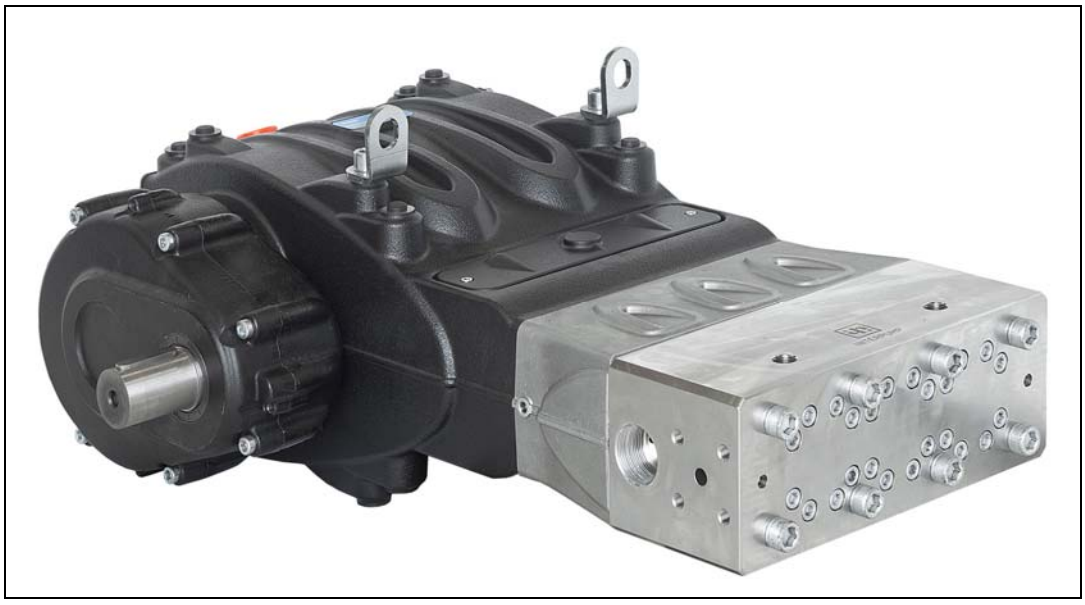
SM Series



Use and maintenance manual

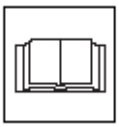
INDEX

1. INTRODUCTION

This manual describes the instructions for use and maintenance of the SM pump and 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 with the standards described in this manual.
Upon receipt, verify that the pump is intact and complete.
Report any faults before installing and starting the pump.

2. DESCRIPTION OF SYMBOLS

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 that will assemble/use and take all precautions necessary to ensure maximum safety in all operating conditions. 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 unauthorised personnel and, wherever possible, restricted or fenced.
Personnel authorised 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 by a min. pressure of 5-7 Bar (Detected in the head flange).
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.

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 generally best to organise 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 authorised personnel.
3. Assembly and disassembly of the pump and the various components must only be carried out by authorised 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 a specification label which contains:

Pump model and version
Serial number
Max revs.
Absorbed power Hp – kW
Pressure bar – P.S.I.
Flow rate l/min – Gpm

Modello	Model
Matricola	Serial number

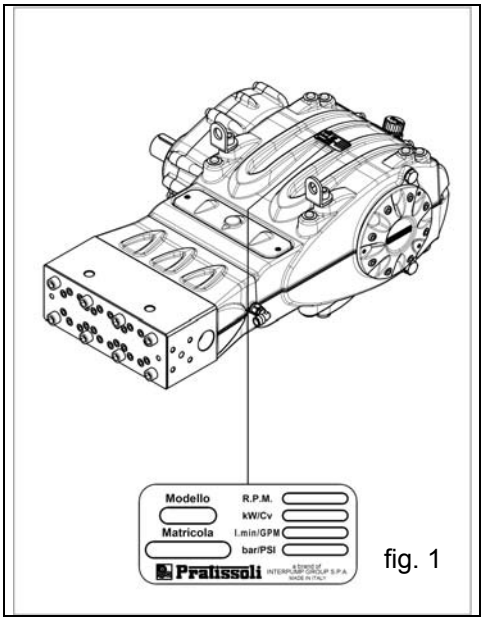


fig. 1

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

5. TECHNICAL CHARACTERISTICS

Model	Rpm/1’	Flow rate		Pressure		Power	
		l/min	Gpm	bar	psi	kW	Hp
SM 14	800	26	6.9	1500	21750	74	101
	1500	26	6.9	1500	21750	74	101
	1800	26	6.9	1500	21750	74	101
	2200	26	6.9	1500	21750	74	101
SM 16	800	34	9.0	1200	17400	78	106
	1500	34	9.0	1200	17400	78	106
	1800	34	9.0	1200	17400	78	106
	2200	34	9.0	1200	17400	78	106
SM 18	800	43	11.4	900	13050	74	101
	1500	43	11.4	900	13050	74	101
	1800	43	11.4	900	13050	74	101
	2200	43	11.4	900	13050	74	101
SM 20	800	53	14.0	750	10875	76	103
	1500	53	14.0	750	10875	76	103
	1800	53	14.0	750	10875	76	103
	2200	53	14.0	750	10875	76	103
SM 22	800	64	16.9	600	8700	73.5	100
	1500	64	16.9	600	8700	73.5	100
	1800	64	16.9	600	8700	73.5	100
	2200	65	17.2	600	8700	74	101
SM 24	800	76	20.1	500	7250	73	99
	1500	76	20.1	500	7250	73	99
	1800	76	20.1	500	7250	73	99
	2200	77	20.3	500	7250	73.5	100

6. DIMENSIONS AND WEIGHT

For dimensions and weight refer to fig. 2.

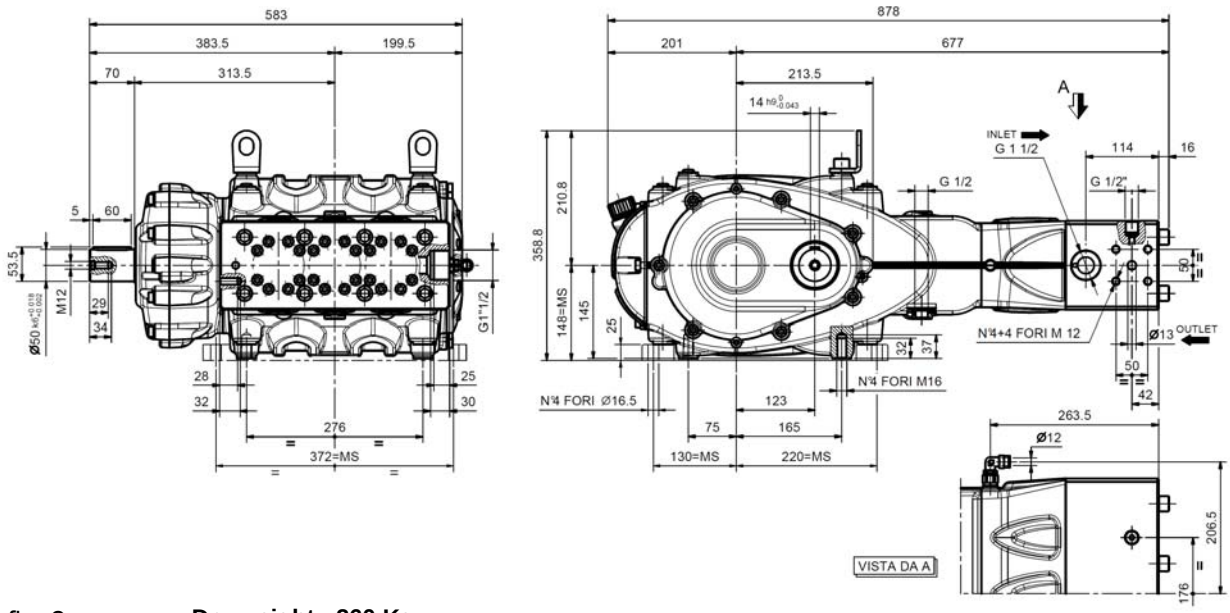


fig. 2 **Dry weight - 260 Kg**

FORI	HOLES
VISTA DA **A**	VIEW FROM **A**

7. OPERATING INSTRUCTIONS

The SM pump was designed to work with clean water (see point 9.7) and at maximum temperature. Other liquids can be used only after approval by the ***Technical or Customer Service Departments.***

7.1 Water temperature

The maximum permissible water temperature is è 30°C.

