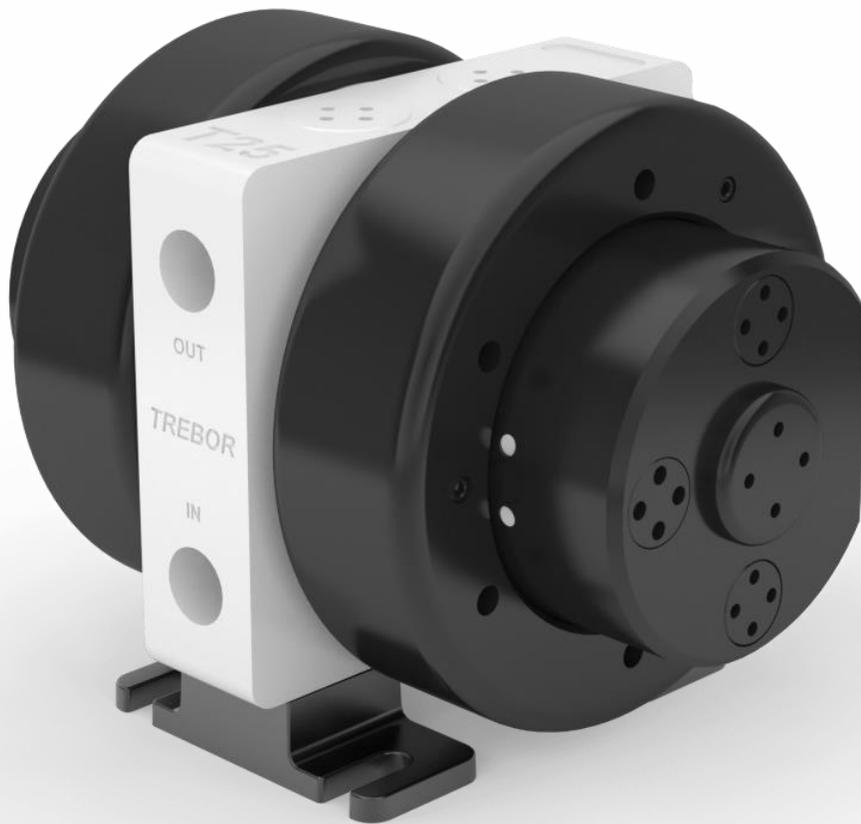


Technology Series 25X PUMP

Operation / Maintenance Manual



CONTENTS

CONTENTS	2
1 UNPACKING	3
1.1 CONTENTS	3
2 OPTIONS	4
2.1 FLUID PORT CONNECTION OPTIONS.....	4
2.2 OPTIONAL LEAK SENSING	5
2.2.a Probe Installation.....	5
2.2.b Sensor Signal Specifications.....	5
2.3 OPTIONAL END-OF-STROKE PROBE	6
2.3.a Probe Installation.....	6
3 INSTALLATION	7
3.1 UTILITIES.....	7
3.2 INSTALL AND START UP.....	7
3.3 CONTROLLER	7
4 PERFORMANCE	8
4.1 PUMP FLOW.....	8
4.2 PUMP PRESSURE.....	9
5 MAINTENANCE	11
5.1 PREVENTIVE MAINTENANCE SCHEDULE	11
5.2 PUMP REBUILD SERVICE	11
6 PC15 (OPTIONAL) INSTALLATION	12
6.1 PC15 OVERVIEW	12
6.2 PC15 INSTALLATION	12
6.3 PC15 UTILITIES / HOOK-UP	13
6.4 PC15 CONTROLLER OPERATION.....	14
6.4.a Turning Pump On and Off	14
7 DISASSEMBLY/ASSEMBLY	16
7.1 PARTS ILLUSTRATION.....	16
7.2 PARTS LIST	17
7.3 CLEAN-UP.....	17
7.4 DISASSEMBLY	18
7.4.a Body Disassembly	18
7.5 ASSEMBLY	21
7.5.a Body Assembly.....	21
7.5.b Head Assembly	25
7.5.c Body-Head Assembly.....	26
7.6 RECOMMENDED SPARE PARTS AND KITS.....	27
7.7 TOOLS.....	28
8 TESTING	29
8.1 PERFORMANCE TEST	29
8.2 PUMP DRYING PROCEDURE	29
8.3 DRY SUCTION TEST.....	29
9 TROUBLESHOOTING	30
10 WARRANTY 	32
11 CONTACT INFORMATION	34
11.1 GENERAL CONTACT INFORMATION.....	34
11.2 TECHNICAL SUPPORT	34
11.3 REGIONAL REPRESENTATIVES	34
APPENDIX	35

1 UNPACKING

1.1 CONTENTS

After unpacking, the pump should be checked for any damage that may have occurred during shipment. Damage should be reported to the carrier immediately.

The following items should be included within the shipping container:

Qty	Item	Description
1	Pump	T25X Pump
1	MT25X	Operation/Maintenance Manual

NOTE: Although extensive efforts are made to deliver dry pumps to our customers, new pumps may contain residual moisture from DI water testing.

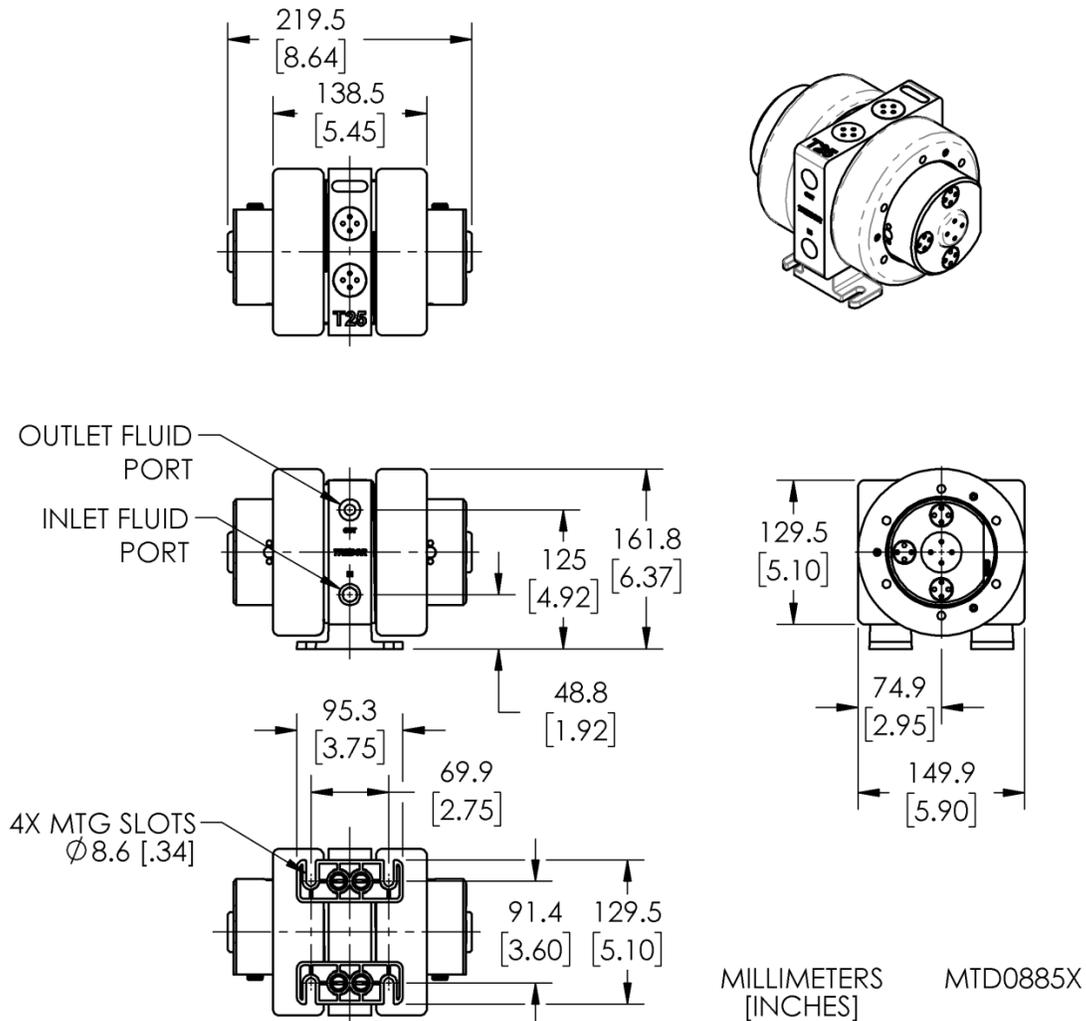


Figure 1-1: Dimensional Views

2 OPTIONS

2.1 FLUID PORT CONNECTION OPTIONS

NOTE: Use O-ring to seal stainless steel or other rigid plumbing.

