainage from this circuit must be redirected to the inlet line upstream of the booster pump (fig. 9), or to the collection tank.

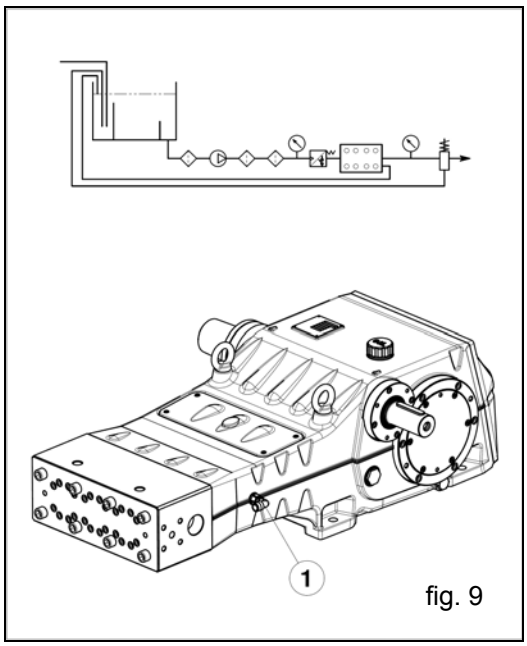



fig. 9

## 11. PREVENTIVE MAINTENANCE

To keep the pump reliable and efficient, the maintenance intervals shown in the table below must be observed.

| PREVENTIVE MAINTENANCE | |
|---|---|
| **Every 500 hours** | **Every 1500 hours** |
| Check oil level | Change oil |
| | Check / Replace: Valves<br>Valve seats<br>Valve springs |
| | Check / Replace: H.P. seals<br>L.P. seals |

# 12. STOPPING THE PUMP FOR LONG PERIODS

### 12.1 Inactivity for lengthy periods

If the pump is started for the first time after a long period of inactivity, before putting it into operation check the oil level, inspect the valves as indicated in section 10, and then follow the prescribed startup procedures.

### 12.2 Method for filling the pump with anticorrosion emulsion or anti-freeze solution using an external diaphragm pump based on the layout shown in section 9.6

a) Close the filter drainage, if it is open.
b) Make sure that the connection pipe is clean. Spread it with grease and connect it to the high-pressure discharge.
c) Connect the inlet pipe to the diaphragm pump. Open the inlet connection of the pump, and connect the pipe between this and the diaphragm pump.
d) Fill the container with solution/emulsion.
e) Put the free ends of the high-pressure inlet pipe and outlet pipe in the container.
f) Start the diaphragm pump.
g) Pump the emulsion until you see it coming out of the high-pressure outlet pipe.
h) Continue pumping for at least another minute. The emulsion can be made stronger if necessary, by adding (e.g.) Shell Donax to the solution.
i) Stop the pump, remove the pipe from the inlet connection and close it with a plug.
j) Remove the pipe from the high-pressure discharge. Clean, grease and plug both connections and the pipes.

### 12.3 Pipes

a) Before greasing and protecting the pipes according to the procedure described previously, dry the connections using compressed air.
b) Cover with polyethylene.
c) Do not wrap them too tightly. Make sure that there are no folds.

# 13. PRECAUTIONS AGAINST FREEZING

In areas and at times of year where/when cold is a risk, follow the instructions in section 12 (see point 12.2).

**If ice is present, DO NOT start the pump for any reason until the circuit has been completely thawed. If ice is still present when the pump starts, it could be very seriously damaged.**

# 14. WARRANTY TERMS

The guarantee period and conditions are contained in the purchasing contract.
The guarantee is invalidated if:

a) The pump is used for purposes other than those agreed.
b) The pump is driven with an electric motor or endothermic motor of greater performance than the levels indicated in the table.
c) The safety devices are unset or disconnected.
d) The pump is used with accessories or parts not supplied by Interpump Group.
e) The damage is caused by:
    1) Improper use
    2) Failure to follow the maintenance instructions
    3) Utilisation other than that described in the operating instructions
    4) Insufficient flow
    5) Defective installation
    6) Incorrect positioning or dimensioning of the pipes
    7) Unauthorised modifications to the design
    8) Cavitation

# 15. OPERATIONAL ANOMALIES AND THEIR POSSIBLE CAUSES

**When the pump is started, it gives no flow:**

- The pump is not primed and is operating dry.
- No water is supplied to the inlet.
- The valves are blocked.
- The outlet line is closed and this is stopping the air in the pump head from exiting.

