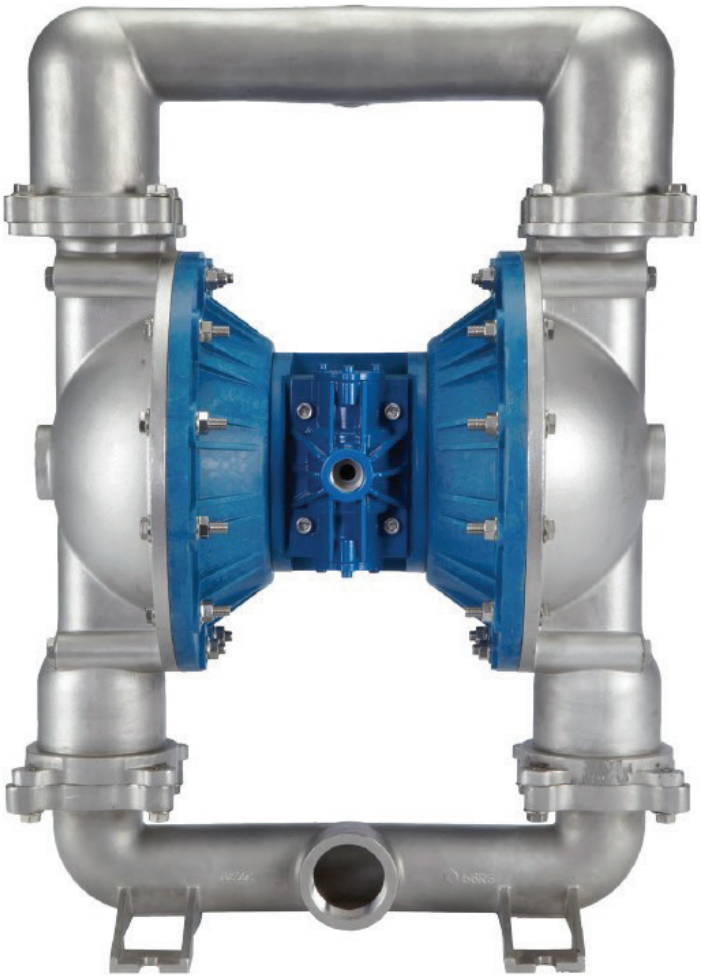
OPERATING INSTRUCTIONS

AIR OPERATED DIAPHRAGM PUMP **AP20**

(metal design)



TRANSLATION OF THE ORIGINAL OPERATING INSTRUCTIONS EN

TABLE OF CONTENT

IMPORTANT INFORMATION

Export Information

U.S. Export Administration Regulations, pursuant to ECCN 2B350, prohibit the export or re-export to certain enumerated countries of air operated double diaphragm pumps in which all wetted materials are constructed from fluoropolymers without first apply-ing for and obtaining a license from the U.S. Bureau of Industry and Security(BIS). This affects all sera airPUMP pumps constructed from PVDF with PTFE balls and diaphragms. Please

Chemical Reaction Disclaimer

The user must exercise primary responsibility in selecting the product's materials of construction which are compatible with the fluid(s) that come(s) in contact with the product. The user may consult a manufacturer's representative/distributor agent to seek a recommendation of the product's material of construction that offers the optimum available chemical compatibility. However neither manufacturer nor agent shall be liable for product damage or failure, injuries, or any other damage or loss arising out of a reaction, interaction or any chemical effect that occurs between the materials of the product's construction and fluids that come into contact with the product's components.

Unpacking & Inspection

Unpack the pump and examine for any signs of shipping damage.
If damage is detected, save the packaging and notify the carrier immediately.
To install the pump, follow the installation instructions provided.

SAFETY PRECAUTIONS for ATEX-pumps

WARNING

READ THIS SUPPLEMENTAL INSERT COMPLETELY BEFORE INSTALLING AND OPERATING THIS PUMP. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY OR DEATH.

WARNING

Static sparking can cause explosion. When operating in a hazardous area or pumping a hazardous fluid, the pump's grounding screw and entire pump system must be grounded to earth to prevent static discharge. This includes but is not limited to pipes, hoses, tanks, containers, valves, etc. Before operating the pump, ensure the electrical continuity throughout the pumping system and earth ground is 1 Ohm or less. If it is greater than 1 Ohm, re-check all grounding connections.

WARNING

Static sparking can cause explosion. Excessive fluid flow rates and improper tank filling methods can produce static electricity causing an explosion. Ensure safe fluid velocities and tank filling procedures in compliance with EN 13463-1 and CLC/TR 50404.

WARNING

Vibrations from operation may cause mounting surfaces and connections to loosen and generate a spark.
Ensure the pump and connections are securely mounted and fastened prior to each operation.

WARNING

Do not exceed minimum and maximum temperature limits of pump components.
A table of temperature limits is provided in the "Pump Data" section of the manual.

WARNING

Prior to operating, check pump for any worn o-rings, gaskets, or seals. Any leaking or damaged o-rings, gaskets, or seals must be repaired or replaced immediately.

WARNING

Do not exceed maximum pressure stated on the pump serial number sticker.

WARNING

Pump exhaust may be loud and contain particles. Wear appropriate ear and eye protection. In the event of a diaphragm rupture material can be forced out of the air exhaust muffler. If product is hazardous or toxic, pipe exhaust to appropriate safe area.

WARNING

Pump must be cleaned on a regular basis to avoid dust buildup greater than 5mm.

WARNING

The surface temperature of the pump depends upon the temperature of the fluid that is being pumped. The chart below lists different fluid temperatures and the corresponding pump surface temperatures, which determine the Temperature Class when used in a hazardous area.

Fluid Temperature	Maximum Surface Temperature	Temperature Class	Maxium Allowable Surface Temperature
78°C (172°F)	78°C (172°F)	T6	85°C (185°F)
95°C (203°F)	95°C (203°F)	T5	100°C (212°F)
130°C (266°F)	130°C (266°F)	T4	135°C (275°F)
195°C (383°F)	195°C (383°F)	T3	200°C (392°F)

SAFETY PRECAUTIONS (general)

EXPLOSION HAZARD

sera airPUMP with standard materials of construction should not be used with halogenated hydrocarbons. Halogenated hydrocarbon solvents can cause explosion when used with aluminum components in a closed (pressurized) system. sera airPUMPs with standard materials of construction contain aluminum components and will be affected by halogenated hydrocarbon solvents.
1-1-1 Trichloroethane and Methylene Chloride are the most common halogenated hydrocarbons. However, other halogenated hydrocarbon solvents are suspect if used either as part of paint or adhesive formulation, or for clean-up flushing.
For applications that may involve halogenated hydrocarbons, contact **sera** to discuss the availability of alternative pump materials of construction.

WARNING

sera airPUMPs maximum temperature limits are based upon the material's mechanical stress only. Maximum temperature is ap-plication dependent. Consult a chemical resistance guide or the chemical manufacturer for chemical compatibility and temperature limits.

WARNING

Chemical Hazard. This pump is used for transferring many types of potentially dangerous chemicals. Always wear protective clothing, eye protection and follow standard safety procedures when handling corrosive or personally harmful materials. Proper procedures should be followed for draining and decontaminating the pump before disassembly and inspection of the pump. There may be small quantities of chemicals present during inspection.

WARNING

Hot surfaces. **sera** airPUMPs are capable of handling liquids with temperatures as high as 104ºC (220ºF).
This may cause the outer areas of the pump to become hot as well and could cause burns.

WARNING

If a diaphragm rupture occurs, material being pumped may be forced out of the air exhaust. Proper care should be taken, always wear protective clothing, eye protection & follow standard safety procedures.

WARNING

For polypropylene or PVDF pumps do not exceed 6.9 bar (100 psig) air supply and 8.3 bar (120 psig) for aluminum and stainless steel.

WARNING

When pumping hazardous liquids, or operating the pump in an enclosed room, it is important to pipe the exhaust air to a safe area.

WARNING

The air outlet from the pump can be noisy and contain particles. Wear appropriate protection for your ears and eyes. Should a seal tear, the conveyed material can escape with the exhaust air. If the conveyed material is a dangerous or poisonous product, the exhaust air must be routed to a safe zone.

CAUTION

Before attaching air supply to pump to make sure all airline debris is clear. It is recommended to use a minimum 5µ (micron) air filter before the air valve.

CAUTION

Do not over-tighten the air inlet fitting or muffler.
Too much torque could damage the air valve or muffler plate.

CAUTION

Before maintenance or repair, close the compressed air line supply valve, bleed the pressure and disconnect air line from the pump. Discharge line may also be pressurized. Any pressure must be relieved prior to servicing.
Remove suction/discharge lines & drain the pump.

CAUTION

If pump is used with materials that tend to solidify or settle, the pump should be flushed after each use to prevent damage.

CAUTION

Use only genuine **sera** replacement parts to assure compatibility & longest service life.

CAUTION

Check the temperature limits for all wetted components when choosing pump materials.
See Materials Profiles table on page 8.

