



A COMPLETE RANGE OF AIR DIAPHRAGM PUMPS

CONGRATULATIONS ON PURCHASING YOUR NEW TABLA PUMP!

IMPORTANT: Please read all the installation and safety information carefully before you start your new pump.

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THE TABLA PUMP DESIGNATION SYSTEM

X / XX / XXXX / XX / XX / XXX / X / X

1 2 3 4 5 6 7 8 9 10 11 12

1	AIR DISTRIBUTION SYSTEM	2	LIQUID PORT SIZE	3	WETTED PARTS	7, 8	DIAPHRAGMS & VALVE BALLS	9	VALVE SEATS	11	CONNECTIONS
D	Dura valve	15	15mm / 1/2"	A	Aluminium	BN	Buna - N / Nitrile	A	Aluminium	N	NPT
L	Legacy valve	25	25mm / 1"	S	Stainless Steel	ND	Nordel / EPDM	P	Polypropylene	B	BSP
		40	40mm / 1 1/2"	P	Polypropylene	NE	Neoprene	S	Stainless Steel	12	BOLTED (OR CLAMPED)
		50	50mm / 2"	K	Kynar® / PVDF	PU	Polyurethane	K	Kynar® / PVDF	B	Bolted
		80	80mm / 3"	4	AIR CHAMBERS	SN	Santoprene™ (balls only)	C	Cast Iron	C	Clamped
				A	Aluminium	TF	PTFE (with NEO back-up)	BN	Buna - N / Nitrile		
				P	Polypropylene (carbon-filled)	VT	Viton/ FKM	NE	Neoprene		
				5	CENTER BLOCK			ND	Nordel / EPDM		
				A	Aluminium			VT	Viton		
				P	Polypropylene (carbon-filled)			SP	Santoprene		
				6	AIR VALVE			10	O-RING		
				A	Aluminium			BN	Buna - N / Nitrile		
								NE	Neoprene		
								ND	Nordel / EPDM		
								VT	Viton		
								TF	Teflon		

D / 40 / SAPP / SN / TF / STF / N / B

1 2 3 4 5 6 7 8 9 10 11 12

1	AIR DISTRIBUTION SYSTEM	2	LIQUID PORT SIZE	3	WETTED PARTS	7, 8	DIAPHRAGMS, VALVE BALLS	9	VALVE SEATS	11	CONNECTIONS
D	Dura valve	40	40mm / 1 1/2"	S	Stainless Steel	SN	Santoprene™ (balls only)	S	Stainless Steel	N	NPT
				4	AIR CHAMBERS			10	O-RING	12	BOLTED (OR CLAMPED)
				A	Aluminium			TF	Teflon	B	Bolted
				5	CENTER BLOCK						
				P	Polypropylene (carbon-filled)						
				6	AIR VALVE						
				P	Polypropylene						

WHY SELECT AIR OPERATED DOUBLE DIAPHRAGM PUMPS

WHY SELECT AIR OPERATED DOUBLE DIAPHRAGM PUMPS

TABLA pumps are self-priming, can handle viscous and abrasive products and can run dry without damage. TABLA pumps do not employ costly motors, variable speed drives, by-pass plumbing or mechanical seals.

Please see the matrix below for a comparison of the TABLA air operated Diaphragm pumps versus Rotary and Centrifugal pumps:

