

En

USE AND MAINTENANCE MANUAL FOR PLUNGER PUMPS



Please carefully read this manual before using the Pump, in particular follow the safety information. Store in a suitable place to keep it unaltered.

**COMPANY WITH QUALITY SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =**

TABLE OF CONTENTS		PAGE
En	1. GENERAL INFORMATION 1.1 SAFETY SYMBOLS 1.2 PUMP IDENTIFICATION 1.3 WARRANTY	4
	2. INTRODUCTION	5
	3. INTENDED USE	
	4. OPERATIONAL RESTRICTIONS	
	5. GENERAL WARNINGS	
	6. BEFORE START UP 6.1 LIQUIDS TO BE PUMPED 6.2 INLET AND OUTLET OF THE PUMP 6.3 INLET CONDITIONS (SUCTION) 6.4 OUTLET CONDITIONS 6.5 SPEED AND ROTATION DIRECTION	5-6
	7. CONTROLS ON SYSTEM 7.1 UNLOADER VALVE 7.2 NOZZLE 7.3 PULSATION DAMPENER (ACCUMULATOR) 7.4 PRESSURE GAUGE	7-8
	8. INSTALLATION, START UP AND SWITCHING OFF 8.1 POSITIONING 8.2 ASSEMBLY 8.3 START UP 8.4 SWITCHING OFF AND STORAGE 8.5 PRECAUTIONS AGAINST FREEZING	8-9
	9. MAINTENANCE 9.1 ROUTINE MAINTENANCE 9.2 LUBRICATION	9
	10. TROUBLE SHOOTING	10
	11. OIL AND WEIGHT	11
	12. TORQUE SPECIFICATIONS	12-13
	DECLARATION OF INCORPORATION	14

1. GENERAL INFORMATION

1.1 SAFETY SYMBOLS

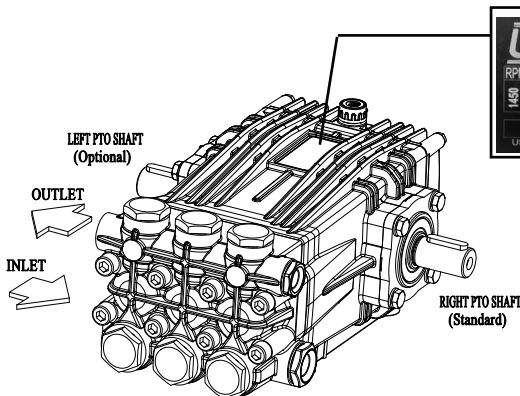
The “**WARNING**” symbol here at the side draws the operator’s attention to situations and/or problems related to the correct **operation of the Pump**.



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 labour and transport are to the charge 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.

2. INTRODUCTION

The horizontal Plunger Pumps of UDOR are designed and manufactured to pump or transfer **water**. They are generally driven by: electric motors, endothermic petrol or diesel engines and hydraulic motors, tractor P.T.O.. Couplings may be fulfilled by means of transmission shaft, direct flanging, reduction unit or multiplier, joints, pulleys and belts.

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



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 RESTRICTION

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 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 AND OUTLET OF THE PUMP

The Inlet port for the liquid that must be pumped is generally located on the lower part of the Pump's head and may also be called the suction port or supply port. The Outlet port for the pumped liquid is generally located on the upper part of the head and may also be called the delivery port.

The Inlet and outlet ports may be used either on the right or the left side of the Pump's head, by dismantling or inverting the closure plugs.



The Inlet and Outlet CANNOT be inverted.

6.3 INLET CONDITIONS (SUCTION)

Pump is mounted above the supply tank.	Pump is mounted below the supply tank in gravity feeding.	Pump is pressure fed.
Max. difference of level between Pump and supply tank: 0,5 m/1.6 ft.	Max. Pump speed: 1750 RPM.	Max. inlet pressure: 6 bar (90 PSI).
Max. working pressure: 200 bar (3000 PSI).	Max. inlet water 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 vacuum: -0.2 bar (-6 inch.Hg).		If a pressure feeding Pump is used, it must be started before the plunger Pump.
Max. Pump speed: 1450 RPM.	Max. inlet water temperature over to 200 bar (3000 PSI) of working pressure: 35°C (95°F).	
Max. inlet water temperature: 40°C (104°F).		
The inlet pipeline must comply with the following requirements: - 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 contraction or any pressure drop. The filter should be grant 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 OUTLET CONDITIONS

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, written on the Label.