Available Options

Fluid Connection Fittings:

- 1/2" PFA Pipe Stub Out (T25B08)
- 3/8" PTFE Flare Fitting (T25F06)
- 1/2" PTFE Flare Fitting (T25F08)
- 3/4" PTFE Flare Fitting (T25F12)
- 1/2" PTFE FNPT Fitting (T25P08)
- 1/2" Pillar Fitting (T25X08)

Torque fluid fittings to 27 in-lbs using dial torque wrench (T0210) and wrench offsets (T0213) or (T0214). **Do not over torque!**

PFA Pipe Stub Out

The T-25 pump can use an ultrapure PFA fluid port adapter. One end of the adapter screws into the pump port and the other end is 1/2" pipe, to which a PFA fitting can be fusion welded. Figure 2-1 shows stub-out fitting and gasket.

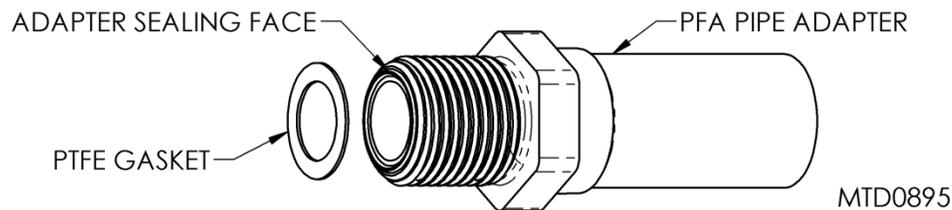


Figure 2-1: Fluid Port Pipe Stub Out

If additional pipe fitting types are needed, contact your sales associate. Custom configurations are available to adapt the T25 pump to other facility configuration.

2.2 OPTIONAL LEAK SENSING

2.2.a Probe Installation

- Remove leak port plug (TJ004) and seal (TJ005) from the head.
- Thread probe cap into port and torque to 32 in-lbs using torque wrench (T0210) and wrench offset (T0217). **Do not overtorque!**
- Connect fiber optic cable to sensor.

NOTE: Minimize bends in fiber optic cable to 2" radius minimum to help ensure optimum signal strength.) Fiber optic cable can be cut to desired length using a proper cable cutter.

2.2.b Sensor Signal Specifications

- The sensor signal is normally closed. In the event of a leak, no light signal is returned to the sensor. See fiber optic sensor installation instructions for proper connection and adjustment.

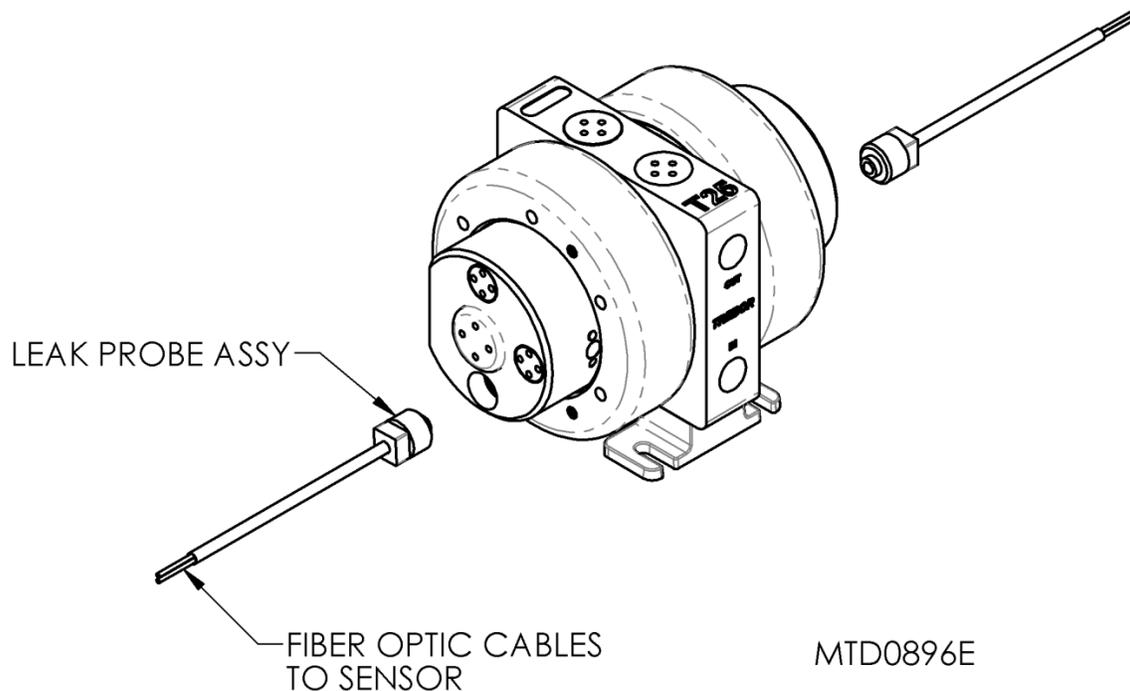


Figure 2-2: Leak Probe Assembly

2.3 OPTIONAL END-OF-STROKE PROBE

2.3.a Probe Installation

- Remove pilot cap (TJ001) and pilot cap seal (AM020).
- Place new pilot cap seal (AM020) into pilot port.
- Thread the fiber optic assembly into the pilot port and tighten to 45 in-lbs using a 3/4" fiber optic pin tool (T0149), torque wrench (T0210) and wrench offset (T0216).
- Connect fiber optic cable to sensor.

NOTE: Minimize bends in fiber optic cable to 2" radius minimum to help ensure optimum signal strength. Fiber optic cable can be cut to desired length using a proper cable cutter (98002986).

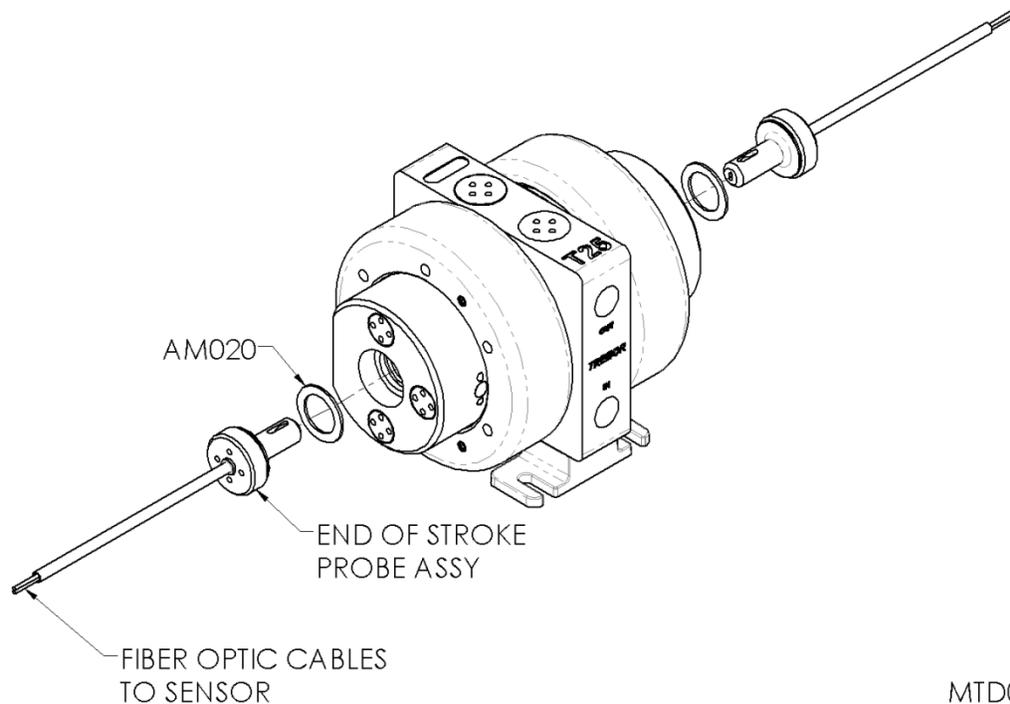


Figure 2-3: End of Stroke Probe Assembly

3 INSTALLATION

3.1 UTILITIES

It is recommended that the pump be positioned within 15° from level to maintain self-priming ability and pumping efficiency. Allow sufficient room for tubing connectors. Pump mounts on a quick-change base for easy installation. It is recommended that a filter be placed on the discharge side of the pump.

Air Inlet: 1/4" FNPT (3/8" Dia. [8mm] supply tube minimum).

Air Supply: 20-100 psig (.14 - .69 MPa) clean dry air or nitrogen (see Performance Charts, Section 4).

