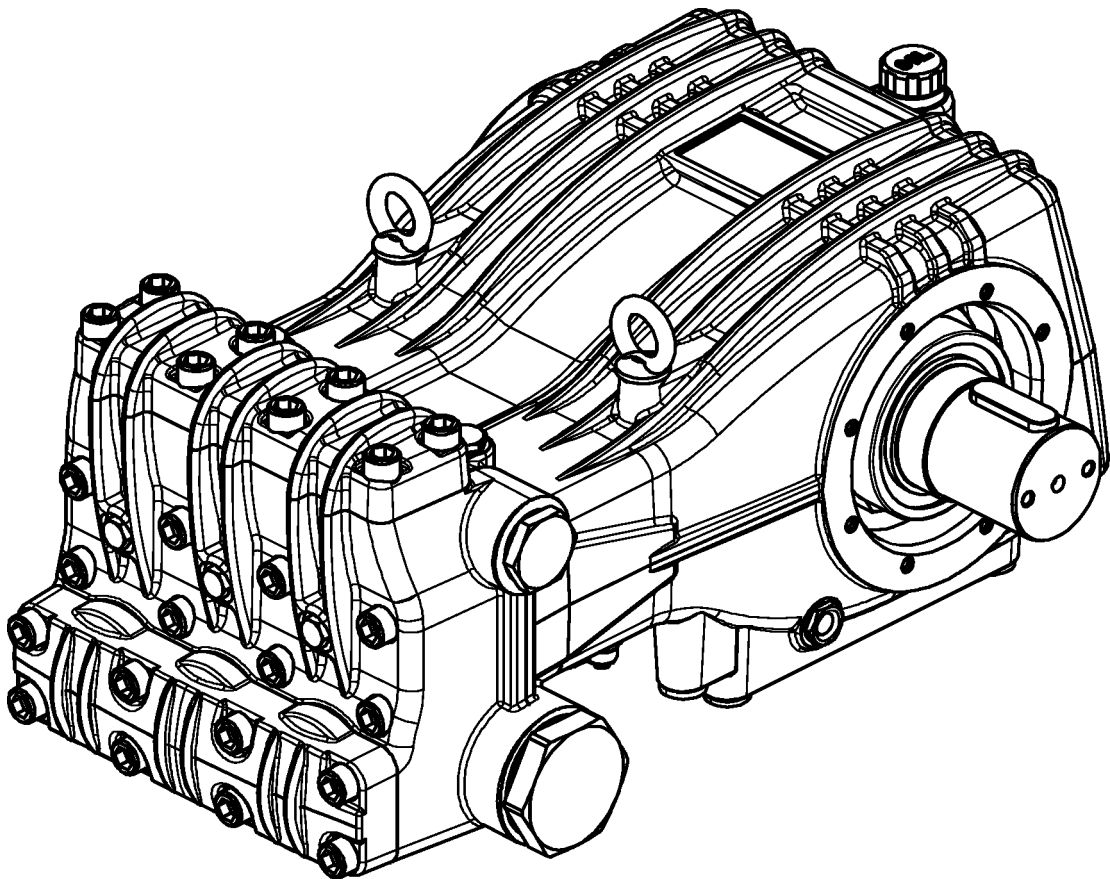




*World Leader in
Diaphragm and
Plunger Pumps*



HX / HXR SERIES PLUNGER PUMPS
USE AND MAINTENANCE MANUAL **2020 EDITION**

2-3	GENERAL INFORMATION
4	PUMP START-UP
5	CONTROLS IN SYSTEM
6-7	PUMP OPERATIONS
8	PUMP MAINTENANCE
9-10	TROUBLESHOOTING
11	PERFORMANCE
11-12	DIMENSIONS
12	TORQUE SPECIFICATIONS

1. GENERAL INFORMATION

1.1 SAFETY SYMBOLS

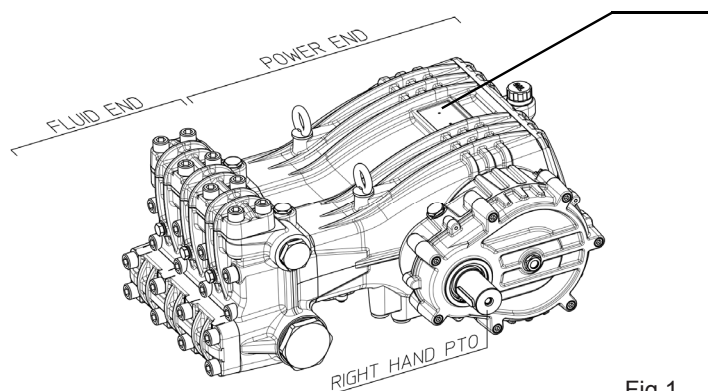
The “**WARNING**” symbol here at the side draws the operator’s attention to situations and/or problems related to the correct **operation of the Pump**.



The “**DANGER**” symbol here at the side draws the operator’s attention to situations and/or problems that could compromise **the safety of people**.



1.2 PUMP IDENTIFICATION



The Label on the Pump bears the Model, the Code, the Serial Number and the main technical specifications with the maximum operational values of the product. The specimen at the side is an example of a Label and its position on the Pump..

Fig.1

1.3 WARRANTY

UDOR guarantees its products for 12 (twelve) months from the date of shipment.

Warranty covers the replacement of parts or products which, to the sole and undisputable judgement of UDOR, are considered to be defective from the date of shipment. Expenses for labor and transport are to the responsibility of the buyer. The product shall only be returned to UDOR following authorization from the latter, free of charge to the warehouse of UDOR and complete with every single original component, without any sign of tampering. Replaced products or components pass over to the ownership of UDOR.

Warranty of a product is void if the buyer fails to observe the payment terms of the product.

Warranty does not cover the following damages:

- Direct and indirect damages of any kind.
- Damages deriving from the failed observance of safety instructions and standards.
- Damages to products due to: incorrect use, dropping, incorrect installation, exposure to freezing conditions, failed maintenance, carelessness and negligence during use.
- Damages to parts subject to normal wear and tear.
- Damages to products in the case of the use of non-original parts or parts that are not explicitly approved by UDOR.

UDOR may add, at any time, any modifications considered necessary to improve the product without having to apply such modifications to products that have already been sold or that are ready for shipment.

The warranty herein is the only one valid and replaces all other forms of warranty or guarantee conditions.

Any controversies will be dealt with according to Italian law by the competent court of Reggio Emilia.