6.5 SPEED AND ROTATION DIRECTION

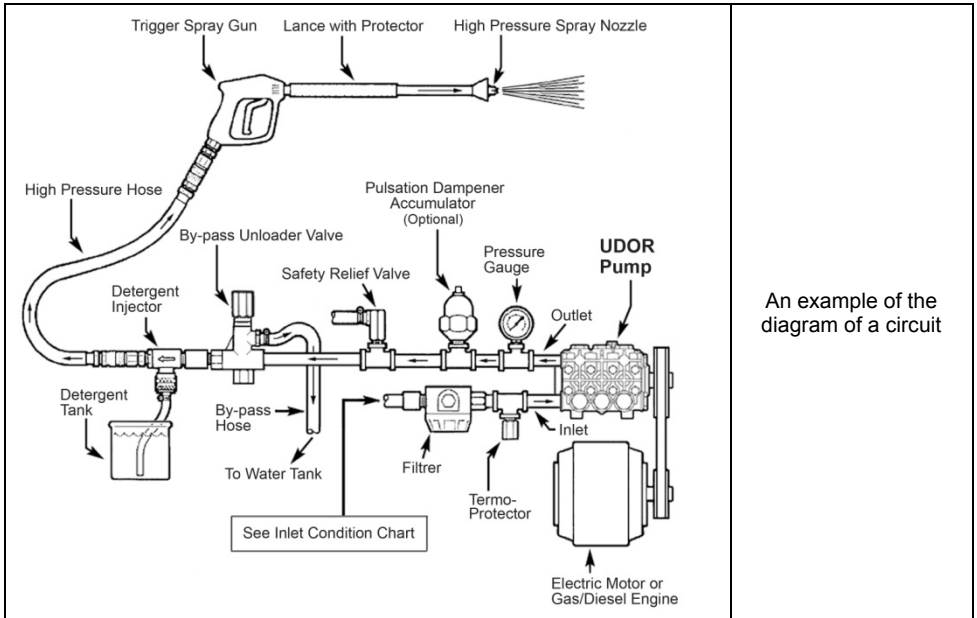


The rotation speed of the shaft of the Pump must never exceed the RPM written on the Label of the actual Pump.

The minimum RPM admitted is: maximum RPM x 0.6.

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

7. CONTROLS ON SYSTEM



7.1 UNLOADER VALVE

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 would 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 "INLET 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. The flow rate of the Pump must be at least 10% higher than the flow rate that the utilities demand; the excess flow rate must be discharged.

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 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

Smaller and lighter Pumps can be handled by hand in compliance with current standards. Heavier Pumps must be handled using the dedicated hook and suitable lifting device. If there is no eyelet and you need to use a lifting device, use appropriate strap/s, being careful not to damage the product. The weight of the Pumps is written in the table on page 25.

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 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.

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

8.3 START UP

Before starting, check the following:



Replace the RED cap on the Pump Crankcase with the venting cap in the kit of accessories supplied.

- Check the oil level through the dedicated oil reservoir or inspection cap; top-up if necessary.
- Check the pressure value on the accumulator, if installed; inflate or deflate if necessary.
- The pressure regulator valve must be set at "0" pressure to favour intake.

Start and run the Pump for approximately 10 seconds until all the liquid has discharged from the delivery line. Once the intake cycle is complete, you can set the Pump at the required pressure, by adjusting the pressure regulator valve, without ever exceeding the maximum pressure written on the Pump's Label.

8.4 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.



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



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 standards.

8.5 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.