Fluid Ports: Inlet/Outlet adaptor fittings and Surge Suppressor require torque application during pump installation.

<p>NOTE: The pump should be operated with clean, dry air or nitrogen. Particulate, water and oils in the air supply can damage the pump.</p>

3.2 INSTALL AND START UP

- Pump air supply pressure must be regulated.
- Open the fluid suction (IN) line valve, if necessary.
- Open the fluid discharge (OUT) line valve, if necessary.
- Program external control to desired settings (must use PC15 Controller).
- Start slowly with air regulator at low (> 20 psi) pressure setting. Increase pressure to attain desired flow, up to the maximum rating
- Refer to Troubleshooting, Section □, if pump fails to start.

3.3 CONTROLLER

The T25X cross-phase pump requires the Trebor PC15CP controller.

4 PERFORMANCE

4.1 PUMP FLOW

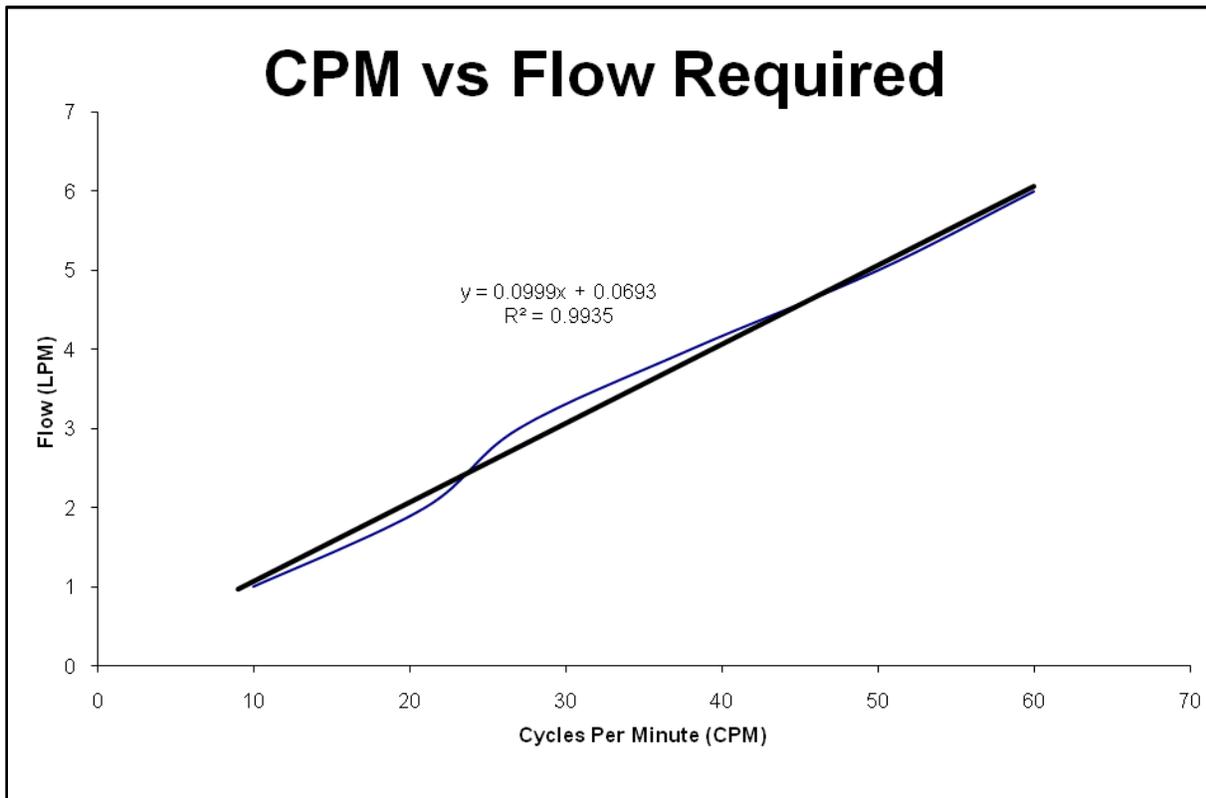


Figure 4-1: Cycle Rate to Flow Pump Performance Curve

NOTE: Test information is based on specific conditions and limited sampling. Use for general reference only.

Pumping capacity is a function of air supply pressure and volume, suction head, suction line restrictions, discharge head, discharge line restriction, and fluid specific gravity and viscosity. Specification should be used to size regulators and control valves.

Figure 4-1 shows the approximate cycle rate to achieve the flow shown. Figure 4-2 shows the discharge pressures that the given flow is achievable.

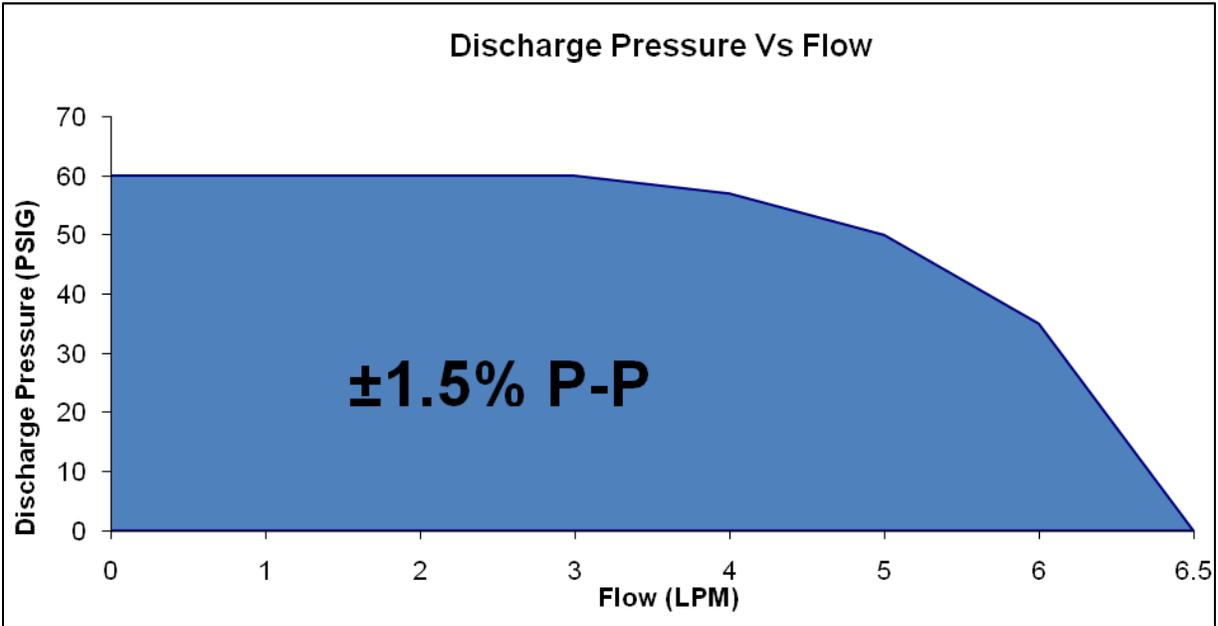


Figure 4-2: Pressure and Flow Capacity

4.2 PUMP PRESSURE

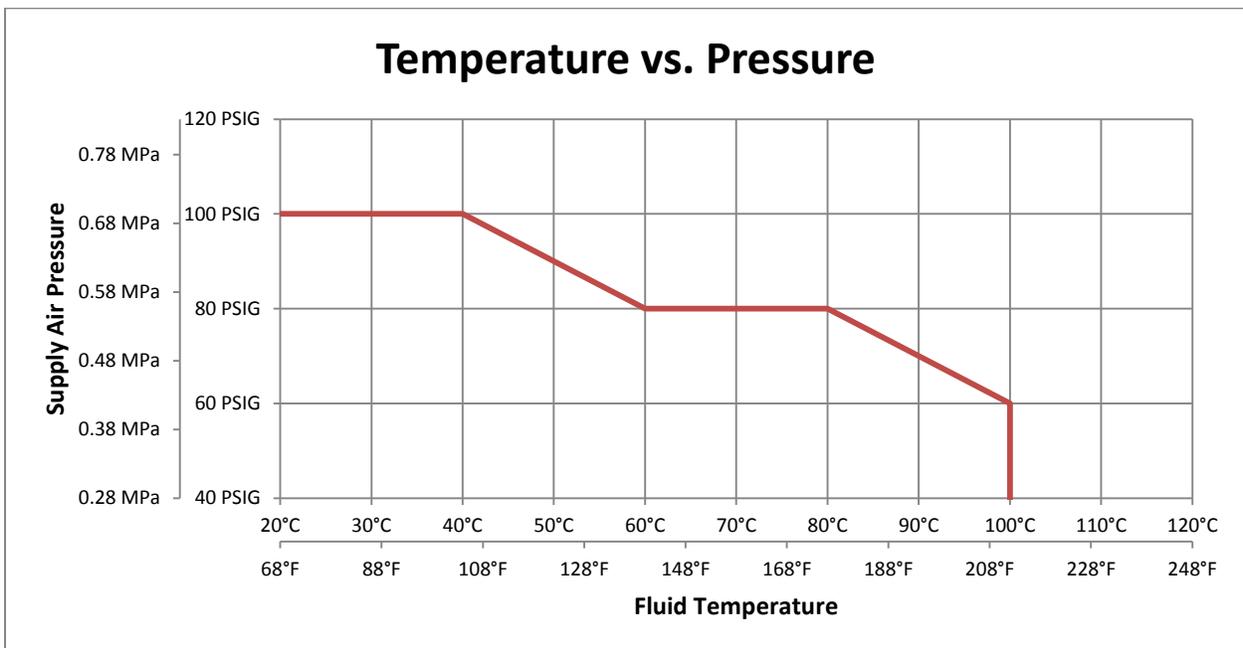


Figure 4-3: Pressure vs. Fluid Temperature Chart
Recommended Maximum Pump Operating Levels

NOTE: Test information is based on specific conditions and limited sampling.
Use for general reference only.

