



Plunger Pumps

Use & Maintenance Manual

SAFETY SYMBOLS

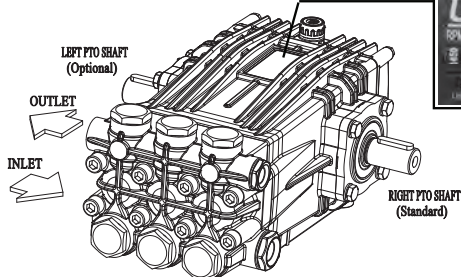
The **“WARNING”** symbol here at the side draws the operator's attention to situations and/or problems related to the correct **operation of the Pump**.



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



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.

INSTALLATION

WARNING! UDOR Plunger Pumps are positive displacement pumps, therefore a properly designed pressure relief valve or unloader valve must be installed on the pump or in the discharge plumbing. A secondary safety relief valve is also recommended. Failure to install a pressure relief valve or unloader valve could result in personal injury, property damage or damage to the pump or system and void any warranty. In no way does UDOR USA assume any liability or responsibility for the construction or operation of a customer's or potential customer's high pressure system.

LOCATION: If the pump is used in dirty or humid conditions, it is recommended that the pump be enclosed. Do not store or operate in excessively high temperature areas or without proper ventilation.

MOUNT: Mount the pump on a rigid, horizontal surface in such a way as to permit drainage of crankcase. An uneven mounting surface will cause damage to the pump. Use appropriate flexible hose to the inlet and discharge ports. Use the proper belts, making sure pulleys are aligned. Excessive belt tension can be harmful to bearings. For CK Series gear reduction applications, pump must have support rail with vibration isolators or an UDOR torque plate installed. Contact UDOR U.S.A. for information.

PUMP ROTATION: UDOR Plunger Pumps are designed for forward rotation to allow optimum lubrication of the crosshead area. Reverse rotation is acceptable if the crankcase oil level is increased slightly above the center dot to assure proper lubrication.

PUMP SPEED: Do not over speed the pump. UDOR Plunger Pumps are designed to operate at or below a specific RPM. Over speeding will cause valves and seals to prematurely fail and could cause other internal damage. Refer to the performance chart or breakdown of your specific pump for maximum operating RPM.

LUBRICATION: Fill the crankcase with UDOR LUBE Premium Pump Oil or SAE 30W non-detergent oil per pump specifications. DO NOT run pump without oil in crankcase. Change oil after initial 50 hour break-in and every 500 hours or 3 months there-after. For any pump with a gear reduction, make sure the gear box is filled to the center of the sight glass with 90 wt. gear lube before operating.

PUMPED FLUIDS: Some fluids may require a flush between operations or before storing. For information regarding pumping fluids other than water, please contact UDOR U.S.A.

INLET CONDITIONS: Ensure proper inlet flow. DO NOT STARVE THE PUMP OR RUN PUMP DRY!

DISCHARGE PLUMBING: DO NOT START PUMP UNLESS A PRESSURE RELIEF VALVE OR UNLOADER VALVE IS INSTALLED. OPEN ALL VALVES BEFORE STARTING THE SYSTEM TO AVOID DEADHEAD OVERPRESSURE CONDITION AND SEVERE DAMAGE TO THE PUMP OR SYSTEM.

PULSATION DAMPENER: (Optional) Install dampener directly into discharge line. Make sure the pulsation dampener is properly pre-charged for the system pressure.

PRESSURE GAUGE: Install pressure gauge near the discharge outlet of the high pressure manifold or in the discharge plumbing. This is extremely important for adjusting the pressure relief valve / unloader valve and for proper sizing of the nozzle or restricting orifice. The pump is rated for a maximum pressure, which should be read at the discharge manifold of the pump only, not at the gun or nozzle.

PRESSURE RELIEF VALVE/UNLOADER VALVE: A pressure relief valve or unloader valve must be installed to prevent over pressurizing and severely damaging the pump if the discharge is turned off or becomes plugged. Pressure relief valves / unloader valves should be at minimum pressure setting at start-up. On any high pressure system, secondary protection, such as a pop-off valve or safety valve, is recommended. Start system with all valves open or in the low pressure setting.

CAUTION: FAILURE TO INSTALL A PRESSURE RELIEF VALVE OR UNLOADER VALVE WILL VOID THE WARRANTY ON THE PUMP.

NOZZLES: A worn nozzle will result in loss of pressure. Do not adjust the pressure relief valve / unloader valve to compensate for pressure loss. Replace nozzle and reset the pressure relief valve / unloader valve to proper system pressure.