MATERIAL SPECIFICATION

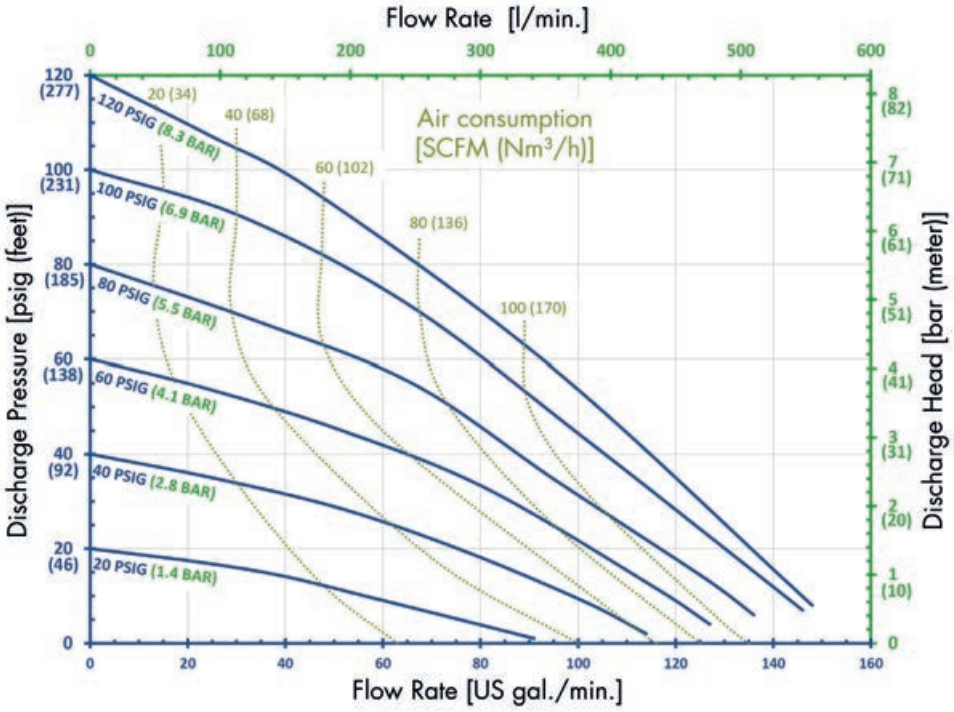
MATERIAL PROFILES

Material	Chemical composition	Description	Operating temperature	
			min.	max.
PP	Pure Polypropylene	Thermoplastic that is resistant to alkali and strong acids.	0°C (32°F)	70°C (158°F)
PVDF	Pure Polyvinylidene Fluoride	Strong fluoropolymer with excellent chemical resistance.	-12°C (10°F)	104°C (220°F)
Stainless Steel	316 Stainless Steel	Excellent chemical resistance, high tensile and impact strength, abrasion resistant.	Limited by other materials used	
Aluminium	ADC 12, LM24, LM25	Moderate chemical resistance with good impact strength and abrasion resistance.	Limited by other materials used	
Buna	Acrylonitrile-butadiene Rubber	General purpose elastomer.Resistant to oil, water, solvent, and hydraulic fluid.	-12°C (10°F)	88°C (190°F)
EPDM	Ethylene Propylene Diene Rubber	Good resistance to mild acids, detergents, alkalis, ketones, and alcohols.	-40°C (-40°F)	121°C (250°F)
FKM	Fluorocarbon Rubber	Good chemical resistance and high temperature properties. Resistant to most acids, aliphatic, aromatic, and halogenated hydrocarbons, oils, grease, and fuels.	-40°C (-40°F)	177°C (350°F)
Neopren	Chloroprene Rubber	General purpose elastomer with good resistance to moderate chemicals, oils, grease, solvents, and some refrigerants.	-18°C (0°F)	100°C (212°F)
Santopren	Fully cured EPDM rubber particles encapsulated in a polypropylene (PP) matrix	Thermoplastic elastomer with good abrasion resistance with chemical resistance to a wide range of solvents and chemicals. Injection molded with no fabric layer.	-40°C (-40°F)	107°C (225°F)
Hytrel	Thermoplastic polyester elastomer	Combines resistance and flexibility of elastomers with the strength of plastics. Resistant to acids, bases, amines, and glycols. Injection molded with no fabric layer.	-29°C (-20°F)	104°C (220°F)
PU	Polyester Urethane	Thermoplastic that exhibits excellent abrasion resistance.Injection molded with no fabric layer.	0°C (32°F)	66°C (150°F)
PTFE	Polytetrafluoroethylene	Chemically inert. Resistant to a wide range of chemicals.	4°C (40°F)	107°C (225°F)
FEP	Fluorinated Ethylene Propylene	Similar to PTFE in composition and chemical resistance. Used to encapsulate FKM o-rings for superior chemical resistance.	-40°C (-40°F)	107°C (225°F)

PERFORMANCE DATA

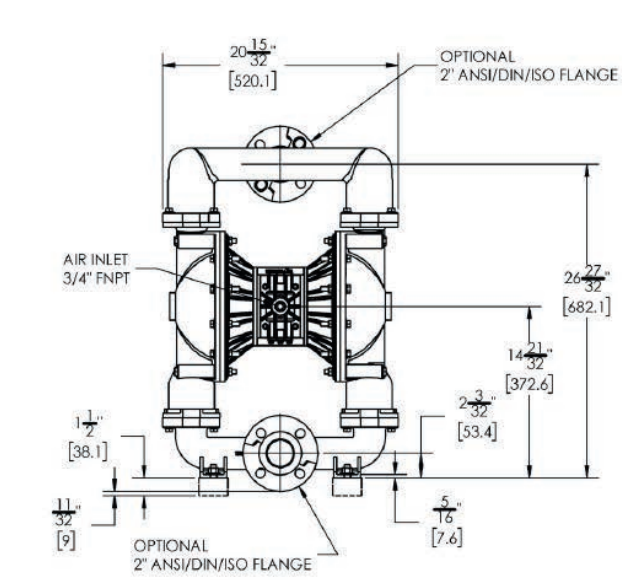
Air operated diaphragm pump **AP20** (metal)			
Max Flow Rate:	590 Litre/min. (156 gal/m)	Suction/Discharge Size:	2" FNPT or FBSP
Displacement Per Stroke:	1,2 Litre (0.31 gal)	Air Inlet/Exhaust Size:	¾" FNPT
Max Outlet Pressure:	8,3 bar (120 psig)	Air Consumption @ 6,9 bar:	170 Nm³/h (100 sfcm)
Max Particle Size:	0,7 bar (10 psig)	Max Material Inlet Pressure:	8,3 bar (120 psig)
Noise Level:	8,9 mm (0.35")	Max Air Inlet Pressure:	77 dB(A)
Max Suction Lift (Water)	dry: 4,0 mWS (13 ft.) wet: 8,5 mWS (28 ft.)	Weight:	Aluminium: 39,5 kg (87 lbs) Stainless st.: 59,0 kg (130 lbs)