**The pump pulses irregularly:**

- Intake of air.
- Insufficient water supply.
- Curves, elbows, and/or fittings along the inlet line are choking the passage of the liquid.
- The inlet filter or dirty or too small.
- The booster pump provides insufficient pressure or flow.
- The pump is not primed because the water head is insufficient, or the outlet is closed during priming.
- The pump is not primed because a valve is stuck.
- Worn valves.
- Worn pressure gaskets.
- Imperfect operation of the pressure control valve.
- Problems with the transmission.

**The pump does not provide the rated flow / makes excessive noise:**

- Insufficient water supply (various different causes listed above).
- The number of revs is lower than the rated RPM.
- Excessive throttling by the pressure control valve.
- Worn valves.
- Excessive throttling by the pressure gaskets.
- Cavitation, due to:
  1) Incorrect dimensioning of inlet pipes / underdimensioned diameters.
  2) Insufficient flow.
  3) High water temperature.

**The pressure provided by the pump is insufficient:**

- The usage (nozzle) is or has become greater than the pump's capacity.
- The RPM is insufficient.
- Excessive throttling by the pressure gaskets.
- Imperfect operation of the pressure control valve.
- Worn valves.

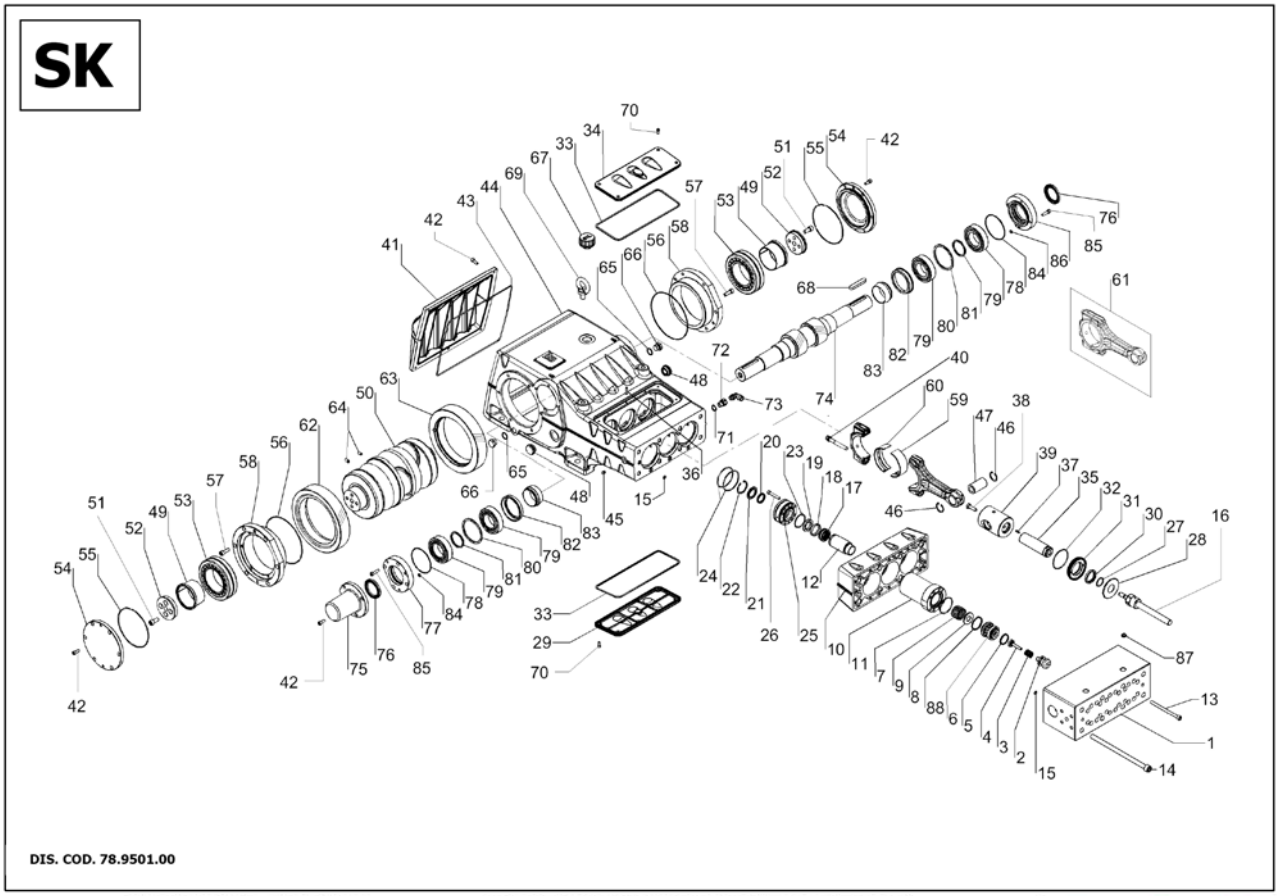
**The pump overheats:**

- The pump is working under excess pressure, or the RPM is higher than the rated level.
- The oil in the pump casing is below the correct level, or it is not of the recommended type, indicated in section 7 (see point 7.4).
- The alignment of the coupling is not perfect.
- The inclination of the pump during operation is excessive.

**Vibrations or blows on the pipes:**

- Intake of air.
- Imperfect operation of the pressure control valve.
- Malfunction in the valves.
- Non-uniform movement in the transmission.

# 16. EXPLODED VIEW AND PART LIST




| KIT RICAMBIO – SPARE KIT | | SK20 | SK22 | SK24 | SK26 | SK28 | SK30 |
|---|---|---|---|---|---|---|---|
| A | Kit tenute pomponti – Plunger packing kit | KIT 2079 | KIT 2080 | KIT 2081 | KIT 2082 | KIT 2083 | KIT 2084 |
| B | Kit tenute valvole – Valve seals kit | | KIT 2085 | | | KIT 2086 | |
| C | Kit tenute complete – Complete seals kit | KIT 2087 | KIT 2088 | KIT 2089 | KIT 2090 | KIT 2091 | KIT 2092 |
| D | Kit bronzine bielle – Conrod bushing kit | KIT 2076 | | | | | |
| E | Kit valvole aspiraz/mandata – Suction + outlet valves kit | KIT 2111 | | | KIT 2112 | | |