2. INTRODUCTION

The horizontal HX Series Plunger Pump of UDOR are designed and manufactured to pump or transfer water.

The pump consists of two main sections (see fig.1): a “Power End” and a “Fluid End”.

In the “Power End”, the moving components are in contact with the lubricant and transform the rotary motion of the power take-off of the shaft into the alternating horizontal motion of the pistons inside the “Fluid End”, whose other components are in contact with the water used in the system. In the case of a pump with gearbox, Series HXR, the mechanical part also includes the gearbox.

The Pumps are supplied standard with the power take-off of the shaft on the right (see fig.1); on request, all models can be supplied with power take-off on the left.

The Pumps are generally driven by: electric motors, endothermic petrol or diesel engines and hydraulic motors, tractor or truck P.T.O. Couplings may be fulfilled by means of transmission shaft, direct flanging, reduction unit or multiplier, joints, pulleys and belts..



The Pump is supplied to be installed on a more complex machine or plant; the manufacturer of such machine or plant shall add all the information related to safety of the assembled machine/plant fulfilled

3. INTENDED USE

UDOR Plunger Pumps are designed to be used in machines or systems for transferring pressurized water, such as the following for example: Car Wash, Civil and Industrial Washing Systems, Road Washers and Bin Washers, Water Treatment, Misting, Drain and Pipe Cleaning and Fire-fighting.

The temperature of the workplace shall be between: Min. 0°C (32°F) - Max. 45°C (113°F)

The Pump cannot be used submerged under any type of liquid.

4. OPERATIONAL RESTRICTIONS

The specifications of the liquid to be used are described in detail herewith: do not use for different liquids; in particular, it is NOT possible to use UDOR Pumps in the following conditions:



- In the presence of water with high salt content, such as seawater for example; for this type of use, you are recommended to use UDOR Pump stainless steel series.
- In workplaces where there is a corrosive or explosive atmosphere.
- In the presence of any liquid that is not compatible with the constructional material of the Pump.
- To pump paint, solvents, fuel and any flammable liquid (not suitable for ATEX workplaces).
- To foodstuffs.
- To wash people, animals, live electrical or electronic equipment.
- To wash the Pump itself.

5. GENERAL WARNINGS



- Never start the Pump under pressure.
- Constantly check the state of wear of the pipes and relevant fittings, especially those under pressure. Pipes with signs of abrasion or that do not guarantee a perfect seal shall be replaced.
- The Pump must never run dry/without any liquid while in use.



- Protect rotating parts with a cover to prevent contact.
- The Pump is designed to be integrated in a machine or system, with various supply systems, which may make the temperature of the external surfaces and the noise level vary, even quite substantially. The manufacturer of such machine or system shall assess the level of noise emitted by the assembled machine or system and inform the user appropriately, also in relation to the use of suitable personal protection equipment.

6. BEFORE START UP

6.1 LIQUIDS TO BE PUMPED

The Pump is designed and manufactured to transfer clean liquid or non-aggressive watery solutions.

The liquid intaken must be free from sand or other solid particles in suspension.

The liquid intaken shall have viscosity and density similar to water.

The maximum temperature of the liquid to be pumped varies according to the conditions of the system (see section 6.3 – INLET CONDITIONS).

Any other use is not admitted unless authorized in writing by the Engineering Department of UDOR.

6.2 INLET, OUTLET AND PORTS OF THE PUMP

The UDOR pumps of the HX series (see fig. 2) are equipped with the following fittings:

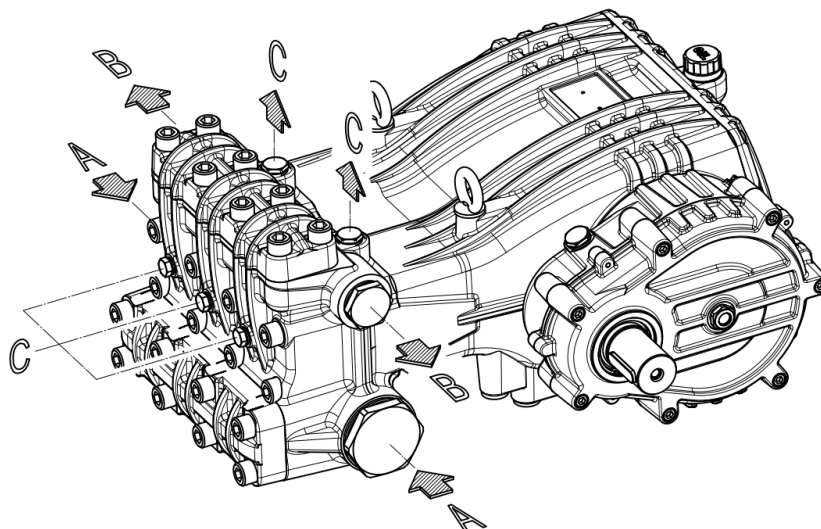


Fig. 2


- A.** No. 2 G 2" Inlets (also called In-take or Supply fittings) in versions 135/300, 160/240, 200/200 and G 2-1/2" in versions 250/160, 310/130, 400/100; by removing or inverting the sealing caps, they can be used indifferently on the right or left part of the head of the Pump or they can both be used.
- B.** No. 2 Outlets (also called Delivery fittings) G 1" in versions 135/300, 160/240, 200/200 and G 1-1/4" in versions 250/160, 310/130, 400/100; by removing or inverting the sealing caps, they can all be used indifferently, as fittings for regulator and maximum pressure valves, gauges, pipes of spray guns or other high pressure components. The seal between the sealing caps and head is guaranteed by a special stainless steel seat with double taper; the caps and head are machined so that they couple perfectly with this special seat



The Inlet and Outlet of the Pump CANNOT be inverted

- C.** No. 2 Auxiliary ports G 1/2" and No. 3 frontal Auxiliary ports G 1/4" can also be used as gauge ports; do not use these ports in substitution of inlet or outlet.