7.2 Maximum pressure and flow rate

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

7.3 Minimum rotating speed

Any rotating speed other than that indicated in the performance table (see chapter 5) must be expressly authorised by our ***Technical or Customer Service Departments.***

7.4 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 SAE 85W-90 oil for gearing lubrication.

Hersteller Manufacturer Producteur	Schmieröl Lubricant 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 Manufacturer Producteur	Schmieröl Lubricant 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 Manufacturer Producteur	Schmieröl Lubricant 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 by means of the cap with dipstick, equipped with minimum and maximum reference notches ①, fig.3. Refill if necessary to top up level.
The correct checking of the oil level is made with the pump at room temperature.
Oil changes are to be made with the pump at working temperature, removing the plug pos.②, fig.3.
The oil check and change must be carried out as indicated in chapter 11.
The quantity required is ~ 9 litres for pumps with reduction gear and ~8 litres for pumps without reduction gear.

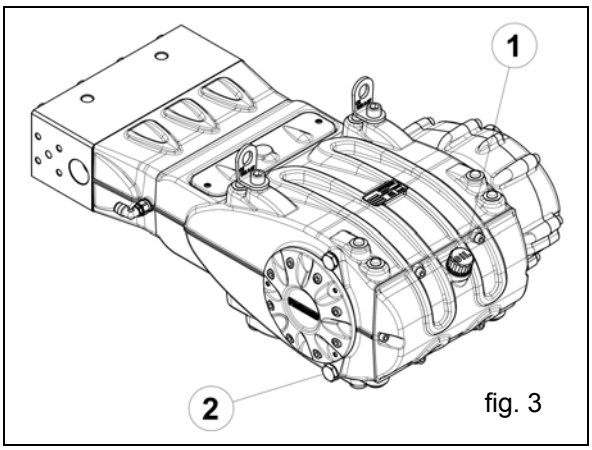
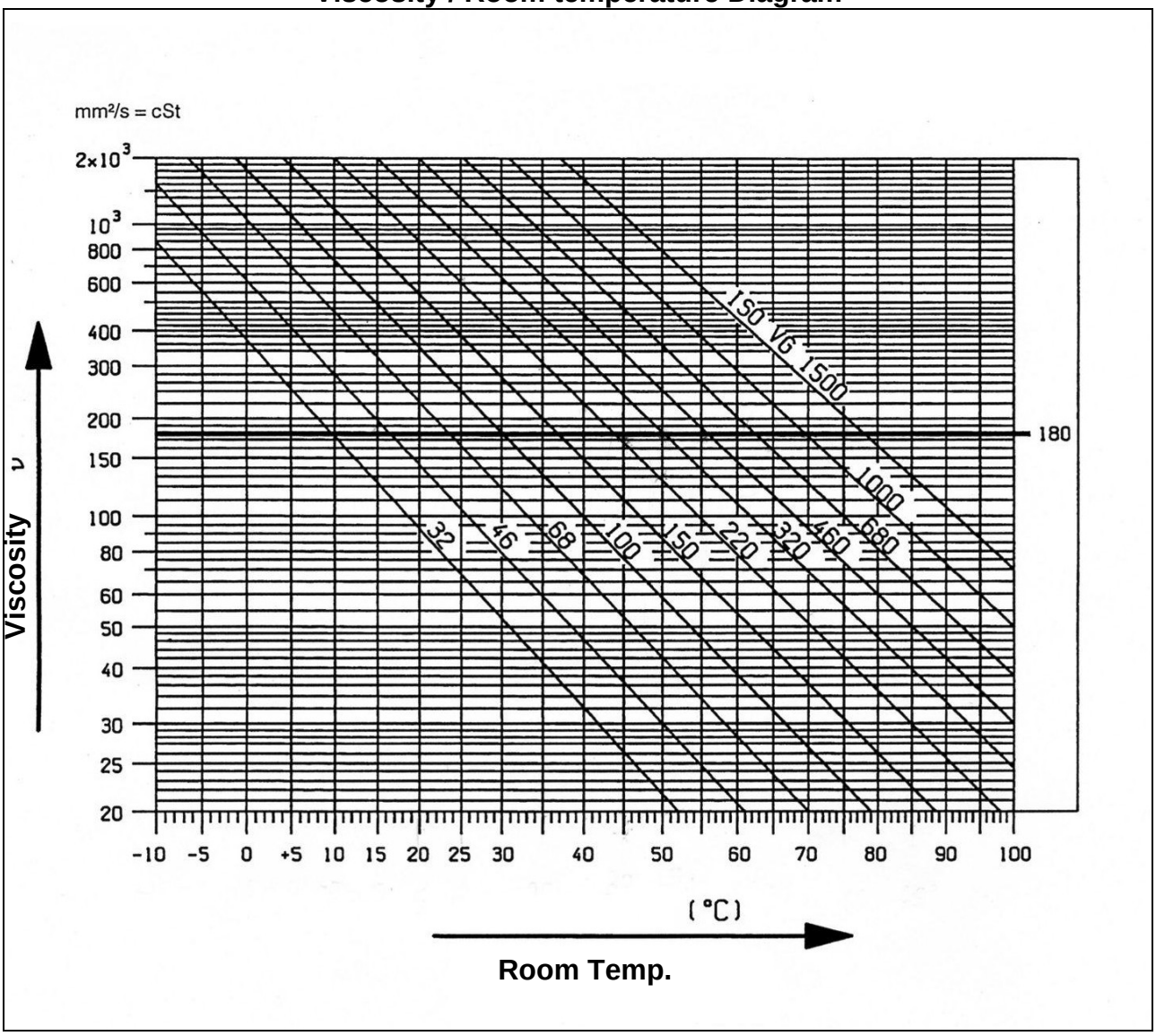


fig. 3

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



The oil must be placed in a suitable container and disposed of in special centres. It absolutely should not be discarded into the environment.

8. PORTS AND CONNECTIONS

SM series pumps are equipped with (see fig.4):

① 2 “IN“ inlet ports 1” 1/2 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 with Ø13 mm.
③ 2 service ports of 1/2” Gas, these can be used for the pressure gauge and the safety valve.
④ 1 “DRAIN “ port supplied with a 90° adjustable quick coupling for polyamide pipes with Ø 12 mm.
These allow drainage recovery of the seal pack cooling circuit and must be
connected to the discharge, making sure that there is no back pressure.

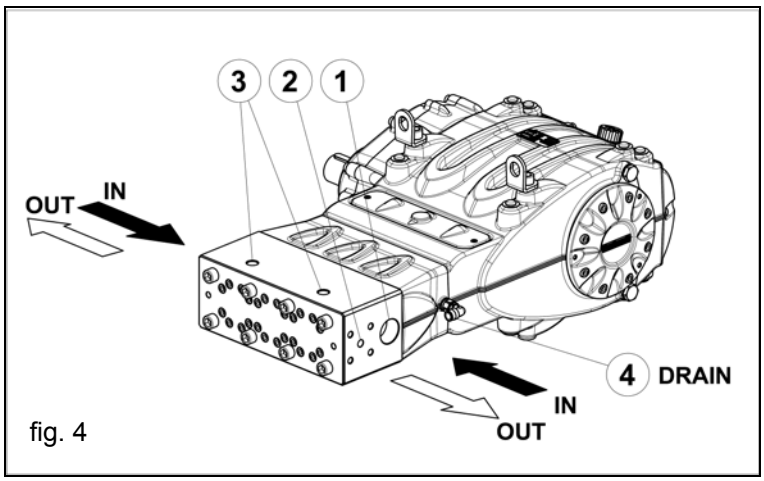


fig. 4

8.1 Linings / nose cones

The SM pumps are supplied with 4 steel tapered linings to be used in the corresponding pump outlet ports (see fig. 5) or in the optional fitting flanges, with the function of ensuring connection sealing. While the pump outlet port housing is already processed for holding the tapered lining, whenever outlet fitting or closing plug attachment is necessary, these will have to be processed as indicated in fig. 5/a.