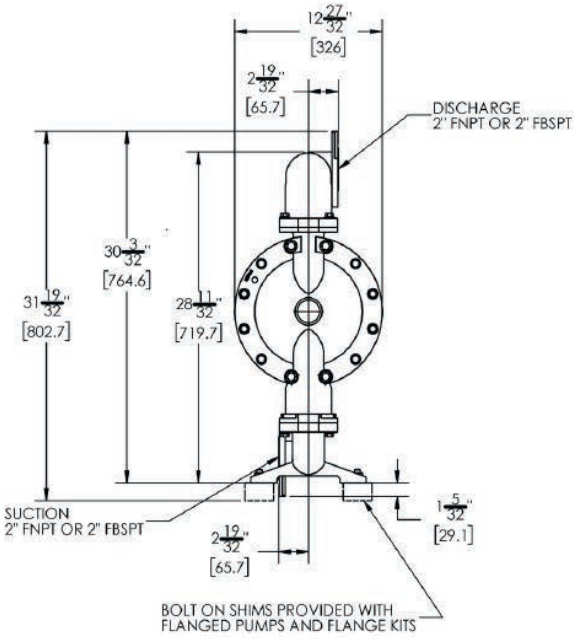
CHARACTERISTIC CURVES

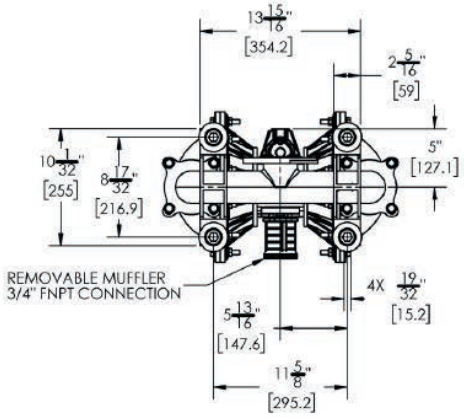


DIMENSIONS

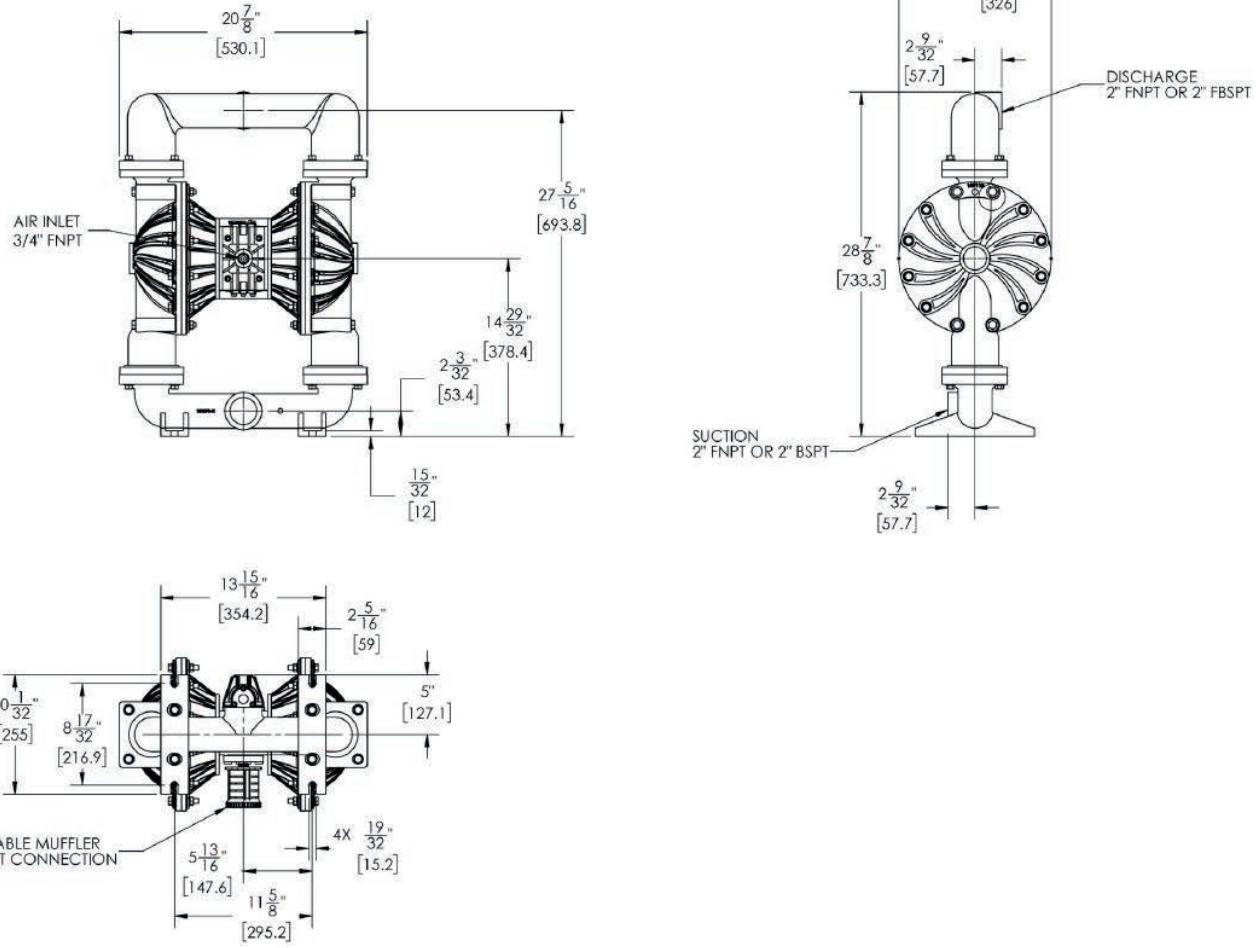
Stainless steel





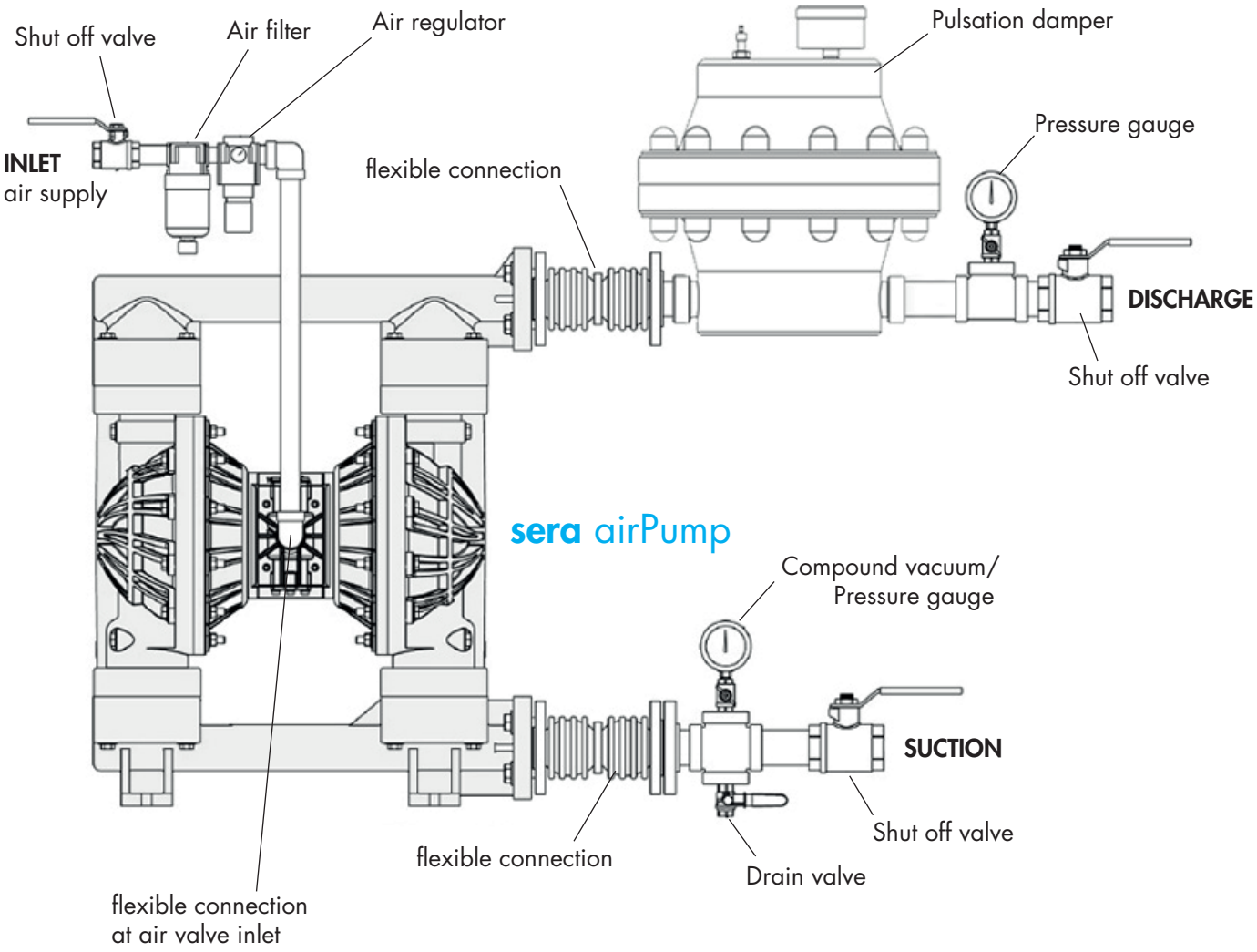


Aluminium


20 7/8" [530.1]
AIR INLET 3/4" FNPT
27 5/16" [693.8]
14 29/32" [378.4]
2 3/32" [53.4]
15/32" [12]
12 27/32" [326]
2 9/32" [57.7]
DISCHARGE 2" FNPT OR 2" FBSPT
28 7/8" [733.3]
SUCTION 2" FNPT OR 2" BSPT
2 9/32" [57.7]
13 15/16" [354.2]
2 5/16" [59]
5" [127.1]
10 1/32" [255]
8 17/32" [216.9]
REMOVABLE MUFFLER 3/4" FNPT CONNECTION
4X 19/32" [15.2]
5 13/16" [147.6]
11 5/8" [295.2]

INSTALLATION/OPERATION

INSTALLATION DRAWING



INSTALLATION / START UP

Installation and Start up

Install the pump in a vertical position or it may not prime properly. Pump should be located as close to the product being pumped as possible. Suction line length should be as short as possible and limit the number of fittings. Suction line di-ameter should not be reduced smaller than the suction diameter of the pump. When using rigid pipe run short sections of flexible hose or flexible connections between the pump & piping. Secure the pump to a suitable surface.

Air Supply

Connect the pump air inlet to an air supply with sufficient capacity to achieve desired performance. A pressure regulating valve should be installed to insure air supply pressure does not exceed recommended limits.

Air Valve Lubrication

No lubrication is required for the air distribution system.

Fasteners

Re-torque all fasteners before operation. Creep of housing and gasket materials may cause fasteners to loosen. Re-torque all fasteners to the torque specifications listed on the exploded view drawing in this manual.

Air Inlet & Priming

Pump will start to operate as soon as the shut-off valve is opened. It is recommended to open the shut-off valve slowly at first. Once the pump primes; the shut-off valve can be opened additionally to increase the pump's flow. If the pump is oper-ating but not pumping any liquid see the troubleshooting section for tips & suggestions.

Accessories

Surge suppressors, spill stops & filter regulators are available and should be used with **sera airPUMP**.

TROUBLESHOOTING TIPS AND SUGGESTIONS

PUMP WILL NOT START OR CYCLEL:

- Blocked liquid pipe or hose - Clean out or replace
- Clogged liquid chamber - Remove debris
- Diaphragm shaft bushing / o-ring leak - Replace o-rings
- Air valve carrier not shifting - Inspect, clean, re-oil with 10 wt. air tool oil. (aluminum air valve)
- Air valve carrier not shifting - Inspect, replace seals (polypropylene air valve)

ERRATIC CYCLING:

- Diaphragm failure - Replace diaphragm
- Valve ball not seating properly, worn or damaged – Inspect, remove debris or replace
- Leak in suction line - Inspect, repair or replace
- Diaphragm shaft bushing / o-ring leak - Replace o-rings
- Air valve carrier not shifting - Inspect, clean, re-oil with 10 wt. air tool oil. (aluminum air valve)
- Air valve carrier not shifting - Inspect, replace seals (polypropylene air valve)
- Over lubrication in air valve - Inspect, degrease, reuse. Adjust lubrication
- Excess moisture in air valve – Inspect, dry, reuse. Consider installing an air dryer
- For aluminum air valves, worn carrier or valve bore – measure carrier and valve bore, diametrical clearance should be between 0,05 - 0,088mm. Replace worn components as needed
- For plastic air valves, worn carrier seals – replace carrier seals if there is no longer interference between seals and valve bore

PUMP CYCLES BUT WILL NOT PUMP:

- Too much suction lift - Reduce suction lift or fill liquid chambers with liquid
- Leak in suction line - Inspect, repair or replace
- Valve ball not seating properly, worn or damaged - Inspect, remove debris or replace
- Clogged suction pipe or hose - Inspect & clear
- Clogged strainer if used - Inspect & clear
- Diaphragm failure - Replace diaphragm

PUMPED LIQUID RELEASED FROM AIR EXHAUST:

- Diaphragm failure - Replace diaphragm
- Outer plate unthreading - Tighten & re-torque

MAINTENANCE

Recommended tools for servicing pump

- Box wrench (13mm, 15mm and 17mm)
- Socket wrenches (30mm (2x))
- Snap ring pliers
- Hex wrenches (5mm, 6mm and 8mm)
- O-Ring pick
- Torque wrench

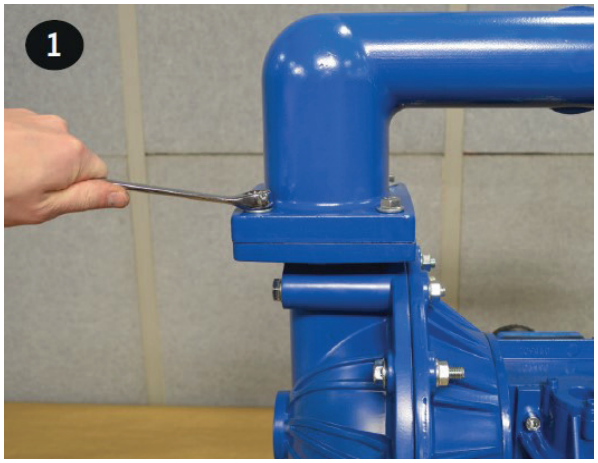
Wet End Servicing (Installing Wet End Kit)

- Relieve airline pressure and fluid line pressures before conducting maintenance.
- The pump can be drained by turning it upside down and allowing fluid to drain into an appropriate container. Use proper safety equipment when conducting maintenance as internal components may still contain the pumped media.
- Lubricate all stainless steel to stainless steel fasteners to prevent galling. Torque values listed in the back of this manual are for lubricated fasteners (see page 29).

DISASSEMBLY

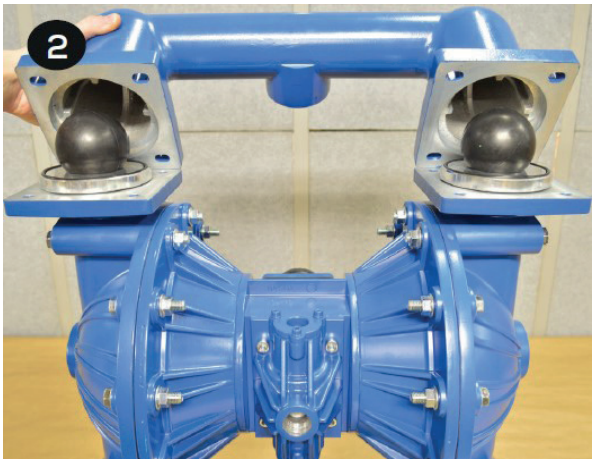
1)

Remove the eight discharge manifold bolts (11) from the discharge manifold (39) using a 15mm wrench.



2)

The discharge seat o-rings (13), valve seats (14) and valve balls (15) can now be accessed and replaced if needed.



3)

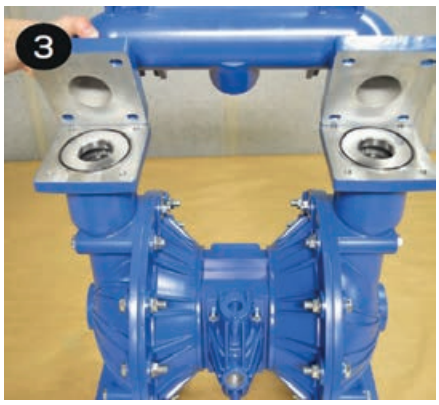
Repeat the above steps for the suction manifold (12). The seat o-rings (13), valve seats (14) and valve balls (15) are located in the liquid chambers (18).

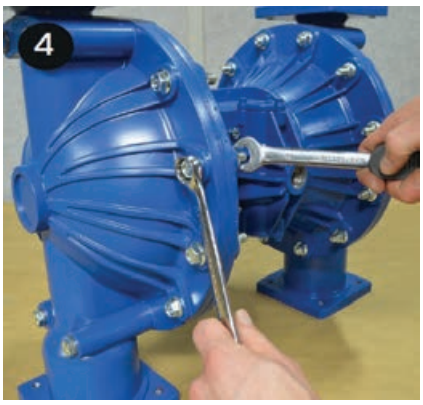
4)

Remove both liquid chambers (18) by removing the twelve bolts (16, 17) and nuts (27) on each liquid chamber using a 15 mm wrench. Inspect and replace diaphragms if needed.

5)

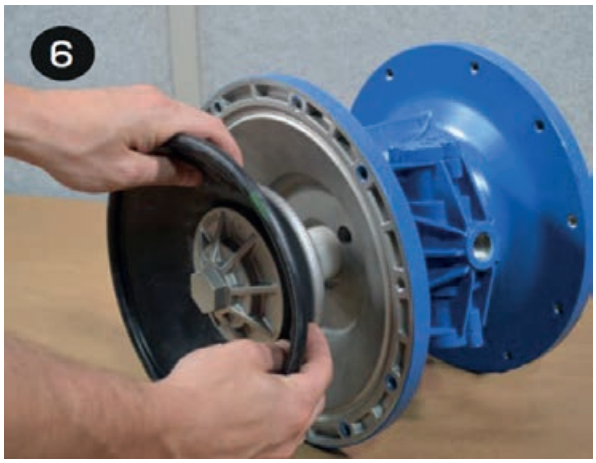
To remove the diaphragms (items 21/22), begin by loosening the two outer plates (19) using two 30 mm wrenches. Use 6-sided sockets or wrenches to prevent damage to the hex portion of the outer plate.





6)

Remove the outer plate, diaphragm(s), and inner plate (19, 21/22 & 23) from the side that is loosened. Pull or push the shaft (32) and remaining plates and diaphragms out of the center section. If pulling, it may be easier to grip the diaphragm if it is inverted.



7)

To remove the remaining diaphragm(s) (21/22) and plates (19 & 23) from the shaft (32), place the shaft in a vise. Using a 6-sided 30 mm wrench, remove the remaining diaphragm(s) and plates.

After performing required maintenance, the pump can be reassembled. The pump can also be reassembled using the disassembly instructions in the reverse order as listed above. For detailed assembly instructions, follow steps in Wet End Reassembly section „MOUNTING“ beginning on the next page.

MOUNTING

1)

Slide the center hole of one diaphragm (22) over the cast/threaded bolt of an outer plate (19). The air side of the diaphragm is labeled and should face away from the outer plate.
If the pump is fitted with PTFE diaphragms (21), first place a PTFE diaphragm over the cast/threaded bolt of the outer plate (19). Then place the backup diaphragm (22) on the outer plate. The shape of the PTFE diaphragm and back up diaphragm should roughly conform to one another.

See the exploded view drawing for proper orientation.

2)

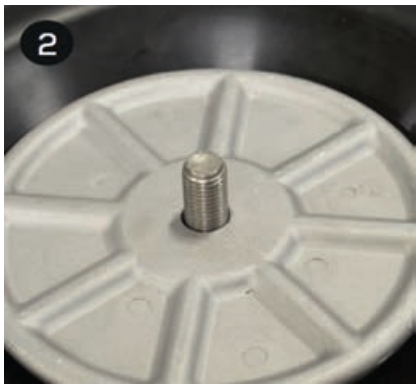
Place the inner plate (23) over the cast/threaded bolt. Ensure the round recess in the plate faces the diaphragm (22).

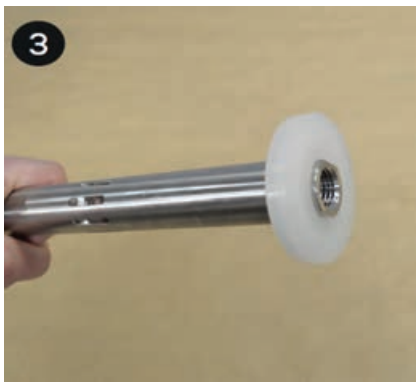
3)

Place the bump stop (31) onto one end of the shaft (32).

4)

Apply a couple drops of a medium strength thread locker, such as Loctite® 246, to the cast/threaded outer plate bolt (20). Thread the shaft (32) onto the bolt until it is snug to the flat back side of the inner plate (23).





5)

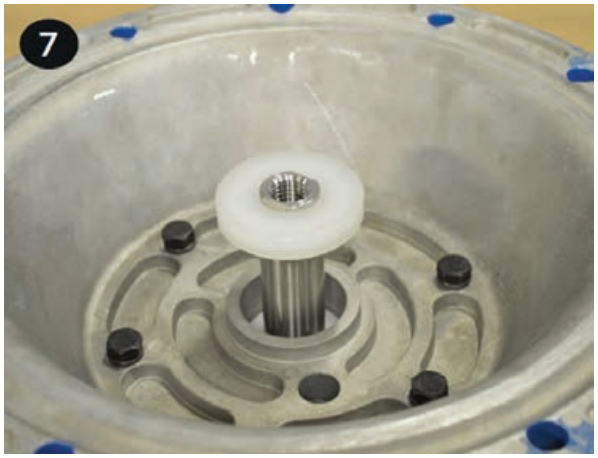
The shaft (32) and shaft o-rings (30) should retain the lubricant that was factory applied. If they appear dry, apply a light coat of lithium thickened grease. Avoid over-lubrication as it can cause decreased performance of the air distribution system.

6)

Push the shaft (32) through the center of the shaft bushing (29). It is normal for this to be a tight fit, especially if the shaft and shaft o-rings (30) are in good condition.

7)

Place the remaining bump stop (31) on the other end of the shaft (32).