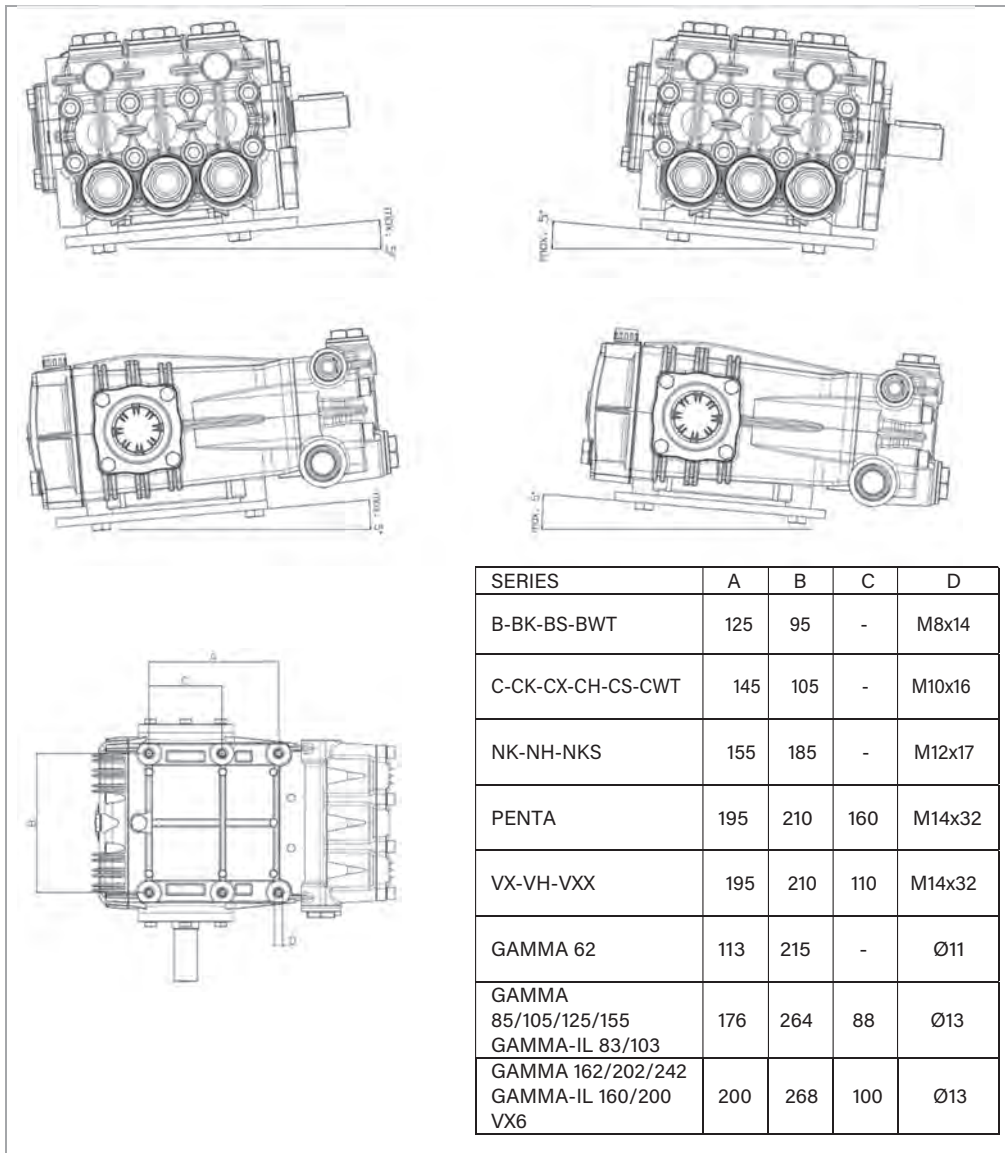
STORING: For extended storage or between use in cold climates, drain all pumped fluids from the pump and complete system and flush with a 50/50 mixture of antifreeze and water to prevent freezing and damage to the pump. DO NOT run pump with frozen fluid. Before restarting the pump after anti-freezing, make sure to purge all anti-freeze from pump and complete system at low pressure only. Anti-freeze will foam under high pressure and can cause severe damage to the pump and pressure regulator. FAILURE TO FOLLOW THIS STEP WILL VOID ANY AND ALL WARRANTIES.

5.4 Pump Fastening

Assemble the Pump on a rigid surface while keeping the power take-off and support feet horizontal in order to allow correct drainage in the event of water or oil spills.

Attach the Pump to the support with screws appropriate to the diameter and depth of the holes provided in the pump body. (See Fig. below).

The illustration shows the maximum permissible inclination of the pump to ensure correct lubrication.



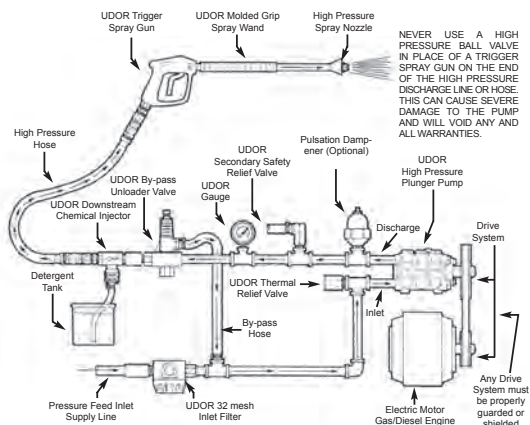
UDOR USA BASIC PRESSURE FEED HIGH PRESSURE CLEANING SYSTEM PLUMBING DIAGRAM

NOTE: This is a basic pressure feed plumbing diagram and is not recommended for all systems. Consult UDOR USA for specific system requirements and components.

On any multiple gun system never use a standard unloader style valve; these valves are designed for full on or full off only. A balance relief valve must be used for multiple gun systems.

Use blue threadlocker or equivalent on all plumbing components, fittings and accessories.

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.

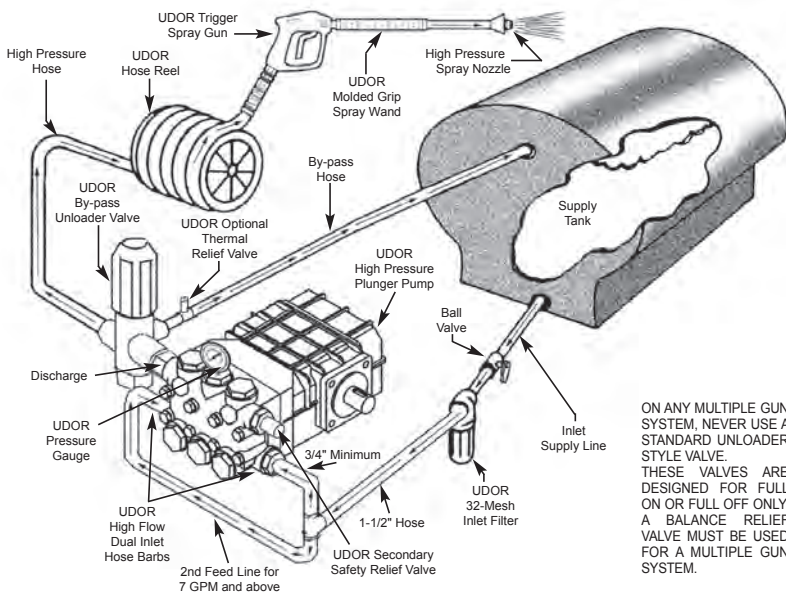


NEVER USE A HIGH PRESSURE BALL VALVE IN PLACE OF A TRIGGER SPRAY GUN ON THE END OF THE HIGH PRESSURE DISCHARGE LINE OR HOSE. THIS CAN CAUSE SEVERE DAMAGE TO THE PUMP AND WILL VOID ANY AND ALL WARRANTIES.