The tapered linings must be replaced at each disassembly.

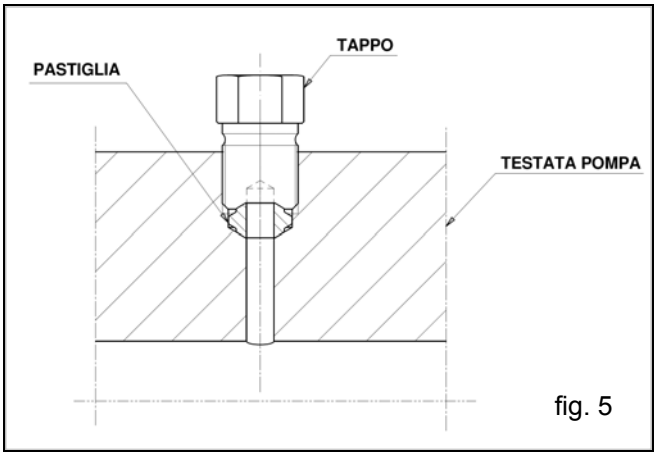


fig. 5

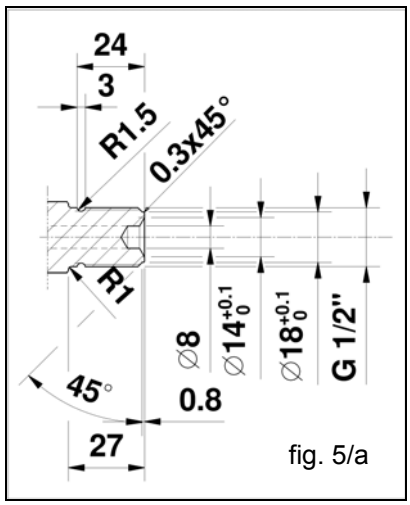


fig. 5/a

PASTIGLIA	LINING
TAPPO	PLUG
TESTATA POMPA	PUMP HEAD

9. PUMP INSTALLATION

9.1 Installation
The pump must be fixed horizontally using the M 16x1.5 threaded support feet.
Tighten the screws with a torque of 200 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.

Two lifting brackets are mounted on the pump for easy installation, as per the figure below.

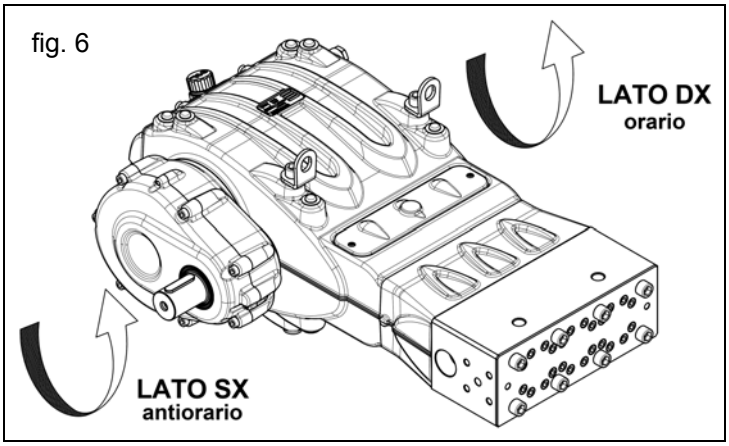
The brackets are sized solely for pump lifting and therefore are absolutely not permitted for use of additional loads.

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

The pump shaft (PTO) should not be rigidly connected to the propulsor unit
The following types of transmission are recommended:
- Flexible joint.
- Cardan-shaft (comply with manufacturer's Max. recommended working angles) .
- Belts. For proper application consult with our Technical ***or Customer Service***

9.2 Rotation direction
The PTO rotation direction is indicated by an arrow located on the reduction gear cover.
From a position facing the pump head, the rotation direction will be as in fig.6.

fig. 6



LATO DX ORARIO	**RIGHT SIDE clockwise**
LATO SX ANTIORARIO	**LEFT SIDE counter-clockwise**

9.3 Version change and reduction gear positioning
The pump version is defined as right when:
observing the pump facing the head side, the PTO shank is on the right side.

The pump version is defined as left when:
observing the pump facing the head side, the PTO shank is on the left side (see fig.6).

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

1. Separate the hydraulic part from the mechanical part as indicated in chapter 2 section 2.2.1 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. Invert the two inspection covers, ensuring that the open one is positioned lower. Finally, properly reposition the specification label in its housing on the casing.

Make sure that the lower inspection cover draining holes are open

3. Join the hydraulic part to the mechanical part as indicated in chapter 2 section 2.2.2 of the repair manual.

It is also possible to place the reduction gear in 5 different positions as per fig.7.

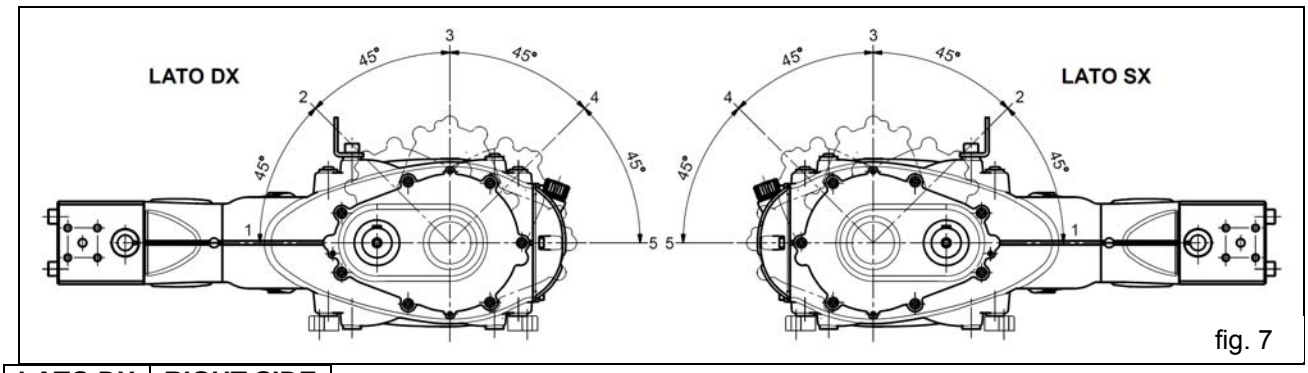


fig. 7

LATO DX	**RIGHT SIDE**
LATO SX	**LEFT SIDE**

The reduction gear position can only be modified by trained and authorised personnel carefully following directions contained in 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 consistency of the suction section must be such as to prevent deformations caused by vacuums produced by the pump.

9.5 Pump power supply

SM pumps require a positive head ($NPSH_r$) between 5 and 7 bar detected at the head inlet.
The booster supply pump must have a flow rate that is at least double the nominal flow rate of the plunger pump with minimum pressure of 5 bars.
These supply conditions must be respected at any operating rpm.
Activation of the booster pump must be independent from activation of the plunger pump.

Booster pump start-up must always come before start-up of the plunger pump .
Installing a pressure regulator downstream from the pump protection filters on the power supply line is recommended.

