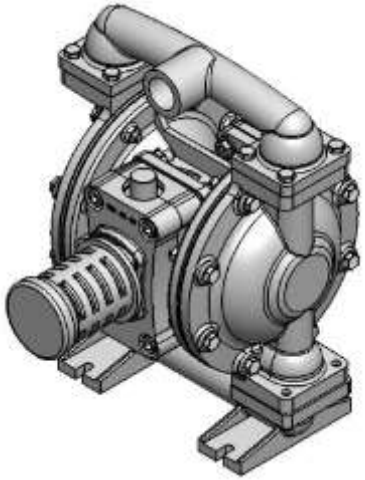
VESTA PUMP
Makes life comfortable

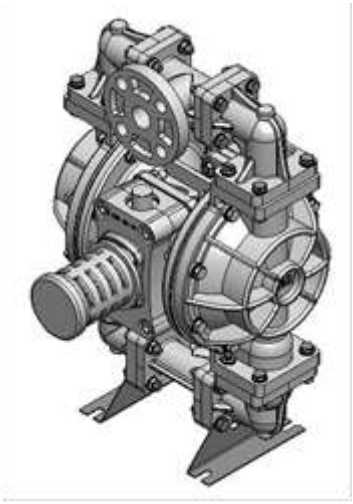
USER MANUAL
VP 10 PLASTIC/ METAL PUMPS

VP 10 PUMPS DEVIDED INTO TWO CATEGORIES WHICH ARE:

METALLIC PUMPS



PLASTIC PUMPS



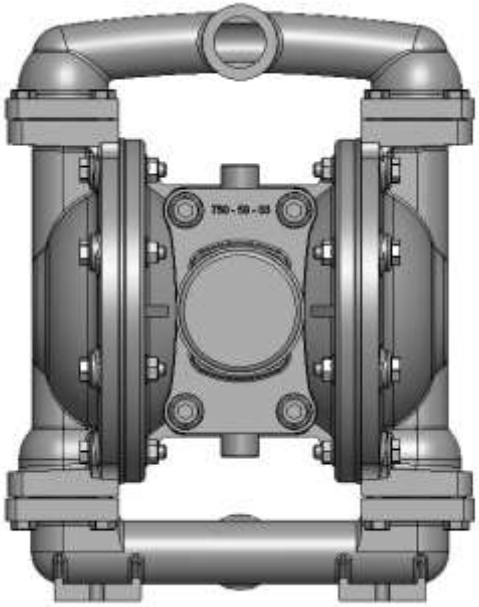
VP 10 PUMP USER'S MANUAL

COMPRESSED AIR DOUBLE DIAPHRAGM
TRANSFER PUMPS

TABLE OF CONTENT

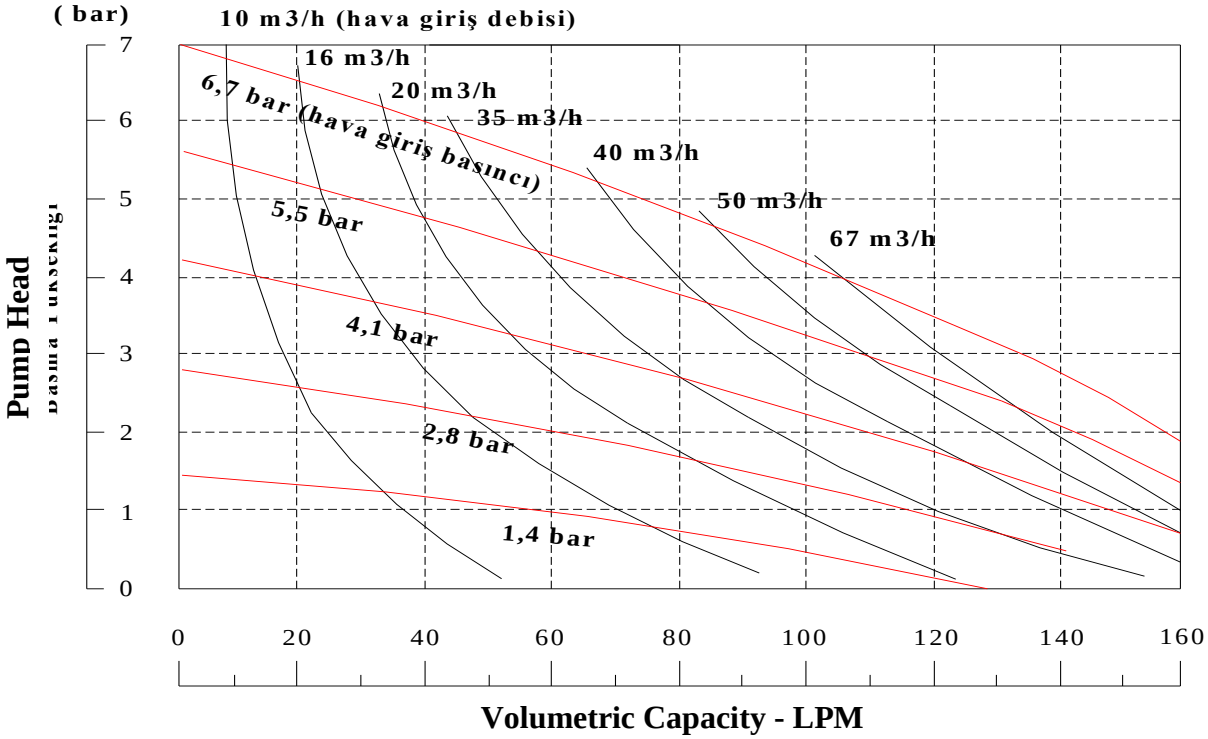
VESTA PUMP
Makes life comfortable

VP 10 (1") METALLIC PUMP



VP 10 (1") METALLIC PUMP

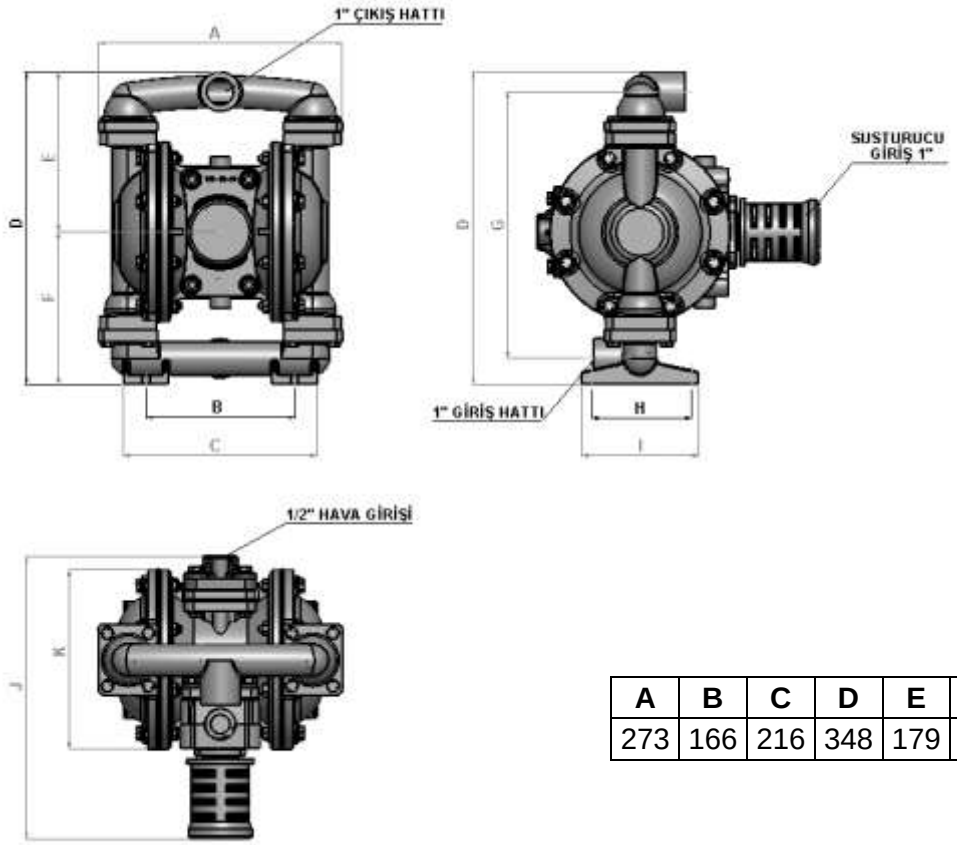
PERFORMANCE CURVES



Suction / Discharge 1"	Max. Capacity 150 lpm	Max. Solid particle permeability (4 mm)	Max. Operation pressure 7 bar	Weight 9 kg (Aluminum)