BASIC PLUNGER PUMP TANK FEED HIGH PRESSURE CLEANING SYSTEM PLUMBING DIAGRAMS

These are basic tank feed plumbing diagrams and are not recommended for all systems. Consult UDOR USA for specific system requirements and components.

Over 7 GPM. DUAL INLET REQUIRED



NOTE: On any tank feed system each pump must be fed by its own separate feed line only. Never feed multiple pumps with one common feed line.

NOTE: For Tank Feed Systems over 7 GPM, feed pumps through BOTH inlets to ensure proper flow and prevent cavitation and damage to the pump.

FEED TANK SIZE: A recommended minimum feed tank size is 6-10 times the maximum GPM output rating of the pump or pumps being used.

SAMPLE: 10 GPM PUMP x 6 = 60 GALLON MINIMUM FEED TANK SIZE.

MAKE SURE ALL FEED TANKS HAVE PROPER BAFFLES AND VENTING.

USE BLUE THREADLOCKER OR EQUIVALENT ON ALL PLUMBING COMPONENTS, FITTINGS AND ACCESSORIES.

NEVER USE A HIGH PRESSURE BALL VALVE IN PLACE OF A TRIGGER SPRAY GUN ON THE END OF THE HIGH PRESSURE DISCHARGE LINE OR HOSE. THIS CAN CAUSE SEVERE DAMAGE TO THE PUMP AND WILL VOID ANY AND ALL WARRANTIES.

ON ANY MULTIPLE GUN SYSTEM, NEVER USE A STANDARD UNLOADER STYLE VALVE. THESE VALVES ARE DESIGNED FOR FULL ON OR FULL OFF ONLY. A BALANCE RELIEF VALVE MUST BE USED FOR A MULTIPLE GUN SYSTEM.

Always keep the by-pass line as far away as possible from the inlet supply line to prevent aeration or cavitation of the fluid being pumped.

MINIMUM PLUMBING REQUIREMENTS	Pump GPM	Min. Feed Line Size	Inlet Filter (40 Mesh Max.)	NOTE: All plumbing accessories should be the same or greater diameter as the feed line. All ball valves should be full port valves only.
	2 - 4 GPM	3/4"	3/4" 20-40 Mesh Screen	
	5 - 7 GPM	1"	1" 20-40 Mesh Screen	
	8 - 19 GPM	1-1/4"	1-1/4" 20-40 Mesh Screen	
	20 - 30 GPM	1-1/2"	1-1/2" 20-40 Mesh Screen	

WARNING: Consult UDOR U.S.A. for plumbing requirements on high speed, 3400 RPM Direct Drive Pumps.

REFER TO THE PROPER PUMP BREAKDOWN AND PLUNGER PUMP SERVICE GUIDE BEFORE PERFORMING ANY MAINTENANCE OR SERVICING OF THE PUMP. www.udorusa.com

UDOR plunger pumps “pump volume”, not pressure. The pressure is determined by adjusting the pressure relief valve or unloader valve and selecting the proper orifice size of spray nozzle or nozzles.

NEVER run any UDOR plunger pump without a pressure relief valve or unloader valve installed on the pump or in the discharge plumbing.

PROBLEM	CAUSE	REMEDY
• LOW PRESSURE	1) Worn or plugged nozzle 2) Belt Slippage 3) Air leak in inlet plumbing 4) Pressure gauge inoperative or not registering accurately 5) Relief/unloader valve worn, partially plugged or improperly adjusted 6) Inlet suction strainer clogged or improper size (too small) 7) Worn wet end seals; Abrasives in pumped fluid or severe cavitation; Inadequate water supply 8) Fouled or dirty inlet or discharge valves 9) Worn inlet or discharge valves 10) Leaky discharge hose	• Replace or clean nozzle; check for proper size • Tighten or replace belts • Disassemble, reseal and reassemble; use blue threadlocker • Check with new gauge; replace worn or damaged gauge • Repair/replace and adjust relief/unloader valve • Clean; use a proper size; check more frequently • Install and maintain proper filter; replace seals; check inlet water supply; Max. 6 in. inlet vacuum • Clean inlet and discharge valve assemblies • Replace worn valves • Replace discharge hose
• PUMP RUNS EXTREMELY ROUGH • PRESSURE VERY LOW	1) Restricted inlet or air entering the inlet plumbing 2) Inlet restrictions and/or air leaks; stuck inlet or discharge valves 3) Plugged inlet filter	• Proper size inlet plumbing; check for air tight seal at fittings and filter • Replace worn seals; clean out material in valves or replace worn valves • Clean or replace filter
• WATER LEAKAGE FROM UNDER THE MANIFOLD	1) Worn wet end seals 2) Cracked plungers	• Replace seals • Replace plungers
• OIL LEAK BETWEEN CRANKCASE AND PUMP HEAD	1) Worn crankcase oil seals 2) Scored or damaged plunger rods	• Replace crankcase oil seals • Replace plunger rods
• OIL LEAKING IN THE AREA OF CRANKSHAFT	1) Worn crankshaft seal or case o-ring 2) Bad bearing	• Replace crankshaft seal or case o-ring • Replace bearing
• EXCESSIVE PLAY IN THE END OF THE CRANKSHAFT	1) Worn bearings	• Replace bearings
• WATER IN CRANKCASE OIL	1) May be caused by humid air condensing into water inside the crankcase 2) Worn or improperly installed wet end seals	• Change oil at 3 month or 500 hour intervals using UDOR LUBE (or SAE 30W non-detergent oil) • Replace seals; follow proper installation procedures (refer to UDOR USA Plunger Pump Service Guide) or contact UDOR pump supplier for servicing
• OIL LEAKING AT THE REAR PORTION OF THE CRANKCASE	1) Damaged or improperly installed sight glass or crankcase rear cover gasket or drain plug gasket	• Replace sight glass, crankcase cover gasket or drain plug gasket
• LOUD KNOCKING NOISE IN PUMP	1) Pulley loose on crankshaft 2) Broken or worn bearing	• Check shaft key and tighten set screw or bolts • Replace bearings
• FREQUENT OR PREMATURE FAILURE OF THE WET END SEALS	1) Scored plungers 2) Over-pressure to inlet manifold 3) Abrasive material in the fluid being pumped 4) Excessive temperature of fluid being pumped 5) Running pump dry	• Replace plungers • Reduce inlet pressure; Max. 75 PSI • Install proper filtration on pump inlet plumbing • Assure fluid inlet temperature is within specified range; Max. 160° F • DO NOT run pump without fluid / Replace seals
• STRONG SURGING AND LOW PRESSURE DISCHARGE	1) Foreign particles in the inlet or discharge valves or worn inlet and/or discharge valves 2) Worn wet end seals	• Clean valves or replace worn valves; check supply tank for contamination; install and regularly clean filter; never pump abrasive fluids • Replace seals