CAUTION: When handling potentially dangerous fluids under pressure, the pump and its fittings should be placed in an enclosure away from operators. Be sure that fittings and tubing used are capable of these operating conditions. Noise level while operating is approximately 80 dB.

5 MAINTENANCE

Trebor pump maintenance can be divided into two categories: air system maintenance and fluid system maintenance. The purpose of air system maintenance is to prevent air system failures such as stalling or erratic cycling. The purpose of fluid system maintenance is to maintain suction and lift capabilities.

5.1 PREVENTIVE MAINTENANCE SCHEDULE

The following maintenance schedule is recommended to optimize pump performance and minimize failures. Certain operating conditions and application may require more frequent maintenance intervals. In positive pressure inlet conditions where suction or lift is not required, fluid system maintenance may be extended.

Adhering to the recommended preventative maintenance schedule along with periodic inspection of the pump will ensure continued efficient operation and overall reliable pump performance. It is recommended that the Preventive Maintenance Record be copied, maintained and kept with this unit for future reference.

T25D Maintenance Schedule

	Install	30 Days	3 Months	6 Months	9 Months	12 Months	15 Months	18 Months	21 Months	24 Months
Check Balls and O-Rings										R
Diaphragms										R
Check Cap Seal										R
Suction and Discharge Check Cage										I
I=Inspect, R=Replace										

See Appendix for Maintenance Log

5.2 PUMP REBUILD SERVICE

Trebor International provides a factory rebuild service for customers using Trebor products. Trebor will rebuild any standard pump (exclusive of options). Please contact Trebor International Sales Department for current rebuild pricing. The fixed rebuild price includes a factory rebuild and parts equivalent to the standard rebuild kit. Each factory rebuild comes with a new one year warranty. Repairs requiring more extensive part replacements will be quoted prior to proceeding with the pump rebuild. If the pump has exceeded its useful life and cannot be rebuilt, the customer may elect to purchase a new Trebor pump. If the customer chooses not to rebuild or replace the pump, an evaluation fee will be required.

All returned pumps are to be shipped freight prepaid with a valid Purchase Order for the cost of rebuild service. Please contact Trebor International prior to returning your pump to obtain an RMA Number and Pump Return Data Sheet to ensure proper safety precautions.

6 PC15 (OPTIONAL) INSTALLATION

6.1 PC15 OVERVIEW

The PC15 Pump Controller is designed specifically to operate Trebor's T25X pump. Cross-phase timing results in overlapping pump strokes which produces a near pulse-less pump output. PC15 controllers can be configured depending on flow requirements (See QIG manual)

6.2 PC15 INSTALLATION

The PC15 pump controller can be installed in any orientation. Pump controller mounts using four 1/4" (6mm) bolts and should be mounted above the level of the fluid feeding the pump. Allow clearance for tubing connectors.

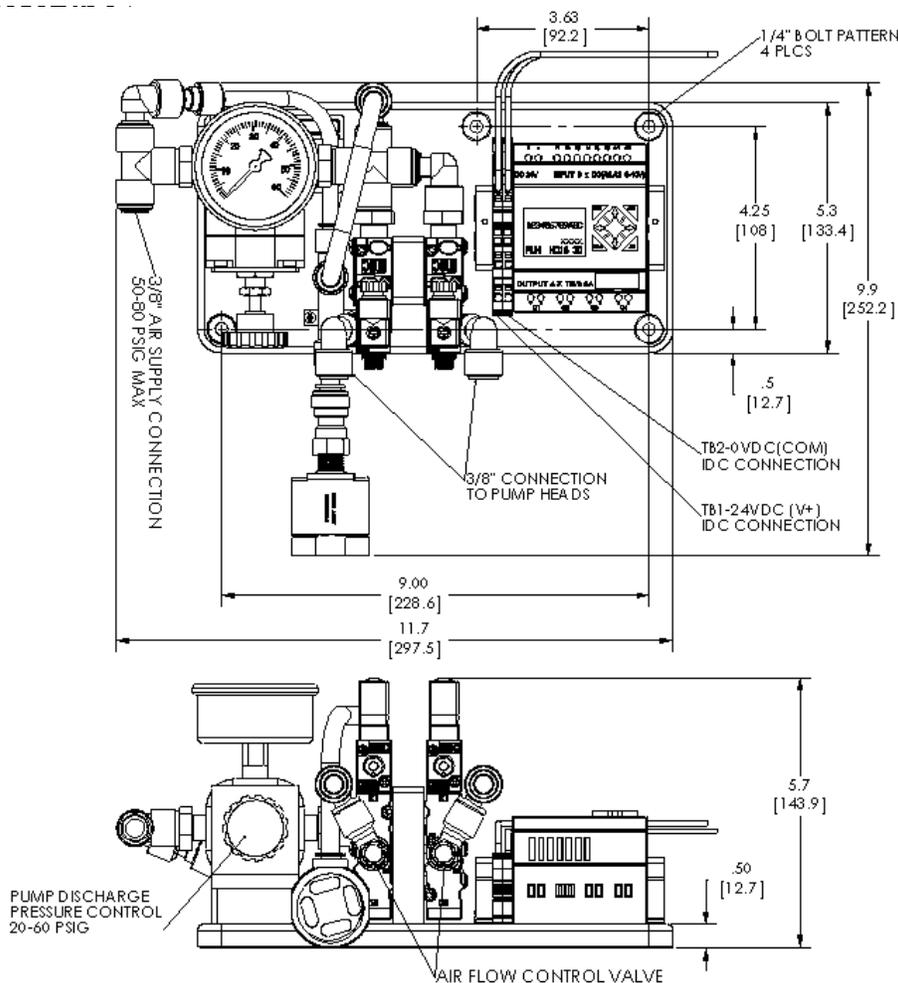


Figure 6-1 Dimension (in / [mm])

6.3 PC15 UTILITIES / HOOK-UP

<u>Utility</u>	<u>Pump</u>
Air Inlet:	<ul style="list-style-type: none"> • 3/8" Diameter supply tube.
Air Supply:	<ul style="list-style-type: none"> • 50-80 PSIG (.55±.03 MPa Max), clean dry air or inert gas
Power	<ul style="list-style-type: none"> • 24VDC - 500mA
Controller Weight:	<ul style="list-style-type: none"> • 4.4 lbs (2.0 Kg)

ATTENTION: Air supplied to the PC15 pump controller must be regulated to 50 - 80 PSIG to operate the vacuum venturi. An onboard precision regulator controls pump air supply pressure.

- Air supply connections between the pump and the pump controller are required.

NOTE: 3/8" tubing required for distances not to exceed 4 meters between the pump and the pump controller.

- 24VDC is required to operate the pump controller.
 - Terminal blocks are insulation displacement type. Insert 22-16 awg wires into the indicated location and rock lever to engage connection, see Figure 6-2.

NOTE: Follow local wiring codes and applicable wiring standards to insure proper power and over-current protection.