The 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

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

- After the first 50 hours: Oil change (see section 9.2 - Lubrication)
- Every 500 hours: Oil change (see section 9.2 - Lubrication)
- Every 1000 hours: Replace the valves – replace piston seal rings

For heavy-duty purposes, carry out the maintenance jobs more often.



When inspecting or replacing the Pump valves, be careful which type of Loctite® you use on the caps over the valves (see table on page 26-27).

9.2 LUBRICATION

The Pump is supplied with the correct amount of lubrication oil (see table on page 25). Periodically check the oil level in the Pump through the oil level indicator.

Use OIL type SAE 15W-40 or equivalent. Here are some recommended types of oil:

BRAND	TYPE
AGIP	F.1 Supermotoroil 15W-40
BP	Vanellus C 15W-40
CASTROL	GTX 15W-40
ESSO	Uniflo 15W-40
MOBIL	Super M 15W-40
SHELL	Rimula R4 15W-40 / Helix Super 15W40
TOTAL	Rubia 15W-40 / Quartz 5000 15W-40

The oil is to be changed by draining it through the dedicated bottom oil drain plug and strictly 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 PUMP!



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 standards.



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.

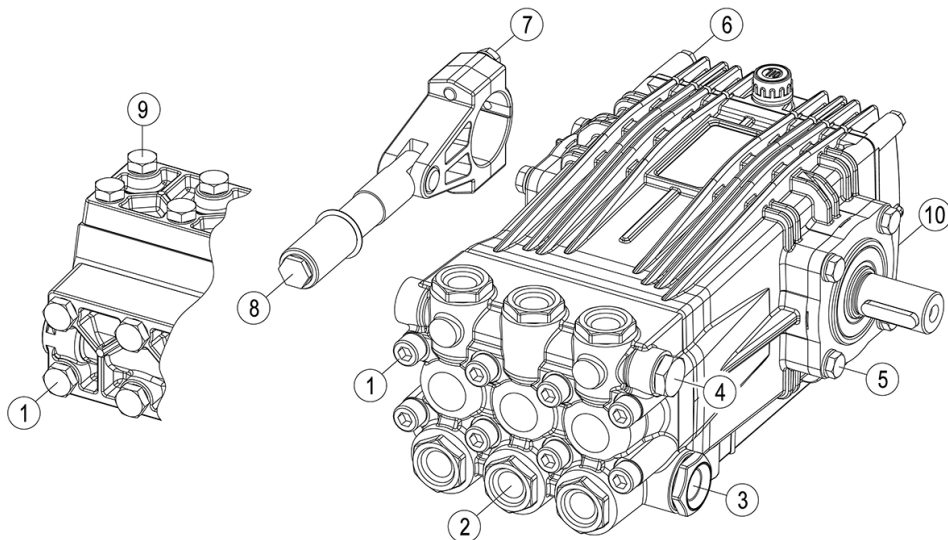
10. TROUBLE SHOOTING

PROBLEMS	PROBABLE CAUSES	SOLUTIONS
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.	Install and maintain proper filter. Replace seals. Check inlet supply: Max. -0,2 bar (-6 inch.Hg) vacuum.
	Abrasives in Pumped fluid; severe cavitation; inadequate water supply.	Check with new gauge; replace worn or damaged gauge.
	Pressure gauge is broken or not registering accurately.	Adjust or repair or replace relief / unloader valve.
	Relief / unloader valve stuck, partially plugged or improperly adjusted.	Check and clean or replace valves.
	Dirty or worn inlet or outlet valves.	Check or replace discharge hoses or fittings.
Pump is noisy.	Leaky outlet hose.	Check or replace hoses or fittings.
	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.
Water leakage under the Pump head.	Broken or worn bearings.	Replace bearings.
	Worn low pressure seal or o-ring.	Replace seal or o-ring.
Water in crankcase. Oil is changing color into white.	Cracked plunger.	Install new plunger.
	High humidity in air (condensing).	Change oil every 250 hours instead of 500.
	Worn crankcase oil seal.	Replace crankcase oil seal.
Oil leak between crankcase and head.	Worn low pressure seal.	Replace seal.
	Worn crankcase oil seal.	Check plunger rod. Replace crankcase oil seal.
Oil leak in the area of crankshaft.	Worn crankshaft oil seal.	Replace crankshaft oil seal.
	Worn bearing case o-ring.	Replace bearing case o-ring.
	Bad bearings.	Replace bearings.
Oil leak at the rear end of the Pump.	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.
	Excessive temperature of fluid being Pumped.	Assure fluid inlet temperature are within specified range (see page 20).
	Running Pump dry.	Do not run Pump without fluid.
Excessive vibrations in outlet line.	Air leak in inlet plumbing.	Check or replace hoses or fittings.
	Pulsation damper pressure too low.	Check and repressure.
	Dirty or worn inlet or outlet valves.	Check and clean or replace valves.