Pratissoli

**SK20 - SK22 - SK24**
**SK26 - SK28 - SK30**

| POS | CODE CODICE | DESCRIPTION DESCRIZIONE | KIT | NR. PCS |
|---|---|---|---|---|
| **1** | **78.1200.56** | **Testata pompa SK** | | **1** |
| **2** | **36.2080.60** | **Guida valvola** | **E** | **3** |
| 3 | 94.7475.00 | Molla Ø 18x35 – INOX – SK20-22-24 | E | 3 |
| | 94.7489.00 | Molla Ø 18.9x35 – INOX – SK26-28-30 | E | 3 |
| 4 | 36.2083.56 | Valvola Ø 20-22-24 | E | 3 |
| | 36.2084.56 | Valvola Ø 26-28-30 | E | 3 |
| **5** | **93.1987.00** | **Guarnizione Ø 36x41x3.8** | **B-C-E** | **3** |
| 6 | 36.2081.56 | Sede valvola Ø 20-22-24 | E | 3 |
| | 36.2082.56 | Sede valvola Ø 26-28-30 | E | 3 |
| **7** | **90.3903.00** | **OR Ø 60x2.62 (3237)** | **A-C** | **3** |
| 8 | 36.2078.56 | Valvola piana Ø 20-22-24 | E | 3 |
| | 36.2079.56 | Valvola piana Ø 26-28-30 | E | 3 |
| 9 | 94.7640.00 | Molla Ø 32x40 – INOX - SK20-22-24 | E | 3 |
| | 94.7705.00 | Molla Ø 41.5x44 – INOX - SK26-28-30 | E | 3 |
| **10** | **78.2100.20** | **Distanziale per camice** | | **1** |
| 11 | 78.0600.56 | Camicia Ø 20-22-24 | | 3 |
| | 78.0601.56 | Camicia Ø 26-28-30 | | 3 |
| 12 | 78.2119.82 | Bussola per pistone Ø 20 | | 3 |
| | 78.2120.82 | Bussola per pistone Ø 22 | | 3 |
| | 78.2121.82 | Bussola per pistone Ø 24 | | 3 |
| | 78.2122.82 | Bussola per pistone Ø 26 | | 3 |
| | 78.2123.82 | Bussola per pistone Ø 28 | | 3 |
| | 78.2124.82 | Bussola per pistone Ø 30 | | 3 |
| **13** | **99.3828.00** | **Vite TCEI M10x140 UNI 5931** | | **24** |
| **14** | **99.5232.00** | **Vite TCEI M16x280 UNI 5931** | | **8** |
| **15** | **90.3818.00** | **OR Ø 7.59x2.62 (3030)** | **A-C** | **2** |
| 16 | 78.0406.01 | Pistone completo Ø 20 | | 3 |
| | 78.0407.01 | Pistone completo Ø 22 | | 3 |
| | 78.0408.01 | Pistone completo Ø 24 | | 3 |
| | 78.0409.01 | Pistone completo Ø 26 | | 3 |
| | 78.0410.01 | Pistone completo Ø 28 | | 3 |
| | 78.0411.01 | Pistone completo Ø 30 | | 3 |
| 17 | 90.2712.00 | Anello ten. alt. Ø 20x36x17.9 H.P. | A-C | 3 |
| | 90.2733.00 | Anello ten. alt. Ø 22x36x17.9 H.P. | A-C | 3 |
| | 90.2744.00 | Anello ten. alt. Ø 24x36x17.9 H.P. | A-C | 3 |
| | 90.2749.50 | Anello ten. alt. Ø 26x46x20.5 H.P. | A-C | 3 |
| | 90.2759.00 | Anello ten. alt. Ø 28x46x18.5 H.P. | A-C | 3 |
| | 90.2778.00 | Anello ten. alt. Ø 30x46x17.8 H.P. | A-C | 3 |
| 18 | 78.2125.68 | Anello antiestrusore Ø 20 | A-C | 3 |
| | 78.2126.68 | Anello antiestrusore Ø 22 | A-C | 3 |
| | 78.2127.68 | Anello antiestrusore Ø 24 | A-C | 3 |
| | 78.2128.68 | Anello antiestrusore Ø 26 | A-C | 3 |
| | 78.2129.68 | Anello antiestrusore Ø 28 | A-C | 3 |
| | 78.2130.68 | Anello antiestrusore Ø 30 | A-C | 3 |
| 19 | 78.2131.60 | Bussola guarnizione Ø 20 | A-C | 3 |
| | 78.2132.60 | Bussola guarnizione Ø 22 | A-C | 3 |
| 19 | 78.2133.60 | Bussola guarnizione Ø 24 | A-C | 3 |
| | 78.2134.60 | Bussola guarnizione Ø26 | A-C | 3 |
| | 78.2135.60 | Bussola guarnizione Ø 28 | A-C | 3 |
| | 78.2136.60 | Bussola guarnizione Ø 30 | A-C | 3 |