9.6 Suction line

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

1. Minimum internal diameter as indicated in the graph at point 9.9 and equal to or exceeding that of the pump head.
   Localised restrictions should be avoided along the run of the duct, as these can cause load losses resulting in cavitation. Avoid 90° elbow bends, connections with other piping, constrictions, counterslopes, inverted U-curves and T-connections.
2. With a layout that is set in such a way to prevent cavitation.
3. Completely airtight and constructed to ensure sealing over time.
4. Prevents that pump stopping causes emptying, even partial.
5. Do not use hydraulic fittings, 3 or 4-way fittings, adapters, swivel joints, etc. as they could jeopardise pump performance.
6. Do not install Venturi tubes or injectors for detergent suction.
7. Avoid use of base valves or other types of unidirectional valves.
8. Do not recirculate by-pass valve discharge directly into suction.
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.
11. Install the pressure gauge to control booster pressure near the plunger pump suction port and always downstream from the filters.

9.7 Filtration

The filtration allowed for this series of pumps must be max 20 μm (microns), normally obtained through a battery of at least three filters, positioned as shown in fig. 8.

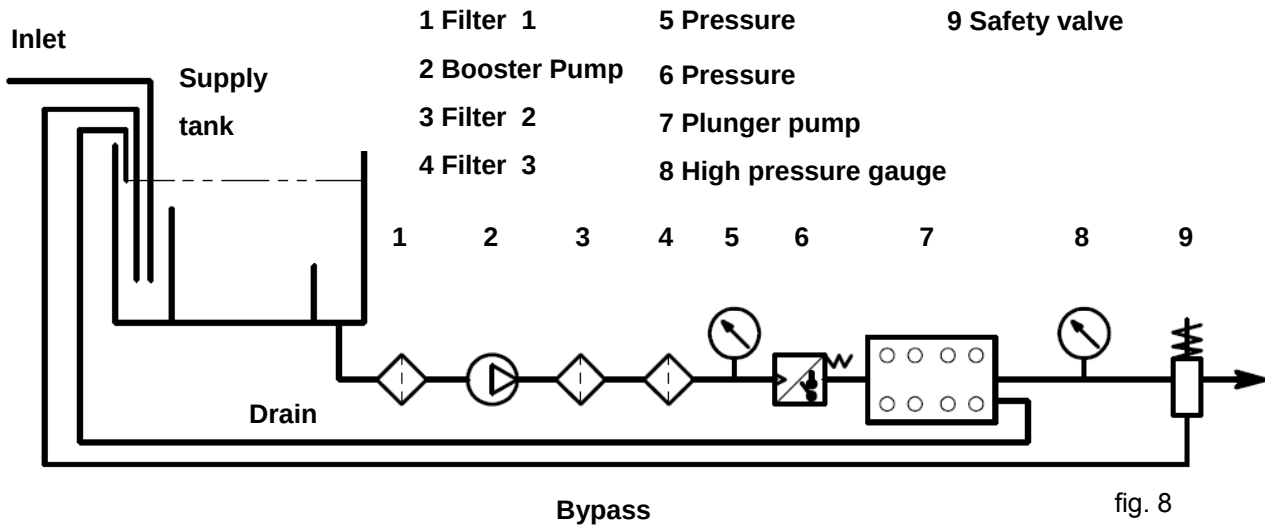


fig. 8

The filters must be installed as close as possible to the pump and must be easy to inspect and must have the following characteristics:

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 degree :

Filter 1: 250 μm
Filter 2: 100 μm
Filter 3: 20 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.

Provide a pressure regulator to ensure the required supply pressure (see section 9.5).

9.8 Outlet line

For the correct laying of the outlet line, the following installation rules must be followed:

1. The internal diameter of the pipe must be sufficient to ensure correct fluid velocity, see graph at point 9.9.
2. The first section of the line connected to the pump outlet must be a flexible hose, in order to isolate the vibrations produced by the pump of 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 installed with a safety gauge.
5. Use pressure gauges suitable to withstand pulsating loads typical of the plunger pumps.
6. During the design stage, keep in mind the line load losses which result in a drop in pressure during use 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.

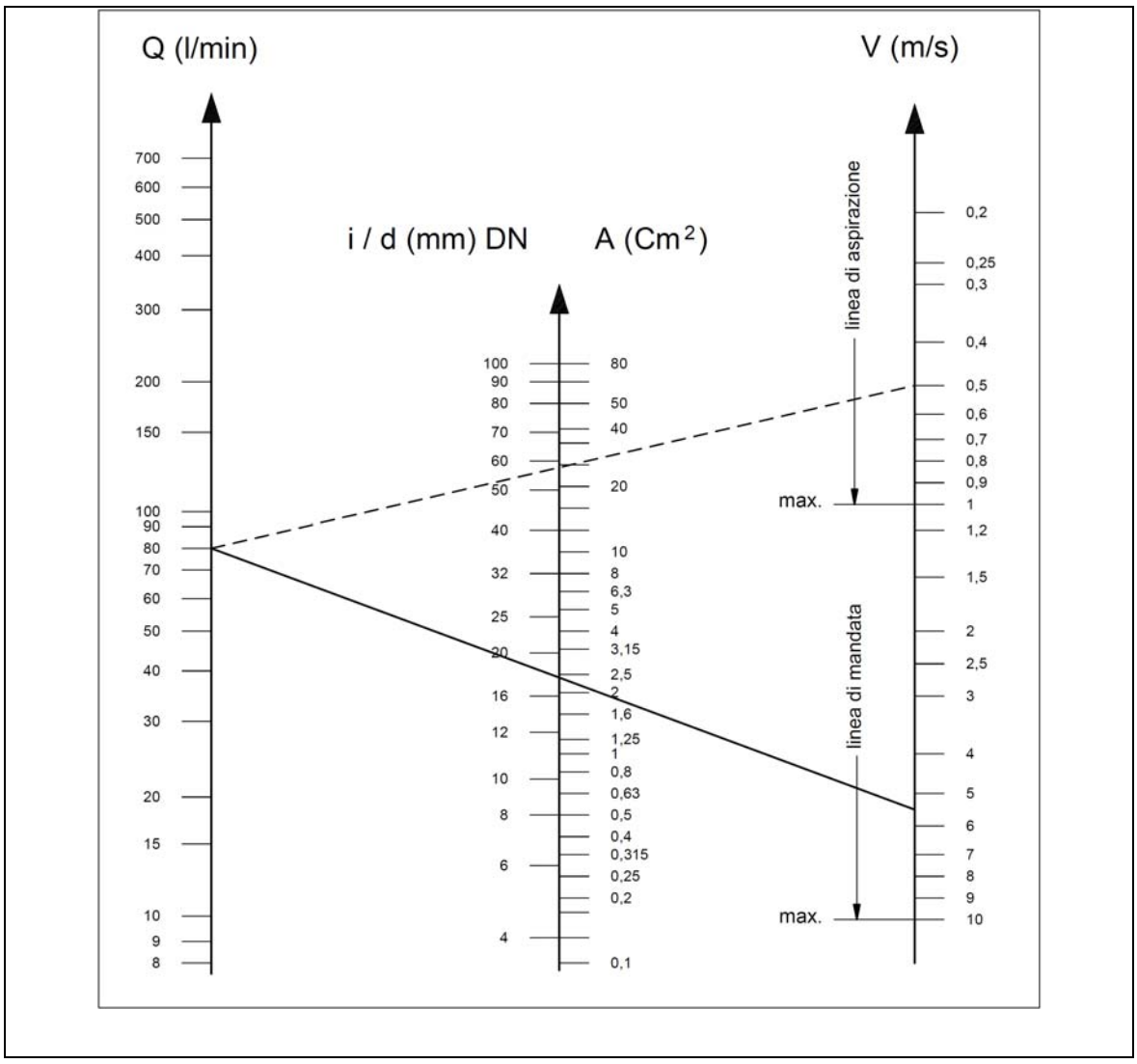
9.9 Calculation of the internal diameter of the duct pipes.
To determine the internal diameter of the duct, refer to the following diagram:

Suction duct
With a flow rate of ~ 80 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 ~ 58 mm.

Outlet duct
With a flow rate of ~ 80 l/min and a water velocity of 5.5 m/sec. The graph line joining the two scales meets the central scale showing the diameters, corresponding to a value of ~ 18 mm.