6.3 INLET CONDITIONS (SUCTION)

Pump is mounted below the supply tank in gravity feeding.	Pump is pressure fed.
Max. Pump speed Version HX : 800 RPM max. Version HXR-C : 1500 RPM max. Version HXR-D : 1800 RPM max. Version HXR-M : 2200 RPM max.	Max. inlet pressure: 6 bar (90 PSI).
The minimum height difference between the inlet of the pump and the minimum level of the tank is 1 m. For optimal operation and to avoid cavitation it is recommended to use a boost pump.	The Boost Pump, if any, must be started before the Piston Pump.
Max. inlet liquid temperature: up to 200 bar (3000 PSI) of working pressure: 50°C (122°F).	The feeding source must provide 50% more than the Pump flow.
Max. inlet liquid temperature over to 200 bar (3000 PSI) of working pressure: 35°C (95°F).	Max. inlet liquid temperature: 50°C (122°F).
<div style="text-align: center;">  The pump must never be installed above the supply tank </div>	
The inlet pipeline must comply with the following requirements: <ul style="list-style-type: none"> - Any point of the inlet pipeline cannot be smaller than the diameter of the Pump inlet. - Be absolutely leak-proof to avoid any air infiltration - Not have 90° bends near the Pump inlet. - Not have contractions or restrictions. - Avoid any turbulence near the Pump inlet and in the supply tank. - If an inlet filter is used, it must allow 200% more flow than the flow required by the Pump. It must not cause any constriction or any pressure drop. The filter should have a filtration degree between 50 and 80 mesh and should be cleaned on a regular basis to ensure its proper functionality. 	

Any other use is not admitted unless authorized in writing by the Engineering Department of UDOR.

6.4 FILTERING

The **filter** must be installed as close as possible to the pump inlet and it must allow flow 3 times greater than that required by the Pump, it must not cause any constriction or any pressure drop and **should be cleaned on a regular basis to ensure its proper functionality.**

The recommended filtration degree is 50 - 80 mesh (180 - 300 micron).

6.5 OUTLET CONDITIONS

- A safety valve must be installed on the delivery line of the system.

- Make sure the delivery line and all the accessories are connected correctly, secured firmly, hermetically sealed and that the pipes are sized appropriately.
- All pressurized pipes must be marked durably with the maximum admitted pressure, which must never be less than the maximum working pressure of the Pump that is written on the Label.
- If there are excessive pulsations in the system where the Pump is fitted, install a correctly sized pulsation damper (accumulator).
- To isolate the vibrations we recommend, at least for the first section, the use of flexible pipes

6.6 SPEED AND ROTATION DIRECTION



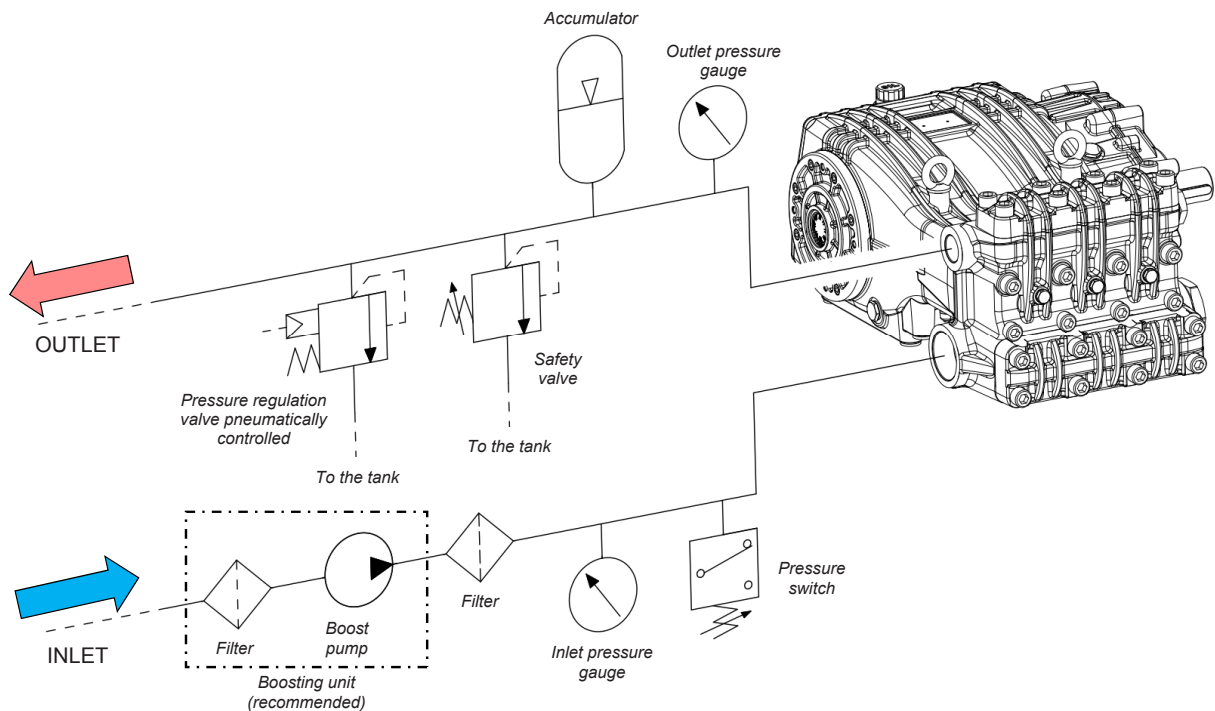
The rotation speed of the shaft of the Pump must never exceed the RPM written on the Label of the actual Pump.

The minimum RPM admitted is $\times 0.6$.

The rotation direction of the shaft of UDOR Pumps may be clockwise or counter-clockwise.

7. CONTROLS ON SYSTEM

By way of example, the layout of a circuit is shown below



7.1 PRESSURE REGULATOR

A pressure regulator valve must be installed to avoid the pressure exceeding the maximum limit indicated on the Label of the Pump.



Use of the Pump, even for a short period, with a pressure higher than such limit will damage the Pump itself.

The regulator valve shall be compatible with the maximum pressure, flow rate and temperature values written on the Label and in the "POWER CONDITIONS".



Incorrect installation of the pressure regulator valve could cause serious personal injuries and damage to property as well as seriously damaging the actual Pump.

The circuit must be equipped with another safety valve to prevent the maximum pressure from being exceeded in the case of anomalies in the pressure regulator valve.

7.2 NOZZLE

A deteriorated nozzle could cause a drop in pressure; in this case, do not adjust the pressure regulator valve in the attempt to increase the pressure of the system because when the delivery line closes, this would cause a boost in pressure, which could damage the Pump.

If the pressure drops, it is advisable to replace the nozzle and adjust the system's pressure again.

7.3 PULSATION DAMPENER (ACCUMULATOR)

For applications in which pulses produced by the Pump on the delivery line are harmful or undesired, install an appropriately sized pulse dampener.

7.4 PRESSURE GAUGE

Install a gauge on the Pump or as near as possible to the outlet of the Pump because the maximum pressure written on the Pump's Label refers to the pressure detected on the head of the Pump and not on the nozzle or on other accessories.