8)

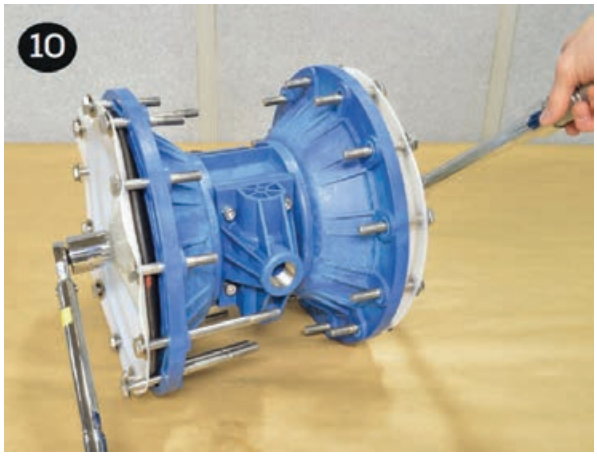
It may be easier to thread the bolt into the shaft if the diaphragm(s) is inverted on one or both sides. This can be done by hand.

9)

The other diaphragm(s) (21/22) and inner/outer plates (19 & 23) can be installed onto the opposite end of the shaft (32).

10)

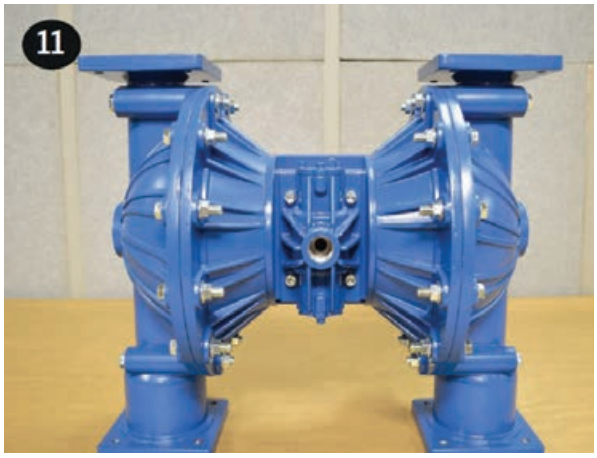
Tighten and torque the outer plates (19).
If the pump is fitted with PTFE diaphragms (21), it is necessary to restrict their ability to rotate when tightening the outer plates. This can be done by threading the liquid chamber bolts (16, 17) through the PTFE diaphragm holes and into the center section (35) on each side. This will ensure that the PTFE diaphragm does not obstruct the bolts ability to thread into the center section when the liquid chambers are installed. Remove these bolts once the outer plates are torqued.



Note: When installing polytetrafluoroethylene (PTFE) diaphragms, it is important to tighten outer plates simultaneously (turning in opposite directions) to ensure tight fit.

11)

Install the liquid chambers (18) by placing one side over the diaphragm. Start all bolts (16, 17) and nuts (27) before tightening and torqueing. Torque all fasteners in a star pattern. Repeat to install the second liquid chamber. Ensure both chambers are orientated the same and that the inlet and outlet ports are vertical when facing the front of the pump as shown.

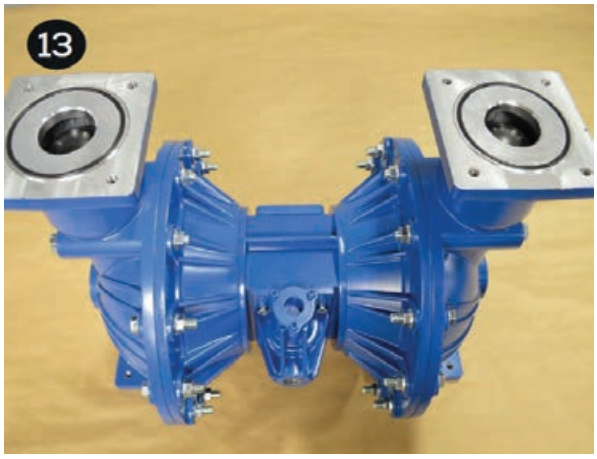


12)

Flip the pump upside down and drop the suction valve balls (15) into the liquid chamber (18) ball cages.

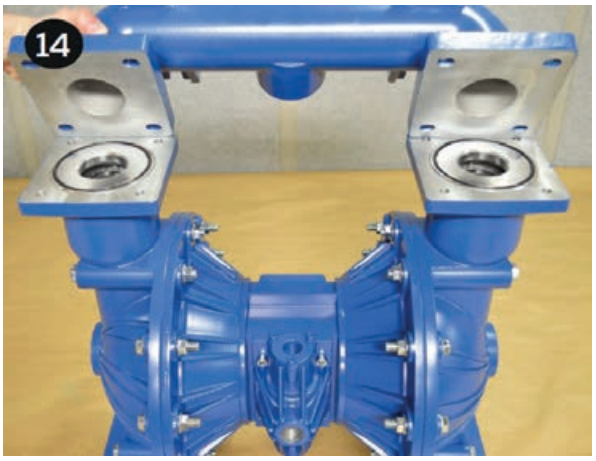
13)

For pumps fitted with metal or PTFE valve seats (14), place the valve seat o-rings (13) into the glands on both sides of the valve seat. Pumps fitted with rubber or TPE seats do not require valve seat o-rings. All seats are symmetrical, i.e. there is no top or bottom.



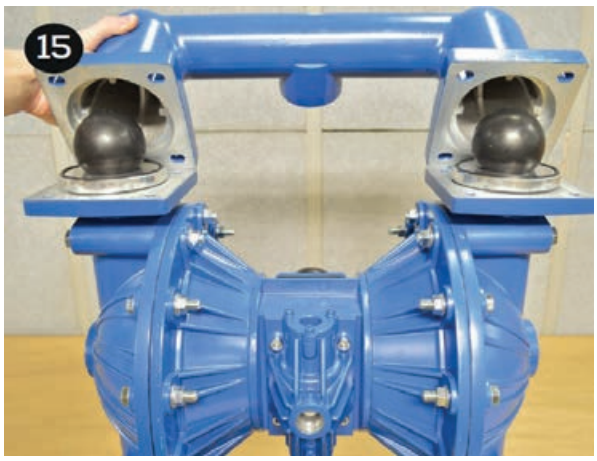
14)

Place the valve seats (14) into the seat bore in the liquid chamber (18). Place the suction manifold (12) atop the pump, install, tighten and torque the eight manifold bolts (11).



15)

Stand the pump upright onto the suction manifold feet. Place the valve seat o-rings (13) into both sides of the valve seat. Place the seat on the liquid chamber (18). Place the valve balls (15) on the seats and discharge manifold (39) atop the components that are stacked on top of the liquid chambers. Install, tighten and torque the eight manifold bolts (11).



AIR END SERVICING (INSTALLING AIR END KIT)

- Follow steps 1 – 7 in the Wet End Servicing disassembly section to access the shaft bushing (29) and o-rings (28 & 30), then follow steps below.

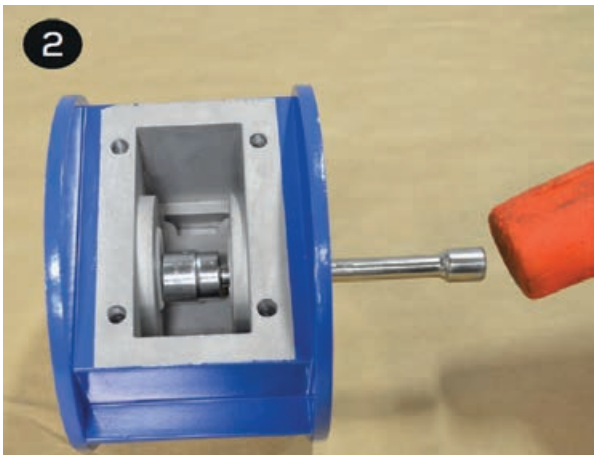
SHAFT, BUSHING AND O-RING REPLACEMENT

1)

Remove both air chambers by removing the four bolts & washers (24 & 25) on each side of the pump with a 13mm wrench.

2)

Remove and set aside the air valve (3) using a 6mm hex wrench (see Valve and Muffler Gasket Replacement section for more details). The shaft bushings can be removed by placing a large socket between the two bushings. Place an extension into the socket from one side of the center section. Tap with a rubber mallet to remove the bushing. Repeat for the remaining bushing.



3)

Use the supplied grease packets to lightly grease the OD and ID o-rings (28 & 30) that come preinstalled in the new shaft bushings supplied in air end kits.

4)

Insert both bushings into the center section. Ensure the bushing is fully installed and the large rib on the outside of the bushing is flat against the center section.

5)

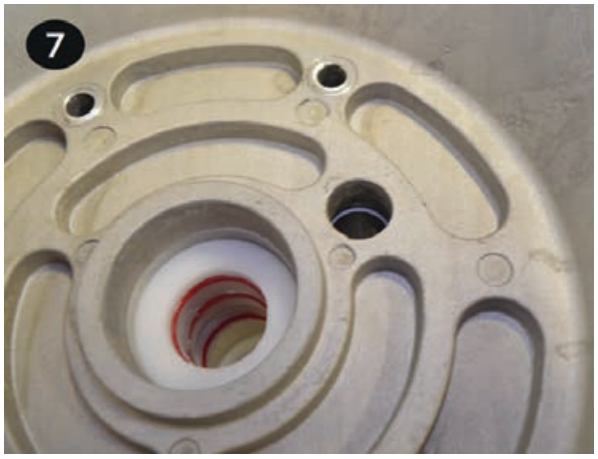
Inspect the shaft (32) for damage. It is common for shafts to become grooved during service. Grooving is normally caused by carbonized oil and/or abrasive foreign material getting trapped between the seal and the shaft. Over time, deep grooves can form in the shaft. When that occurs, it is recommended that the shaft be replaced.

6)

After determining if the condition of the shaft is acceptable, ensure both center section o-rings (33 & 34) are in place on both sides of the center section.

7)

Install air chambers (26) by placing one side on top of the center section (35). Ensure the air path hole of the center section lines up with the through hole in the air chamber.