Optimal speed to be obtained with the Booster pump:
- Suction: ≤ 0.5 m/sec.
- Outlet: ≤ 5.5 m/sec.

Linea di aspirazione	**Suction line**
Linea di mandata	**Outlet line**



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
As indicated in point 9.1, the pump can be controlled by a v-belt system only in exceptional cases.
For proper layout sizing, consult our ***Technical or Customer Service Departments.***

9.11 Transmission of power from the second PTO
SM series pumps can upon request be supplied with an auxiliary power outlet on the opposite side of the activation.
Transmission can be carried out:

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

By means of the V-Belt, withdrawable Max Torque is:
150 Nm corresponding to 12.5 KW (17HP) at 800 rpm.

By means of the joint, withdrawable Max Torque is:
220 Nm corresponding to 18.4 KW (25HP) at 800 rpm.

With transmission by means of the joint, pay particular attention to perfect alignment so that no transverse forces are generated on the pump shaft.
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 pressurised (see chapter 9): 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 during is free discharge, to permit air present in the pump head to come out quickly and therefore favour 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 (position 1 fig.8)

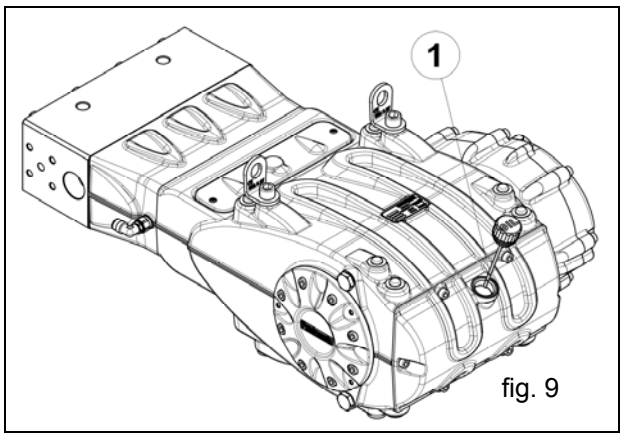


fig. 9

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 is correct.
2. Check proper pump supply.
3. Start-up the pump without any load.
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.

10.3 Seal pack cooling circuit
During operation, a certain quantity of water from the seal pack cooling circuit will come out of outlet 1 (fig.10).
Drainage of this circuit must be made to reflow to the suction line upstream of the booster pump (fig.10), or else into the collection tank.

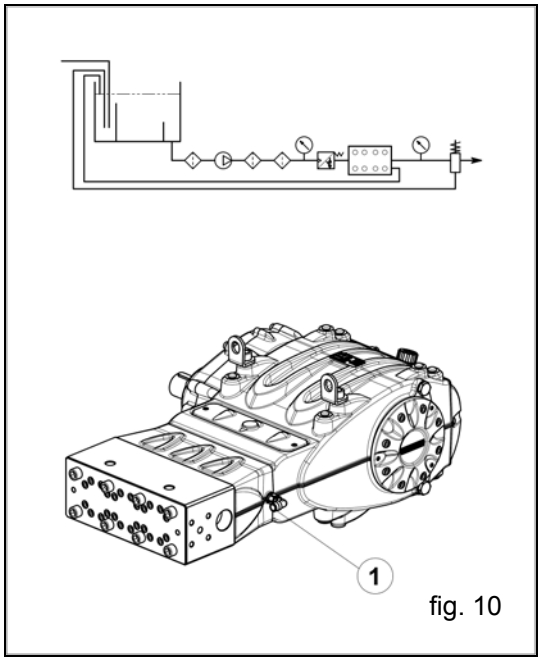


fig. 10

11. PREVENTIVE MAINTENANCE

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

PREVENTIVE MAINTENANCE	
Every 500 hours	**Every 1500 hours**
Check oil level	Change oil
	Check / Replace * : Valves Valve housings Valve springs
	Check / Replace * : H.P. seals L.P. seals

* for replacement follow instructions contained in the repair manual

12. PUMP STORAGE

12.1 Method for filling pump with anti-corrosion emulsion or anti-freeze solution using an external diaphragm pump based on the layout shown in point 9.7

a) Close the filter drainage, if open.
b) Make sure the connecting pipe is clean, spread with grease and connect them to the high pressure discharge.
c) Fix the suction pipe to the diaphragm pump, open the pump suction connection and attach the pipe between it and the diaphragm pump.
d) Fill the container with solution/emulsion.
e) Put the free ends of the suction pipe and the high pressure exhaust pipe inside the container.
f) Switch on the diaphragm pump.
g) Pump the emulsion until it exits from the high pressure exhaust pipe.
h) Continue pumping for at least another minute. The emulsion can be reinforced if necessary by adding Shell Donax for example to the solution.
i) Stop the pump, remove the pipe from the suction connection and close with a plug.
j) Remove the hose from the high pressure exhaust. Clean and grease and plug both connections and pipes.

12.2 Tubes

a) Before greasing and protecting pipes according to previously described procedure, dry connections with compressed air.
b) Cover with polyethylene.
c) Do not wind too tight, ensure that there are no folds.

13. PRECAUTIONS AGAINST FROST

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

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

14. GUARANTEE CONDITIONS

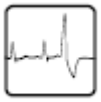
The guarantee duration and conditions are contained in the purchase agreement.
The guarantee will be invalidated if:

a) The pump is used for purposes other than for those agreed upon.
b) The pump is fitted with an electric or combustion motor with performance exceeding those indicated in the table.
c) Safety devices are decalibrated or disconnected.
d) The pump is used with accessories or 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) insufficient flow rate
    5) defective installation
    6) improper positioning or sizing of pipes
    7) unauthorised plan 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 blocked.
- The outlet line during is closed and does not allow air present in the pump head to come out.



The pump pulsates irregularly:

- Air suction.
- Insufficient supply.
- Bends, elbow bends, fittings along the suction line are choking the passage of liquid.
- The suction filter is dirty or too small.
- The booster pump is supplying insufficient pressure or flow rate.
- The pump is not primed for insufficient head or the outlet is closed during priming.
- The pump is not primed for the fixing of some valves.
- 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:

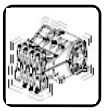
- Insufficient supply (see various causes as above).
- The number of rpms is less than the nominal rate.
- Excessive leakage of the pressure control valve.
- Worn valves.
- Excessive leakage of the pressure seals.
- Cavitation due to:
  1) Improper sizing of suction ducts/undersized diameters.
  2) Insufficient flow rate.
  3 Elevated water temperature.

The pressure supplied by the pump is insufficient:

- Use (nozzle) is or has become higher than the capacity of the pump.
- The number of rpms is insufficient.
- Excessive leakage of the pressure seals.
- Imperfect functioning of the pressure control valve.
- Worn valves.