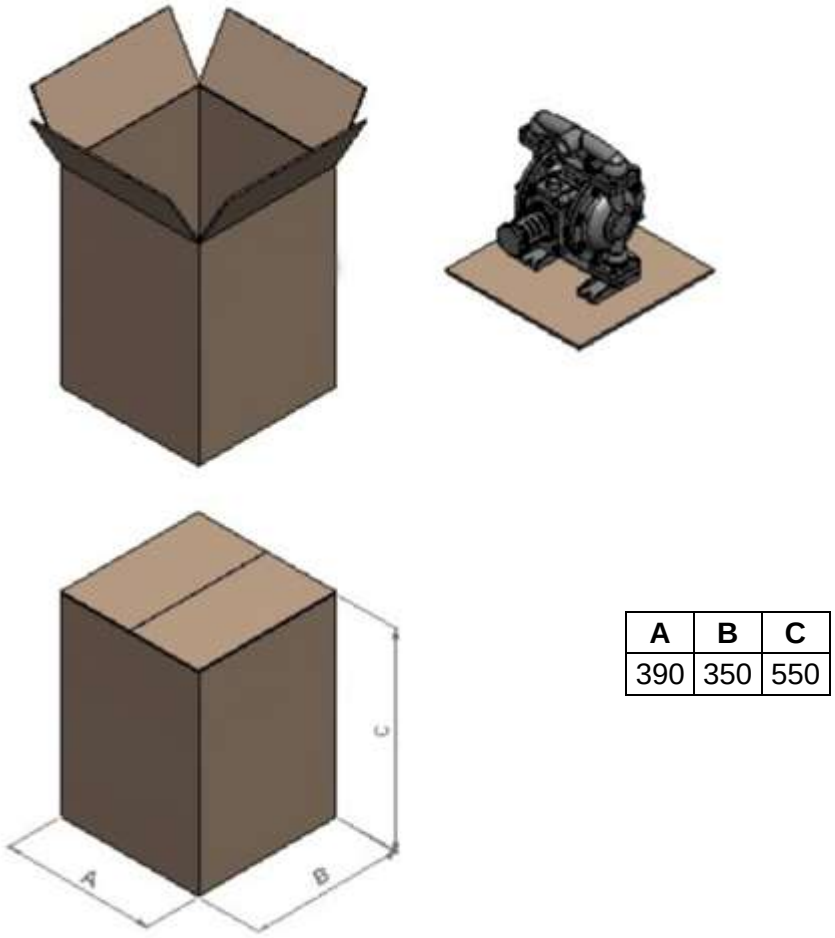
The operation pressure is 0 to 7 bars.
Operation temperature is between (-18 ˚Cand 100 ˚C.)

METRIC DIMENSIONS [mm]
Dimensional tolerances ± 3 mm



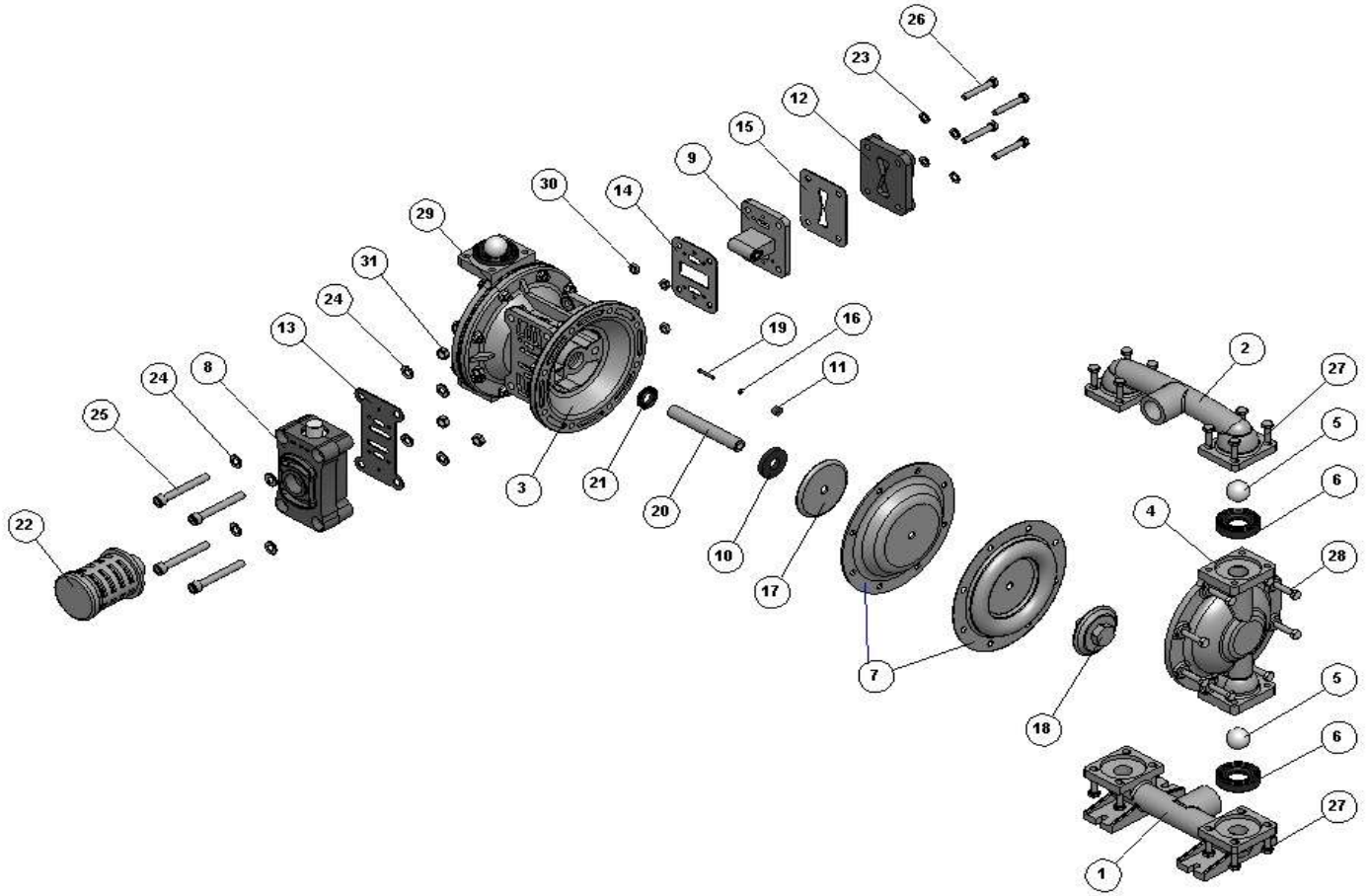
A	B	C	D	E	F	G	H	I	J	K
273	166	216	348	179	169	298	112	130	315	200

PACKING DIMENSIONS[mm]



A	B	C
390	350	550

COMPOSİTE PARTS DRAWING OF VP 10 (1") METALLIC PUMP



METALLIC PUMP COMPOSITE PARTS LIST

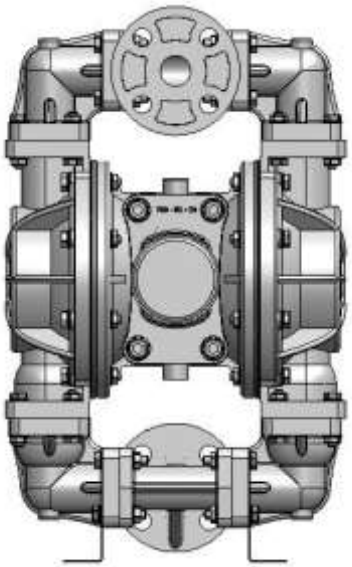
1	S011030	Suction Line	1
	S011031	Suction Line	1
	S011032	Suction Line	1
2	S021030	Discharge Line	1
	S021031	Discharge Line	1
	S021032	Discharge Line	1
3	H011033	Main Body	1
4	S031030	Outer Chamber	2
	S031031	Outer Chamber	2
	S031032	Outer Chamber	2
5	S041045	Check Ball	4
	S041046	Check Ball	4
	S041047	Check Ball	4
	S041048	Check Ball	4
	S041050	Check Ball	4
	S041051	Check Ball	4
6	S051036	Check Ball Seat	4
	S051045	Check Ball Seat	4
	S051046	Check Ball Seat	4
	S051047	Check Ball Seat	4
	S051048	Check Ball Seat	4
	S051050	Check Ball Seat	4
	S051051	Check Ball Seat	4
7	S061045	Diaphragm	2
	S061046	Diaphragm	2
	S061047	Diaphragm	2
	S061048	Diaphragm	2
	S061050	Diaphragm	2
	S061051	Diaphragm	2
8	H034033	Air Valve Repair Kit	1
9	H044033	Pilot Valve Repair Kit	1
10	H051047	Bumper	2
11	H061036	Pin Bushing	2
12	H071033	Cover, Air Inlet Assembly	1
13	H084047	Gasket, Air Valve	1
14	H091047	Gasket, Pilot Valve, Front	1
15	H104047	Gasket, Pilot Valve, Rear	1
16	H124047	O-ring, Pin	2
17	H131030	Inner Diaphragm Holder	2
18	S071032	OuterDiaphragm Holder	2
	S071033	OuterDiaphragm Holder	2
19	H141090	Actuator Pin	2
20	H151090	Diaphragm Rod	1
21	H161047	Oil Seal	2
22	H174036	Muffler	1
23	PM8-P	Washer, M8	4
	PM8	Washer, M8	4
24	PM10-P	Washer, M10	8
	PM10	Washer, M10	8
25	CM10X80-Pİ	Capscrew M 10 X 80 (imbus)	4
	CM10X80	CapscrewM 10 X 80 (imbus)	4
26	CM8X50-P	CapscrewM 8 X 50	4
	CM8X50	CapscrewM 8 X 50	4
27	CM8X25-P	CapscrewM 8 X 25	16
	CM8X25	CapscrewM 8 X 25	16
28	CM8X45-P	CapscrewM 8 X 45	16
	CM8X45	CapscrewM 8 X 45	16
29	SM8-PF	Ring Nut, M8, Flanged	16
	SM8-F	Ring Nut, M8, Flanged	16