All the components of the machine or of the circuit must have technical specifications compatible with the data written on the Pump's Label.

8. INSTALLATION, START UP AND SWITCHING OFF

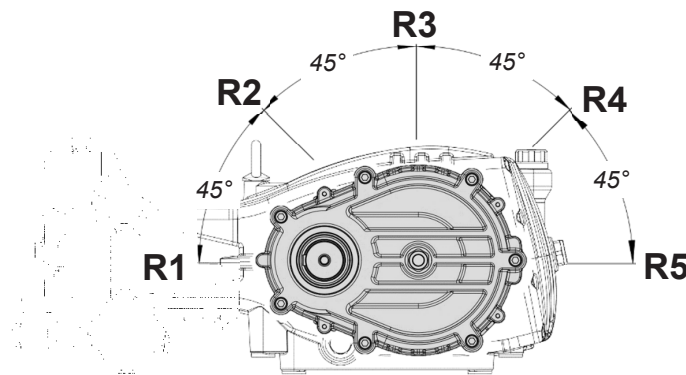
8.1 POSITIONING

The pump is to be handled using exclusively the specific eyebolt supplied, hooking it to a rope or chain with the specific hook and using suitable lifting equipment.

If the Pump is used in a particularly dirty workplaces or is exposed to atmospheric agents, you are recommended to protect it, respecting the ventilation conditions.

8.2 GEARBOX ORIENTATION

The HXR models are supplied equipped with parallel-axis speed gearbox. Depending on the installation requirements, the gearbox can be oriented in the five positions R1, R2, R3, R4, R5 as shown below



8.3 ASSEMBLY

Fit the Pump on a rigid surface keeping the power take-off and support feet horizontal to ensure correct drainage in the case of leakage of water or oil. The Pump must be secured firmly on a base, which must be perfectly aligned with the transmission components. In the case of belt transmission, make sure the pulleys are aligned and check the tension of the belts.



- In the operational phase, the maximum admitted inclination of the pump is 10°; if you should tilt it more, this could cause insufficient lubrication of some of the components in the "Power End".

- The power take-off of the pump shaft must not be connected to the drive unit by means of rigid components.

Use appropriately sized hoses, both on the inlet and outlet of the Pump, according to the technical specifications written on the Label.

8.4 START UP

Before starting, check the following:

- **Replace the RED cap on the Pump Crankcase with the Oil Vented Plug in the kit of accessories supplied.**
- Check the level of oil through the dedicated clear level indicator on the rear cover or via the level rod of the oil vent cap; top-up if necessary (see paragraph 9.2).
- Check the pressure value on the accumulator, if installed; inflate or deflate if necessary.
- Make sure all the pipes are connected properly
- The pressure regulator valve must be set at "0" pressure to favor intake.
- Start the Booster Pump or open the line connected to the Pump inlet, respecting the minimum and maximum supply pressure values (see paragraph 6.3)



Attention: the pump must never run dry!

- Start and run the Pump until all the liquid has discharged from the delivery line without air bubbles.



The presence of air inside the pump during use under pressure could seriously damage the pump itself.

Once the suction cycle has been completed correctly:

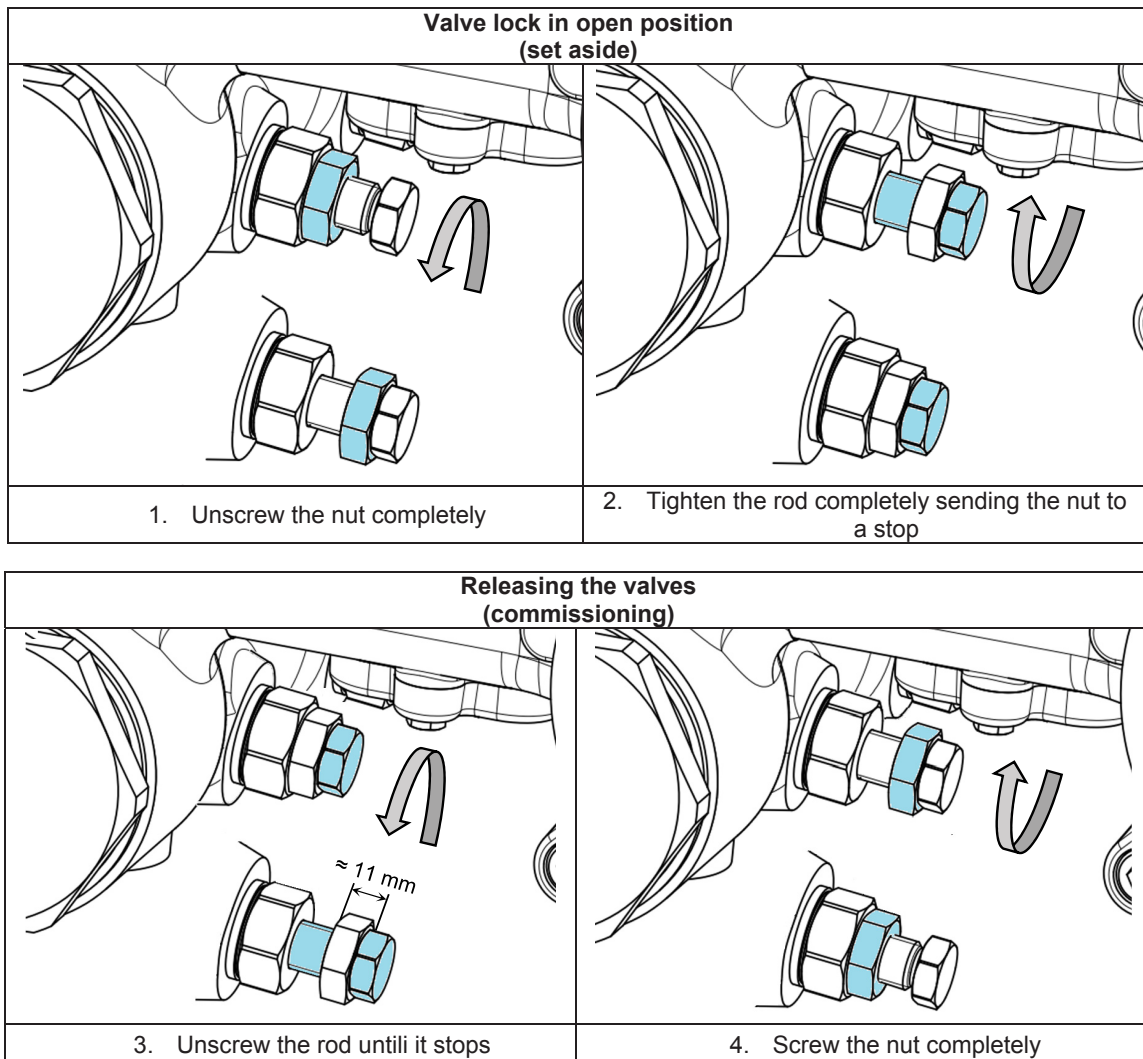


- Let the pump run in these conditions for a couple of minutes, checking that the pipes, connections and components of the system are in perfect working conditions and making sure there are no leaks or drips of water.
- At the end of this settling-in and inspection cycle, the system can be taken to the required pressure, without ever exceeding the maximum pressure written on the nameplate of the pump itself.