The pump is overheated:

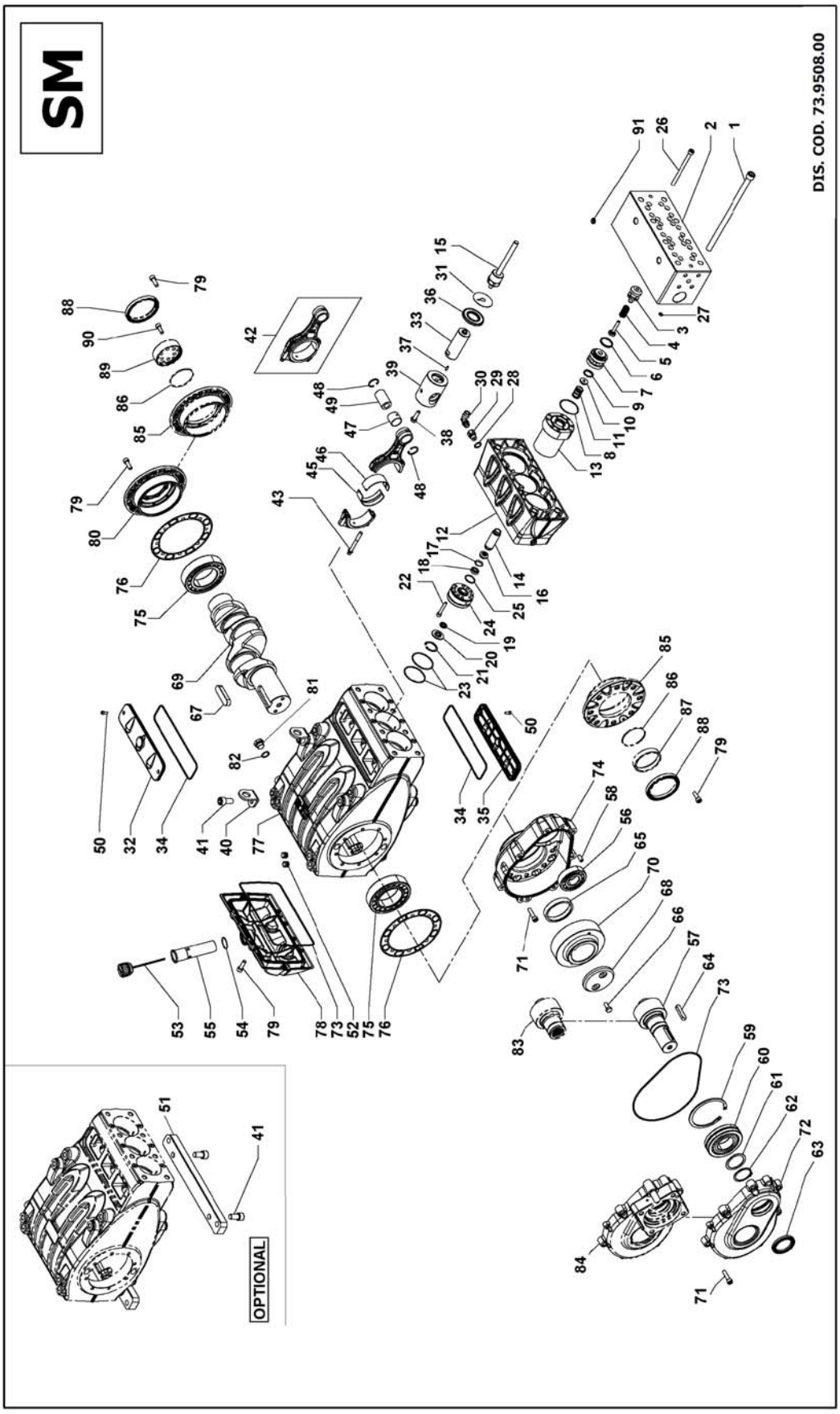
- The pump is working in pressure excess or the number of rpms is higher than the nominal rate.
- Oil in the pump casing is not at level or not the recommended type as detailed in chapter 7 (see point 7.4) .
- Joint or pulley alignment is incorrect.
- Excessive pump tilt during operation.



Vibrations and shock to pipes:

- Air suction.
- Imperfect functioning of the pressure control valve.
- Valve malfunction.
- Non-uniformity in the transmission motion.

16. EXPLODED DRAWING AND PARTS LIST



Pratissoli

SM14 – SM16 – SM18
SM20 – SM22 – SM24

KIT RICAMBIO – SPARE KIT		SM14	SM16	SM18	SM20	SM22	SM24
A	Kit tenute pompanti – Plunger packing kit	KIT 2190	KIT 2191	KIT 2192	KIT 2198	KIT 2199	KIT 2200
B	Kit tenute valvole – Valve seals kit	KIT 2193			KIT 2085		
C	Kit tenute complete – Complete seals kit	KIT 2195	KIT 2196	KIT 2197	KIT 2201	KIT 2202	KIT 2203
D	Kit bronzine bielle – Conrod bushing kit	KIT 2150 – 2151 - 2153					
E	Kit valvole aspiraz/mandata – Suction + outlet valves kit	KIT 2194			KIT 2111		
F	Kit piedi di fissaggio – Mounting feet kit	KIT 2152					

Pag.21 disegno 16	Pag.21 drawing 16
KIT RICAMBIO	SPARE PARTS LIST
A-kit tenute pompanti	A- Pump seals kit
B-Kit tenute valvole	B- Valve seals kit
C-Kit tenute complete	C- Complete seals kit
D-Kit bronzine biele	D-Con-rod bushings kit
E-Kit valvole aspiraz/mandata	E-Suction/outlet valves kit
F-Kit piedi di fissaggio	F-Fixing feet kit

POS	CODE CODICE	DESCRIPTION DESCRIZIONE	KIT	NR. PCS
1	**99.5242.00**	**Vite M16x320 UNI 5931**		**8**
2	**73.1206.56**	**Testata pompa SM**		**1**
3	**36.2080.60**	**Guida valvola**	**E**	**3**
4	**94.7475.00**	**Molla Ø 18x35 – INOX**	**E**	**3**
5	**36.2083.56**	**Valvola Ø 14-16-18**	**E**	**3**
6	**93.1987.00**	**Guarnizione Ø 36x31x3.8**	**B-C-E**	**3÷6**
7	36.2109.56	Sede valvola Ø 14-16-18	E	3
	36.2081.56	Sede valvola Ø 20-22-24	E	3
8	**90.3903.00**	**OR Ø 60x2.62 (3237)**	**A-C**	**3**
9	**93.1974.00**	**Guarnizione Ø 26x31x3.8**	**B-C-E**	**3**
10	36.2110.56	Valvola piana Ø 14-16-18	E	3
	36.2078.56	Valvola piana Ø 20-22-24	E	3
11	94.7525.00	Molla Ø 23.2x30.8 – SM 14-16-18	E	3
	94.7640.00	Molla Ø 32x40 – SM 20-22-24	E	3
12	**73.2173.20**	**Distanziale per camice**		**1**
13	73.0600.56	Camicia Ø 14-16-18		3
	73.0601.56	Camicia Ø 20-22-24		3
14	73.2198.82	Bussola per pistone Ø 14		3
	73.2199.82	Bussola per pistone Ø 16		3
	73.2200.82	Bussola per pistone Ø 18		3
	73.2201.82	Bussola per pistone Ø 20		3
	73.2202.82	Bussola per pistone Ø 22		3
	73.2203.82	Bussola per pistone Ø 24		3
15	73.0412.01	Pistone completo Ø 14		3
	73.0413.01	Pistone completo Ø 16		3
	73.0414.01	Pistone completo Ø 18		3
	73.0415.01	Pistone completo Ø 20		3
	73.0416.01	Pistone completo Ø 22		3
	73.0417.01	Pistone completo Ø 24		3
16	90.2606.50	Anello ten. alt. Ø 14x26x11 HP	A-C	3
	90.2635.00	Anello ten. alt. Ø 16x26x11 HP	A-C	3
	90.2652.50	Anello ten. alt. Ø 18x25x10.6 HP	A-C	3
	90.2712.00	Anello ten. alt. Ø 20x36x17.9 HP	A-C	3
	90.2733.00	Anello ten. alt. Ø 22x36x17.9 HP	A-C	3
	90.2744.00	Anello ten. alt. Ø 24x36x17.9 HP	A-C	3
17	73.2192.68	Anello antiestrusore Ø 14	A-C	3
	73.2193.68	Anello antiestrusore Ø 16	A-C	3
	73.2194.68	Anello antiestrusore Ø 18	A-C	3
	78.2125.68	Anello antiestrusore Ø 20	A-C	3
	78.2136.68	Anello antiestrusore Ø 22	A-C	3
	78.2137.68	Anello antiestrusore Ø 24	A-C	3
18	73.2195.60	Bussola guarnizioni Ø 14	A-C	3
	73.2196.60	Bussola guarnizioni Ø 16	A-C	3
	73.2197.60	Bussola guarnizioni Ø 18	A-C	3
	78.2131.60	Bussola guarnizioni Ø 20	A-C	3
	78.2132.60	Bussola guarnizioni Ø 22	A-C	3
	78.2133.60	Bussola guarnizioni Ø 24	A-C	3
19	90.2604.00	Anello ten. alt. Ø 14x22x6 LP	A-C	3
	90.2629.50	Anello ten. alt. Ø 16x24x6 LP	A-C	3
	90.2651.50	Anello ten. alt. Ø 18x26x6 LP	A-C	3