| 20 | 90.2689.00 | Anello ten. alt. Ø 20x28x6 L.P. | A-C | 3 |
| | 90.2714.00 | Anello ten. alt. Ø 22x30x6 L.P. | A-C | 3 |
| | 90.2739.00 | Anello ten. alt. Ø 24x32x6 L.P. | A-C | 3 |
| | 90.2749.20 | Anello ten. alt. Ø 26x34x8 L.P. | A-C | 3 |
| | 90.2752.00 | Anello ten. alt. Ø 28x36x6 L.P. | A-C | 3 |
| | 90.2763.00 | Anello ten. alt. Ø 30x38x6 L.P. | A-C | 3 |
| 21 | 78.2113.56 | Anello per tenuta Ø 20 | | 3 |
| | 78.2114.56 | Anello per tenuta Ø 22 | | 3 |
| | 78.2115.56 | Anello per tenuta Ø 24 | | 3 |
| | 78.2116.56 | Anello per tenuta Ø 26 | | 3 |
| | 78.2117.56 | Anello per tenuta Ø 28 | | 3 |
| | 78.2118.56 | Anello per tenuta Ø 30 | | 3 |
| **22** | **90.0780.00** | **Anello 48 UNI 7437 – INOX** | | **3** |
| 23 | 90.3878.00 | OR Ø 39.34x2.62 (3156) - SK20-22-24 | A-C | 3 |
| | 90.3888.00 | OR Ø 48.89x2.62 (3193) - SK26-28-30 | A-C | 3 |
| **24** | **90.3914.50** | **OR Ø78.87x2.62 (3300)** | A-C | **6** |
| 25 | 78.2107.56 | Supporto guarnizione Ø 20 | | 3 |
| | 78.2108.56 | Supporto guarnizione Ø 22 | | 3 |
| | 78.2109.56 | Supporto guarnizione Ø 24 | | 3 |
| | 78.2110.56 | Supporto guarnizione Ø 26 | | 3 |
| | 78.2111.56 | Supporto guarnizione Ø 28 | | 3 |
| | 78.2112.56 | Supporto guarnizione Ø 30 | | 3 |
| **26** | **99.3146.00** | **Vite TCEI M8x50 UNI 5931** | | **30** |
| **27** | **90.3865.00** | **OR Ø 29.82x2.62 (3118)** | **C** | **3** |
| **28** | **74.2133.51** | **Paraspruzzi** | | **3** |
| **29** | **74.1502.22** | **Coperchio ispezione aperto** | | **1** |
| **30** | **90.1679.00** | **Anello rad. Ø 40x52x7** | **C** | **3** |
| **31** | **78.2137.71** | **Coperchio paraolio guida pistone** | | **3** |
| **32** | **90.3914.00** | **OR Ø 72.69x2.62 (3287)** | **C** | **3** |
| **33** | **90.4500.00** | **OR Ø 266.06x5.34 (61050)** | **C** | **2** |
| **34** | **74.1501.22** | **Coperchio ispezione chiuso** | | **1** |
| **35** | **78.0500.66** | **Stelo guida pistone** | | **3** |
| **36** | **99.1916.00** | **Vite STEI M6x30 UNI 5927** | | **3** |
| **37** | **97.6740.00** | **Spina elastica Ø 5x16 UNI EN 28748** | | **3** |
| **38** | **99.3697.00** | **Vite TE M10x35 UNI 5739** | | **3** |
| **39** | **74.0500.43** | **Guida pistone** | | **3** |
| **40** | **99.4410.00** | **Vite serraggio biella M12x1.25x87** | | **6** |
| **41** | **78.1600.20** | **Coperchio carter** | | **1** |
| **42** | **99.3059.00** | **Vite TCEI M8x20 UNI 5931 – Zinc.** | | **23** |
| **43** | **90.4170.00** | **OR Ø 355.19x3.53 (41400)** | **C** | **1** |
| **44** | **78.0100.13** | **Carter pompa** | | **1** |
| **45** | **98.1955.00** | **Tappo Koenig Ø 9x10** | | **1** |
| **46** | **90.0697.00** | **Anello 35 UNI 7437** | | **6** |
| **47** | **97.7450.00** | **Spinotto Ø 35x64** | | **3** |
| **48** | **97.5978.00** | **Spia livello olio G1"** | | **2** |
| **49** | **78.2142.00** | **Bussola di pressione** | | **2** |
| **50** | **78.0200.35** | **Albero a gomiti C.90** | | **1** |