8.5 SWITCHING OFF AND STORAGE

After use or if the Pump is to be put away in storage, wash it internally. You can do this by running the Pump for several minutes with clean water, then disconnect the supply line and leave the Pump to run for approximately 15 seconds so that all the water in the head is discharged.

A few minutes devoted to the internal washing of the pump brings considerable benefits in terms of the pump's lifetime. In the case of long rest periods, lock the suction valves in the open position using the special devices available upon request, proceed as follows:





Do not wash the Pump externally: water could get into the Pump crankcase, for example through the oil vented plug.



After switching off, the Pump could remain very hot for some time.



Do not throw the liquid used to wash the Pump outdoors but observe current regulations.

8.6 PRECAUTIONS AGAINST FREEZING

If shutdown during winter or in the case of places and seasons subject to frost, once the Pump has finished working, run it for the time required to Pump an emulsion of 50% of clean water and 50% of antifreeze fluid through it in order to prevent freezing and damage to the Pump. Use the valve locking devices -see chapter 8.4- if necessary.



Pump must not be used to Pump antifreeze fluid that is not mixed with water.



In the presence of ice or very cold temperatures at the workplace, the Pump must never be started, otherwise the Pump could be seriously damaged. To start the system, the whole circuit must be completely defrosted.

9. MAINTENANCE

9.1 ROUTINE MAINTENANCE



- Maintenance operations must be carried out by qualified and authorized personnel.

- Use appropriate tools to disassemble and assemble the various components of the pump. Each tool must be specific for the individual job to be done. The use of unsuitable tools could damage the pump irreparably.

If the Pump is used for light-duty purposes, the following routine maintenance jobs are advised:

- After the first 50 hours: Oil change
- Every 500 hours: Oil change
- Every 1000 hours: Check or replace the valves.

For heavy-duty purposes, carry out the maintenance jobs more often. In any case, the oil must be changed at least once a year.

9.2 LUBRICATION

The Pump comes supplied with the correct amount of lubrication oil which, in the case of pump series HXR, is about 10 liters, in case of pump serie HX is about 7 liters.

Periodically check the oil level inside the Pump by means of the appropriate transparent level indicators placed on the side flanges and on the gearbox or through the oil dipstick level dipstick.

Use CLP 220 OIL or alternatively SAE 85W-90 oil. The following oil types are suggested:

BRAND	TYPE
AGIP	BLASIA 220
BP	ENERGOL GR-XP 220
CASTROL	ALPHA SP 220
ESSO	SPARTAN EP 220
MOBIL	MOBILGEAR XMP 220
SHELL	OMALA 220
TOTAL	CARTER EP 220

The oil is to be changed by draining it through the dedicated bottom discharge cap and with the Pump stopped. Every time you unscrew the oil drain plug we suggest to replace its gasket.



DO NOT START THE PUMP IF THERE IS NO OIL IN THE CRANKCASE!



During maintenance, you are recommended to:

- Use and wear suitable personal protection equipment (i.e. gloves).
- Wait for the machine to cool down and to have stopped completely.



During maintenance, do not throw residues outdoors but observe current regulations.



If the Pump is to be scrapped:

1. Separate the various parts depending on their type (i.e. plastic, harmful fluids, metal etc.).
2. Use public or private waste disposal systems envisaged by local law to dispose of waste.
3. This device could contain harmful substances: improper use or incorrect disposal could have negative effects on human health and on the environment

10. TROUBLESHOOTING

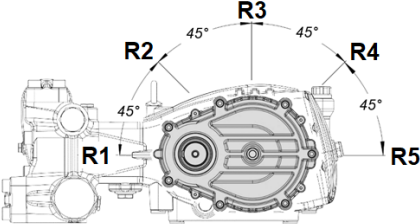
PROBLEMS	PROBABLE CAUSES	SOLUTIONS
The Pump does not make any noise after starting its drive.	The pump is not supplied correctly and is running dry.	Switch the pump off immediately! Check the pressurized supply line and the correct operation of the booster pump.
	The valves are blocked.	Inspect the valves.
	The delivery line is obstructed and is stopping the air inside the pump from being let out of the system.	Clear any obstructions on the delivery line.
The Pump overheats.	Excessive running speed.	Respect the maximum running speed (RPM) written on the nameplate of the Pump.
	Excessive working pressure.	Respect the maximum pressure written on the nameplate of the Pump.
	The belts of the pulleys are too tight.	Tension the belts correctly.
	The power take-off of the pump shaft is not perfectly aligned with that of the drive.	Align the power take-off of the pump shaft perfectly with that of the drive.
	Not enough oil inside the pump.	Check the oil level; top-up if necessary.
	An unsuitable type of oil has been put in the pump.	Use nothing but the recommended types of oil.
	The oil has deteriorated due to oxidation.	Change the oil.
The Pump doesn't reach required pressure.	Incorrect or worn or plugged nozzle.	Change to proper size nozzle; replace nozzle or clean nozzle.
	Belt slippage.	Tighten or replace belt.
	Air leak in inlet plumbing.	Check or replace hoses or fittings.
	Inlet suction strainer clogged or improper size.	Check and clean, use adequate size.
	Worn seals. Abrasives in Pumped fluid; severe cavitation; inadequate water supply.	Install and maintain proper filter. Replace seals.
	Pressure gauge is broken or not registering accurately.	Check with new gauge; replace worn or damaged gauge.
	Relief / unloader valve stuck, partially plugged or improperly adjusted.	Adjust or repair or replace relief / unloader valve.
	Dirty or worn inlet or outlet valves.	Check and clean or replace valves.
	Leaky outlet hose.	Check or replace discharge hoses or fittings.
Pump is noisy.	Air leak in inlet plumbing.	Check or replace hoses or fittings.
	Inlet strainer clogged or improper size or insufficient supply of water to the Pump.	Check and clean, use adequate size; increase water supply if not sufficient.
	Dirty or worn inlet or outlet valves.	Check and clean or replace valves.
	Worn seals or o-rings.	Replace seals or o-rings.
	Plugged inlet filter or improper size.	Clean or replace filter.
	Pulley loose on crankshaft or worn key.	Check pulleys and key.
	Broken or worn bearings.	Replace bearings.
Water leakage between head and body.	Worn low pressure seal or o-ring.	Replace seal or o-ring.
	Cracked plunger.	Install new plunger.