POS	CODE CODICE	DESCRIPTION DESCRIZIONE	KIT	NR. PCS
19	90.2689.00	Anello ten. alt. Ø 20x38x6 LP	A-C	3
	90.2714.00	Anello ten. alt. Ø 22x30x6 LP	A-C	3
	90.2739.00	Anello ten. alt. Ø 24x32x6 LP	A-C	3
20	73.2186.56	Anello per tenuta Ø 14		3
	73.2187.56	Anello per tenuta Ø 16		3
	73.2188.56	Anello per tenuta Ø 18		3
	73.2189.56	Anello per tenuta Ø 20		3
	73.2190.56	Anello per tenuta Ø 22		3
	73.2191.56	Anello per tenuta Ø 24		3
21	**90.0731.00**	**Anello seeger Ø 40 UNI 7437**		**3**
22	**99.3146.00**	**Vite M8x50 UNI 5931**		**30**
23	**90.3913.00**	**OR Ø 67.95x2.62 (3268)**	**A-C**	**6**
24	73.2180.56	Supporto guarnizione Ø 14		3
	73.2181.56	Supporto guarnizione Ø 16		3
	73.2182.56	Supporto guarnizione Ø 18		3
	73.2183.56	Supporto guarnizione Ø 20		3
	73.2184.56	Supporto guarnizione Ø 22		3
	73.2185.56	Supporto guarnizione Ø 24		3
25	90.3866.00	OR Ø 29.82x2.62 (3118) – SM 14 16 18	A-C	3
	90.3878.00	OR Ø 39.34x2.62 (3156) – SM 20 22 24	A-C	3
26	**99.3828.00**	**Vite M10x140 UNI 5931**		**24**
27	**90.3818.00**	**OR Ø 7.59x2.62 (3030)**	**A-C**	**1**
28	**96.7380.00**	**Rosetta Ø 17.5x23x1.5**		**1**
29	**78.2145.66**	**Raccordo str. Ø 3 3/8"-3/8" M-M**		**1**
30	**96.4164.00**	**Raccordo 90° G 3/8" - Ø12 girev.**		**1**
31	**96.7355.00**	**Rosetta Ø 16x65x1**		**3**
32	**73.1500.22**	**Coperchio ispezione chiuso**		**1**
33	**73.0501.56**	**Stelo guida pistone**		**3**
34	**90.4148.00**	**OR Ø 202.8x3.53 (4800)**	**C**	**2**
35	**73.1501.22**	**Coperchio ispezione aperto**		**1**
36	**90.1685.00**	**Anello rad. Ø 40x72x7/8.5**	**C**	**3**
37	**97.6740.00**	**Spina elastica Ø5x16 UNI 6876**		**3**
38	**99.3697.00**	**Vite M10x35 UNI 5739**		**3**
39	73.0500.43	Guida pistone		3
	73.0502.43	Guida pistone +0.10		3
40	**73.2106.74**	**Staffa di sollevamento**		**1**
41	**99.5130.00**	**Vite M16x30 UNI 5931**	**F**	**2÷4**
42	**73.0301.01**	**Biella – Completa**		**3**
43	**99.3788.00**	**Vite serraggio biella**		**6**
45	90.9283.00	Semiboccola testa biella – Inf.	D	3
	90.9284.00	Semiboccola testa biella +0.25 – Inf.	D	3
	90.9285.00	Semiboccola testa biella +0.50 – Inf.	D	3
46	90.9280.00	Semiboccola testa biella – Sup.	D	3
	90.9281.00	Semiboccola testa biella +0.25 – Sup.	D	3
	90.9282.00	Semiboccola testa biella +0.50 – Sup.	D	3
47	**90.9158.00**	**Boccola piede biella**		**3**
48	**90.0690.00**	**Anello seeger Ø 32 UNI 7437**		**6**
49	**97.7440.00**	**Spinotto Ø 32x55**		**3**
50	**99.1837.00**	**Vite M6x14 UNI 5931**		**4**
51	**73.2000.64**	**Piedino pompa**	**F**	**2**
52	**98.2060.00**	**Tappo per foro Ø 15 – TTN18**		**6**
53	**98.2331.00**	**Tappo olio G 1" con asta L=130**		**1**

POS	CODE CODICE	DESCRIPTION DESCRIZIONE	KIT	NR. PCS
54	**90.3616.00**	**OR Ø 34.65x1.78 (2137)**	**C**	**1**
55	**73.2102.95**	**Tubo per tappo carico olio G 1"**		**1**
56	**91.8540.00**	**Cuscinetto a rulli NJ308ECP**		**1**
57	10.0767.35	Pignone Z24 R.1.875 - Elicoidale		1
	10.0768.35	Pignone Z21 R.2.238 - Elicoidale		1
	10.0769.35	Pignone Z18 R.2.722 - Elicoidale		1
58	**97.6230.00**	**Spina cilindrica Ø 10x24 UNI 6364**		**2**
59	**90.1010.00**	**Anello seeger Ø 120 UNI 7437**		**1**
60	**91.8599.00**	**Cuscinetto a rulli Ø 55x120x29**		**1**
61	**73.2104.55**	**Anello appoggio cuscinetto**		**1**
62	**90.0810.00**	**Anello seeger Ø 55 UNI 7435**		**1**
63	**90.1724.00**	**Anello rad. Ø 55x75x8**	**C**	**1**
64	**91.5005.00**	**Linguetta 14x9x60 UNI 6604**		**1**
65	**73.2105.89**	**Anello appoggio corona**		**1**
66	**99.3667.00**	**Vite M10x25 UNI 5739**		**2**
67	**91.5110.00**	**Linguetta 22x14x80 UNI 6604**		**1**
68	**74.2132.55**	**Fermo corona**		**1**
69	**73.0200.35**	**Albero a gomiti C.70**		**1**
70	10.0770.35	Corona Z45 R.1.875 - Elicoidale		1
	10.0771.35	Corona Z47 R.2.238 - Elicoidale		1
	10.0772.35	Corona Z49 R.2.722 - Elicoidale		1
71	**99.3710.00**	**Vite M10x40 UNI 5931**		**15**
72	**73.2101.13**	**Coperchio riduttore**		**1**
73	**90.4150.00**	**OR Ø 253.6x3.53 (41000)**	**C**	**2**
74	**73.2100.13**	**Scatola riduttore**		**1**
75	**91.8810.00**	**Cuscinetto a rulli Ø 80x140x33**		**2**
76	**73.2103.84**	**Guarnizione laterale**	**C**	**2**
77	**73.0100.13**	**Carter pompa**		**1**
78	**73.1600.22**	**Coperchio posteriore carter**		**1**
79	**99.3686.00**	**Vite M10x30 UNI 5931**		**14**
80	**73.1502.22**	**Coperchio cuscinetto**		**1**
81	**98.2183.00**	**Tappo G 1/2"x13 - NICKEL**		**2**
82	**96.7514.00**	**Rosetta Ø 21.5x27x1.5**		**3**
CON MOTORE IDRAULICO – WITH HYDRAULIC MOTOR				
83	10.0794.55	Pignone Z18 R.2.722 – Elicoidale		1
	10.0773.55	Pignone Z24 R.1.875 – Elicoidale		1
	10.0774.55	Pignone Z21 R.2.238 - Elicoidale		1
84	**73.2155.13**	**Coperchio riduttore Hydraulic Pack**		**1**
AZIONAMENTO DIRETTO – DIRECT DRIVE				
79	**99.3686.00**	**Vite M10x30 UNI 5931**		**8**
85	**73.1503.22**	**Coperchio cuscinetto aperto**		**1**
86	**90.3914.50**	**OR Ø 75.87x2.62 (3300)**		**1**
87	**73.2156.54**	**Anello per funzionamento idraulico**		**1**
88	**90.1950.00**	**Anello rad. Ø 90x110x12**		**1**
CON PRESA DI FORZA AUSILIARIA – WITH AUXILIARY PTO				
79	**99.3686.00**	**Vite M10x30 UNI 5931**		**8**
85	**73.1503.22**	**Coperchio cuscinetto aperto**		**1**
86	**90.3914.50**	**OR Ø 75.87x2.62 (3300)**		**1**
88	**90.1950.00**	**Anello rad. Ø 90x110x12**		**1**
89	**73.2157.54**	**Dispositivo presa di forza ausiliaria**		**1**
90	**99.3672.00**	**Vite m10x25 UNI 5931**		**6**