REPLACING PUMP VALVES

1. All inlet and discharge valves can be serviced without disrupting the inlet or discharge plumbing.
2. To service the valves, remove valve caps.
3. Remove the valve assembly from the valve cavity.
4. Remove o-ring from valve cavity.
5. Only one valve kit is necessary to replace all the valves in the pump. The kit includes new valve o-rings and valve assemblies.
6. Install o-ring into cavity.
7. Insert valve assembly into valve cavity.
8. Install valve cap and torque to specifications. NOTE: Use "blue" threadlocker or equivalent on all valve caps.

REMOVING PUMP HEAD

1. Remove the bolts from the pump head.
2. Separate the head from the crankcase. NOTE: It may be necessary to tap head lightly with a plastic or rubber mallet to loosen.

CAUTION: Do not damage plungers when removing the head.

3. The packing assemblies typically come off with the head. At this point, inspect ceramic plungers. Plunger surfaces should be smooth and free from scoring and cracks. IF NOT, replace plunger.

REPLACING CERAMIC PLUNGERS

1. Remove plunger nut or bolt, then remove plunger from piston rod.
2. If slinger washer comes off with the plunger, be certain this is reinstalled or replaced before a new plunger is installed.
3. Separate plunger bolt from plunger.
4. Install new o-ring, PTFE back-up ring and washer on plunger bolt or stem. NOTE: A film of grease on the outside of the o-rings ensures a better installation.
5. Carefully insert plunger bolt into plunger. NOTE: Use "red" threadlocker or equivalent on all plunger nuts or bolts.
6. Slide new plunger over the piston guide and torque to specifications.

REPLACING WET END SEAL KIT

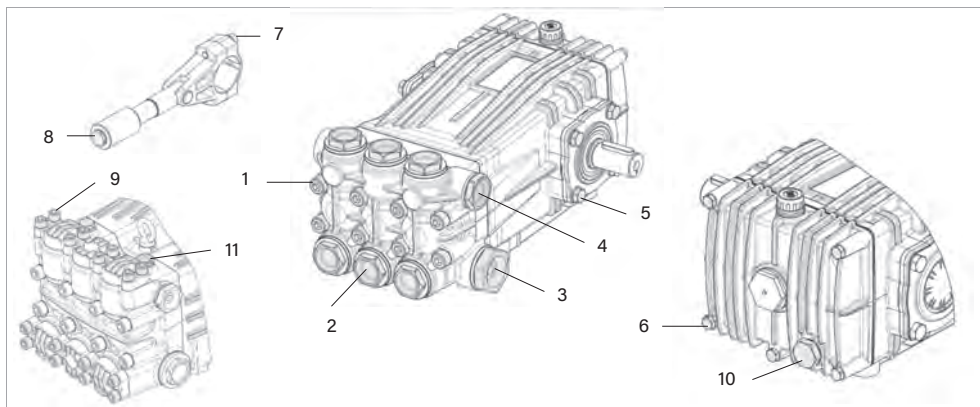
1. Insert proper seal stack extractor tool or reversible pliers through seal retainer. Extract retainers, packings and spreader rings.
2. Only one seal kit is necessary to replace the wet end seals in the pump. The kit includes low pressure seals, high pressure seals, spreader rings and long life rings.
3. Place proper seal insertion sleeve into cylinder and install plastic spreader ring into bottom of the cylinder flat side down. Insert brown high pressure seal into seal insertion sleeve flat side up and tap firmly into place. Remove insertion sleeve.
4. Install long life ring on top of the high pressure seal and insert middle brass ring.
5. Install the black low pressure seal into upper brass ring (flat side goes into the upper brass ring), lightly grease the outer o-ring and insert into cylinder.
6. Coat each plunger and seal stack with grease and carefully reinstall the pump head. NOTE: It may be necessary to tap pump head lightly with a plastic or rubber mallet. Install head bolts and torque to specifications.

CHANGING PUMP OIL

1. Change pump oil after the first 50 hour break-in period, then change pump oil after every 500 hours of use.
2. Remove oil drain plug from back cover or under pump. Drain oil.
3. Re-install oil drain plug.
4. Fill pump crankcase with UDOR LUBE Premium Pump Oil or SAE 30W non-detergent oil to the recommended mark on the oil sight glass/gauge, about halfway on the oil sight glass/gauge.