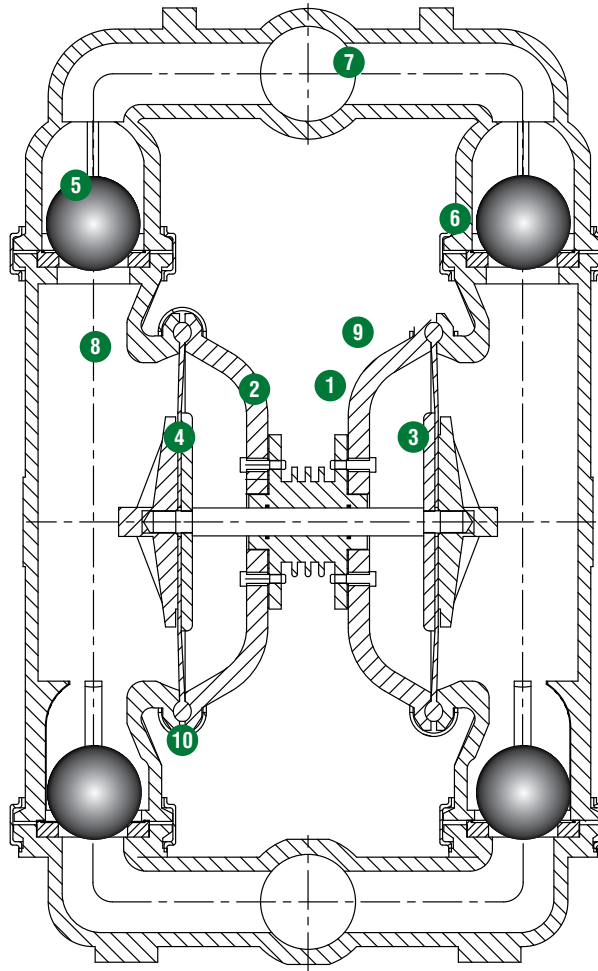
	SOLIDS PASSAGE	SHEAR SENSITIVITY	ABRASIVES HANDLING	SOLVENT HANDLING	DRY PRIMING	VISCOUS FLUIDS HANDLING	MAINTANANCE COSTS
TABLA Diaphragm Pumps	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★
Vane Pumps	★	★	★	★★★★	★★★	★★	★★
Internal Gear Pumps	★	★	★★★	★★★	★★	★★★★	★
External Gear Pumps	★	★	★	★★★	★★	★★★★	★
Lobe Pumps	★★★★	★★	★★★	★★	★★	★★★★	★
Centrifugal Pumps	★	★	★★★	★★★	★★	★	★★★
Progressive Cavity Pumps	★	★★	★★★★	★★★	★★★★	★★★★	★
Piston/Plunger Pumps	★★	★	★★★	★★	★★★★	★★★★	★

★★★★ - Excellent, ★★★ - Good,★★ - Average, ★ - Poor

1. No electrical motor - non sparking.
2. No mechanical seals or gland packing.
3. The pumps can run dry indefinitely without damage.
4. Safe for use in hazardous/explosive environments.
5. Variable flow - simply regulate the inlet air supply to adjust the pump flow from zero to max.
6. If discharge is clogged/closed pump stops immediately; no power consumed, no wear. Flow starts automatically by opening discharge
7. Self-priming from a dry start up to 6 meters without a foot valve.
8. Pressure up to 100 PSI (7 bar).
9. Operates submerged or with flooded suction.
10. No close fitting, sliding or rotating parts so can handle a wide range of fluids with high solid content.
11. Gentle non-shearing action.
12. Quick assembly and disassembly with split clamp bands.
13. Pumps are light weight and portable.

THE TABLA PUMP AIR OPERATED DIAPHRAGM PUMP

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1. Air Chamber

The air chamber is the chamber that houses the air which powers the diaphragms.

2. Air Distribution System

The air distribution system is the heart of the pump. The air distribution system is the mechanism that shifts the pump in order to create suction and discharge strokes.

3. Lock Nut (Outer Diaphragm Piston)

The outer diaphragm pistons provide a means to connect the diaphragms to the reciprocating common shaft and to seal the liquid side from the air side of the diaphragm.

4. Holding plate (Inner Diaphragm Piston)

The inner piston is located on the air side of the pump and does not come into contact with the process fluid.

5. Check Valve Ball

TABLA air-operated pumps use suction and discharge check valves to produce directional flow of process fluid in the liquid chamber. The check valve balls seal and release on the check valve seats allowing for discharge and suction of process fluid to occur.

6. Check Valve Seat

The removable seats provide the ball valves a site to check.

7. Discharge Manifold

Process fluid exits the pump from the discharge port located on the discharge manifold at the top of the pump.

8. Liquid Chamber

The liquid chamber is filled with the process fluid during the suction stroke and is emptied during

the discharge stroke. It is separated from the compressed air by the diaphragms.

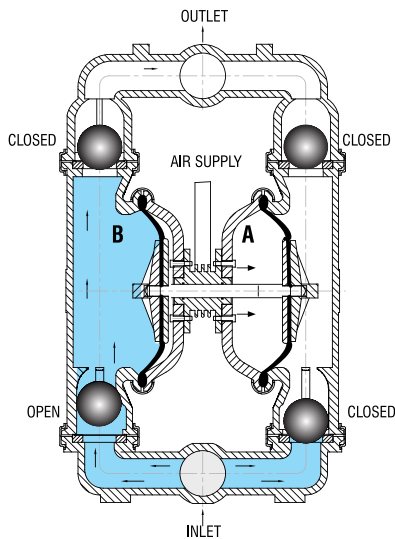
9. Diaphragm

The diaphragm membrane provides for separation of the process fluid and the compressed air power source. To perform adequately, diaphragms should be of sufficient thickness and of appropriate material to prevent degradation or permeation in specific process fluid applications. TABLA offers a variety of diaphragm materials for your specific application requirements.