Pag.23 Tabella POS / CODICE/ DESCRIZIONE/ KIT /NR.PCS	**Pag.23 Table** POS / CODE/ DESCRIPTION/ KIT /NBR.PIECES
1-Vite M16x320 UNI 5931 2- Testata pompa SM 3-Guida valvola 4-Molla Ø 18x35 – INOX 5-Valvola Ø 14-16-18 6-Guranizione Ø 36x31x3,8	1- M16x320 screw UNI 5931 2- SM pump head 3-Valve guide 4- Ø 18x35 spring – stainless steel 5-Valve Ø 14-16-18 6-Gasket Ø 36x31x3.8
7-Sede valvola Ø 14-16-18 Sede valvola Ø 20-22-24	7-Valve housing Ø 14-16-18 Valve housing Ø 20-22-24
8-OR Ø 60X2,62 (3237) 9- Guarnizione Ø 26-31-3,8	8-OR Ø 60X2.62 (3237) 9- Gasket Ø 26-31-3.8
10-Valvola piana Ø 14-16-18 Valvola piana Ø 20-22-24	10-Flat valve Ø 14-16-18 Flat valve Ø 20-22-24
11- Molla 23,2x30,8 – SM 14-16-18 Molla 32x40 – SM 20-22-24	11- Spring 23.2x30,8 – SM 14-16-18 Spring 32x40 – SM 20-22-24
14 – Bussola per pistone	14 – Piston bush
15-Pistone completo	15-Complete piston
16-Anello ten.alt.	16-Alt. seal ring
17-Anello antiestrusore	17- Anti-extrusion ring
18-Bussola guarnizioni	18-Seal bush
19-Anello ten. Alt.	19- Alt. seal ring
20-Anello per tenuta	20-Seal ring
21-Anello seeger 22-Vite 23-OR	21-Seeger ring 22-Screw 23-O-ring
24-Supporto guarnizione	24-Gasket support
25- OR	25- O-ring
26-Vite 27-OR 28-Rosetta 29-Raccordo str. 30-Raccordo 90° Ø girev. 31-Rosetta 32-Coperchio ispezione chiuso 33-Stelo guida pistone 34-OR 35-Coperchio ispezione aperto 36-Anello rad. 37-Spina elastica 38-Vite	26-Screw 27- O-ring 28-Washer 29-Choke fitt. 30-Rot. Fitting 90° Ø 31-Washer 32-Closed inspection cover 33-Piston guide rod 34- O-ring 35-Open inspection cover 36-Rad.ring 37-Elastic pin 38-Screw
39-Guida pistone	39-Piston guide
40-Staffa di sollevamento 41-Vite 42-Biella – Completa	40-Lifting bracket 41-Screw 42-Con-rod – Complete

43- Vite serraggio biella	43- Con-rod tightening screw
45-Semiboccola testa biella – Inf.	45-Con-rod head semi-bush – Low.
46- Semiboccola testa biella – Sup.	46- Con-rod head semi-bush – Upp.
47-Boccola piede biella 48-Anello seeger 49-Spinotto 50-Vite 51-Piedino pompa 52-Tappo per foro 53-Tappo olio G1” con asta	47-Con-rod foot bush 48- Seeger ring 49-Spindle 50-Screw 51-Pump foot 52-Hole plug 53-Oil plug G1” with rod
54-OR 55-Tubo per tappo carico olio 56- Cuscinetto a rulli	54-O-ring 55- Oil filling plug pipe 56- Roller bearing
57-Pignone- Elicoidale	57-Pinion- Helical
58-Spina cilindrica 59-Anello seeger 60-Cuscinetto a rulli 61-Anello appoggiocuscinetto 62-Anello seeger 63-Anello rad. 64-Linguetta 65-Anello appoggio 66-Vite 67-Linguetta 68-Fermo corona 69-Albero a gomiti	58-Cylinder pin 59-Seeger ring 60-Roller bearing 61-Bearing support ring 62-Seeger ring 63-Rad.ring 64-Tab 65-Support ring 66-Screw 67-Tab 68-Ring gear stop 69-Bend shaft
70-Corona - Elicoidale	70-Ring gear - Helical
71- Vite 72-Coperchio riduttore 73- OR 74-Scatola riduttore 75- Cuscinetto a rulli 76- Guarnizione laterale 77-Carter pompa 78-Coperchio posteriore 79-Vite 80-Coperchio cuscinetto 81-Tappo 82-Rosetta	71- Screw 72- Reduction gear cover 73- O-ring 74-Reduction gear box 75- Roller bearing 76- Lateral gasket 77-Pump casing 78-Rear cover 79-Screw 80-Bearing cover 81-Plug 82-Washer
CON MOTORE IDRAULICO	WITH HYDRAULIC MOTOR
83-Pignone – Elicoidale	83-Pinion – Helical
84- Coperchio riduttore Hydraulic Pack	84- Hydraulic Pack Reduction gear cover
AZIONAMENTO DIRETTO	DIRECT DRIVE
79-Vite 85-Coperchio cuscinetto aperto 86-OR 87-Anello per funzionamento idraulico 88-Anello rad.	79-Screw 85-Open bearing cover 86-O-ring 87-Hydraulic operation ring 88-Rad. ring

CON PRESA DI FORZA	WITH PTO
79- Vite 85-Coperchio cuscinetto aperto 86-OR 88-Anello rad. 89-Dispositivo presa di forza ausiliaria 90-Vite	79- Screw 85-Open bearing cover 86-O-ring 88-Rad.ring 89-Auxiliary PTO device 90-Screw

Declaration of incorporation
(According to annex II of European Directive 2006/42/CE)

The manufacturer **INTERPUMP GROUP S.p.A.** . Via E. Fermi, 25 . 42049 S.ILARIO D.ENZA (RE) - Italy
DECLARE that the device identified and described as follows:
Description: Pump Type: High pressure reciprocating pump for water
Trademark: **INTERPUMP GROUP**
Model: **SM**

Complies with the requirements of the below-listed directives and following updates:
- Directive 2006/42/EC Machinery
- Directive 2002/95/EC Reduction of hazardous substances . **RoHS**
- Directive 85/374/EC Liability for defective products

UNI EN ISO 12100.1:2005 - UNI EN ISO 12100.2:2005 - UNI EN 809:2000

The above-mentioned pump complies with all the essential requirements of safety and health protection listed in annex I, point 1 of the Machinery Directive and the relevant technical documents are compiled in accordance with annex VII B.
Moreover, in response to a reasoned request, the manufacturer undertake to transmit copy of the technical documents on the pump within the terms and in the ways to be determined.
The pump must not be put into service until the system into which the pump is to be incorporated has been declared in conformity with the provisions of the relevant directives and/or norms.

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

Person empowered to draw up the declaration: Ing. Paolo Marinsek (Managing Director)

Signature

Code 73980203 rev.0 - Cod.IE 2860000114 – 27/09/2011
Data contained in this document may change without notice.

PRATISSOLI a brand of INTERPUMP GROUP S.P.A.
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