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TIGHTENING TORQUES



ITEM	DESCRIPTION	NOTE
1	Head Screws	Loctite® 243 Threadlocker Medium Color: Blue Loctite® 272 Threadlocker Strong Color: Red
2	Valve Caps	
3	Inlet Cap	
4	Outlet plug	
5	Flange Bearing Screws	
6	Rear Cover Screws	
7	Connecting rod screws	
8	Screw / Nut Plunger	
9	Valve Cover Screws	
10	Oil Plug	
11	Head service caps	

ITEM	PN				PK – PKWT				B – BK – BCW – BWT			
	dia.	N•m	lb•ft	Loctite ¹	dia.	N•m	lb•ft	Loctite ¹	dia.	N•m	lb•ft	Lo
1 Head Screws	M6	11	8	-	M6	11	8	-	M8	25	18	
2 Valve Caps	M22x1,5	100	74	243	M22x1,5	100	74	243	M22x1,5	100	74	
3 Inlet Cap	G3/8	70	52	272	G1/2	70	52	272	G1/2	70	52	
4 Outlet plug	G3/8	70	52	272	G3/8	70	52	272	G3/8	70	52	
5 Flange Bearing Screws	-	-	-	-	-	-	-	-	M8	25	18	
6 Rear Cover Screws	M6	11	8	-	M6	11	8	-	M8	25	18	
7 Connecting rod screws	-	-	-	-	-	-	-	-	M6	11	8	
8 Screw / Nut Plunger	M8	15	11	243	M8	15	11	243	M8	15	11	
9 Valve Cover Screws	-	-	-	-	-	-	-	-	-	-	-	
10 Oil Plug	G1/4	11	8	-	G1/4	11	8	-	G1/4	11	8	
11 Head service caps	-	-	-	-	-	-	-	-	-	-	-	

ITEM	C (1)				C (2)				C (3)			
	dia.	N•m	lb•ft	Loctite ¹	dia.	N•m	lb•ft	Loctite ¹	dia.	N•m	lb•ft	Lo
1 Head Screws	M10	50	37	-	M10	50	37	-	M10	50	37	
2 Valve Caps	M27x1,5	140	103	243	M27x1,5	140	103	243	M30x1,5	180	133	
3 Inlet Cap	G3/4	70	52	272	G3/4	70	52	272	G1	120	89	
4 Outlet plug	G3/8	70	52	272	G1/2	70	52	272	G3/4	70	52	
5 Flange Bearing Screws	M8	25	18	-	M8	25	18	-	M8	25	18	
6 Rear Cover Screws	M6	11	8	-	M6	11	8	-	M6	11	8	
7 Connecting rod screws	M8	25	18	243	M8	25	18	243	M8	25	18	
8 Screw / Nut Plunger	M8	20	15	243	M8	20	15	243	M8	20	15	
9 Valve Cover Screws	-	-	-	-	-	-	-	-	-	-	-	
10 Oil Plug	G3/8	11	8	-	G3/8	11	8	-	G3/8	11	8	
11 Head service caps	-	-	-	-	-	-	-	-	-	-	-	

(1) = CC 21/20 – CC 26/20 – CD 5.5/30 – CD 7.0/30 – CD 7.5/30 – CD 8.5/30 – CD 9.5/30 – CB 21/20 – CC 3 0/20 – CC 34/20 – CD 11.0/25 – CD 12.0/20 – CWTC 27 /20 – CWTC 34/20

(2) = CB 26/20 – CB 30/20 – CC 38/17 – CC 42/17 – CB 3 4/20 – CC 50/15 – CWTC 42/15 – CWTC 50/15

(3) = CB 50/15 – CC 70/15 – CD 18.5/22 – CWTC 70/15

ITEM	CK (1)				CK (2)				CK (3)			
	dia.	N•m	lb•ft	Loctite ¹	dia.	N•m	lb•ft	Loctite ¹	dia.	N•m	lb•ft	Lo
1 Head Screws	M10	50	37	-	M10	50	37	-	M10	50	37	
2 Valve Caps	M22x1,5	100	74	243	M30x1,5	180	133	243	M27x1,5	140	103	
3 Inlet Cap	G3/4	70	52	272	G3/4	70	52	272	G3/4	70	52	
4 Outlet plug	G3/8	70	52	272	G3/8	70	52	272	G1/2	70	52	
5 Flange Bearing Screws	M8	25	18	-	M8	25	18	-	M8	25	18	
6 Rear Cover Screws	M6	11	8	-	M6	11	8	-	M6	11	8	
7 Connecting rod screws	M8	25	18	243	M8	25	18	243	M8	25	18	
8 Screw / Nut Plunger	M8	20	15	243	M8	20	15	243	M8	20	15	
9 Valve Cover Screws	-	-	-	-	-	-	-	-	-	-	-	
10 Oil Plug	G3/8	11	8	-	G3/8	11	8	-	G3/8	11	8	
11 Head service caps	-	-	-	-	-	-	-	-	-	-	-	

(1) = CKD 3.5/51 – CKC 17/36 – CKC 21/36 – CKD 4.5/51 – CKD 6.0/51

(2) = CKC 17/30 – CKC 21/30 – CKC 26/30 – CKC 30/30 – CKD 5.5/44 – CKD 7.0/44 – CKC 34/25

(3) = CKC 38/20 – CKC 42/20 – CKC 50/20

ITEM	CX (1)				CH (2)							
	dia.	N•m	lb•ft	Loctite ¹	dia.	N•m	lb•ft	Loctite ¹				
1 Head Screws	M10	80	59	-	M10	80	59	-				
2 Valve Caps	M22x1,5	100	74	243	-	-	-	-				
3 Inlet Cap	G3/4	70	52	272	G3/4	70	52	272				
4 Outlet plug	G3/8	70	52	272	G3/8	70	52	272				
5 Flange Bearing Screws	M8	25	18	-	M8	25	18	-				
6 Rear Cover Screws	M6	11	8	-	M6	11	8	-				
7 Connecting rod screws	M8	25	18	243	M8	25	18	243				
8 Screw / Nut Plunger	M8	15	11	243	M8	15	11	243				
9 Valve Cover Screws	-	-	-	-	M10	50	37	-				
10 Oil Plug	G3/8	11	8	-	G3/8	11	8	-				
11 Head service caps	-	-	-	-	-	-	-	-				