30	SM8-P	Ring Nut, M8	4
	SM8	Ring Nut, M8	4
31	SM10-P	Ring Nut, M8	4
	SM10	Ring Nut, M8	4

MATERIAL CODES

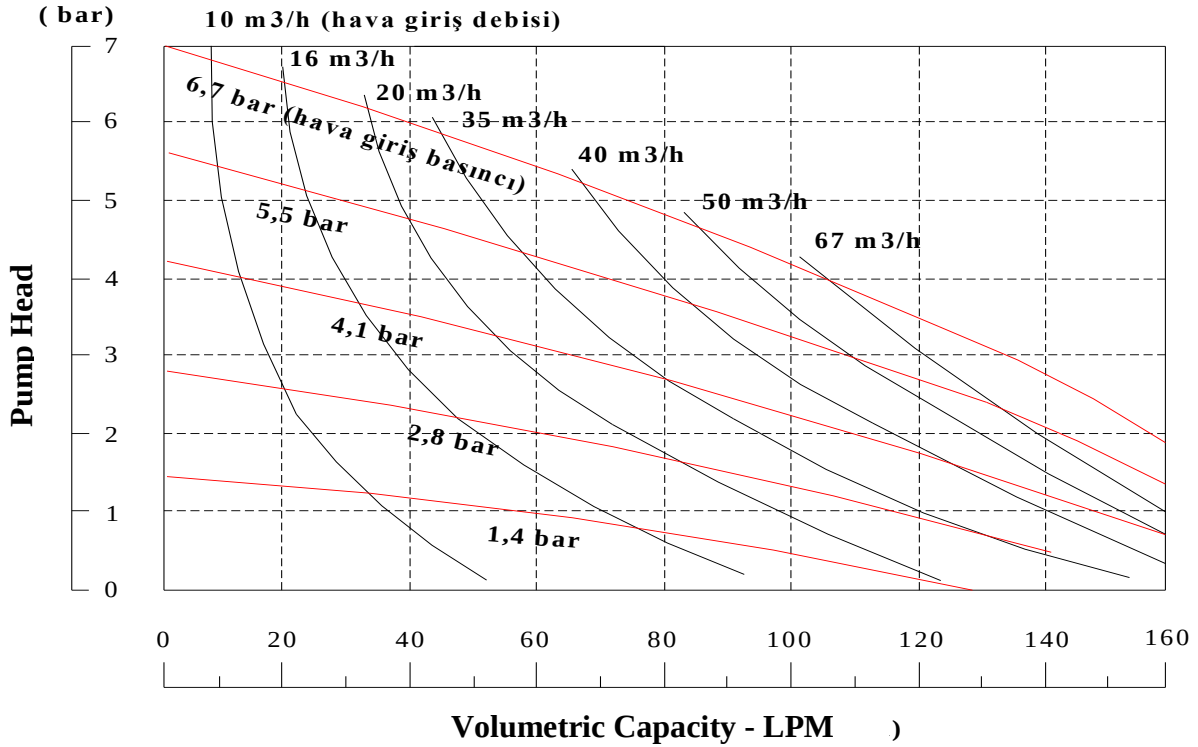
30	ALUMINUM	45	NEOPRENE
31	CAST IRON	46	SANTOPRENE
32	STAINLESS STEEL	47	BUNA-N
33	POLYPROPYLENE	48	EPDM
34	DELRIN	50	TEFLON
35	PVDF	51	VİTON
36	POLYETHYLENE	70	DIA SPECIAL MATERIAL
38	BRONZE	90	STEEL

VP 10 PLASTIC PUMP



VP 10 (1") PLASTIC PUMP

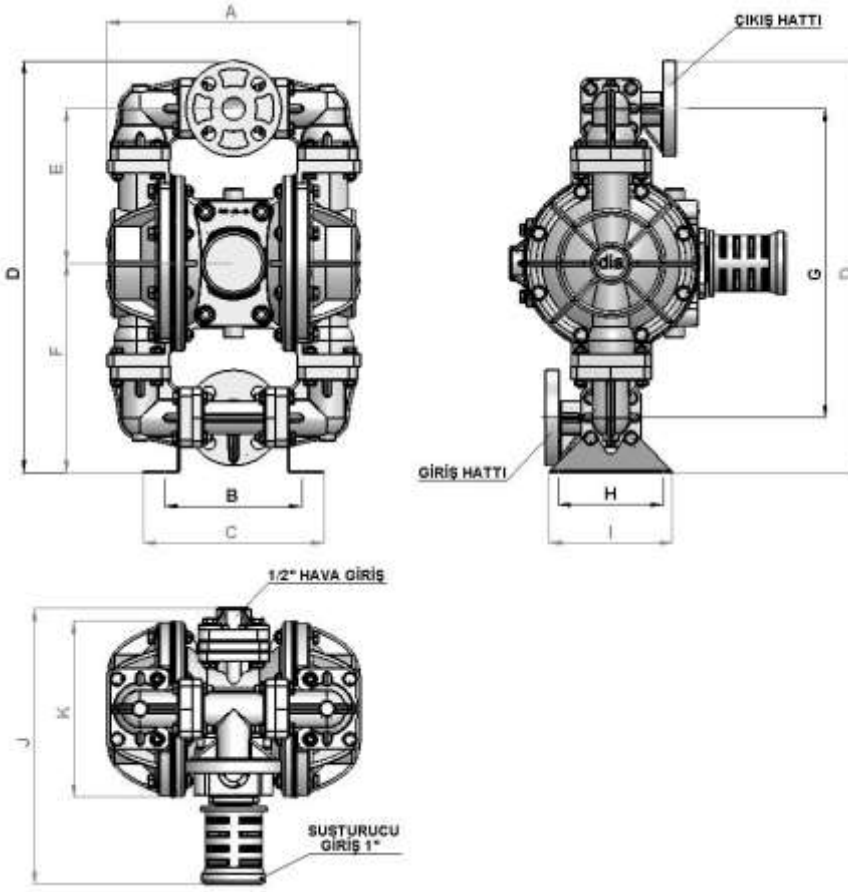
PERFORMANCE CURVES



Suction / Discharge 1"	Max. Capacity 150 lpm	Max. Solid particle permeability (4 mm)	Max. Operation pressure 7 bar	Weight 7,5 kg (Plastic)

The operation pressure is 0 to 7 bars.
Operation temperature is between (-18 ˚Cand 100 ˚C.)