Water in crankcase. Oil is changing into milky white color.	High humidity in air (condensing).	Change oil every 250 hours instead of 500.
	Worn crankcase oil seal.	Replace crankcase oil seal.
	Worn low pressure seal.	Replace seal.
Oil leak between crankcase and head.	Worn crankcase oil seal.	Check plunger rod. Replace crankcase oil seal.
	Worn crankshaft oil seal.	Replace crankshaft oil seal.
Oil leak in the area of crankshaft.	Worn bearing case o-ring.	Replace bearing case o-ring.
	Bad bearings.	Replace bearings.
	Damaged or improperly installed sight glass or crankcase cover seal or drain plug.	Replace sight glass, plug or seals.
Frequent or premature failure of the packing.	Scored plungers.	Replace plungers.
	Over pressure in inlet manifold.	Reduce inlet pressure.
	Abrasive material in the fluid being Pumped.	Install proper filter on Pump inlet plumbing.
	Corrosive additives in the fluid being Pumped.	Use clean water or contact UDOR Technical Service Department for more informations.
	Running Pump dry.	Do not run Pump without fluid.
Excessive vibrations.	Air leak in inlet plumbing.	Check or replace hoses or fittings.
	Pulsation damper pressure too low.	Check and repressure.
	Pump – Drive connection not suitable.	Check and modify the Pump – Drive connection if necessary.
	Dirty or worn inlet or outlet valves.	Check and clean or replace valves.

11. TECHNICAL CHARACTERISTICS

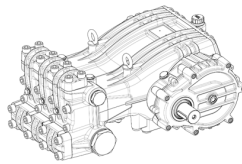
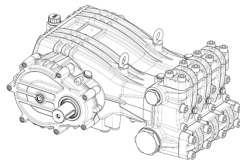
The product description is as follows

HX R 1 – C 250/160 R

Gearbox type and orientation	
-	Without gearbox
R1, R2, R3 R4 or R5	

R1: standard orientation

Reference speed	
C	With gearbox 1500 RPM
D	With gearbox 1800 RPM
M	With gearbox 2200 RPM
A	Without gearbox (800 RPM)

Shaft positioning	
	
R : "right" pump	L : "left" pump

Performances	
135/300	See performance table
160/140	
200/200	
250/160	
310/130	
400/100	

Example:

Right-hand pump of 201 l/min and maximum pressure 200 bar with vertically oriented 1800 RPM gearbox

HXR3-D 200/200 R

Left-hand pump of 201 l/min and maximum pressure 200 without gearbox

HX-A 200/200 L

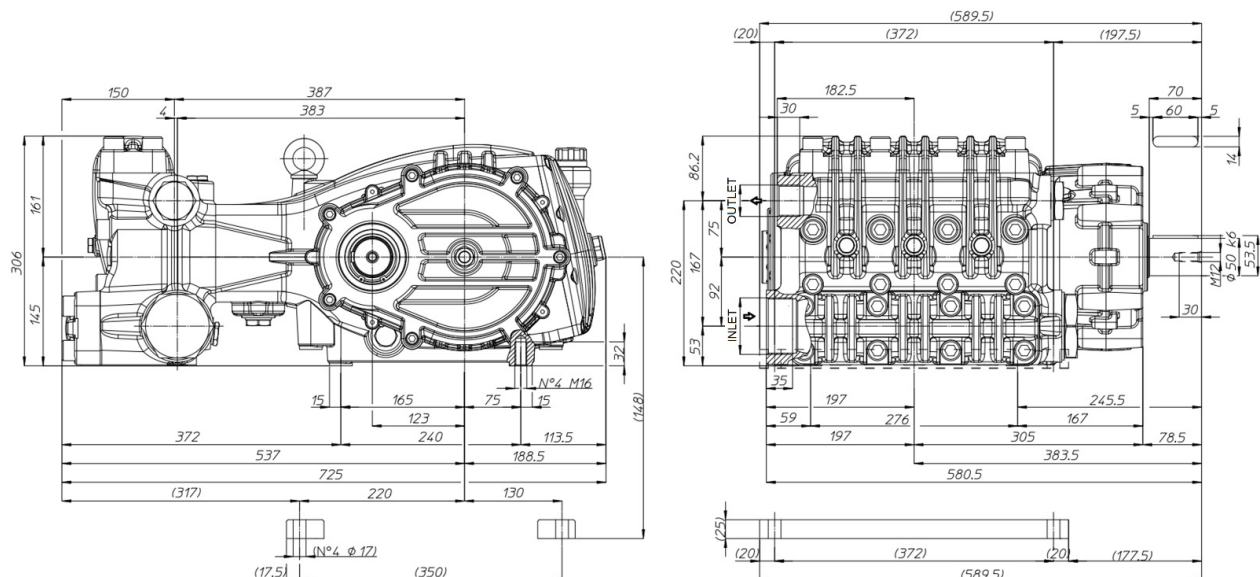
Performance table

RPM	CODE	MODEL	FLOW RATE		PRESSURE		POWER		INLET	OUTLET	WEIGHT
			l/min	GPM	bar	PSI	HP	kW			
800	310500	HX-A 135/300 R	128.0	33.8	300	4350	98.5	73.5	G2"	G1"	158 kg 348 lbs.
	310400	HX-A 160/240 R	162.0	42.8	240	3480	99.7	74.3			
	310300	HX-A 200/200 R	201.0	53.1	200	2900	103.1	76.9			
	310200	HX-A 250/160 R	254.0	67.1	160	2320	104.2	77.7	G2-1/2"	G1-1/4"	
	310100	HX-A 310/130 R	313.0	82.7	130	1885	104.3	77.8			
	310000	HX-A 400/100 R	379.0	100.0	100	1450	97.2	75.5			