10. Inlet Manifold

Process fluid enters the pump from the intake port located on the inlet manifold at the bottom of the pump.

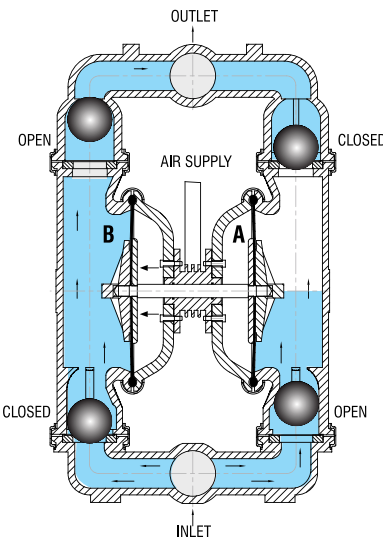
THE TABLA PUMP HOW IT WORKS



RIGHT STROKE (Fig 1)

FIGURE 1

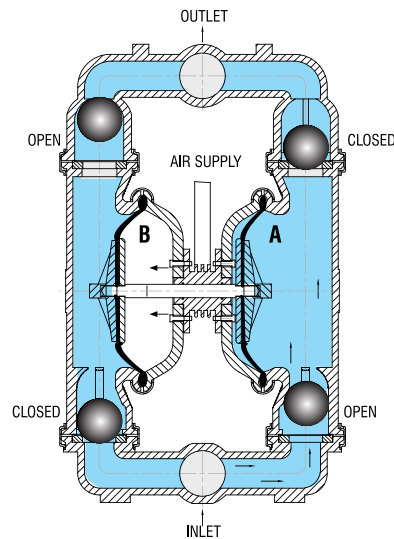
The air valve directs pressurized air to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomeric diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical stress from the diaphragm. The compressed air moves the diaphragm away from the center block of the pump. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. The movement of diaphragm B toward the center block of the pump creates a vacuum within chamber B. Atmospheric pressure forces fluid into the inlet manifold forcing the inlet valve ball off its seat. Liquid is free to move past the inlet valve ball and fill the liquid chamber (see shaded area).



MID STROKE (Fig 2)

FIGURE 2

When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now on its discharge stroke. Diaphragm B forces the inlet valve ball onto its seat due to the hydraulic forces developed in the liquid chamber and manifold of the pump. These same hydraulic forces lift the discharge valve ball off its seat, while the opposite discharge valve ball is forced onto its seat, forcing fluid to flow through the pump discharge. The movement of diaphragm A toward the center block of the pump creates a vacuum within liquid chamber A. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet valve ball is forced off its seat allowing the fluid being pumped to fill the liquid chamber.



LEFT STROKE (Fig 3)