METRIC DIMENSIONS [mm]
Dimensional tolerances ± 3 mm

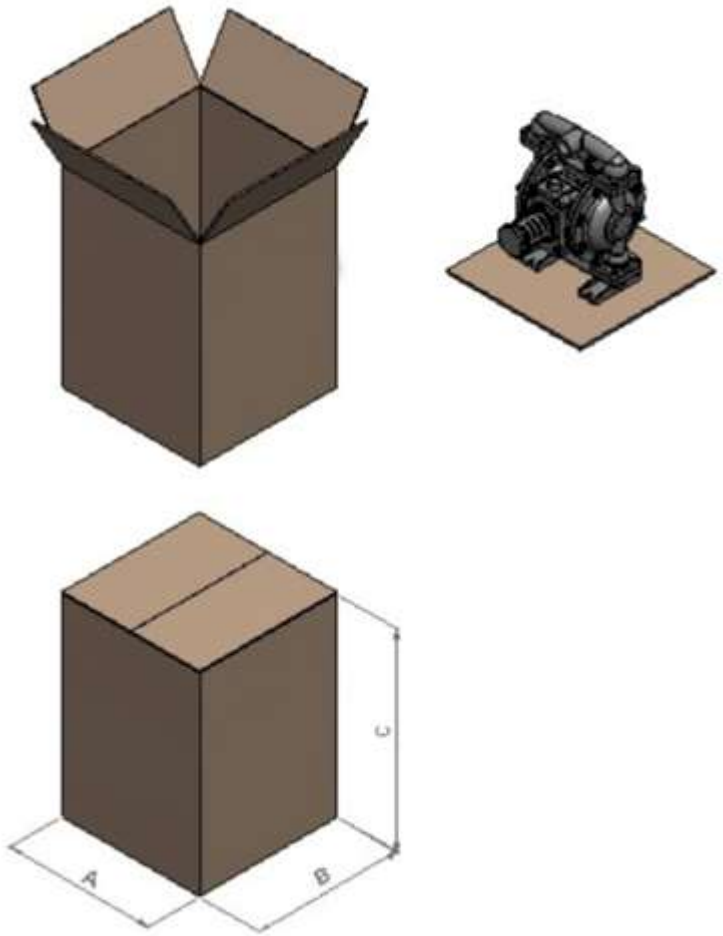


A	B	C

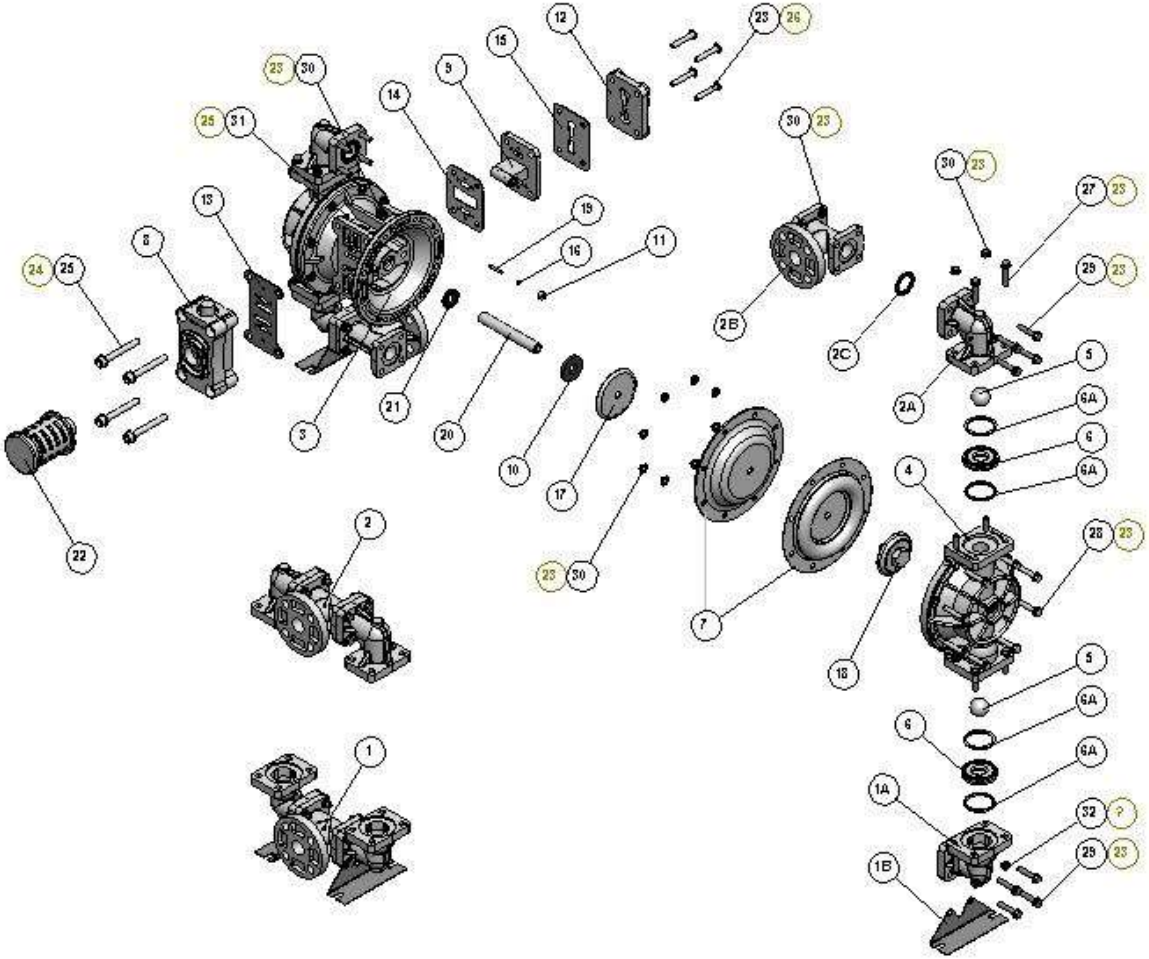
A	B	C	D	E	F	G	H	I	J	K
288	156,5	206,5	471	176,5	239,5	353,5	120	140	315	201,5

PACKING DIMENSIONS [mm]

390	390	550



COMPOSİTE PARTS DRAWING OF VP 10 (1") PLASTIC PUMP



PLASTIC PUMP COMPOSITE PARTS LIST

1	S011033	Suction Line	1
	S011035	Suction Line	1
1-A	S261033	Suction Line Elbow	2
	S261035	Suction Line Elbow	2
1-B	S301032	Bracket	2
2	S021033	Discharge Line	1
	S021035	Discharge Line	1
2-A	S601033	Discharge Line Elbow	2
	S601035	Discharge Line Elbow	2
2-B	S241033	T Flanged	2
	S241035	T Flanged	2
2-C	S161050	Bracket Gasket	4
3	H011033	Main Body	1
4	S031033	Outer Chamber	2
	S031035	Outer Chamber	2
5	S041045	Check Ball	4
	S041046	Check Ball	4
	S041047	Check Ball	4
	S041048	Check Ball	4
	S041050	Check Ball	4
	S041051	Check Ball	4
6	S051033	Check Ball Seat	4
	S051035	Check Ball Seat	4
6-A	S081050	Check Ball Seat Gasket	8
7	S061045	Diaphragm	2
	S061046	Diaphragm	2
	S061047	Diaphragm	2
	S061048	Diaphragm	2
	S061050	Diaphragm	2
	S061051	Diaphragm	2
8	H034036	Air Valve Repair Kit	1
9	H044036	Pilot Valve Repair Kit	1
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15	H104047	Gasket, Pilot Valve, Rear	1
16	H124047	O-ring, Pin	2
17	H131090	Inner Diaphragm Holder	2
18	S071033	Outer Diaphragm Holder	2
	S071035	Outer Diaphragm Holder	2
19	H141090	Actuator Pin	2
20	H151090	Diaphragm Rod	1
21	H161045	Oil Seal	2
22	H175036	Muffler	1
23	PM8-P	Washer, M8	100
	PM8	Washer, M8	100
24	PM10-P	Washer, M10	8
	PM10	Washer, M10	8
25	CM10X80-Pİ	Capscrew M 10 X 80 (imbus)	4
	CM10X80-İ	Capscrew M 10 X 80 (imbus)	4
26	CM8X50-P	Capscrew M 8 X 50	4
	CM8X50	Capscrew M 8 X 50	4
27	CM8X40-P	CapscrewM 8 X 40	16
	CM8X40	CapscrewM 8 X 40	16
28	CM8X45-P	Capscrew M 8 X 45	16
	CM8X45	Capscrew M 8 X 45	16
29	CM8X35-P	Capscrew M 8 X 35	16
	CM8X35	Capscrew M 8 X 35	16

30	SM8-P	Ring Nut, M8	52
	SM8	Ring Nut, M8	52
31	SM10-P	Ring Nut, M8	4
	SM10	Ring Nut, M8	4

MATERIAL CODES

30	ALUMINUM	45	NEOPRENE
31	CAST IRON	46	SANTOPRENE
32	STAINLESS STEEL	47	BUNA-N
33	POLYPROPYLENE	48	EPDM
34	DELRIN	50	TEFLON
35	PVDF	51	VİTON
36	POLYETHYLENE	70	DIA SPECIAL MATERIAL
38	BRONZE	90	STEEL