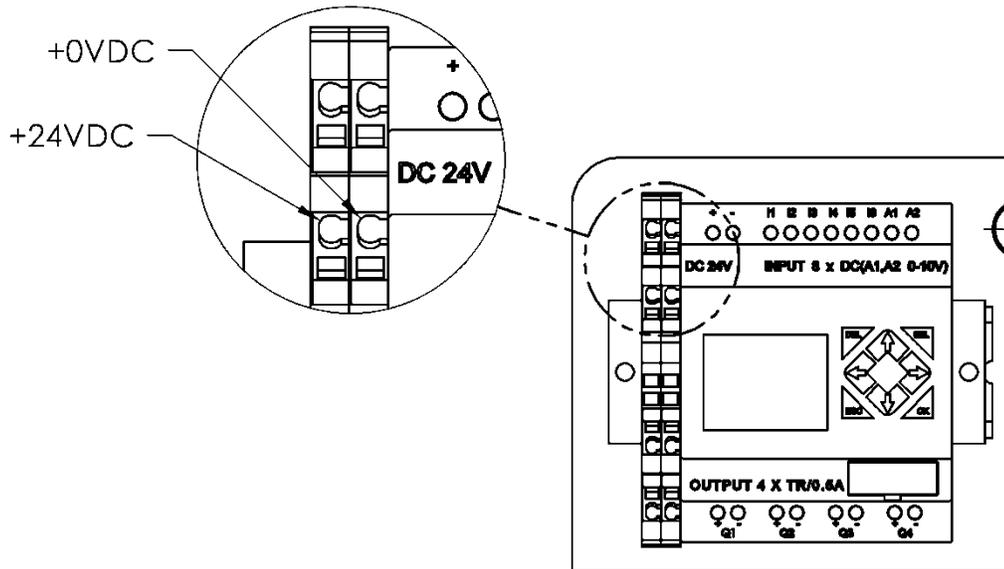


Figure 6-2: 24VDC Connection

6.4 PC15 CONTROLLER OPERATION

Ensure that all system interlock and safety devices are functional prior to operation. Before starting the system, it is important to read and understand the PC15PC manual. Only trained, qualified, authorized personnel should operate this pump controller.

The controller is operated by using the buttons located on the PLR, see Table 6-1.

Table 6-1: PLC Buttons

Button	Normal mode	Numeric value change mode (while digit is flashing)
←	Scroll through Menu pages.	Activates setup pages when depressed during Home page.
→	Enables/Disables controller cycling.	Activates controller when depressed during Home page.
↑	Increases pump cycle rate on Home page.	Increases value of digital readout.
↓	Decreases pump cycle rate on Home page.	Reduces value of digital readout.
SEL	Maintenance alarm page.	Displays the Maintenance alarm page
ESC	Return to home page	Displays the Home page.

6.4.a Turning Pump On and Off

From the Home Page, pressing the RIGHT arrow key (→) will start and stop the cycling of the pump controller. When activated a cursor will be located below position 3 (Figure 6-3), accompanied by an oscillating cursor between positions 1 & 2 (Figure 6-3).



Figure 6-3: Controller Off



Figure 6-4: Controller Cycling

NOTE: See PC15 manual for additional instructions, requirements, limitations and troubleshooting.

7 DISASSEMBLY/ASSEMBLY

7.1 PARTS ILLUSTRATION

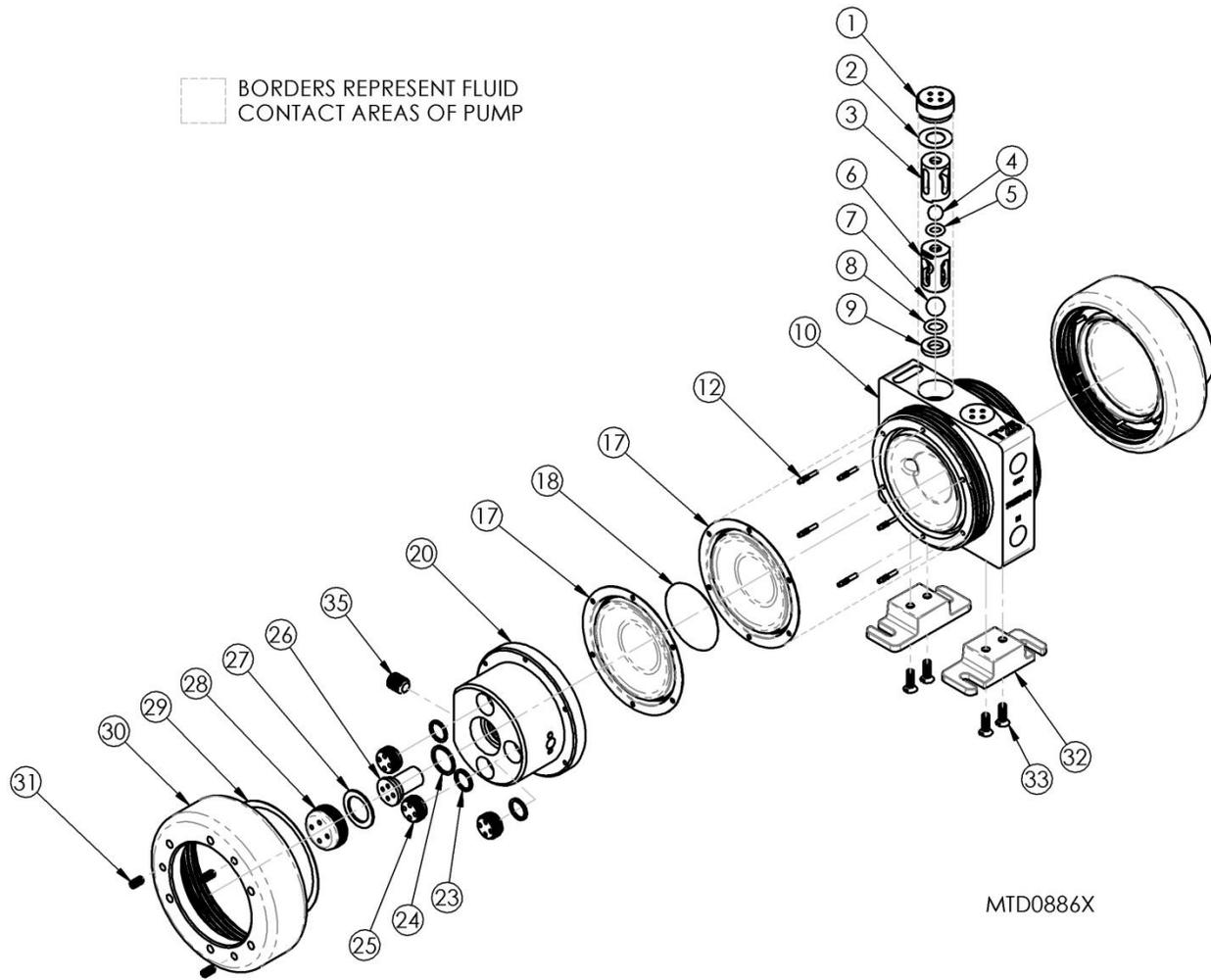


Figure 7-1: T25X Itemized Parts

7.2 PARTS LIST

ILL NO	PART NO	QTY	DESCRIPTION	PM year #	material
1	TA015	2	Check Port Cap		PTFE
2	AM082	2	Check Port Seal	2	PTFE
3	TA013	2	Discharge Sleeve		PTFE
4	98004341	2	Check Ball, PTFE, 1/2"	2	PTFE
5	98004346	2	Check Sleeve O-Ring	2	PTFE
6	TA012	2	Suction Sleeve		PTFE
7	98003211	2	Check Bal, PTFE, 5/8"	2	PTFE
8	98003212	2	Check Valve O-Ring	2	PTFE
9	TA011	2	Check Seat Wear Ring		PFA
10	TA001	1	Body		PTFE
11	Not Used	-	-	-	-
12	TJ006	12	Pin, Diaphragm		PP
13	Not Used	-	-	-	-
14	Not Used	-	-	-	-
15	Not Used	-	-	-	-
16	Not Used	-	-	-	-
17	TA008	4	Diaphragm	2	PTFE
18	TJ007	2	Fiber Optic Target	2	PTFE
19	Not Used	-	-	-	-
20	TA002	2	Head		PP
21	Not Used	-	-	-	-
22	Not Used	-	-	-	-
23	TJ005	6	Seal, Leak Port		PTFE
24	AK120	2	Seal, Pilot		PTFE
25	TJ004	6	Plug, Leak Port		PP
26	TA019	2	Pilot Assembly		-
27	AM020	2	Seal, Pilot Cap		PTFE
28	TJ001	2	Cap, Pilot		PP
29	TA010	2	Slip Washer		PTFE
30	TA003	2	Union Nut		PP
31	98004392	6	Screw, Union Nut		PTFE - SS
32	TA016	2	Base		PP
33	98003207	4	Screw, Base		PP
34	Not Used	-	-	-	-
35	98003080	2	Plug, 1/4"		HDPE

7.3 CLEAN-UP

To help remove potentially dangerous chemicals prior to service or shipment, the pump should be flushed with DI water or disassembled and thoroughly cleaned. Allow DI water to flush through the inlet and out the outlet to prevent pressure build up.