(1) = CXK 15/50 – CXK 18/50 – CXK 22/50

(2) = CHC 12/50 – CHC 16/50 – CHD 3.0/75 – CHD 4.5/7 5 – CHC 20/50

ITEM	NK (1)				NK (2)				NK (3)			
	dia.	N•m	lb•ft	Loctité ⁷	dia.	N•m	lb•ft	Loctité ⁷	dia.	N•m	lb•ft	Loctité ⁷
Head Screws	M10	50	37	-	M10	50	37	-	M10	50	37	-
Valve Caps	M30x1.5	180	133	243	M36x1.5	180	133	243	M36x1.5	180	133	-
Inlet Cap	G1	140	103	-	G1 1/4	140	103	-	G1 1/4	140	103	-
Outlet plug	G1/2	80	59	-	G3/4	80	59	-	G1	80	59	-
Flange Bearing Screws	M10	50	37	-	M10	50	37	-	M10	50	37	-
Rear Cover Screws	M6	11	8	-	M6	11	8	-	M6	11	8	-
Connecting rod screws	M8	25	18	243	M8	25	18	243	M8	25	18	-
Screw / Nut Plunger	M8	25	18	243	M8	25	18	243	M8	25	18	-
Valve Cover Screws	-	-	-	-	-	-	-	-	-	-	-	-
Oil Plug	G3/8	11	8	-	G3/8	11	8	-	G3/8	11	8	-
Head service caps	-	-	-	-	-	-	-	-	-	-	-	-

NK-B 25/350 - NK-B 32/350 - NK-B 37/300 - NK-B 42/250 - NK-B 50/250 - NK-C 35/350 - NK-C 47/350 - NK-C 55/300 - NK-C 60/250 - NK-C 70/250 - NK-D 11.0/51 - NK-D 15.0/44
 NK-B 52/170 - NK-B 60/170 - NK-B 70/150 - NK-C 75/170 - NK-C 85/170 - NK-C 100/150 - NK-D 115/145 - NK-D 24.0/25 - NK-D 27.0/25
 NK-B 100/100 - NK-C 130/130 - NK-C 145/100

ITEM	VX - VXX (1)				VX - VXX -VH (2)				VX - VXX (3)			
	dia.	N•m	lb•ft	Loctité ⁷	dia.	N•m	lb•ft	Loctité ⁷	dia.	N•m	lb•ft	Loctité ⁷
Head Screws	M14	200	148	-	M14	200	148	-	M14	200	148	-
Valve Caps	-	-	-	-	-	-	-	-	-	-	-	-
Inlet Cap	G1 1/2	140	111	-	G1 1/2	140	111	-	G1 1/2	140	111	-
Outlet plug	G1	140	89	-	G1	140	89	-	G1	140	89	-
Flange Bearing Screws	M10	50	37	-	M10	50	37	-	M10	50	37	-
Rear Cover Screws	M6	11	8	-	M6	11	8	-	M6	11	8	-
Connecting rod screws	M8	25	18	243	M8	25	19	243	M8	25	19	-
Screw / Nut Plunger	M10	50	37	243	M8	25	19	243	M12	50	37	-
Valve Cover Screws	M12	140	103	-	M12	140	103	-	M12	140	103	-
Oil Plug	G3/8	11	8	-	G3/8	11	8	-	G3/8	11	8	-
Head service caps	G1/2 - G3/8	80	59	-	G1/2 - G3/8	80	59	-	-	80	59	-

VX-B 100/200 - VX-B 130/160 - VX-B 160/130 - VX-C 135/160 - VX-D 140/130 - VX-D 150/80 - VX-C 115/110 - VX-C 150/80 - VXX-B 130/220 - VXX-B 160/180
 VX-C 100/200 - VX-B 60/350 - VX-B 75/280 - VX-C 9 5/16 - VX-D 90/140 - VH-B 40/600
 VX-A 161/110 - VX-B 200/100 - VXX-B 200/150 - VXX-F 230/140

ITEM	GAMMA 62				GAMMA 85/105/125/150 GAMMA-IL 83/103				GAMMA 162/202/242 GAMMA-IL 160/200 - VXX			
	dia.	N•m	lb•ft	Loctité ⁷	dia.	N•m	lb•ft	Loctité ⁷	dia.	N•m	lb•ft	Loctité ⁷
Head Screws	M10	50	37	-	M12	80	59	-	M12	80	59	-
Valve Caps	-	-	-	-	-	-	-	-	-	-	-	-
Inlet Cap	G1	120	89	-	G1	120	89	-	G1	120	89	-
Outlet plug	G3/4	70	52	272	G3/4	70	52	272	G3/4	70	52	-
Flange Bearing Screws	M10	50	37	-	M10	50	37	-	M10	50	37	-
Rear Cover Screws	M6	11	8	-	M6	11	8	-	M6	11	8	-
Connecting rod screws	M8	25	18	243	M8	25	18	243	M8	25	18	-
Screw / Nut Plunger	M12	50	37	243	M14	65	48	243	M14	65	48	-
Valve Cover Screws	-	-	-	-	-	-	-	-	-	-	-	-
Oil Plug	G3/8	11	8	-	G3/8	11	8	-	G3/8	11	8	-
Head service caps	-	-	-	-	-	-	-	-	-	-	-	-