DIAPHRAGM MATERIALS AND OPERATION TEMPERATURES

Material	*Maximum*	*Minimum*
Neoprene It is resistant to the vegetable oils. Its abrasion resistant is very good. The fluids like acids, esters, ketones can cause damages to the material of construction and therefore they are not recommended.	90 ˚C	-22 ˚C
Buna-N It is generally used for oils. It is very durable to the transfer of water and hydraulic oil.	87 ˚C	-22 ˚C
EPDM It is durable to chemicals. It is not durable to oil and solvents. It has moderate resistance to the alcohols and ketones.	138 ˚C	-40 ˚C
Teflon It is generally used for heavy chemicals and acids. It features good resistance. It is suitable for heat transfer at elevated temperatures.	100 ˚C	-35 ˚C
Viton It has very good resistance to acids, oils and solvents.	175 ˚C	-40 ˚C
Santopren It is resistant to weak and medium acids. It features good abrasion resistance.	135 ˚C	-40 ˚C
Polypropylene It is resistant to chemicals. It is usually preferred for food, chemicals and cosmetic products.	82 ˚C	0 ˚C

PRINCIPLE OF PUMP OPERATION

The diaphragm pump is consisted of two diaphragm chambers and two diaphragms.The diaphragms are connected to each other with a diaphragm rod andmove in a reciprocating action.As one diaphragm performs thedischarge stroke, the other diaphragm which is connected with the rod ispulled to perform the suction.At the end of the stroke, an airdistribution valve automatically shifts, reversing the entire sequence, filling and pumping from alternate chambers. Mutual movements that repeatedcontinuouslyensure suction and discharge movements onto the fluids in each chamber.Continuously repeated reciprocal motions pump the liquid during entering to andexitingfrom the chambers.The flow of the fluid from one chamber to another is regulated by the suction and discharge valves.

The ball and butterfly valves automatically controls the fluid suction and discharge of the fluid.The butterfly valves allow passage of the solid particles with a size up to diameter of the pipe.The ball valves regulate passage of the small-size particles.

INSTALLATION &START-UP

The interconnections of the diaphragm pump are straightforward.The fluid is taken from the bottom manifold and discharged at the upper manifold.Diaphragm pumps are characterized by turbulence flow.To prevent turbulence flow, the flexible hoses are installed upstream the suction and the discharge port.

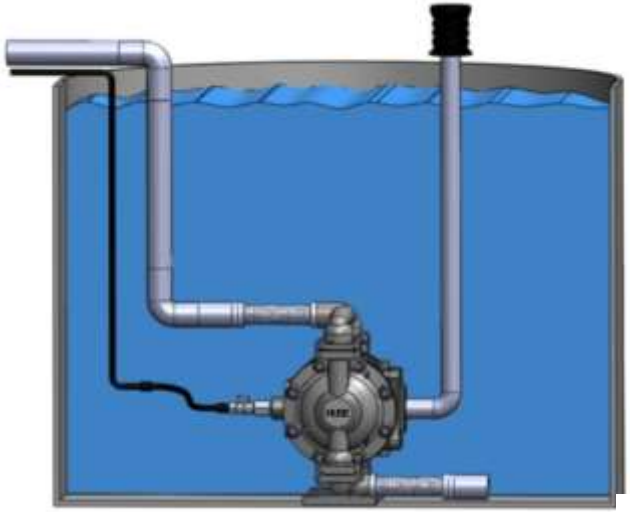
In order to observe the pressures at the suction and discharge parts of the pump and adjust the flow rate,the manometers and valves are attached at the suction and discharge ports. When one or both valves are closed down, the pump will be stopped.When they are opened, the operation will be resumed.

For the pump operation, the pressurized air is required.The pump is operated at the full capacity, if the suction and discharge hoses are the same size.A conditioner should be installed at the suction port.The conditioner will allow the pressure adjustment and lubricating the air direction valve.The valve installed downstream the air inlet line the air flow is regulated by the valve operation.

Special precautions should be observed in the operation of diaphragm pump.These precautions will provide the maximum efficiency to thethe pump.

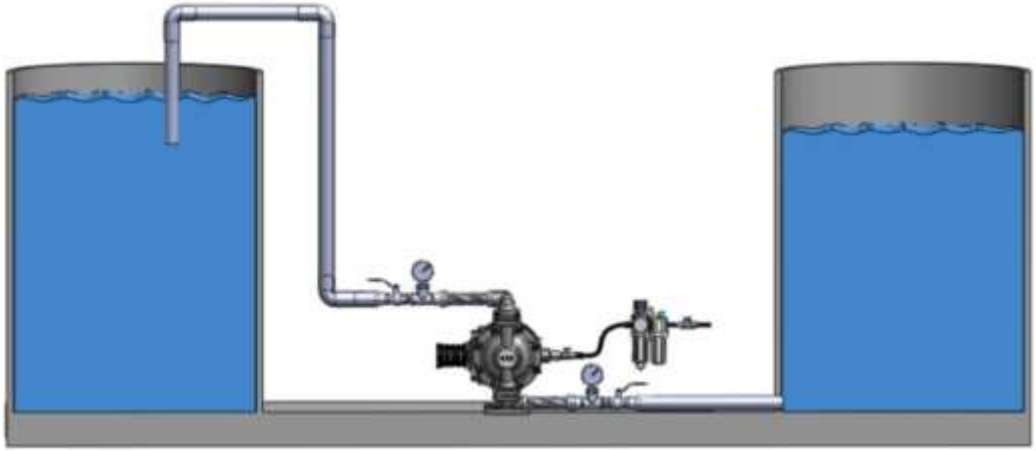
- The pump should be located as close to the product being pumped as possible.
- The suction line length and number of fittings should be kept in a minimum.
- The size of the suction pipe should not less than the size of the suction port of the pump.
- For installations of rigid piping, short sections of flexible hose should be installed between the pump and the piping.
- The flexible hose reduces vibration and strain to the pumping system.
- The buffer tank should be provided at the discharge port of the pump if discharge pipe assembly is long.The buffer tank will reduce transfer of the vibration in the pipe assembly onto the pump.

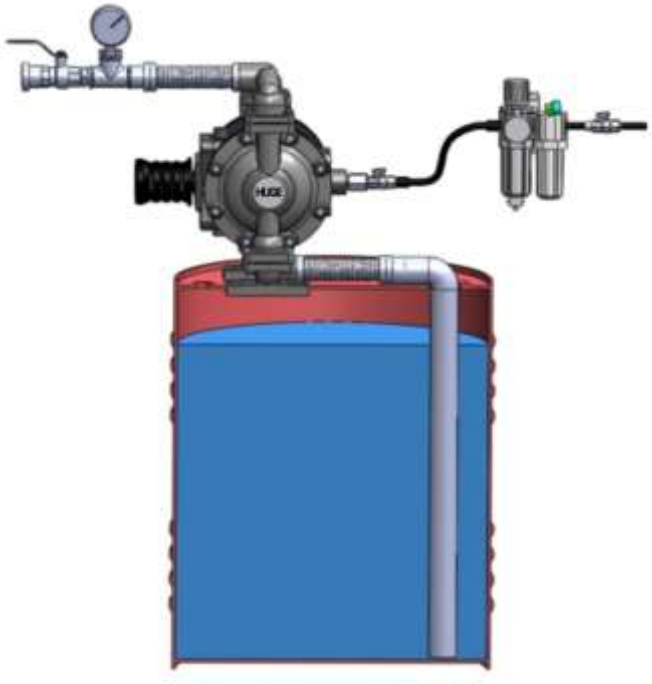
AREAS OF APPLICATION



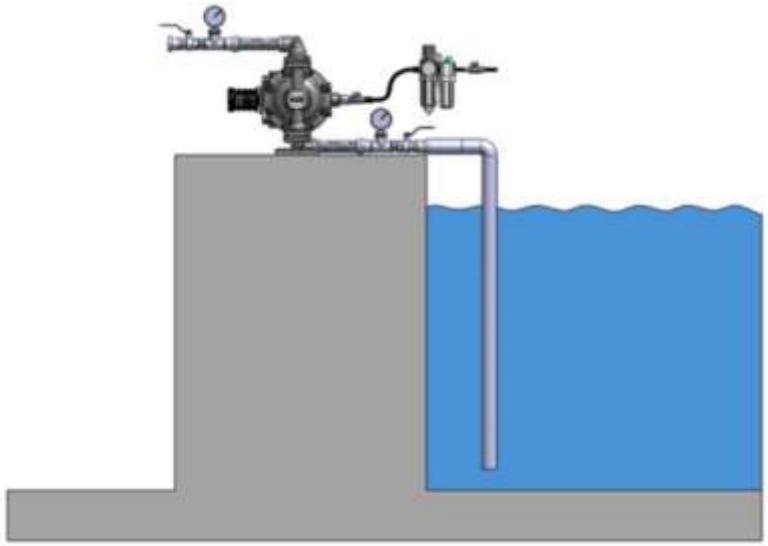
Diaphragm pumps can also be used as submerged pump. It is necessary to maintain the exhaust port of the pump above the liquid surface with pipe or hose.