Caution: Use appropriate personal protection equipment when handling pump.

7.4 DISASSEMBLY

During the life of the pump it will be necessary to perform certain preventative maintenance procedures to ensure its continued high performance. This section and the next (7.5 Assembly) are provided for the user's convenience in disassembly and re-assembly procedures.

7.4.a Body Disassembly

- Remove union nut screws (98004392) from union nut using 1/8" allen wrench (T0208).
- Remove the bases (TA016) from the pump body using a slotted screw driver (T0211) to remove the 4 mounting screws (98003207).

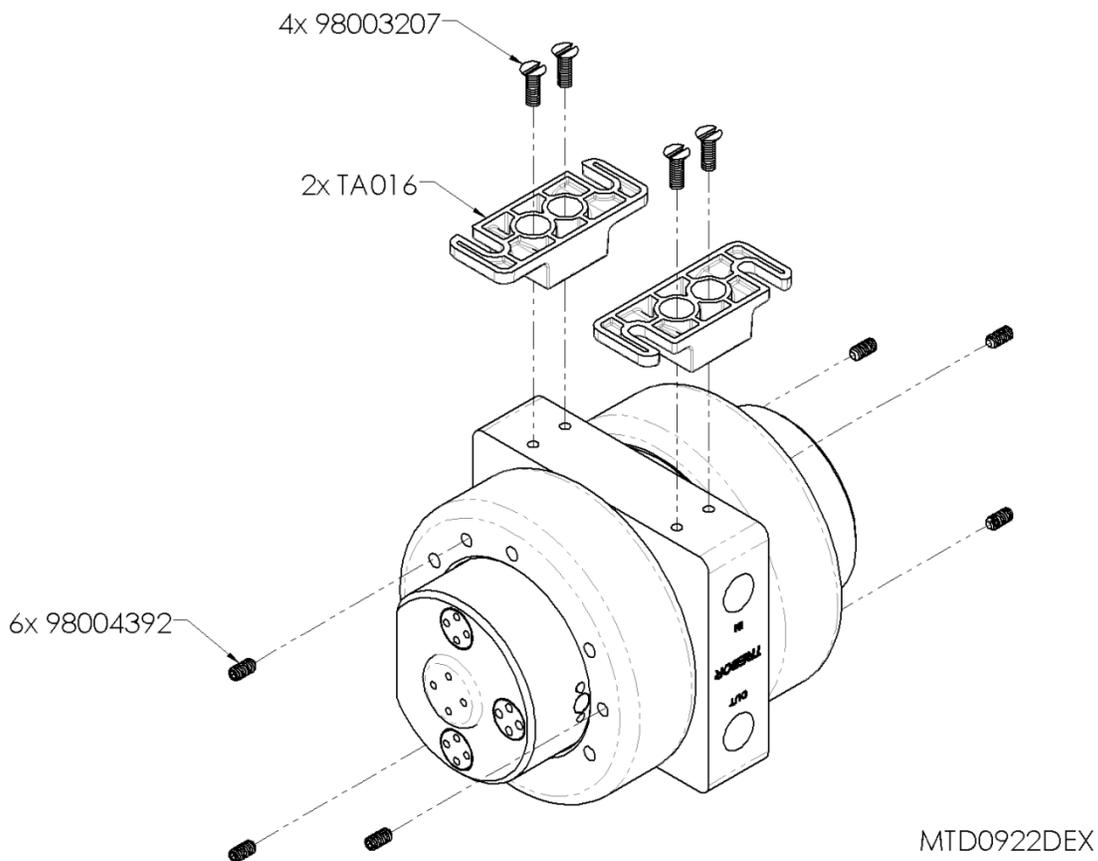


Figure 7-2: Base and Union Nut Screw Removal

- Install mounting plugs in pump fluid ports and lock body into bench mounting fixture.
NOTE: Securely attach mounting fixture to work surface using hardware provided as part of the rebuild fixture (T0189).

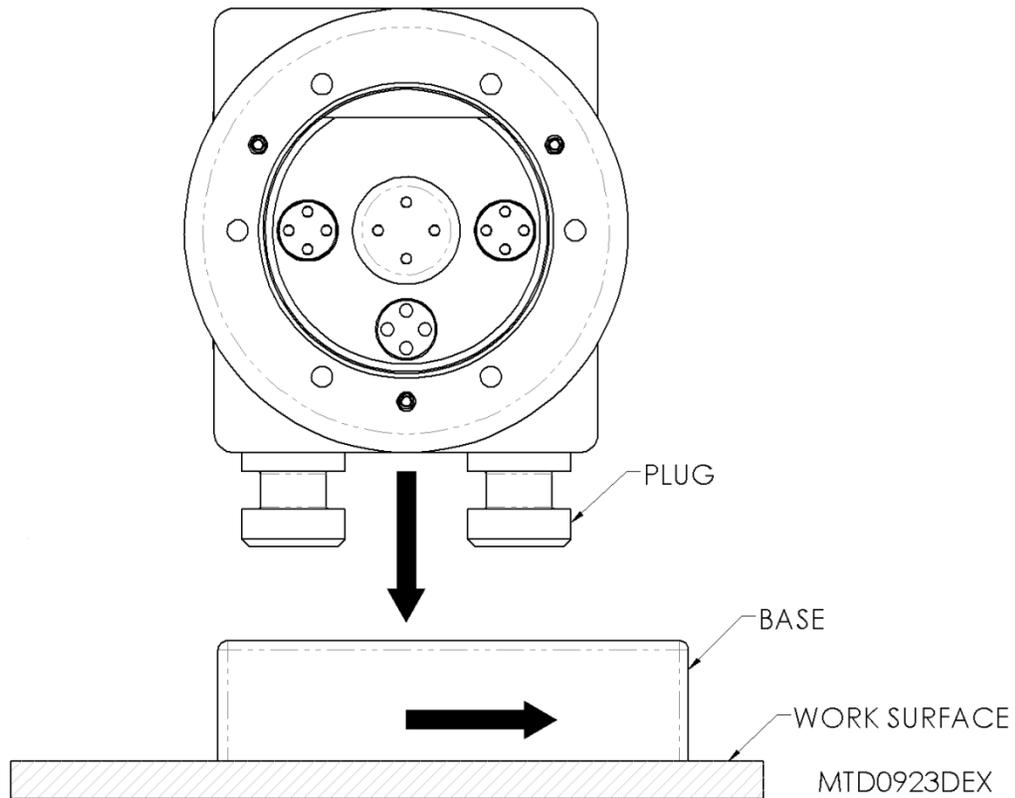


Figure 7-3: Rebuild Fixture Mounting

- Using strap wrench (T0129) and wrench (T0212) turn union nut counter-clockwise facing the union nut to remove. Repeat for second union nut.