8)

Tighten and torque the four fasteners (24 & 25) that connect the air chamber (26) to the center section (35). Repeat for the second air chamber.

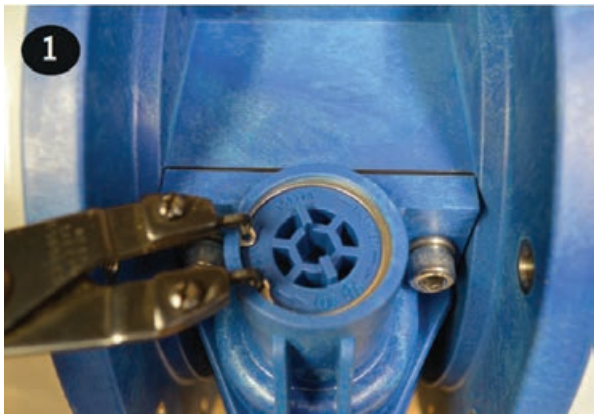
7)

To rebuild the rest of the pump, follow steps 5 – 15 in the Wet End Servicing – Wet End Reassembly section „MOUNTING“.

AIR VALVE O-RING REPLACEMENT

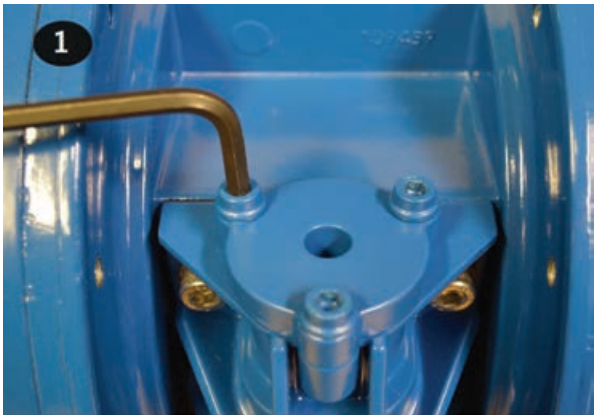
1)

Plastic Air Valve
To replace the valve cap o-ring remove the retaining ring (item 8), then unthread the valve cap (6) using a 8mm hex wrench.



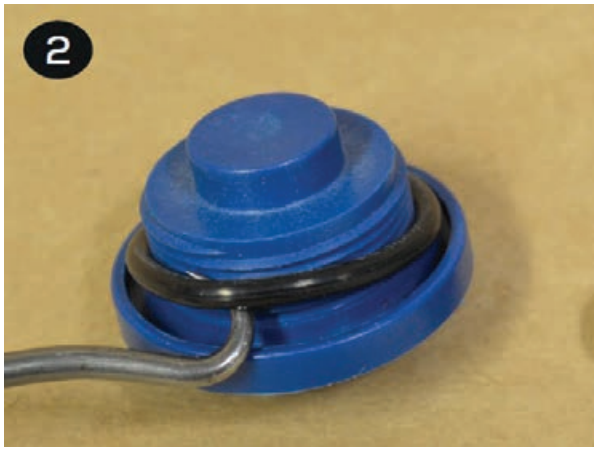
1)

Aluminum Air Valve
To replace the valve cap o-rings (5), remove the three button head cap screws (7) using a 5mm hex wrench.



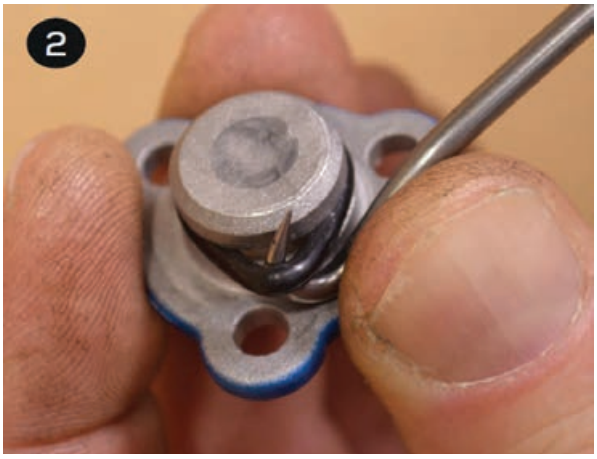
2)

Plastic Air Valve
Remove and replace o-ring (5). Install cap (6) and tighten until groove for the retaining ring is visible. Install retaining ring.



2)

Aluminum Air Valve
Remove and replace o-ring (5). Install cap (6), tighten, and torque the valve cap screws (7). Repeat for the remaining cap.



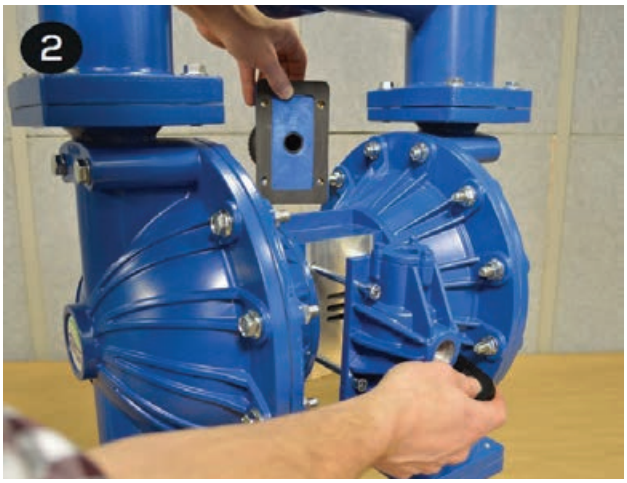
VALVE AND MUFFLER GASKET REPLACEMENT

1)

Remove the valve body (3) by removing the four socket head cap screws and washers (1 & 2) that attach the valve body to the muffler plate (38) with a 6 mm hex wrench

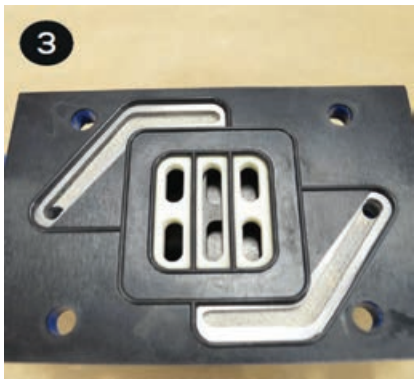
2)

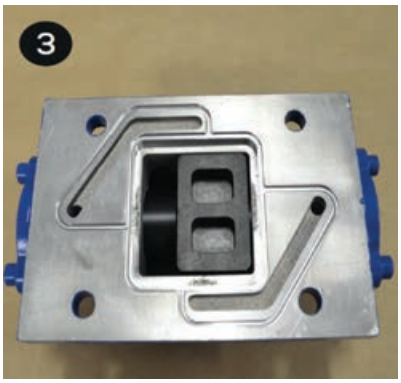
Pull the valve body and gasket (3 & 36) off the front of the center section (35) and the muffler plate gasket, muffler plate and muffler (37, 38, & 40) off the back.

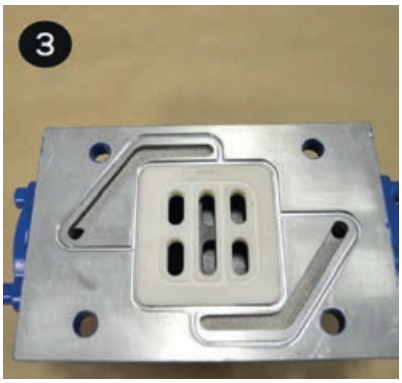


3)

Place the new gasket (38) on the air valve (3) and ensure the slots in the gasket align with the slots in the air valve and valve plate (10).
Air Valve Slide, Plate & Gasket Orientation: If the valve plate (10) and slide valve (9) are removed, ensure they are installed in the proper orientation. The flat face of the slide valve sits in the pocket of the valve carrier (4) so that the square cut out on the slide valve faces the smooth polished side of the valve plate

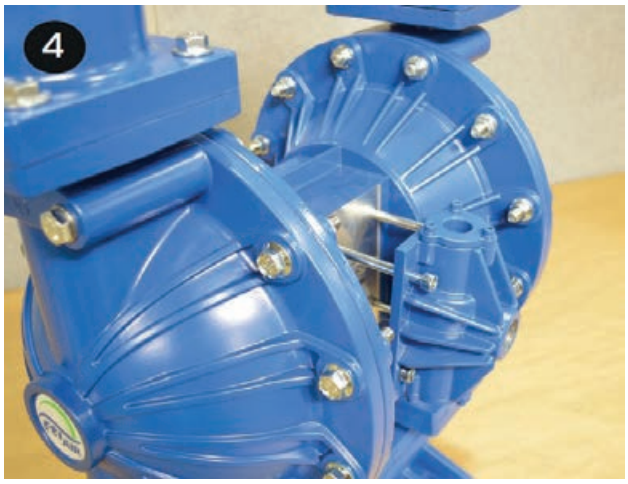






4)

Insert the four cap screws (1) and washers (2) through the valve body (3) and gasket (36) and place onto the center section (35). Ensure the slide valve (9) and valve plate (10) are in place and the valve sits flat on the center section.

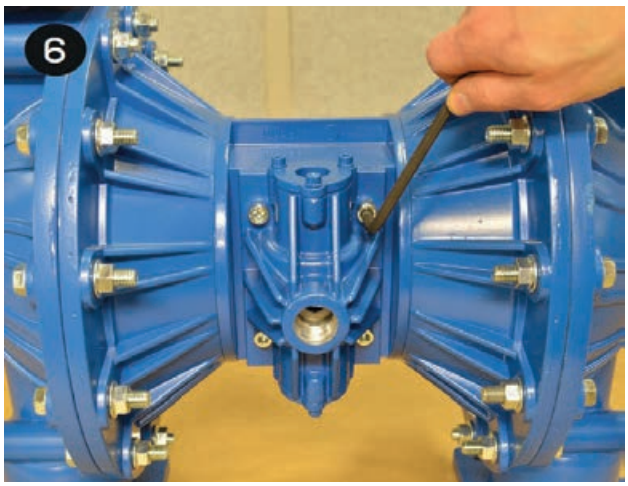


5)

Place the muffler gasket (37) over the four cap screws (item 1) on the back side of the center section (35) followed by the muffler plate (38) and muffler (40).