ITEM	PENTA (1)				PENTA (2)				PENTA (3)			
	dia.	N•m	lb•ft	Loctité ⁷	dia.	N•m	lb•ft	Loctité ⁷	dia.	N•m	lb•ft	Loctité ⁷
Head Screws	M10	50	37	-	M10	50	37	-	M10	50	37	-
Valve Caps	M30x1.5	180	133	243	M30x1.5	180	133	243	-	-	-	-
Inlet Cap	G1	140	103	-	G1 1/4	140	103	-	G1	140	103	-
Outlet plug	G1/2	80	59	-	G3/4	80	59	-	G3/8	80	59	-
Flange Bearing Screws	M10	50	37	-	M10	50	37	-	M10	50	37	-
Rear Cover Screws	M6	11	8	-	M6	11	8	-	M6	11	8	-
Connecting rod screws	M8	25	18	243	M8	25	18	243	M8	25	18	-
Screw / Nut Plunger	M8	20	15	243	M8	20	15	243	M8	15	11	-
Valve Cover Screws	-	-	-	-	-	-	-	-	M10	50	37	-
Oil Plug	G3/8	11	8	-	G3/8	11	8	-	G3/8	11	8	-
Head service caps	-	-	-	-	-	-	-	-	-	-	-	-

PENTA-B 25/400 - PENTA-B 25/350 - PENTA-C 35/400 - PENT A-C 35/350

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 70/20

PENTA-B 21/600 - PENTA-C 30/600 - PENTA-D 28/600

S	RECOMMENDED QUANTITY OF OIL				PUMP WEIGHT	
	Kg.	Lbs.	Lt.	Fl. Oz	Kg.	Lbs.
	0.26	0.57	0.29	10.25	5.3 / 6.0	11.7 / 13.
ainless Steel)	0.32	0.70	0.36	11.50	6.6	14.6
	0.32	0.70	0.36	11.50	3.8 / 7.2	8.4 / 15.9
(HWT)	0.32	0.70	0.36	11.50	6.2	13.7
	0.42	0.93	0.47	15.4	9.1 / 10.3	20.1 / 22
	0.42	0.93	0.47	15.4	10.5 / 11.6	23.1 / 25
ainless Steel)	0.42	0.93	0.47	15.4	10.3	22.7
(HWT)	0.42	0.93	0.47	15.4	9.3	20.5
	0.42	0.93	0.47	15.4	9.3	20.5
	0.93	2.05	1.04	34.6	14.8 / 16.2	32.6 / 35
ainless Steel)	0.93	2.05	1.04	34.6	19.7	43.4
(HWT)	0.93	2.05	1.04	34.6	14.8 / 17.5	32.6 / 38
	0.93	2.05	1.04	34.6	17.5	38.5
	0.93	2.05	1.04	34.6	24.1 / 25.1	53.1 / 55
	0.93	2.05	1.04	34.6	21.1	46.5
NH	1.5	3.3	1.7	57.6	30.5 / 34.4	67.2 / 75
(Stainless Steel)	1.5	3.3	1.7	57.6	36.2	79.8
MA 62	1.5	3.3	1.7	57.6	22.2	49.0
MA 85 / 105 / 125 /155	3.4	7.5	3.8	128.0	37.6 / 38.0	82.9 / 83
MA 162 / 202 / 242	1.7	3.7	1.9	64.0	51.8 / 52.0	114.2 / 114
MA-IL 83 / 103	3.4	7.5	3.8	128.0	53.3	117.5
MA-IL 160 / 200	1.7	3.7	1.9	64.0	69.0	152.1
A	3.1	6.8	3.5	118.0	43.8 / 44.5	96.6 / 98
XX	3.4	7.5	3.8	128.0	57.9 / 58.5	127.6 / 129
	1.7	3.7	1.9	64.0	90.0	198.0
Stainless Steel)	3.4	7.5	3.8	128.0	68.0	149.0
	3.4	7.5	3.8	128.0	66.0	145.5

UDOR USA SALES POLICY

UDOR USA reserves the right to refuse to conduct business with any company that is not in good credit standing or that is not determined to be a qualified equipment manufacturer, wholesaler or distributor.

SHIPPING STOCK ORDERS

All orders will be shipped by UPS, FedEx, USPS and International we use DHL. For LTL truck orders all shipping is Prepaid and Add (PPA). Customer may specify LTL carrier on purchase order.

ORDER PROCEDURE

To place orders please submit your purchase orders to email (sales@udorusa.com) or fax (800-732-2670). For call in your orders or questions, please call us from 8 a.m. to 5 p.m. CST at 651-785-0666.

MINIMUM ORDER

Udor USA has a minimum order required amount of \$25.00 USD, which may include Drop Ship Charge.

DROP SHIPS

Udor USA will drop ship directly to your customer for a \$15.00 drop ship service fee per order.

OPEN CREDIT TERMS & CONDITIONS

Our standard term is Net 30 days. Once approved Udor USA will send an approval letter which specifies account number and credit limit.

FORMS OF PAYMENT

For approved Net 30 terms Udor USA will accept Checks, ACH, Wire, Credit Cards, Virtual CC payments and Cash. Credit Cards Udor USA accepts are Visa, Master Card, Discover Card and American Express. Special Processes and fees are required for Discover and American Express. If paid via Credit Card, there may be an additional 3% charge for processing fees.

PAST DUE INVOICES

Receiving open credit terms form Udor USA is a result of good faith and your ability to meet payment terms. Our system generates an invoice the day your product is shipped. Invoice(s) are considered past due 1 day after your specific terms that were agreed upon, unless otherwise specified by Udor USA. Past due invoices can be subject to late fees and interest.

RETURNED CHECKS

Bank Returned Payments formerly known as NSF. Electronic or Paper A \$36.00 or current NSF charge the bank charges for returned checks (electronic or paper) will be added to your account. We will notify Accounts Payable Dept. to resolve payment issue.