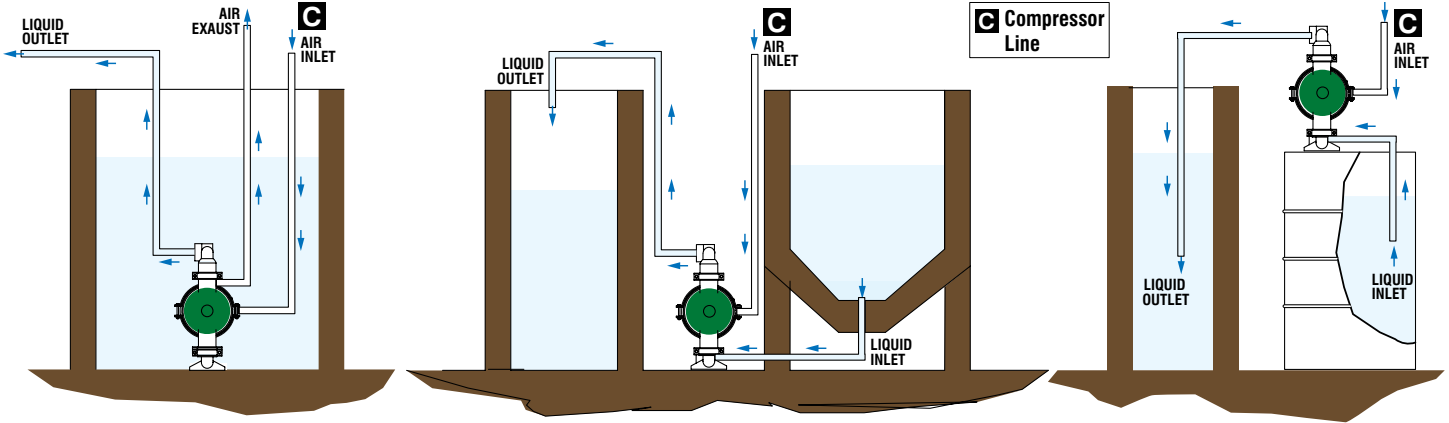
FIGURE 3

At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete pumping cycle. The pump may take several cycles to completely prime depending on the conditions of the application.

The TABLA diaphragm pump is an air-operated, positive displacement, self-priming pump. These drawings show the flow pattern through the pump upon its initial stroke. It is assumed the pump has no fluid in it prior to its initial stroke.

THE TABLA PUMP INSTALLATION VERSATILITY

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SUBMERGED

TABLA Pumps are totally submersible. It is important that the air exhaust be ported above the level of the fluid, and that the MOC also be compatible.

POSITIVE SUCTION

Pump can draw from the bottom of the vessel. Preferred installation for viscous fluids.

SELF PRIMING / DRUM TRANSFER

The suction capabilities of each pump may vary due to system design, product being pumped, and pump materials of construction.

APPLICATION VERSATILITY

Automotive Industry

Aviation

Food and Beverage

Ceramics

Chemical Industry

Latex

Mining

Construction Industry

Electronics Industry

Plating & Finishing

Pulp Paper Packaging

Refineries

Road Tanker Trucks

Shipbuilding

Smelters, Foundries & Dye Casting

Textile & Carpet

Water and Sewage Treatment

Utility

Paints, Inks & Coatings

Pharmaceutical Industry

THE TABLA PUMP SAFETY SUPPLEMENT

Supplement to Engineering, Operation and Maintenance Manual

ALWAYS FIRST READ THIS MANUAL BEFORE INSTALLATION, START-UP OR MAINTENANCE.

This safety manual applies to all TABLA pumps and comprises instructions for safe installation, use and maintenance of your pump.

In this manual you may be warned for remaining hazards. This kind of information is preceded by the following label.

CAUTION:

Hazards or unsafe practices which could result in severe personal injury, death or in substantial product or property damage.

CAUTION:

- Verify pump model received against purchase order or spec sheet.
- Retorque all bolts to specifications on torque table. Remove shipping plugs.
- Pumps that need to be submersed must have both wetted and non-wetted parts compatible with material being pumped.
- Submersed pumps must have a hose attached to pump's air exhaust and the exhaust air piped above liquid level. Pumps should be thoroughly flushed with water before installation.

CAUTION:

- Blow out air line for 10 to 20 seconds before attaching to pump to make sure all pipe line debris is clear.
- Always wear safety glasses when operating pump. If diaphragm rupture occurs, material being pumped may be forced out air exhaust.

CAUTION:

All suction and discharge piping/hoses should be designed to withstand the pressure and temperature of the specific application.

CAUTION:

Do not exceed 0.7 bar (10 psig) liquid inlet pressure to pump port; this creates potential for premature wear and parts failure.

CAUTION:

- Do not exceed 8.5 bar (125 psig) air supply pressure.
- Due to the reciprocating action of the pump, lateral instabilities can occur during normal operation, thus footed pumps should be bolted to

structural steelwork/concrete. Ensure the operating surface is level and flat.

- Most TABLA pumps can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.
- Each TABLA pump has a particular maximum solids capability. Whenever the possibility exists that larger solid objects may be sucked into the pump, a strainer should be used on the suction line to prevent damage to the pump and subsequent risk to the operator.

CAUTION: VENTILATION

Ensure proper ventilation of tanks/vessels that house liquid supply. Due to a pump's high vacuum ability, improper ventilation of these supply tanks can lead to implosion of tanks when fluid is completely evacuated.

CAUTION: ELECTRICAL HAZARDS

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.

CAUTION: TEMPERATURE HAZARDS

Material being pumped should be compatible with pump's materials of construction and stated temperature limits as stated in TABLA Chemical Resistance Guide.