6)

Tighten and torque the four cap screws (1) washers (2) into the muffler plate.

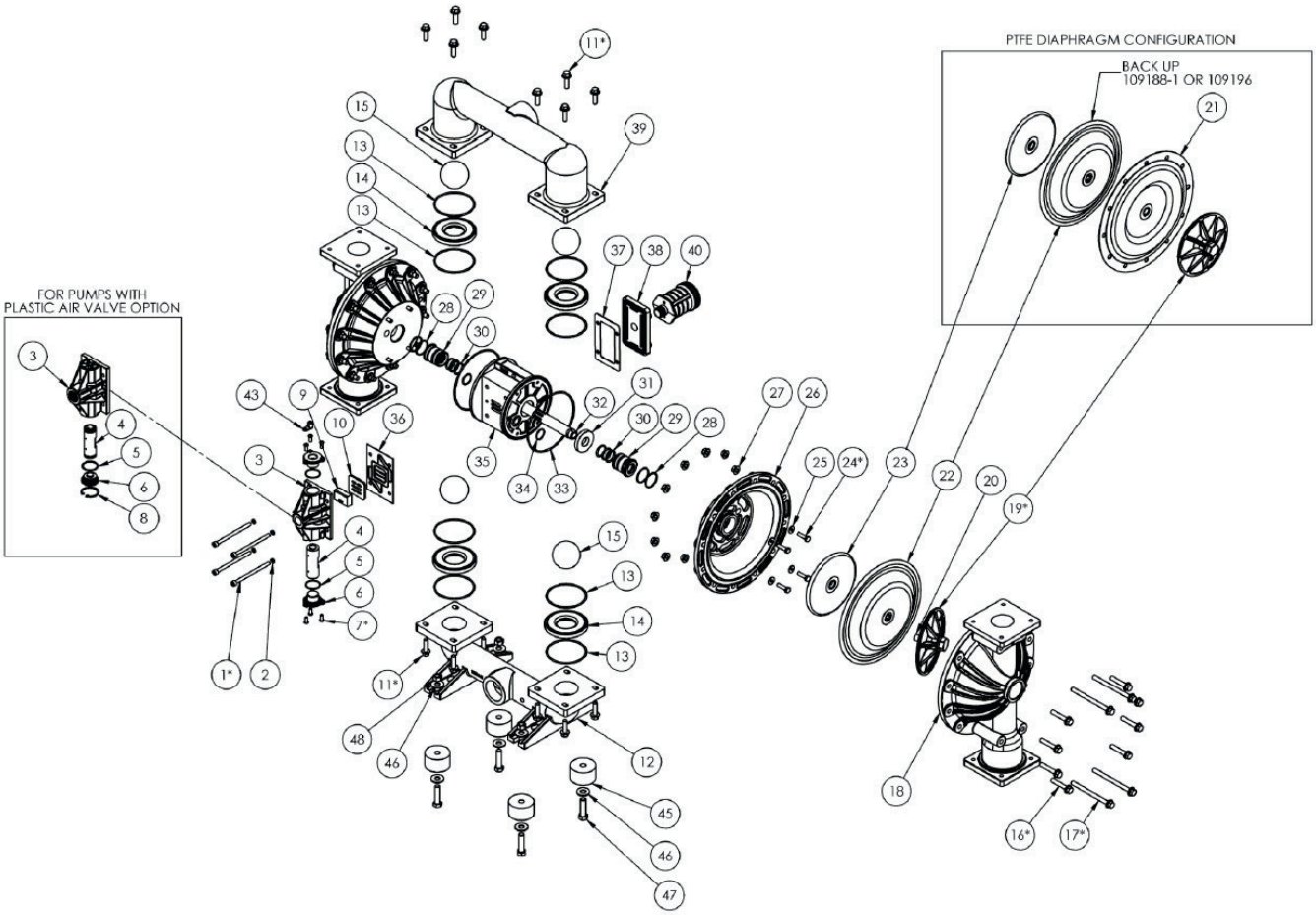


REPLACEMENT AIR VALVE KIT INSTALLATION

- 1) Remove the valve that is to be replaced by removing the four socket head cap screws with a 6 mm hex wrench that attaches the valve body to the center section.
- 2) Save the four cap screws, four lock washers, muffler plate, and muffler. All other valve components can be discarded.
- 3) Remove the packing tape that holds the air valve components in place during shipping.

- Follow steps 3 – 6 in the Valve Gasket Replacement section of Air End Servicing above.

EXPLODED VIEW AND SPARE PARTS LIST



Pos.	Description	Material	Part-No.	Qty.	Set
3	VALVE BODY		SEE AIR VALVE TABLES		V1/V2
4	VALVE CARRIER		SEE AIR VALVE TABLES		V1/V2
5	VALVE CAP O-RING		SEE AIR VALVE TABLES		A1/A2/V1/V2
6	VALVE CAP		SEE AIR VALVE TABLES		V1/V2
9	SLIDE VALVE		109259	1	V1/V2
10	VALVE PLATE		109263	1	V1/V2
12	MANIFOLD, SUCTION	Aluminium	SEE MANIFOLD TABLES		
		Stainless Steel			

Pos.	Description	Material	Part-No.	Qty.	Set
13	O-RING, VALVE SEAT	Neoprene	109313	8	W
		Buna	109539		
		EPDM	109540		
		FKM	109419		
		PTFE, FDA	109318		
		FEP-covered	109600		
14	VALVE SEAT	Aluminium (requires Pos. 13)	109238	4	W
		Stainless Steel, FDA (requires Pos. 13)	109242		
		PTFE, FDA (requires Pos. 13)	109597		
		Neoprene	109230		
		Buna-N	109234		
		EPDM	109442		
		FKM	109288		
		Santoprene	109246		
		Santoprene, FDA	109246-1		
		Hytrel	109226		
		Hytrel, FDA	109226-1		
		PU	109303		
15	VALVE BALL	Neoprene	109205	4	W
		Buna-N	109209		
		EPDM	109213		
		FKM	109217		
		Santoprene	109221		
		Santoprene, FDA	109221-1		
		PTFE, FDA	109201		
		Stainless Steel, FDA	109370		
		PTFE (weighted), FDA	109379		
18	LIQUID CHAMBER	Aluminium	109767-13	2	
		Stainless Steel	109767-14		
19	OUTER PLATE	Aluminium (one piece, incl. stud)	109161	2	
		Stainless Steel (requires Pos. 20)	109165		
21	DIAPHRAGM	PTFE, FDA	109184	2	W
22	DIAPHRAGM	Neoprene	109188-1	2	W
		Buna-N	109188-2		
		EPDM	109188-3		
		FKM	109188-4		
		Santoprene	109196		
		Santoprene, FDA	109196-1		
		Hytrel	109192		
		Hytrel, FDA	109192-1		
		PU	109437		
23	INNER PLATE	Aluminium	109170	2	
		Stainless Steel	109715		
26	AIR CHAMBER	Aluminium	109461	2	
		PP-FRP	109146		

Pos.	Description	Material	Part-No.	Qty.	Set
28	O-RING, BUSHIN OD		109420	4	A1/A2
29	SHAFT BUSHING		109180	2	A1/A2
30	O-RING, SHAFT		109424	6	A1/A2
31	BUMP STOP		109429	2	–
32	SHAFT		109175	1	–
33	O-RING, LARGE	CENTER SECTION/AIR CHAMBER	109434	2	A1/A2
34	O-RING, SMALL	CENTER SECTION/AIR CHAMBER	109418	2	A1/A2
35	CENTER SECTION	Aluminium	109460	1	–
		PP-FRP	109151		–
36	GASKET, AIR VALVE		109267	1	A1/A2/V1/V2
37	GASKET, MUFFLER		109428	1	A1/A2/V1/V2
38	MUFFLER PLATE	Standard	109271	1	–
		ATEX	109271-1	1	–
39	MANIFOLD, DISCHARGE	Aluminium	SEE MANIFOLD TABLES		
		Edelstahl			
40	MUFFLER	Standard	109562	1	–
		ATEX	109700	1	–
42	SPLIT FLANGE HALF		SEE MANIFOLD TABLES		
43	GROUNDING LUG	Standard bei ATEX-Ausführung	108091	1	–
45	SHIM	PU	109765	4	–

KIT COLUMN KEY:

W PARTS SUPPLIED IN A WET SIDE KITS

V1 PARTS SUPPLIED IN PLASTIC REPLACEMENT VALVE KIT 109677

V2 PARTS SUPPLIED IN ALUMINUM REPLACEMENT VALVE KIT 109590

A1 PARTS SUPPLIED IN PLASTIC VALVE AIR END KIT 109674

A2 PARTS SUPPLIED IN ALUMINUM VALVE AIR END KIT 109596

AP20 with air valve PP-FRP				
Pos.	**Description**	**Part-No.**	**Qty.**	**Set**
3	VALVE BODY, GFRPP	109251	1	V1
4	VALVE CARRIER WITH SEALS	109655	1	V1
5	VALVE CAP O-RING	109644	1	A1/V1
6	VALVE CAP, GFRPP	109275	1	V1
8	RETAINING RING, HO-165	109645	1	V1