11. OIL AND WEIGHT

SERIES	RECOMMENDED OIL QUANTITY				PUMP WEIGHT	
	Kg.	Lbs.	Lt.	Fl. Oz.	Kg.	Lbs.
PN	0,26	0.57	0,29	10.25	5,3 ÷ 6,0	11.7 ÷ 13.2
PS (Inox - Stainless Steel)	0,32	0.70	0,36	11.5	6,6	14.6
PK	0,32	0.70	0,36	11.5	3,8 ÷ 7,2	8.4 ÷ 15.9
PKWT (HWT)	0,32	0.70	0,36	11.5	6,2	13.7
M	0,42	0.93	0,47	15.4	9,3 ÷ 10,5	20.5 ÷ 23.1
MS (Inox - Stainless Steel)	0,42	0.93	0,47	15.4	10,3	22.7
MWT (HWT)	0,42	0.93	0,47	15.4	9,3	20.5
MK	0,54	1.19	0,60	20.5	10,1 ÷ 11,9	22.2 ÷ 26.2
B	0,42	0.93	0,47	15.4	9,1 ÷ 10,3	20.1 ÷ 22.7
BK	0,42	0.93	0,47	15.4	10,5 ÷ 11,6	23.1 ÷ 25.6
G	0,93	2.05	1,04	34.5	14,8 ÷ 16,2	32.6 ÷ 35.7
GS (Inox - Stainless Steel)	0,93	2.05	1,04	34.5	18,7	41.2
GWT (HWT)	0,93	2.05	1,04	34.5	14,8 ÷ 17,5	32.6 ÷ 38.6
GK	0,93	2.05	1,04	34.5	17,5	38.6
GX	0,93	2.05	1,04	34.5	24,1 ÷ 25,1	53.1 ÷ 55.3
GH	0,93	2.05	1,04	34.5	21,1	46.5
C	0,93	2.05	1,04	34.5	14,8 ÷ 16,2	32.6 ÷ 35.7
CS	0,93	2.05	1,04	34.5	19,7	43.4
CWT (HWT)	0,93	2.05	1,04	34.5	14,8 ÷ 17,5	32.6 ÷ 38.5
CK	0,93	2.05	1,04	34.5	17,5	38.5
CX	0,93	2.05	1,04	34.5	24,1 ÷ 25,1	53.1 ÷ 55.3
CH	0,93	2.05	1,04	34.5	21,1	46.5
NX	1,5	3.3	1,7	57.6	30,4 ÷ 33,8	53.1 ÷ 74.5
GAMMA 62	1,5	3.3	1,7	57.6	22,2	49.0
GAMMA 85 / 105 / 125 / 155	3,4	7.5	3,8	128	37,6 ÷ 38,0	82.9 ÷ 83.7
GAMMA 162 / 202 / 242	1,7	3.7	1,9	64.0	51,8 ÷ 52,0	114.2 ÷ 114.6
GAMMA-IL 83 / 103	3,4	7.5	3,8	128	53,3	117.5
GAMMA-IL 160 / 200	1,7	3.7	1,9	64.0	69,0	152.1
PENTA	3,1	6.8	3,5	118	43,8 ÷ 44,5	96.6 ÷ 98.1
VX - VXX	3,4	7.5	3,8	128	57,9 ÷ 58,5	127.6 ÷ 129.0
VH	3,4	7.5	3,8	128	66,0	145.5