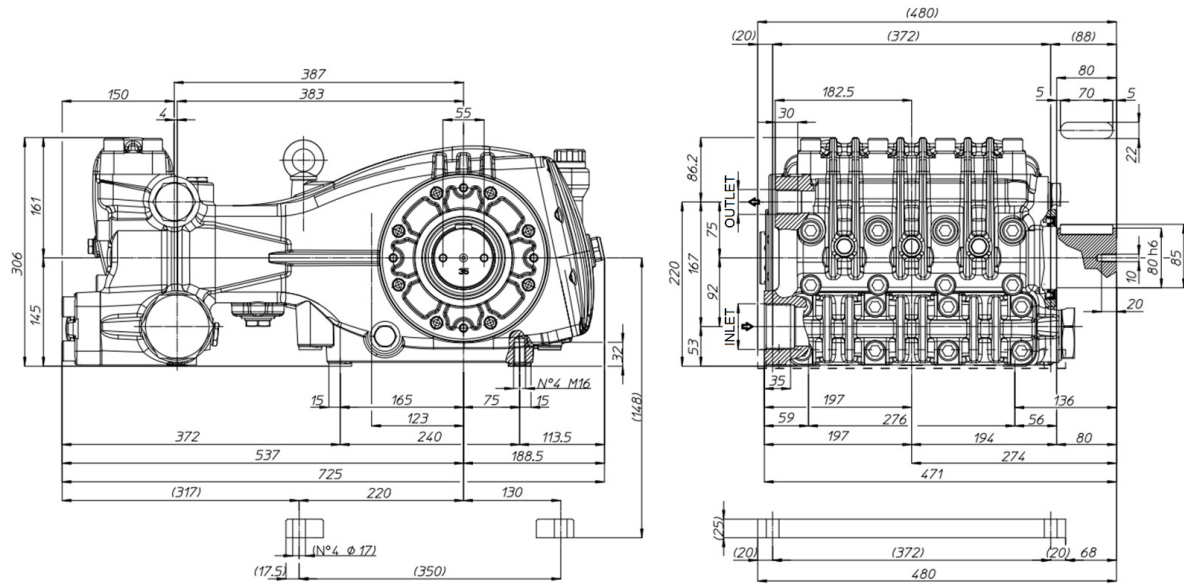
RPM	CODE	MODEL	FLOW RATE		PRESSURE		POWER		INLET	OUTLET	WEIGHT
			l/min	GPM	bar	PSI	HP	kW			
1500	317600	HXR1-C 135/300 R	128.0	33.8	300	4350	98.5	73.5	G2"	G1"	181 kg. 399 lbs.
	317300	HXR1-C 160/240 R	162.0	42.8	240	3480	99.7	74.3			
	317000	HXR1-C 200/200 R	201.0	53.1	200	2900	103.1	76.9			
	316700	HXR1-C 250/160 R	254.0	67.1	160	2320	104.2	77.7	G2-1/2"	G1-1/4"	
	316400	HXR1-C 310/130 R	313.0	82.7	130	1885	104.3	77.8			
	316100	HXR1-C 400/100 R	379.0	100.0	100	1450	97.2	75.5			
1800	317700	HXR1-D 135/300 R	128.0	33.8	300	4350	98.5	73.5	G2"	G1"	
	317400	HXR1-D 160/240 R	162.0	42.8	240	3480	99.7	74.3			
	317100	HXR1-D 200/200 R	201.0	53.1	200	2900	103.1	76.9			
	316800	HXR1-D 250/160 R	254.0	67.1	160	2320	104.2	77.7	G2-1/2"	G1-1/4"	
	316500	HXR1-D 310/130 R	313.0	82.7	130	1885	104.3	77.8			
	316200	HXR1-D 400/100 R	379.0	100.0	100	1450	97.2	75.5			
2200	317500	HXR1-M 135/300 R	128.0	33.8	300	4350	98.5	73.5	G2"	G1"	
	317200	HXR1-M 160/240 R	162.0	42.8	240	3480	99.7	74.3			
	316900	HXR1-M 200/200 R	201.0	53.1	200	2900	103.1	76.9			
	316600	HXR1-M 250/160 R	254.0	67.1	160	2320	104.2	77.7	G2-1/2"	G1-1/4"	
	316300	HXR1-M 310/130 R	313.0	82.7	130	1885	104.3	77.8			
	316000	HXR1-M 400/100 R	379.0	100.0	100	1450	97.2	75.5			

12. OVERALL DIMENSIONS

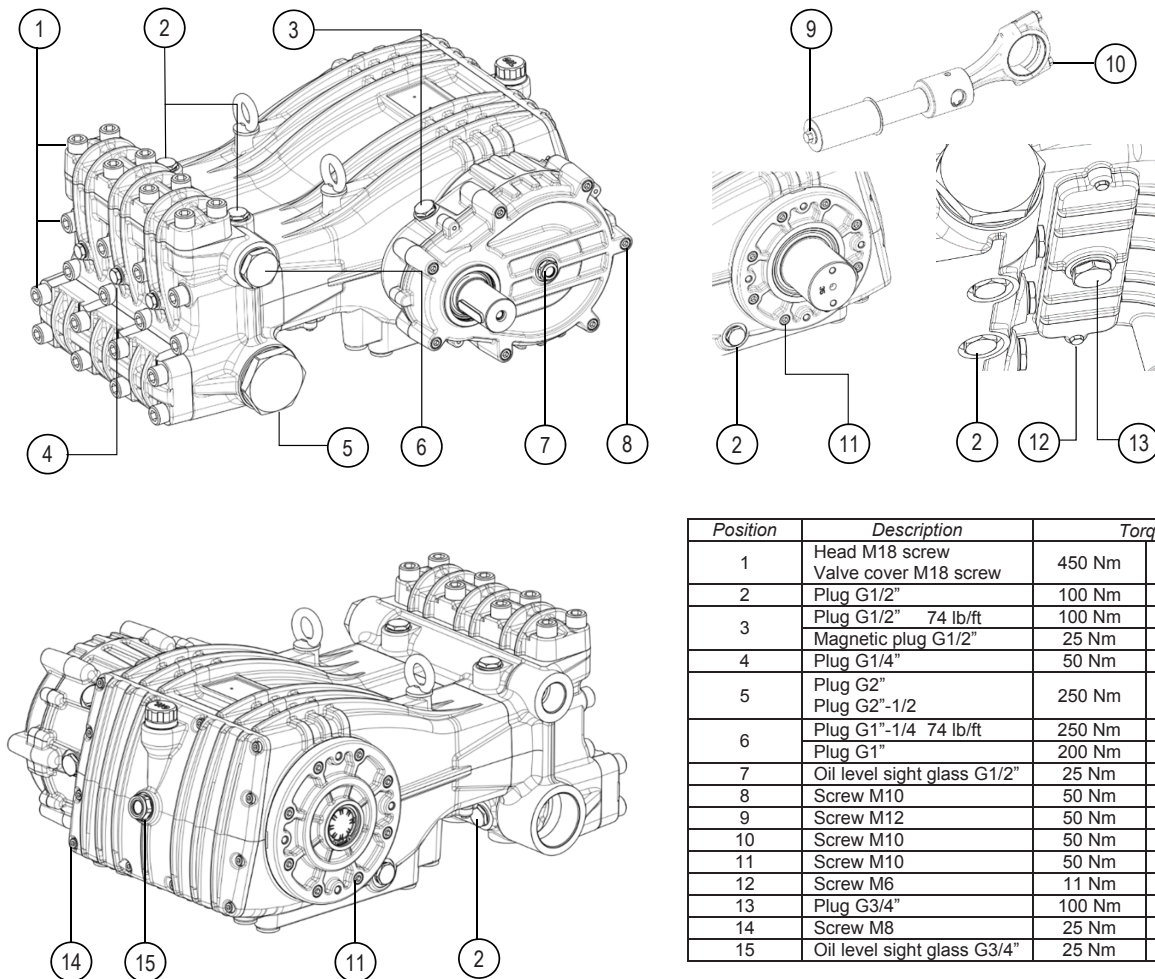
Pump with integrated gearbox – "HXR"