CAUTION: HAZARDS GENERATED BY NOISE

Pump noise can exceed 75 dba under certain operating conditions, e.g. high air pressure supply and little or no discharge head. Extended periods of operation under such conditions can create a hazard to operators working in proximity of the pumps. Use proper hearing protection devices.

CAUTION: HAZARDOUS MATERIALS

- a. Maintenance instructions in section eight of your pump's Engineering, Operation and Maintenance Manual must be followed to avoid diaphragm failure.
- b. NOTICE: All fasteners should be checked to match the pump's given torque specifications.

- c. Handler should obtain Material Safety Data Sheet from the supplier for all materials being pumped for appropriate handling instructions.

CAUTION: CHEMICAL COMPATIBILITY

- a. When specifying a pump for a particular application, pump wetted materials of construction and elastomer materials must be compatible with the process fluid. Please consult TABLA Chemical Resistance Guide or your local authorized TABLA distributor for more information.
- b. Explosive reaction: Some materials such as halogenated hydrocarbon solvents should not be pumped with an aluminum construction pump due to a possible explosive reaction.
- c. Certain materials' chemical compatibility with a particular pump construction, in particular plastic wetted parts, can change as material concentration and temperature vary. Please consult your local authorized TABLA distributor for more information.

CAUTION: OPERATION

Ensure all operators are properly trained and employ safe operating and maintenance practices as outlined in this Safety Manual, the Pump User's Guide and Manual. In addition, all proper safety eye-wear and ear protection should be used when necessary.

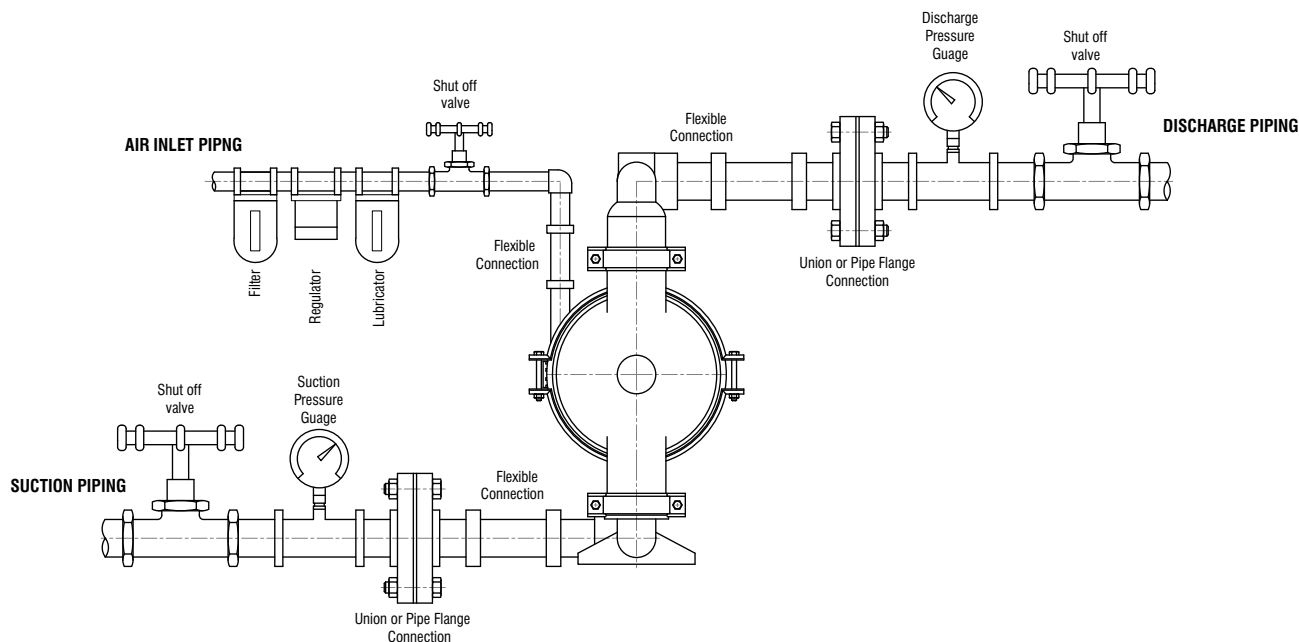
CAUTION: THERMAL EXPANSION

Some liquids present in piping may expand at elevated temperatures, resulting in pipe and/or pump damage and subsequent risk to operator.