Diaphragm pumps can be used to transfer the fluid in the tank readily by connecting them to the bottom of the tank.





Diaphragm pumps can also be used as barrel pumps. They have effective suctions ability and able to transfer allthe fluid in the barrel.



The diaphragm pumps are able to transfer fluids at 6 meter of deepness. Cavitation might obstruct the operation.To prevent this, the air in the hose between the pump and fluid should be discharged.

AIR CONNECTION

The air pressure should not be in excess 7 bars.The pump should be provided with the air supply at such pressure and flow to achieve desired performance.When the airsupply line is solid piping, use a short length of flexible hose not less than ½"in diameter between the pumpand the piping to reduce strain to thepiping. The weight of the air supply line, regulators and filters must be supportedby some means other than the airinlet cap. Otherwise, unsupportive weight may result in damageto the pump. A pressure regulatingvalve should be installed to insureair supply pressure does not exceedrecommended limits.

WARNING If the size of air connection is smaller than the pump supply port, the pump will not be able to provide the air required so, it will not perform properly.

AIR VALVE LUBRICATION

The air distribution valve and the pilot valve are designed to operate without lubrication. This is the preferred modeof operation. In regard to anticipated practice or inferior air quality, it is likely include lubrication oil into the compressed air. The pump air system will operate withproperly lubricated compressed airsupply. Proper lubrication requires theuse of an airline lubricator system to deliver one drop of SAE 10 oil for every 10 liters/sec. of airconsumed by the pump at the operation point.For better determination of the mixing ratios, see the performance curves provided for the pump.

AIR LINE MOISTURE

Water in the compressed air supply might give rise to problem like freezing of the water or icing in the discharge line thatcausethe pump to cycle erratically or stopoperating.These problems might be removed by using a point-of-use air dryer to supplement the user's airdrying equipment.The air drying equipment will removes the water andalleviates problems like, freezing or icing.

AIR INLET AND PRIMING

Before operating the pump, turn the air supply valve at about 1/2 or 3/4 of a turn.Afterthe pump primes, the air valve can be opened to increase air flow as desired.. If opening of the valve increases of the reciprocating frequency without increase in air flow, then it means that the pump operates under cavitation. In such cases, the valveshould be closed slightly to obtain themost efficient air flow to pump flowratio.

FREQUENCY OF USE

The pump should be flushed after each application to prevent its damage if the pump is used for the transfer of the fluid that contains suspended particles that settle and harden in the course of time when it is kept stand still.(Otherwise, product remaining in thepump between uses could dry out orsettle out. This could cause problemswith the diaphragms and check valvesat restart.) The pump should be completely drained after every use in particular under freezing temperatures.

PUMP PROBLEMS AND SOLUTIONS

PROBLEM: The pump fails to operate even the air is supplied.The supplied air is directly exit through the exhaust filter.
SOLUTION: Check the air valve of the pump.The piston of the liner-piston assembly of the air valve may be jammed.Disassembly the air valve thenremove, clean and lubricate the piston of the liner-piston assembly.Wipe off and lubricate the liner.Install the piston in the liner and break in a while.Install the air valve back and start the pump.

PROBLEM: The pump operates but no flow is transferred.
SOLUTION: Check the valves of the pump.The valve plunger may be jammed by the foreign matters.In such case, no transfer of the fluid is possible.

PROBLEM: The pump is in operation, but the capacity of the fluid is insufficient.
SOLUTION: There might be several reasons:
* The pump suction and discharge port sizes are not proper.In such case, the air flow for the pump operation will be insufficient.
* The air flow is less than the required volumetric rate.It is likely that the compressor falls short in supplying required air.
* The cross sectional area of the pump at the suction and discharge ports might be contracted.Any contraction of the pump's suction and discharge ports might cause a drop in the real pump's capacity.

PROBLEM: The pump transfers the fluid, but the flow is fluctuating.
SOLUTION: Check the pilot valve and air valve of the pump.
O-rings of the piston of the pilot valve may be worn out.If this is so, replace the pilot valve.
* The piston in the air valve might be worn out.Disassemble the piston and liner assembly of the air valve and lubricate before reassembling.If the problem still persists, than replace the assembly completely.

PROBLEM: There is excessive vibration in the pump during the fluid transfer.
SOLUTION: There might be several reasons and solutions for that.
* High exit pressure of the pump and lack of rubber mountings on the pump's pedestals.
* Long discharge pipe and lack of compensators on the pipe installed at specific intervals to prevent vibration.
* Use of flexible adaptors at the suction and discharge ports of the pump

IMPORTANT

Read these safety warnings and instructions in thismanual completely, beforeinstallation and start-up of the pump.It is the user's responsibility to retain this manual.Any operation performed that is not in according to the information provided under the manual may render the pump's warranty invalid.

WARNINGS

WARNING: Check all the connections with gaskets for any looseness before operating the pump. Any loose connection must be tightened to prevent any leakage

WARNING: Check all capscrews and ring nuts for tightness before operating the pump for the first time.

WARNING. Operate the pump with a conditioner installed at in front of the pump.

WARNING: Lubricate the pump continuously with the conditioner. In order to prevent effluent water from the air line, in addition to usage of the conditioner, discharge the water accumulated in the compressor tank.

WARNING: Be sure not to tighten excessively to the capscrews during the assembly and disassembly; otherwise the pump's main body may be damaged.

WARNING: The silencer must be used while operating the pump.

WARNING: Please be careful at the pump transfer.

WARNING: The fittings should be installed to eliminate any possible leakage of the transferred liquid.

WARNING: The pump should be installed onto the rubber mountings.

WARNING: In order to prevent the knock at the discharge, the pump should be complete with the flexible hose adaptor at the discharge port where the pipe assembly is long.

WARNING: Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers or other miscellaneous equipment must be grounded.

WARNING: Be sure using the gloves and goggles in the pump repair and maintenance works.

WARNING: The air supply should be switched off before any repair or maintenance of the pump. Then pump pressure should be released and air connection be removed. Be carefulcompressed air line.

WARNING: When used for toxic or aggressive fluids, the pump should always be flushed with water before the repairment.

WARNING: If the diaphragm is split then, the transferred fluid may pass to the air side of the pump and diffuse to the atmosphere.If pumping a product which is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe disposition.

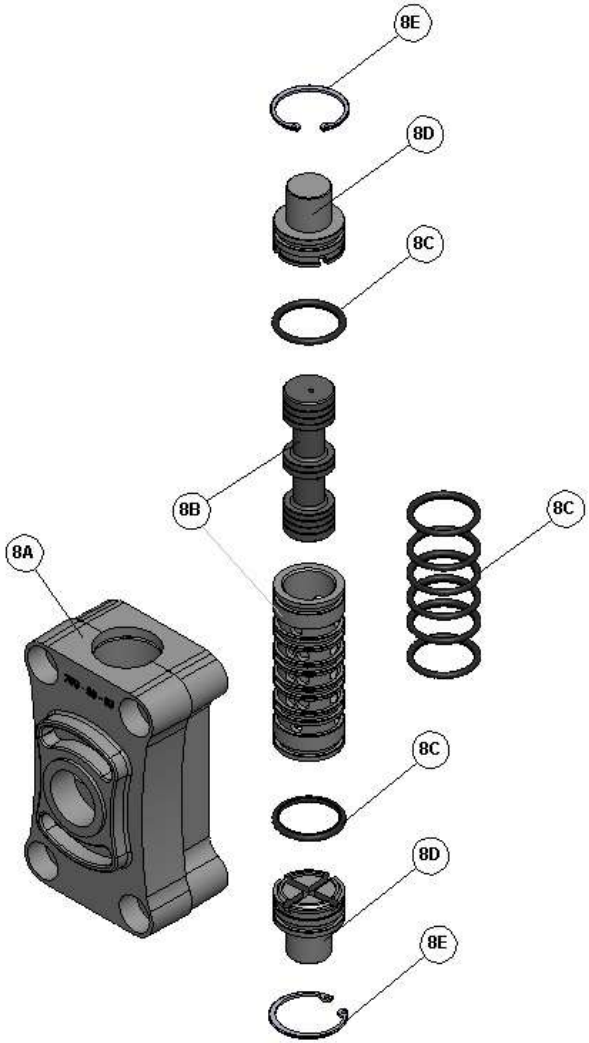
NOTE: Contact to our company in case of any failure of the pump provided under the warranty.2-year warranty will be terminated if the pump is dismantled without notifying to our company.

PUMPING HAZARDOUS LIQUIDS

When a diaphragm fails, the pumpedliquid or fumes enter the air end ofthe pump. Fumes may dissipate in the ambient air.Whenpumping hazardous or toxic materials,the exhaust air must be piped to anappropriate area for safe disposal.