| **51** | **99.4268.00** | **Vite TCEI M12x25 UNI 5931** | | **8** |
| **52** | **78.2139.55** | **Flangia bloccaggio bussola** | | **2** |
| **53** | **91.8862.00** | **Cuscinetto a rulli 22218CCK/C3** | | **2** |
| **54** | **78.1502.20** | **Coperchio cuscinetto** | | **2** |
| **55** | **90.3929.00** | **OR Ø 152.07x2.62 (3600)** | **C** | **2** |
| **56** | **90.3940.00** | **OR Ø 183.62x2.62 (3725)** | **C** | **2** |
| **57** | **99.3686.00** | **Vite TCEI M10x30 UNI 5931** | | **12** |
| **58** | **78.1500.13** | **Coperchio porta-cuscinetto** | | **2** |
| **59** | **90.9310.00** | **Semicusc. testa biella – Sup.** | **D** | **3** |
| **60** | **90.9300.00** | **Semicusc. testa biella – Inf.** | **D** | **3** |
| **61** | **78.0301.01** | **Biella completa** | | **3** |
| 62 | 10.0727.35 | Corona SX Z59 R2.95 Elicoid. | | 1 |
| | 10.0731.35 | Corona SX Z61 R3.389 Elicoid. | | 1 |
| 63 | 10.0728.35 | Corona DX Z59 R2.95 Elicoid. | | 1 |
| | 10.0732.35 | Corona DX Z61 R3.389 Elicoid. | | 1 |
| **64** | **97.6185.00** | **Spina Ø 8x18 UNI 1707** | | **2** |
| **65** | **96.7514.00** | **Rosetta Ø 21.5x27x1.5** | | **2** |
| **66** | **98.2183.00** | **Tappo G 1/2"x13 – Nickel** | | **2** |
| **67** | **98.2328.00** | **Tappo carico olio** | | **1** |
| **68** | **91.5010.00** | **Linguetta 14x9x80 UNI 6604** | | **1** |
| **69** | **93.1050.00** | **Golfare M16 UNI 2947 – Zinc.** | | **2** |
| **70** | **99.1837.00** | **Vite TCEI M6x14 8.8 – Zinc.** | | **8** |
| **71** | **96.7380.00** | **Rosetta Ø 17.5x23x1.5 - Alluminio** | | **1** |
| **72** | **78.2145.66** | **Raccordo strozzato Ø 3 3/8"M – 3/8"F** | | **1** |
| **73** | **96.4164.00** | **Raccordo 90° G 3/8" – Ø 12 girevole** | | **1** |
| 74 | 10.0733.55 | Pignone Z20 R2.95 Elicoid. | | 1 |
| | 10.0735.55 | Pignone Z18 R3.389 Elicoid. | | 1 |
| **75** | **78.1501.20** | **Coperchio estremità albero** | | **1** |
| **76** | **90.1724.00** | **Anello rad. Ø 55x75x8 – Viton** | **C** | **2** |
| **77** | **78.1503.20** | **Coperchio cuscinetto PTO – SX** | | **1** |
| **78** | **90.3918.00** | **OR Ø 94.92x2.62 (3375)** | **C** | **2** |
| **79** | **91.8597.00** | **Cuscinetto a rulli NJ2211ECP/C3** | | **4** |
| **80** | **78.2140.89** | **Distanziale cuscinetto esterno** | | **2** |
| **81** | **78.2141.89** | **Distanziale cuscinetto interno** | | **2** |
| **82** | **78.2144.89** | **Bussola lubrificazione cuscinetti** | | **2** |
| **83** | **78.2143.89** | **Cono lubrificazione cuscinetti** | | **2** |
| **84** | **90.3581.00** | **OR Ø 8.73x1.78 (108)** | **C** | **2** |
| **85** | **99.3084.00** | **Vite TCEI M8x30 UNI 59318.8 – Zinc.** | | **8** |
| **86** | **78.1504.20** | **Coperchio cuscinetto PTO – DX** | | **1** |
| **87** | **93.1740.00** | **Pastiglia conica di tenuta G 1/2"** | | **2** |
| 88 | 93.1989.00 | Guarnizione Ø 46x51x3.8 – SK26-28-30 | B-C-E | 3 |
| | 93.1987.00 | Guarnizione Ø 36x41x3.8 – SK20-22-24 | B-C-E | 3 |

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