TEMPERATURE LIMITS		
Polypropylene	0°	to 79°C (32° to 175°F)
PVDF	-12°	to 107°C (10° to 225°F)
Carbon-Filled Acetal	-28.9°	to 65.6°C (-20° to 150°F)
Neoprene	17.8°	to 93.3°C (0° to 200°F)
Buna-N	-12.2°	to 82.2°C (10° to 180°F)
Nordel®	-51.1°	to 137.8°C (-60° to 280°F)
Viton®	-40°	to 176.7°C (-40° to 350°F)
Teflon® PTFE	4.4°	to 104.4°C (40° to 220°F)

THE TABLA PUMP SUGGESTED INSTALLATION & MAINTENANCE

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PRE-INSTALLATION CHECKLIST:

Cautions

- Verify pump model received against purchase order or spec sheet.
- Re-torque all bolts to specifications on torque table.
- Remove shipping plugs.
- Pumps that need to be submersed must have both wetted and non-wetted parts compatible with material being pumped.
- Submersed pumps must have a hose attached to pump's air exhaust and the exhaust air piped above liquid level.
- Pumps should be thoroughly flushed with water before installation.
- Do not exceed 7 bar (105 psi) air supply pressure.
- Blow out air line for 10 to 20 seconds before attaching to pump to make sure all pipe line debris is clear.

SUGGESTED INSTALLATION:

The suction pipe should be at least the diameter of the pump's inlet manifold connection or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as TABLA pumps are capable of pulling a high vacuum. Discharge piping should be at least the diameter of the pump's discharge manifold connection; larger piping can be used to reduce friction losses. It is critical that all fittings and

connections are airtight or a reduction or loss of pump suction capability will result. The pump should not be used as a support mechanism for the piping system. TABLA suggests the use of flexible connections for inlet/outlet ports and air line (see diagrams). Due to the reciprocating action of the pump, lateral instabilities can occur during normal operation, thus footed pumps should be bolted to the ground and pads should be used. Ensure the operating surface is level and flat. Most TABLA pumps can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.

OPERATION:

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump (preferred method). An air regulator is used to regulate air pressure. A needle valve is used to regulate volume. Pump discharge rate can also be controlled by throttling the pump discharge by partially closing a valve in the discharge line of the pump. This action increases friction loss which reduces flow rate. This is useful when the need exists to control the pump from a remote location. When the pump discharge pressure equals or exceeds the air supply pressure, the pump will stop; no bypass or pressure relief valve is needed, and pump damage will not occur. The

pump has reached a "deadhead" situation and can be restarted by reducing the fluid discharge pressure or increasing the air inlet pressure. The TABLA pump runs solely on compressed air and does not generate heat, therefore your process fluid temperature will not be affected.

RECORDS:

When service is required, a record should be made of all necessary repairs and replacements. Over a period of time, such records can become a valuable tool for predicting and preventing future maintenance problems and unscheduled downtime. In addition, accurate records make it possible to identify pumps that are poorly suited to their applications.

MAINTENANCE AND INSPECTIONS:

Since each application is unique, maintenance schedules may be different for every pump. Frequency of use, line pressure, viscosity and abrasiveness of process fluid all affect the parts life of a TABLA pump. Periodic inspections have been found to offer the best means for preventing unscheduled pump downtime. Personnel familiar with the pump's construction and service should be informed of any abnormalities that are detected during operation. If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the pump's ability. Note: Materials of construction and elastomer

material have an effect on suction lift parameters. Refer to Section 6 of your EOM for your pump's specific suction lift capability.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 0.5–0.7 bar (7–10psig). Premature diaphragm failure may occur if positive suction head is 0.8 bar (11 psig) and higher, particularly when using Teflon® and Thermoplastic diaphragms. All positive suction head applications should include a “check valve” at the pump liquid inlet to allow for the pump to be disconnected. Each TABLA pump has a specific maximum solids capability.

Whenever the possibility exists that larger solid objects may be sucked into the pump, a strainer should be used on the suction line.

CAUTION:

Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from the pump.

Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container. Wear safety glasses. When diaphragm failure occurs, material being pumped may be forced out the air exhaust.

NOTE:

Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.