If the material of construction of the pump is compatible to the liquid being pumped, the pump can be submerged into the fluid.In such case,the air exhaust must bepiped above the liquid level. The size of the pipe for air discharge should be at least 1" diameter.Reducingthe pipe size will reduce air flow and pump performance.If the liquid to be transferred is at higher lever than the pump (flooded suctioncondition), the discharge port should be kept at a higher level then the liquid surface to prevent siphoning spills.

AIR VALVE ASSEMBLY(H034033B)



8 PART LIST OF AIR VALVE REPAIR KIT

Item No.	Part No.	Name of Part	Qty
8A	H554033B	Air Valve Body	1
8B	H594070	Sleeve and Spool Set	1
8C	H574047	O-ring	8
8D	H584033	Cap	2
8E	H504090	Snap ring	2

AIR VALVE MAINTENANCE

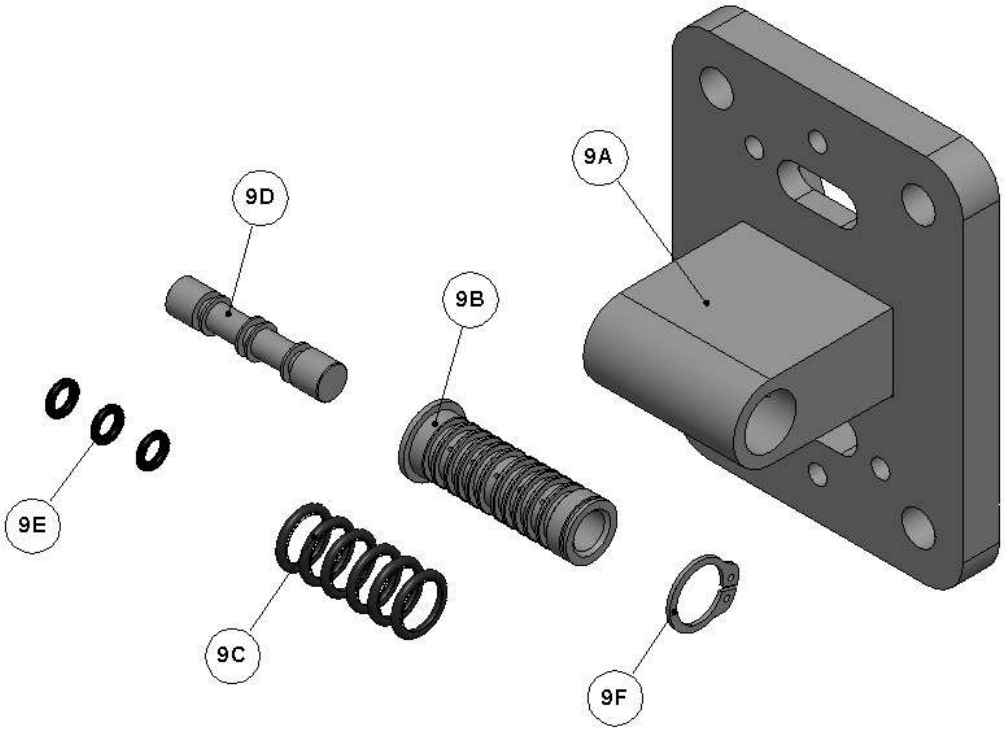
To begin with the servicing of the air valve first shut off thecompressed air, bleed pressure from thepump, and disconnect the air supply line from the pump.

* **First: inspect the exploded view of the air valve.**
Remove four hex capscrews by using wrench or socket.Remove the air valve assembly from the pump.Remove the gasket and check to see any cracking or damage.Replace the gasket if it is necessary,

* **Second:Disassembly of the air valve.**
Remove the snap rings of two plugs beneath the air valve with pliers in order to have access to the internal parts of the air valve.Then remove two caps.Check O-rings to see any abrasion or cuts.Replace O-rings as neeeded.Take the the spool out of the sleeve. Be sure not to scratch or damage the surface of the spool's mating surface.Wipe the spool with soft piece of cloth and check to see any scratch or damage.Check inner surface of the sleeve to see any dirt, scratches or other contaminants.Remove the sleeve and replace with a new sleeve and spool assembly, as necessary.

*** Third: reassembly of the air valve**.
To do this, install one bumper together with its O-ring on the one side of the air valve assembly. Check O-rings of the existing or new or sleeve and spool set replaced as necessary.Carefully take the spool out from the sleeve.Install six O-rings into the six grooveson the sleeve.
Then install the liner onto the main housing of the air valve.Be sure to apply a light coating of grease to the O-rings before installing thesleeve into the valve body; alignthe slots in the sleeve with the slots in thevalve body. Insert the spool into the sleeve.Be careful not to scratch or damage the spool during installation.Install other bumper together with its O-ring. Install the snap ring. The repair of the valve is completed.During installing the complete with and gasket onto the pump, be sure to have the holes of the valve in line with the holes on the pump.Connect the compressed air line onto the pump.The pump is now ready to operation.

PILOT VALVE ASSEMBLY(H044033B)



9 PART LIST OF PILOT VALVE REPAIR KIT

Item No.	Part No.	Name of Part	Qty
9A	H454033B	Pilot Valve Body	1
9B	H464090	Sleeve	1
9C	H474047	O-ring, sleeve	6
9D	H484090	Spool	1
9E	H484047	O-ring, spool	3
9F	S124090	Snap ring	1

PILOT VALVE MAINTENANCE

To begin with the servicing of the air valve first shut off the compressed air, bleed pressure from the pump, and disconnect the air supply line from the pump.

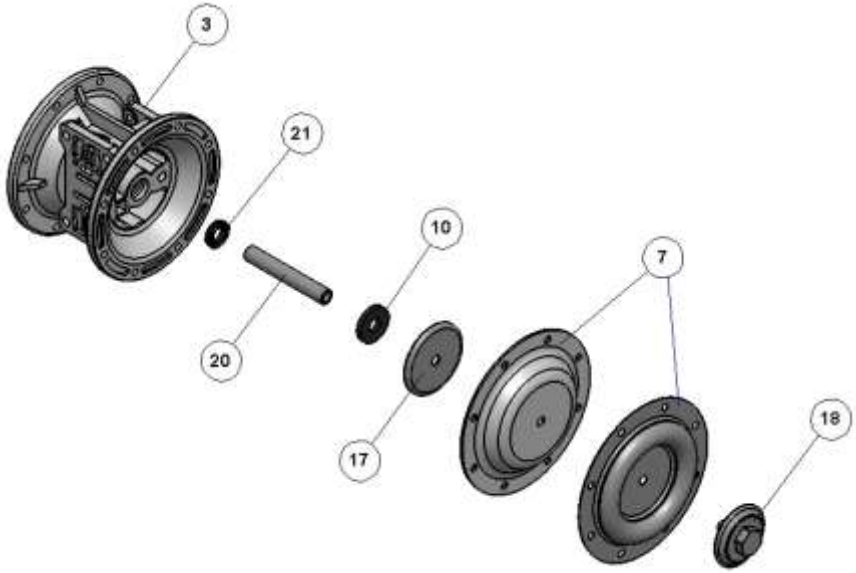
***First: See pump assembly drawings.**
Remove four capscrews by using M8 spanner or socket wrench. Remove air inlet cover and air inlet port gasket.The pilot valve assembly may now be taken out for inspection and service.

***Second: Removal of the pilot valve.**
Remove the spool of the valve.Wipe it to remove any dirt. Check the spool and O-ring to see any dirt, cut or abrasion.Replace O-ring and spool as necessary.Remove the snap ring from the end of the sleeve and remove the sleeve from the valve body.Wipe it to remove any dirt. Check the sleeve and O-ring to see any dirt, cut or abrasion.Replace O-ring and liner, if needed.

***Third: Installing the pilot valve**
Generously lubricate outside diameter of the sleeve and o-rings.
Then carefully insert sleeve into valve body.During the installation of the sleeve, take**CAUTION** not to damage O-rings.Install the snap ring to sleeve. Lubricate the other surface of the piston and O-ring.Then carefully install the spool into the sleeve.During the installation of the piston, take**CAUTION** not to damage O-rings.

***Fourth: Re-install the valve assembly into intermediate portion.**
During installing the pilot valve assembly onto the intermediate portion, be sure pilot valve ends located to the center of the piston pins.Re-install the gasket, air inlet capand capscrews. Connect the air supplyto the pump. The pump is now ready for operation.

DIAPHRAGM MAINTENANCE



Item No.	Part No.	Name of Part	Qty
3	H011033	Main Body	1
21	H161047	Oil Seal	2
20	H151090	Diaphragm Rod	1
10	H051047	Bumper	2
17	H131090	Inner Diaphragm Holder	2
7	S061045	Diaphragm	2
18	S071033	OuterDiaphragm Holder	2

Double diaphragms are used for the pump with Teflondiaphragm.The rubber diaphragm which installed at the front of the Teflondiaphragm provides, supports and extends the service life.