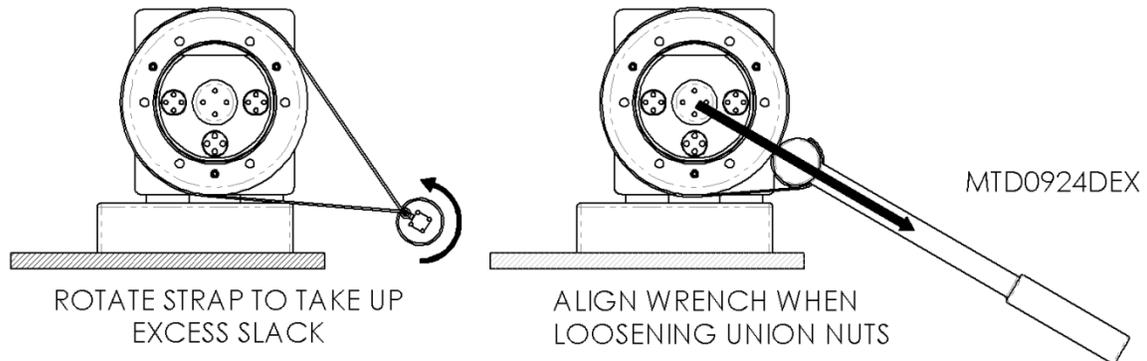


Figure 7-4: Union Nut Removal

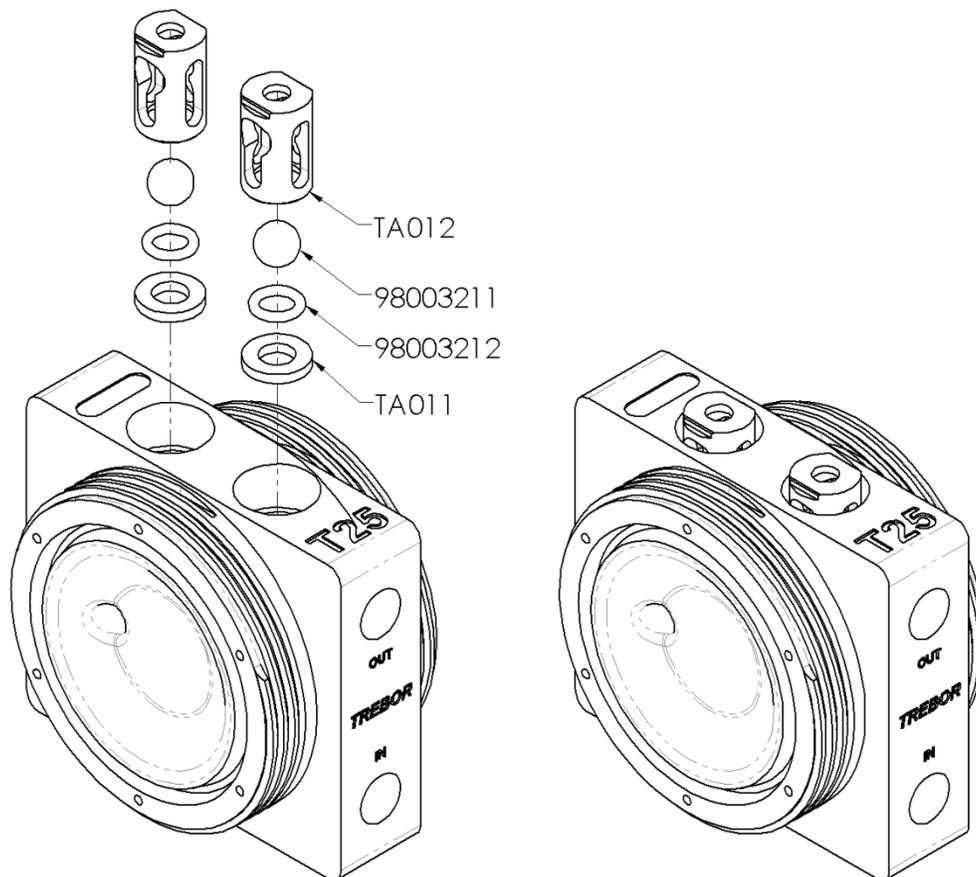
- Remove the heads and inspect the diaphragms for integrity.
- To remove the diaphragms, slit diaphragms with a sharp blade (ST0018) being careful not to contact the body of the pump. Remove the diaphragms from the grooves by reaching inside the slit region of the diaphragm and pulling upward.
Note: (Do not pry on diaphragm seal groove, as this will damage the sealing surface.)
- Remove check caps (TA015) using 1/2" pin tool (T0148) and driver (98003305) and remove check port seals (AM082).
- To prevent check valve components from rolling out of the check bore, the pump must be removed from the rebuild fixture and placed upright on working surface by this time.
- Remove discharge sleeves (TA013) with the assistance of the check sleeve puller (T000B0014). **Note:** Take care to ensure that the sleeve puller does not come into contact with the pump body during removal process.
- Cover the check ports by hand and turn pump over 180° to allow the check balls (98004341) and check rings (98004346) to release from the check bore.
- Remove suction sleeves with the assistance of the check sleeve puller (T000B0014). **Note:** Take care to ensure that the sleeve puller does not come into contact with the pump body during removal process.
- Cover the check ports by hand and turn pump over 180° to allow the suction check balls (98003211) and check rings (98003212) to release from the check bore.
- Using the sleeve puller (T000B0014), carefully remove the check seat wear rings (TA011) from the bottom of the check bores.

7.5 ASSEMBLY

Prior to beginning assembly, inspect all parts to ensure they are clean and dry. Wear clean protective gloves. Precautions should be exercised to prevent contaminating the air chamber surfaces with chemicals during handling.

7.5.a Body Assembly

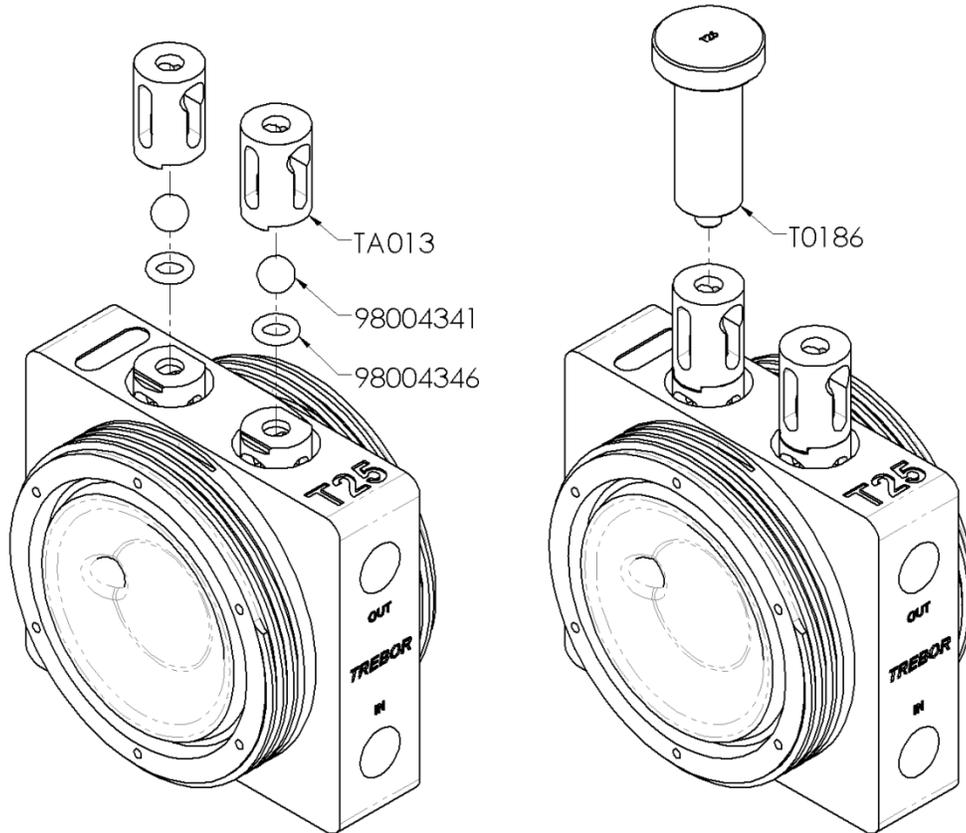
- Insert check seats (TA011) into each check bore.
- Insert suction o-rings (98003212) into each check bore.
- Insert suction check balls (98003211) into each check bore.
- Insert suction check sleeves (TA012) into each check bore oriented as shown below.



MTD0927X

Figure 7-5: Suction Check Valve Assembly

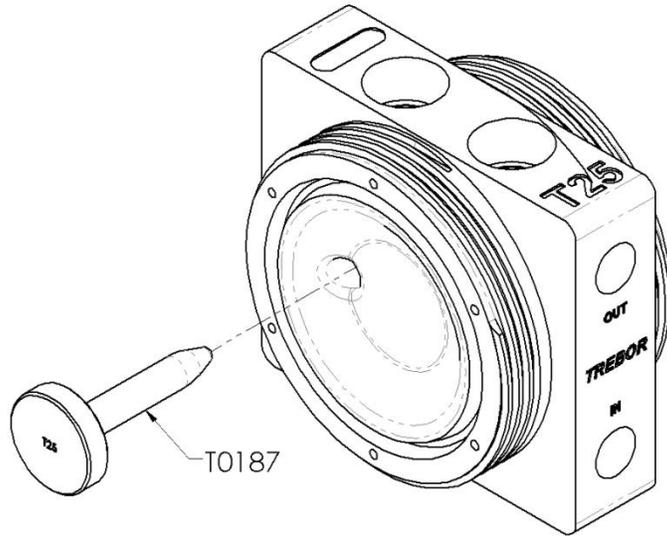
- Place discharge o-rings (98004346) onto suction check sleeves (TA012).
- Place discharge check balls (98004341) onto discharge o-rings (98004346).
- Place discharge check sleeves (TA013) over discharge o-rings (98004346) and check balls (98004341), aligning tabs of discharge check sleeve (TA013) to suction check sleeve (TA012).
- Push check sleeves to bottom of each check bore using the check sleeve insertion tool (T0186).