BEFORE YOU DISASSEMBLE THE PUMP:

- Wear safety glasses
- Shut off main air supply
- Disconnect air hose from air valve to drain air pressure in hose
- Isolate pump using isolation valves to avoid product spillage from pipe
- Turn pump upside down to drain all liquid trapped by valve balls
- Mark a line from each liquid chamber to its corresponding air chamber to assist in proper alignment during reassembly

INSPECTION

Air Valve Piston/Spool and Casing

- Ensure piston/spool can move freely
- Clean out debris

Diaphragms

- Make sure no swelling, cracking, or other damage is apparent

Balls/Seats/O-rings

- Make sure no swelling, cracking, or other damage is apparent
- Lubricate shaft if needed

MEAN TIME TO FAILURE

A Preventative Maintenance Schedule (PMS) should be set up for the following parts to ensure pump is serviced prior to part wear

- Diaphragms
- Valve Seats
- Valve Balls
- O-rings

SEAL REPLACEMENT

Proper seal installation is critical to pump performance when employing AODDPs in your application. Great care must be taken to ensure that seals are placed in the proper grooves and not damaged during installation. Incorrect seal location will render the pump inoperable. Damaged seals may cause decreased performance and shorter seal life

TEMPERATURE LIMITS FOR ELASTOMERS

Santoprene	–40° to 107.2°C (–40° to 225°F)
Neoprene	–18° to 93.3°C (–0° to 200°F)
Buna-N	–12° to 82.2°C (+10° to 180°F)
EPDM	–51° to 137.8°C (–60° to 280°F)
Viton®	–40° to 176.7°C (–40° to 350°F)
PTFE	4° to 104.4°C (+40° to 220°F)
Polyurethane	–12° to 65.6°C (+10° to 150°F)
Hytrel	–29° to 104.4°C (–20° to 220°F)

TEMPERATURE LIMITS FOR PLASTICS

Polypropylene	0° to 79.4°C (+32° to 175°F)
Polyethylene	0° to 70.0°C (+32° to 158°F)
PVDF	–12° to 107.2°C (+10° to 225°F)
PTFE / PFA	–29° to 107.2°C (–20° to 225°F)
Acetal	–29° to 82.2°C (–20° to 180°F)
Nylon	–18° to 93.3°C (0° to 200°F)

NOTE:

These are average temperatures. Chemicals and solvents can have an effect on temperature limits.

WETTED MATERIAL COMPATIBILITY

FLUID SOLUTIONS	NUMERIC pH LEVEL	WETTED PART MOC
Alkaline	14 13 12 11	Stainless Steel
Caustic	10 9	Cast Iron
Neutral	8 7 6	Aluminium
	5 4	Stainless Steel
	3 2 1 0	PP / PVDF

THE TABLA PUMP TROUBLESHOOTING GUIDE

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SYMPTOMS	POTENTIAL CAUSES
PUMP CYCLES ONCE AND STOPS	<ol style="list-style-type: none"> 1. Incorrect o-ring placement 2. Inner diaphragm plate installed backwards 3. Deadhead (system pressure meets or exceeds air supply pressure) 4. Air valve or center block gaskets installed incorrectly
PUMP WILL NOT OPERATE (STALL OR DEADHEAD)	<ol style="list-style-type: none"> 1. Over lubrication 2. lack of air (line size, PSI, CFM) 3. Centering of spool 4. Worn o-ring 5. Air porting in center block is plugged 6. Wrong type of lubrication (attack on –rings) – see Operating Manual 7. Debris in air valve 8. Clogged manifolds 9. Incorrect o-ring placement 10. Deadhead (system pressure meets or exceeds air supply pressure) 11. Closed discharge valve
PUMP CYCLES AND WILL NOT PRIME OR LOW FLOW	<ol style="list-style-type: none"> 1. Cavitation on suction side 2. Valve balls) not seating properly or sticking 3. Valve ball(s) missing (pushed into pump/thermal expansion or missing) 4. Valve ball (s) /seat(s) damaged or attacked by product (swelling, shrinking, etc) 5. Vapor pressure 6. Clogged suction line
PUMP RUNNING SLUGGISH/STALLING	<ol style="list-style-type: none"> 1. Over lubrication/under lubrication 2. Wrong type of lubrication 3. Icing 4. Clogged manifolds 5. Deadhead (system pressure meets or exceeds air supply pressure) 6. Cavitation on suction side 7. Lack of air (line size, PSI, CFM) 8. Worn o-rings 9. Vapor pressure 10. Incorrect pump size
PRODUCT LEAKING THROUGH EXHAUST OR AROUND CLAMP BANDS	<ol style="list-style-type: none"> 1. Diaphragm failure-product leaking out exhaust 2. Diaphragm plate loose - product leaking out exhaust 3. Clamp bands loose-product leaking out clamp bands 4. Clamp bands stretched - product leaking out clamp bands 5. Teflon gasket tape ruined 6. Excessive positive suction pressure – product leaking around many or all clamp bands 7. Diaphragms stretched around center hole or bolt holes 8. Clamp bands not seated properly 9. Excessive air supply pressure
PREMATURE DIAPHRAGM FAILURE	<ol style="list-style-type: none"> 1. Cavitation 2. Excessive flooded suction pressure 3. Misapplication (Chemical /Physical incompatibility) 4. Wrong type of lubrication (attack on air side) 5. Incorrect diaphragm plates 6. Diaphragm plates on backwards 7. Incorrect shaft with corresponding elastomer 8. Start up at full air pressure 9. Excessive dry running at high air pressure
BREAKING AND BENDING SHAFTS	<ol style="list-style-type: none"> 1. Build up of solids in water chamber 2. Loose diaphragm plates