Pump without integrated gearbox – “HX”



13. TORQUE SPECIFICATIONS



Position	Description	Torque	
1	Head M18 screw	450 Nm	332 ft/lb
2	Valve cover M18 screw	100 Nm	74 lb/ft
3	Plug G1/2"	100 Nm	74 lb/ft
4	Plug G1/2"	25 Nm	18.4 lb/ft
5	Plug G2"	50 Nm	37 lb/ft
6	Plug G2"-1/2	250 Nm	184.4 lb/ft
7	Plug G1"-1/4	250 Nm	184.4 lb/ft
8	Plug G1"	200 Nm	147.5 lb/ft
9	Oil level sight glass G1/2"	25 Nm	18.4 lb/ft
10	Screw M10	50 Nm	37 lb/ft
11	Screw M12	50 Nm	37 lb/ft
12	Screw M6	11 Nm	8.1 lb/ft
13	Plug G3/4"	100 Nm	74 lb/ft
14	Screw M8	25 Nm	18.4 lb/ft
15	Oil level sight glass G3/4"	25 Nm	18.4 lb/ft

In the course of marketing or servicing the customer or potential customer's needs, UDOR USA will use its best judgement in its product recommendations. However, the ultimate responsibility for product application decisions shall rest with the customer. The sole and only warranty made by UDOR USA is the limited warranty described below.

LIMITED PRODUCT WARRANTY UDOR Plunger Pumps & Accessories

UDOR Standard Series P, PK, B, BK, C, CK, CH, CX and TC Plunger Pumps are warranted by the manufacturer to the original purchaser to be free from defects in materials and workmanship under normal use and service for a period of five (5) years.

UDOR Industrial Series GAMMA, NX, PENTA, VH, VX, VXX, VY, HX and HXR Plunger Pumps are warranted by the manufacturer to the original purchaser to be free from defects in materials and workmanship under normal use and service for a period of one (1) year.

UDOR Accessories are warranted to be free from defects in materials and workmanship under normal use and service for a period of ninety (90) days.

"Normal use and service" is defined as applications not in excess of recommended maximum speeds, pressures, temperatures or vacuums, only handling fluids which are compatible with pump or accessory materials and maintaining proper oil change intervals.

"Proper oil change intervals" for Plunger Pumps is changing PUMP OIL after the first 50 hour break-in period, and after every 500 hours of use thereafter using UDOR LUBE Premium Pump Oil and UDOR USA original equipment parts.

This Warranty DOES NOT APPLY to freight damage, damage due to freezing, running pump dry or improper lubrication of crankcase, normal wear of moving parts, damage due to misuse or misapplication, defects caused by the fault or negligence of the buyer or third party, or damage due to use of parts or accessories not obtained from or approved by UDOR USA.

This Warranty also does not apply to any pump or accessory which has been altered or modified to affect its performance or reliability or any pump or accessory that has been returned disassembled.

This Warranty excludes "normal wear items" such as elastomers, seals and valves.

All pumps and accessories being returned to UDOR USA for repair or warranty evaluation must be flushed of any and all chemicals. This also pertains to crankcases that have contaminated oil. Any pump received that has not been properly flushed will be immediately returned to sender freight collect. This policy has been put into place to protect our personnel from possible exposure to hazardous or unknown substances.

All warranty evaluation returns must be accompanied by the original purchase invoice and a RMA number. If invoice is not included, UDOR USA will determine warranty by manufacturer's serial number and date of manufacture on the pump label. Any collect shipments or any product returned without a RMA number will be refused and returned to sender.

UDOR USA's obligation under this warranty is limited to repair or replacement of product in question, at UDOR's option, upon return of the product, freight prepaid, to UDOR USA. UDOR USA agrees to be responsible for return shipping costs ONLY on any approved warranty repair or replacement product via ground transportation ONLY. This warranty is in lieu of all other warranties expressed or implied, including any warranty of merchantability and any warranty of fitness for a particular purpose.

IN NO EVENT SHALL UDOR USA BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR EXPENSES OF ANY KIND. This includes lost income, travel time and expenses, lodging expenses, labor expenses, down time, shipping costs and any other INCIDENTAL or CONSEQUENTIAL damages or expenses.

The only and total liability of UDOR USA under this limited warranty or in any claim regarding or involving UDOR USA is expressly limited to the repair, replacement or purchase price of the product.

WARNING!: DO NOT PUMP OR FLUSH PUMP WITH ANY FLAMMABLE, EXPLOSIVE, CAUSTIC OR CORROSIVE FLUIDS. DO NOT USE ANY OF THESE PRODUCTS IN AN EXPLOSIVE ATMOSPHERE. FAILURE TO FOLLOW THIS WARNING CAN RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE AND WILL VOID ANY AND ALL WARRANTIES.

This Warranty supersedes any and all previous Warranties.



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