- 1) A Return Merchandise Authorization (RMA) number is required for all products being returned for warranty evaluation, repair or credit. To obtain an RMA number, please contact UDOR USA customer service at 651-785-0666.
- 2) All products returned for credit are subject to a minimum 10 percent restocking fee based on product evaluation.
- 3) Flush pump to remove any and all chemicals. Drain all pump oil and gear lube.
- 4) The RMA number must appear on the outside of all packages being returned.
- 5) All RMA numbers will be valid for 60 days from date issued. If product is not received within 60 days a new RMA number must be issued.
- 6) Freight for return product is the responsibility of the customer; all products returned must be freight prepaid. Ship to:

UDOR USA / RETURNS
6180 140th Avenue NW
Ramsey, MN 55303

Any collect shipments or any product returned without an RMA number will be refused and returned to sender.

- 7) Any product being returned for warranty evaluation must not be disassembled. Disassembly of the product will void any and all warranties.
- 8) UDOR USA will repair or replace products qualified as defective upon inspection that are judged to be defective due to workmanship or material failure under UDOR USA limited product warranty.
- 9) Customers requiring immediate product replacement for items submitted for warranty evaluation will be invoiced at current price. Limited product warranty will apply to all return products.
- 10) Any product that has been left here past 60 days after contact from UDOR USA will become property of UDOR USA and will be properly disposed.

NOTE:

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.

In the course of marketing or servicing the customer or potential customer's needs, UDOR USA will use its best judgment 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 PN, A, AK, 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, NH, PENTA, VH, VX, VXX, VY, VYY, VX6, 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.

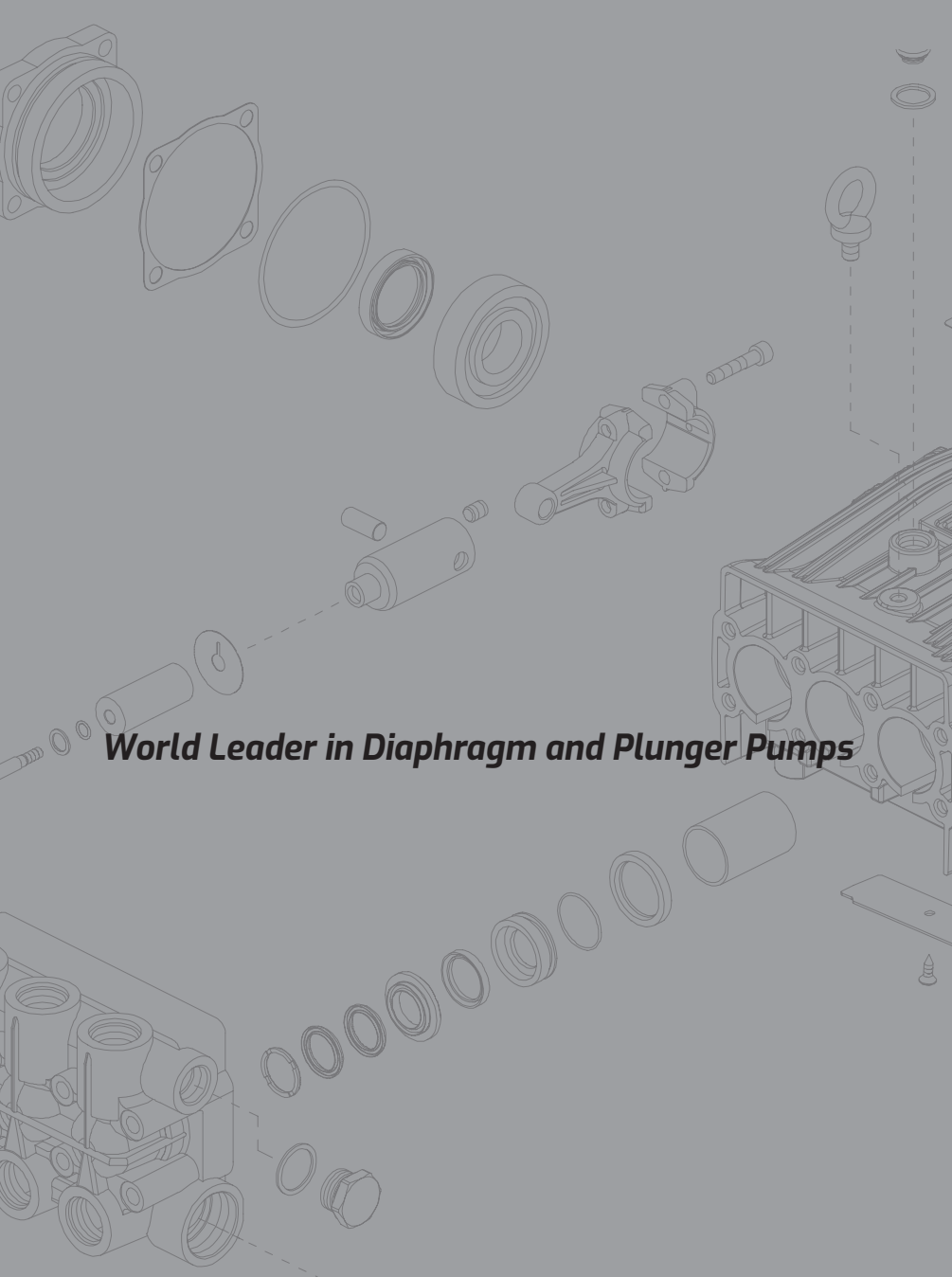
UDOR USA's obligation under this warranty is limited to repair or replacement of product in question, at UDOR's option, upon return of the product, freight prepaid, to UDOR USA. UDOR USA agrees to be responsible for return shipping costs ONLY on any approved warranty repair or replacement product via 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.



World Leader in Diaphragm and Plunger Pumps



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