AP20 with air valve Aluminium				
Pos.	**Description**	**Part-No.**	**Qty.**	**Set**
3	VALVE BODY, ALUMINUM	s.Pos. 41	1	V2
4	VALVE CARRIER, ALUMINUM	109456	1	V2
5	VALVE CAP O-RING	109416	2	A2/V2
6	VALVE CAP, ALUMINUM	s.Pos. 41	2	V2
8	CAP SCREW, M6X1.0X16	109513	6	V2
41	CONTAINS POS 3, 4, 5, 6, 7	109593	1	V2

AP20 Aluminium „HARDWARE“			
Pos.	**Description**	**Part-No.**	**Qty.**
1	CAP SCREW, SOCKET HD M8X1.25X120MM	209020	4
2	WASHER, LOCK M8 HIGH-COLLAR	109493	4
11	CAP SCREW, HEX HD FLNG M10X1.5 X 35MM	209019	16
16	CAP SCREW, HEX HD FLNG M10X1.5 X 55MM		
17	CAP SCREW, HEX HD FLNG M10X1.5X130MM		
24	CAP SCREW, HEX HD M8X1.25X30MM	209019	20
	CAP SCREW, HEX HD M8X1.25X160MM	209029	20
25	WASHER, FLAT M8	209021	4
27	NUT, HEX FLNG M10X1.5	109469	8
44	NUT, HEX M8X1.25 (FOR CENTER SECTION TO AIR CHAMBER - NOT SHOWN)	109474	4

AP20 Stainless Steel „HARDWARE“			
Pos.	**Description**	**Part-No.**	**Qty.**
1	CAP SCREW, SOCKET HD M8X1.25 X 120MM SS	109520	4
2	WASHER, LOCK M8 HIGH-COLLAR SS	109518	4
11	CAP SCREW, HEX HD FLNG M10X1.5 X 30MM SS	109497	16
16	CAP SCREW, HEX HD FLNG M10X1.5 X 50MM SS (f. metal)	109498	16
	CAP SCREW, HEX HD FLNG M10X1.5 X 55MM SS (f. plastic)	109499	
17	CAP SCREW, HEX HD FLNG M10X1.5X130MM SS	109500	8
20	DOUBLE END STUD, M16X2.0X50MM	109523	2
24	CAP SCREW, HEX HD M8X1.25X30MM (f. metal)	109471	8
	CAP SCREW, HEX HD M8X1.25X160MM (f. plastic)	109473	4
25	WASHER, FLAT M8	109469	8
27	NUT, HEX FLNG M10X1.5 SS	109509	24
44	NUT, HEX M8X1.25 (FOR CENTER SECTION TO AIR CHAMBER - only plastic design)	109474	4
46	WASHER, FLAT 1/2” SS	J103851	8
47	CAP SCREW, HEX HD 1/2”X13X2” SS	J104032	4
48	NUT, HEX 1/2”X13 SS	107534	4

Connection / Porting location:

N2 Connection: FNPT Position: center, horizontal
N3 Connection: FNPT Position: center, vertical

T2 Connection: 2" Tri-Clamp Pos.: center, horizontal

B2 Connection: FBSP Position: center, horizontal
B3 Connection: FBSP Position: center, vertical

F2 Connection: Flanges Position: center, horizontal

SUCTION MANIFOLD (POS. 12)	N2		B2		F2		T2	
	Part-No.	Qty.	Part-No.	Qty.	Part-No.	Qty.	Part-No.	Qty.
AP20 Aluminium	109278	1	109278-1	1	N/A	–	N/A	–
AP20 Stainless Steel	109279	1	109279-1	1	109279	1	109279-10	1
Pos.42 (not shown)	N/A	–	N/A	–	109564-1	2	–	–

DISCHARGE MANIFOLD (POS. 39)	N2		B2		F2		T2	
	Part-No.	Qty.	Part-No.	Qty.	Part-No.	Qty.	Part-No.	Qty.
AP20 Aluminium	109282	1	109282-1	1	N/A	–	N/A	–
AP20 Stainless Steel	109283	1	109283-1	1	109283	1	109283-10	1
Pos.42 (not shown)	N/A	–	N/A	–	109564-1	2	–	–

Maximum Torque Settings AP20 (metal design)

Asterisk (*) from the exploded view diagram indicates fasteners to be torqued. Stainless Steel to Stainless Steel fasteners should be lubricated to prevent galling. A Plus sign (+) on the above torque values indicates a lubricated fastener.

Aluminium	
Pos.	**Torque**
1	8,5 Nm (75 in-lbs) +
7	8 Nm (72 in-lbs)
11	38 Nm (336 in-lbs) +
16	38 Nm (336 in-lbs) +
17	38 Nm (336 in-lbs) +
19	91 Nm (800 in-lbs) +
24	20 Nm (180 in-lbs)

Stainless Steel	
Pos.	**Torque**
1	10 Nm (90 in-lbs)
7	8 Nm (72 in-lbs)
11	46 Nm (408 in-lbs)
16	46 Nm (408 in-lbs)
17	46 Nm (408 in-lbs)
19	91 Nm (800 in-lbs) +
24	20 Nm (180 in-lbs)

CLEARENCE CERTIFICATE

NOTE

Inspection / repair of machines and machine parts is only carried out after the clearance certificate was filled in correctly and completely by authorized and qualified personnel.

NOTE

Acceptance will be refused if parts are returned to the manufacturer without a proper clearance certificate.

All industrial companies are obligated by the legal provisions for occupational health, e.g. the workplaces ordinances, the Ordinance on Hazardous Substances, the regulations for prevention of accidents and the environmental protection regulations such as the Waste Management Act and the German Household Water Act to protect their employees or man and the environment from detrimental effects when handling hazardous substances.

Should special safety precautions be necessary despite careful draining and cleaning of the product the necessary information are to be provided.

Machines which are operated with radioactive media shall only be inspected and/or repaired in the safety area of the owner by a **sera** specialized fitter.

The clearance certificate is part of the inspection-/repair order.
sera reserves the right to refuse acceptance of the order for other reasons.

DOWNLOAD
Clearance certificate

Or directly scan
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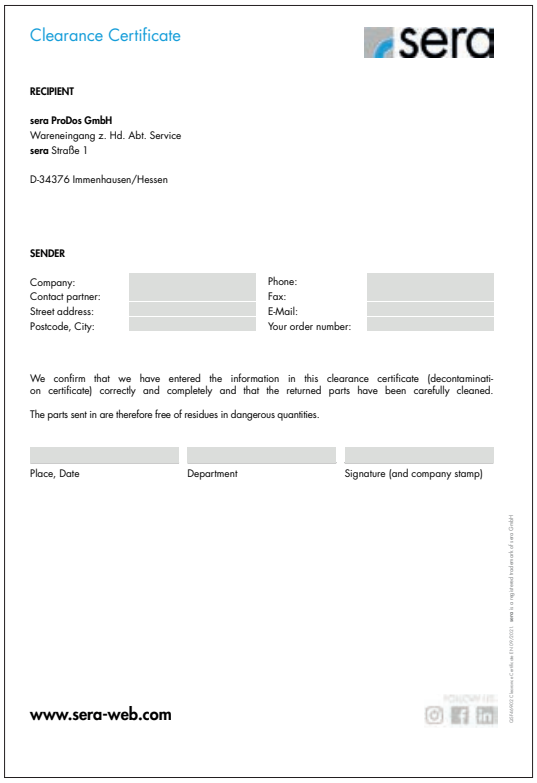

Clearance Certificate

sera

RECIPIENT

sera ProDos GmbH
Wareneingang z. Hd. Abt. Service
sera Straße 1

D-34376 Immenhausen/Hessen

SENDER

Company:		Phone:	
Contact partner:		Fax:	
Street address:		E-Mail:	
Postcode, City:		Your order number:	

We confirm that we have entered the information in this clearance certificate (decontamination certificate) correctly and completely and that the returned parts have been carefully cleaned.

The parts sent in are therefore free of residues in dangerous quantities.

Place, Date	Department	Signature (and company stamp)

www.sera-web.com

EC DECLARATION OF CONFORMITY
OF THE MACHINERY

Original

Business name and full address of the manufacturer:

sera GmbH, sera-Straße 1, D - 34376 Immenhausen

Name and address of the person authorised to compile the technical file:

Sabine Morell, sera-Straße 1, D – 34376 Immenhausen

Description and identification of the machinery:

Air-operated diaphragm pump for dosing fluids for industrial applications.

airPUMP ½“ AP05 Al Santo	airPUMP ½“ AP05 AL PTFE
airPUMP ½“ AP05 316SS Santo	airPUMP ½“ AP05 316SS PTFE
airPUMP 1“ AP10 Al Santo	airPUMP 1“ AP10 AL PTFE
airPUMP 1“ AP10 316SS Santo	airPUMP 1“ AP10 316SS PTFE
airPUMP 1½“ AP15 Al Santo	airPUMP 1½“ AP15 AL PTFE
airPUMP 1½“ AP15 SS Santo	airPUMP 1½“ AP15 SS PTFE
airPUMP 2“ AP20 Al Santo	airPUMP 2“ AP20 Al PTFE
airPUMP 2“ AP20 316SS Santo	airPUMP 2“ AP20 PTFE
airPUMP 3“ AP30 Al Santo	airPUMP 3“ AP30 Al PTFE
airPUMP 3“ AP30 316SS	airPUMP 3“ 316SS PTFE

The machinery fulfils all the relevant provisions of this Directive:

2006/42/EC Machinery

Where appropriate, harmonised standards used:

EN ISO 12100:2010

Place and date of the declaration: Immenhausen, 23.06.2021

Identity and signature of the person empowered to draw up the declaration on behalf of the manufacturer or his authorised representative:

sera GmbH
34376 Immenhausen
i.A.

S. Morell
Quality Management

NOTES

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EXCELLENCE IN FLUID TECHNOLOGY

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TM14-AP20-M-01 EN 01/2022.