12. TORQUE SPECIFICATIONS



POS.	DESCRIPTION	NOTE
1	Head Bolts	Loctite® 243 - Medium Strenght Treadlocking Color: Blue Loctite® 270 - High Strenght Treadlocking Color: Green
2	Valve Caps	
3	Inlet Cap	
4	Outlet Cap	
5	Bearing Flange Bolts	
6	Rear Cover Bolts	
7	Connecting Rod Bolts	
8	Plunger Bolts	
9	Valve Cover Bolts	
10	Oil Drain Plug	

POS.	PN - PS			PK - PKWT			B - BK			MS - MWT		
	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®
1	11	8		11	8		25	19		25	19	
2	100	75	243	100	75	243	100	75	243	100	75	243
3	80	60		110	80		100	75	243	110	80	
4	80	60	243	80	60	243	80	60	243	80	60	243
5	11	8		11	8		25	19		25	19	
6	11	8		11	8		25	19		11	9	
7	-	-		-	-		11	9	243	-	-	
8	15	11	270	15	11	270	15	11	270	15	11	270
10	8	6		8	6		25	19		8	6	

TORQUE SPECIFICATIONS

POS.	CK (D.20)			C - CK - CWT - CS (D.22/25/28)			CH - CX		
	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®
1	50	37		50	37		50	37	
2	100	75	243	140	103	243			
3 (A)	103	140	103				140	103	
3 (B)	103	140	103				180	133	
4	80	60	243	100	75	243	80	60	243
5	25	19		25	19		25	19	
6	11	8		11	8		11	8	
7	25	19	270	25	19	270	25	19	270
8	15	11	270	20	15	270	20	15	243
9							50	37	
10	11	8		11	8		11	8	

3 (A) = CXC 15/50 S – CXC 18/50 S – CXC 22/50 S

3 (B) = CXC 70/15 S

POS.	NK - NKS			GAMMA 62			GAMMA 85/105/125/150 GAMMA-IL 83/103			GAMMA 162/202/242 GAMMA-IL 160/200 VX6			VX – VXX – VH VXS		
	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®
1	50	37		50	37		90	66		90	66		140	103	
2	120	88	243												
3	180	133		180	133		180	133		180	133		200	147	
4	120	88	243	140	103	243	140	103	243	140	103	243	180	133	243
5	50	37		50	37		50	37		50	37		50	37	
6	11	8		11	8		11	8		11	8		11	8	
7	25	19	243	25	19	243	25	19	243				25	19	243
8	30	22	270	50	37	243	65	48	243	65	48	243	40	30	243
9													90	66	
10	11	8		11	8		11	8		11	8		11	8	

POS.	PENTA (1)			PENTA (2)			PENTA (3)		
	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®	N•m	lb•ft	Loctite®
1	50	37		50	37		50	37	
2	180	133	243						
3	180	133		200	147		180	133	
4	110	81	243	140	103	243	80	60	243
5	50	37		50	37		50	37	
6	11	8		11	8		11	8	
7	30	22	270	30	22	270	30	22	270
8	20	15	270	20	15	243	15	11	270
9							50	37	
10	11	8		11	8		11	8	

PENTA (1) = PENTA-B 25/400 – PENTA-B 25/350

PENTA-C 35/400 – PENTA-C 35/350

PENTA (2) = PENTA-B 30/300 – PENTA-B 40/250 – PENTA-B 40/300 – PENTA-B 50/200

PENTA-C 43/300 – PENTA-C 55/250 – PENTA-C 58/300 – PENTA-C 70/200

PENTA (3) = PENTA-B 21/500 – PENTA-C 30/500 – PENTA-D 28/500

DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY

according to Machinery Directive (2006/42/CE and subsequent amendments) and the implementing provisions.

The manufacturer:

UDOR S.p.A.