For maintenance of diaphragms, first remove the suction line of the pump and than block the pump discharge line.Cut off the compressed air supplybleed thepressure from the pump and disconnectthe air supply line from the pump. Drainany remaining liquid from the pump.Inspect the pump assembly drawings and maintenance diagrams.Remove the manifolds.Remove the pump ball and ball seats.Then remove the outer covers of the pump.

***First: Removal of diaphragm assemblies**

Use M16 wrench or socket to unscrew the outer diaphragm holder by turning counterclockwise direction and remove the diaphragm assembly from thediaphragmrod.Then take onediaphragm together with outer and inner diaphragm holders and the otherdiaphragm with its diaphragm rod out.In order to disassembly first diaphragm with its holder, hold the diaphragm assembly with a vice by clamping the inner holder and remove the outer holder by turning it counterclockwise with M16 spanner.

Hold the diaphragm rod of other diaphragm assembly with a vice and dismantle diaphragm with a spanner.Perform dismantling the other diaphragm in the same manner.Check the diaphragm for cuts, bursting, abrasion and chemical corrosion.Replace the diaphragms as necessary.

***Second: Installing diaphragms**

Insert M16 capscrews onto the outer diaphragm holder and push the diaphragm into the center hole. Install the capscrews onto inner diaphragm holder and screw it onto the rod by turning clockwise.Hold loose assembly with a vice.Screw M16 wrench with a spanner.

***Third: Installing diaphragm assembly onto pump**

Make sure the bumper is installed over the diaphragm rod. Screw the rod of the diaphragm assembly by turning clockwise into threaded hole until it is in the same direction with the end of the inner diaphragm plate. Insert rod into pump.Bring the capscrew holes on the diaphragm in line with inner chamber capscrew holes.Install outer chamber onto the pump by capscrews and ring nuts.

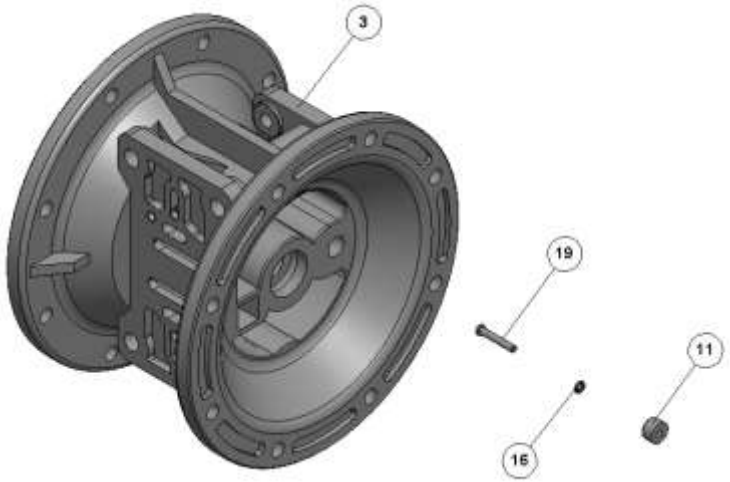
On the opposite side of the pump,pull the diaphragm rod out as far aspossible. Make sure the second bumperis installed over the diaphragm rod.Screw the exposed part of the diaphragm assembly shaft in clockwise direction onto the diaphragm rod as much as possible and leave the gap sufficient enough to adjust the capscrew holes on the diaphragm in line with inner casing capscrew holes.

Install the part of outer casing onto the pump with capscrews, nuts and washers. Install the manifolds onto the pump with capscrews, nuts and washers. Perform the necessary connections onto the pump. Now the pump is ready for the operation.

THRUST PIN MAINTENANCE

Item No.	Part No.	Name of Part	Qty
3	H011033	Main Body	1
19	H141090	Actuator Pin	2
16	H124047	O-ring, pin	2
11	H061036	Pin Bushing	2

In order to prevent damages at the high pressure operation replace the actuator pin with new one. If this situation continues use bigger size of actuator pin.



To begin with the maintenance of the actuator pin, firstthe compressed air supply, bleed the pressure from the pump, anddisconnect the air supply line fromthe pump.

***First: Inspect pump installation drawings**
Remove four capscrews by using M8 spanner or socket wrench. Remove the air inlet cap and air inlet gasket. The pilot valve assembly can now beremoved.

***Second: Inspect actuator pins**
See the assembly drawings.Access to the actuator pins can be reached through the opening of the pilot valve assembly. Remove the plungers fromthe bushings in each end ofthe cavity. Inspect the installed o-ring for cuts and/or wear. Replace the o-rings, if it's necessary.Lubricate O-rings slightly and install the pins into the bushing. Push the plungers in as far as they willgo.

***Third: Install the valve assembly into intermediate gap**
During installing the pilot valve assembly onto the intermediate portion, be sure pilot valve ends located to the center of the actuator pins.Install the gasket, air inlet cover and capscrews.Connect the air supply onto the pump.The pump is now ready for operation.

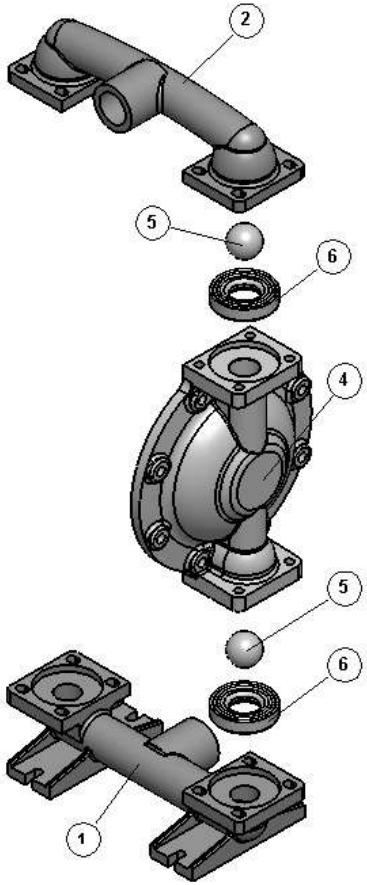
METALLIC CHECK VALVE (BALL & SEAT) MAINTENANCE METALLIC

Shut off the suction line and discharge line of the pump before starting the maintenance work.Then shut the compressed air supply, discharge the pressure in the pipe and remove the compressed air connection.Discharge the fluid in the pump.Now the pump can be disassembled for the maintenance.

Remove the manifold to have access to the check valves.

Inspect the check balls for any abrasion, cuts or corrosion marks.Perform the same checks on the check valve seats to see any cuts, abrasion and any foreign materials embedded onto the surfaceof both the external and internal chambers.The sphericalsurface of the check balls must seat flush to the surface of the check valveseats for the pump to operate to peak efficiency.

The damaged or worn out parts should be replaced as necessary.Re-assemble the parts of the check valves.The seat should fit into thecounter bore of the outer chamber. Assemble the pump and make necessary connections. The pump is ready for operation.



WARNING: The air supply should be switched off before any repair or maintenance of the pump. Then pump pressure should be released and air connection be removed. Be carefulcompressed air line.

Item No.	Part No.	Name of Part	Qty
2	S021030	Discharge Line	1
5	S041047	Check Ball	4
6	S051045	Check Ball Seat	4
4	S031030	Outer Chamber	2
1	S011030	Suction Line	1

METALLIC CHECK VALVE (BALL & SEAT) MAINTENANCE PLASTIC

Shut off the suction line and discharge line of the pump before starting the maintenance work. Then shut the compressed air supply, discharge the pressure in the pipe and remove the compressed air connection. Discharge the fluid in the pump. Now the pump can be disassembled for the maintenance.

Remove the manifold to have access to the check valves.

Inspect the check balls for any abrasion, cuts or corrosion marks. Perform the same checks on the check valve seats to see any cuts, abrasion and any foreign materials embedded onto the surfaceof both the external and internal chambers. The sphericalsurface of the check balls must seat flush to the surface of the check valveseats for the pump to operate to peak efficiency.

The damaged or worn out parts should be replaced as necessary. Re-assemble the parts of the check valves.The seat should fit into thecounter bore of the outer chamber. Assemble the pump and make necessary connections. The pump is ready for operation.

WARNING: The air supply should be switched off before any repair or maintenance of the pump. Then pump pressure should be released and air connection be removed. Be careful compressed air line.

Item No.	Part No.	Name of Part	Qty
2A	S601033	DischargeLineElbow	2
5	S041050	CheckBall	4
6A	S081050	CheckBallSeatGasket	8
6	S051033	CheckBallSeat	4
4	S031033	Outer Diapragm	2
1A	S261033	Suction Line Elbow	2