RECOMMENDATIONS

1. Reinstall o-rings in correct position
2. Reinstall inner diaphragm plate correctly
3. Check system for pressure ratio to pump
4. Install gaskets with holes properly aligned with parts or valve and center block

1. Check suction condition (move pump closer to product)
2. Clean out around valve ball cage and valve seat area
 - Replace valve ball and valve seat if worn or damaged
 - Check Chemical Resistance Chart for compatibility and proper elastomer match
 - Use heavier valve ball material
3. Worn valve ball or valve seat (replace)
 - Thermal expansion in discharge pipe (add one way valve into piping)
 - Worn fingers in valve ball cage (replace part)
4. Check Chemical Resistance Chart for compatibility and proper elastomer match
5. Consult factory for evaluation and recommendation.
6. Clean suction manifold or piping
 - Install screen or bag filter

1. Replace diaphragms (and back up diaphragm when using Teflon)
- 1,2. Clean out entire center section of pump
2. Check diaphragms for damage and retighten diaphragm plates
3. Tighten clamp bands (check for stretching)
4. Replace clamp bands
(apply grease to inside of clamp band to assist complete compression)
5. Replace Teflon gasket tape with Teflon diaphragms
6. Check excessive positive suction pressure
 - Move pump closer to product
 - Add accumulation tank or pulsation dampener as close to the pump as possible on suction side of pump
 - Raise pump/place pump on top of tank to reduce inlet pressure
 - Install flex hose on inlet and discharge as recommended installation
7. Check for excessive inlet pressure or air pressure
 - Tighten bolts to recommended torque
(See assembly/ disassembly instructions page)
8. Seat clamp bands with mallet
9. Check operating manual for recommendations

1. Flush pump
 - Start pump slow
3. Double check tightness of diaphragm plates when installing replacement diaphragms

1. Set lubricator on lowest possible setting.
 - Clean out center section
2. Check:
 - Air line size and length
 - Compressor capacity (HP vs. cfm required)
 - Other usage of air in plant
 - Air requirement by pump
(pump capacity, product viscosity and specific gravity)
3. Disconnect and reconnect air
4. Replace o-rings
5. Clean porting in center block to allow proper air flow
6. Check compatibility of O-rings with lubrication
(see operating manual)
7. Clean air valve/filter
 - Check for scoring on spool and sleeve
8. Clean suction or discharge manifolds/piping
 - Clean filter bags or screens
9. Reinstall o-rings in correct position
(see operating manual for assistance)
10. Increase air supply pressure
11. Open discharge valve

1. Set lubricator on lowest possible setting
- 1,2. Clean out entire center section of pump
lubrication recommended
2. lubrication recommended
4. Clean manifolds to allow proper air flow
5. Check system to locate deadhead (equilibrium)
 - Increase air supply pressure
6. Check suction condition (move pump closer to product)
7. Check:
 - Air line size length
 - Compressor capacity (HP vs cfm required)
 - Other usage of air in plants
 - Air requirement by pump
(pump capacity, product viscosity and specific gravity)
8. Replace o-rings
- 9,10. Consult factory for evaluation and recommendation

1. Enlarge pipe diameter on suction side of pump
- 1,2. Move pump closer to product
 - Raise pump/place pump on top of tank to reduce inlet pressure
3. Add accumulation tank or pulsation dampener as close to the pump as possible
 - Start pump slowly (add smart start)
- 3, 4. Consult Chemical Resistance Chart for compatibility with products, cleaners, temperature limitations and lubrication
5. Check for correct part
6. Check for correct installation
8. Start up pump slowly
9. Install control or automatic shutoff

CELEBRATING

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