Via A. Corradini, 2 - 42048 Rubiera (Reggio Emilia) - Italia

in the person of its legal representative

declares under its sole responsibility that the “partly completed machinery” of its own production, namely:

Plunger Pumps, series:

PN - PK - B - BK - C - CK - CX - CH

HWT (PKWT - MWT - CWT) - Inox / Stainless Steel (PS - MS - CS - NKS - VXS)

NK - GAMMA - GAMMA-IL - PENTA - VX - VX6 - VH - VXX

which this declaration is referred to, is in conformity with the essential safety requirements of Directive 2006/42/EC, for which it is applied and respected in all the essential issues:

- | | | | | |
|-----------------------|-----------------------|-------------------------|-----------------------|-------------------------|
| • from 1.1.1 to 1.1.3 | • from 1.2.6 to 1.3.2 | • 1.3.8.2 | • 1.5.13 | • 1.7.2 |
| • from 1.1.5 to 1.1.5 | • 1.3.4 | • from 1.4.1 to 1.4.2.1 | • from 1.6.1 to 1.6.2 | • from 1.7.4 to 1.7.4.3 |
| • 1.2.4.3 | • from 1.3.7 to 1.3.8 | • from 1.5.2 to 1.5.8 | • from 1.6.4 to 1.7.1 | |


with the Relevant Technical Documentation conforming to the annex VII B.

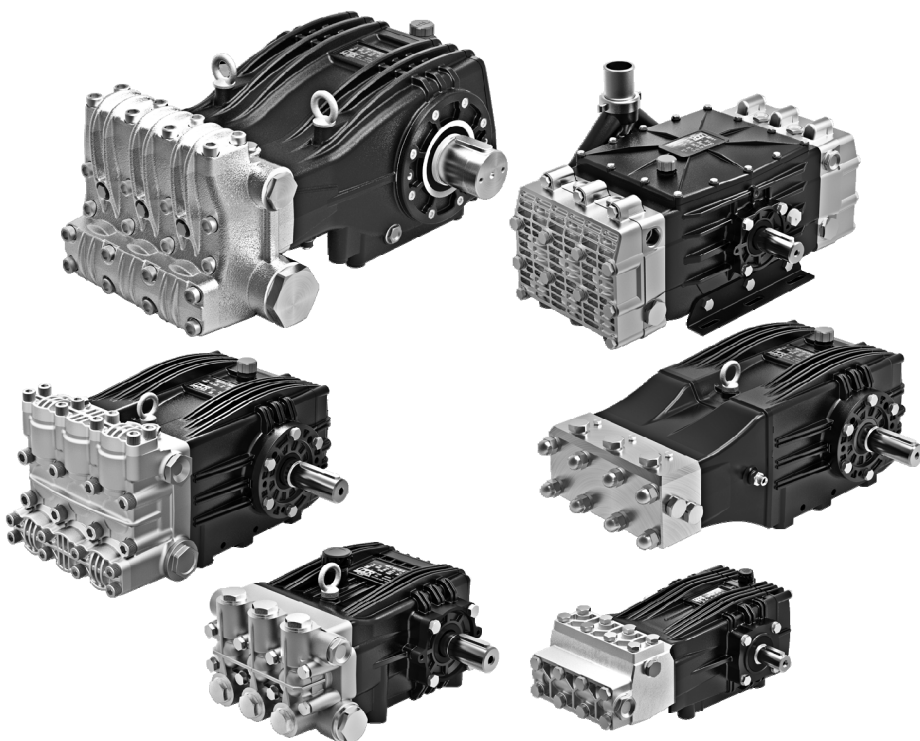
They also comply with the following Standard: UNI EN 809.

It is additionally specified that:

- The Relevant Technical Documentation is kept at UDOR S.p.A. premises in: Via A. Corradini, 2 – 42048 Rubiera (Reggio Emilia) – Italy, in the person of its legal representative.
- Any reasoned request by national authorities will be fulfilled with the relevant information on the “Partly Completed Machinery”.
- The “Partly Completed Machinery” Plunger Pumps cannot be operated until the machine where they are incorporated into, has complied with the same Directive 2006/42/EC and with the other potentially applicable Directives.

Rubiera, 29/12/2009


Marco Zanasi
(CEO UDOR S.p.A.)

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