MTD0928X

Figure 7-6: Discharge Check Valve Assembly

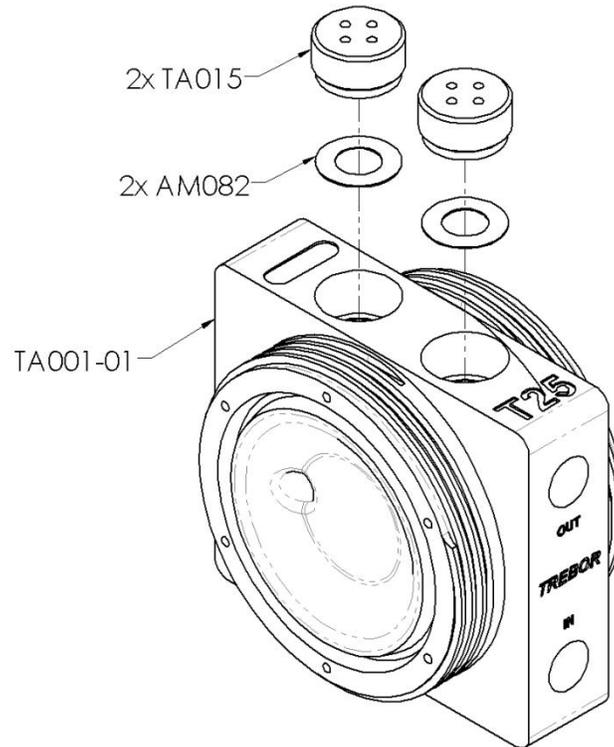
- Align check sleeve valves using the check sleeve alignment tool (T0187).



MTD0929X

Figure 7-7: Check Valve Alignment

- Insert a check port seal (AM082) into each check bore.
- Install a check port cap (TA015) in each check bore and torque to 25 in-lbs using a 1/2" pin tool (T0148) and torque wrench (T0210).

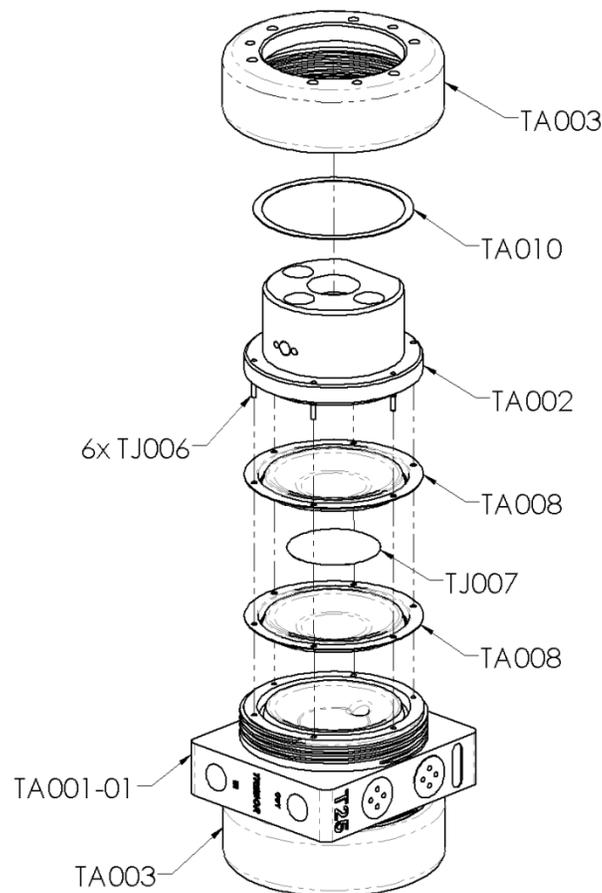


MTD0930X

Figure 7-8: Check Cap Installation

7.5.b Head Assembly

- Thread a union nut (TA003) partially onto one side of the body (TA001-01) and place this side down on the work surface. This will protect the body threads and sealing groove while the opposite head and union nut is installed.
- Install diaphragm (TA008) into the v-groove of body (TA001-01).
- Place fiber optic target (TJ007) onto center of diaphragm (TA008).
- Place diaphragm (TA008) over fiber optic target (TJ007) and diaphragm (TA008)
- Place head (TA002) onto the body (TA001-01) aligned as shown in figure below. Align diaphragm pins (TJ006) with holes in the diaphragms and body as shown.
- Install slip washer (TA010) and union nut (TA003) over the head (TA002) as shown.
- Thread union nut (TA002) onto the body (TA001-01) hand tight.



MTD0932X

Figure 7-9: Head to Body Assembly

- Turn pump over, remove union nut used for thread and seal protection and repeat previous 6 steps for the other side of the pump.

- Install mounting plugs in pump fluid ports and lock body into bench mounting fixture as shown in figure 7-3.
- Using strap wrench (T0129) and wrench (98003108), torque union nuts (TA003) to 37 ft-lbs.

7.5.c Body-Head Assembly

- Thread union nut screws (98004392) into union nuts (TA003) using a 1/8" allen wrench (T0208). Torque until flush with union nuts plus 3/4 turn.
- Install bases (TA016) to pump body (TA001) as shown using a slotted screw driver (T0211) to drive the 4 mounting screws (98003207).

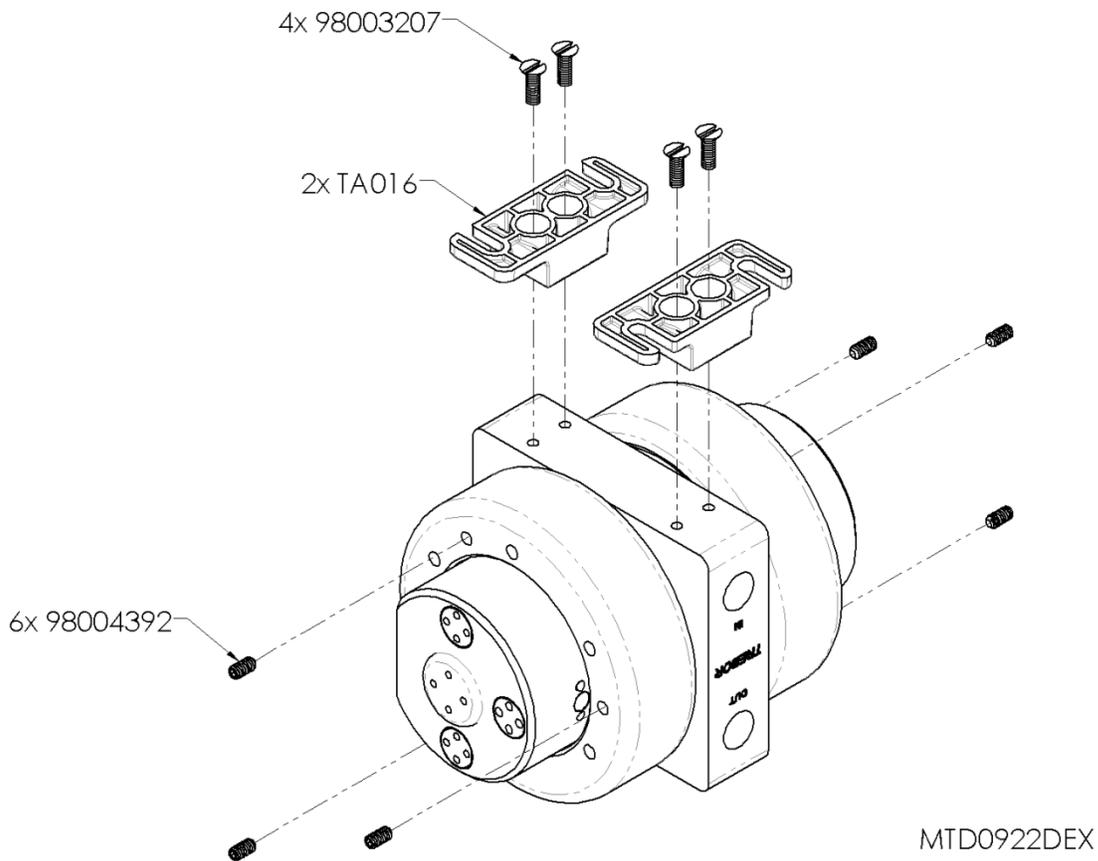


Figure 7-10: Base & Union Nut Screw Assembly

7.6 RECOMMENDED SPARE PARTS AND KITS

Part No	Qty	Description
KDT25X-00-A	1	Diaphragm Kit
TA008	(4)	Diaphragm
TJ007	(2)	Fiber Optic Target

KRT25X-00-A	1	Rebuild Kit
KDT25X-00-A	1	T25X Diaphragm Kit
98004341	2	Checkball, PTFE 1/2"
98003211	2	Checkball, PTFE 5/8"
98003212	2	O-Ring, PTFE, -206
98004346	2	O-Ring, PTFE, -204
AM082	2	Seal, PTFE, Gylon, 1.15 X .63 X .02, (Wetted)
TA024	2	Seal, .73 OD X ½ ID X .020 THK

7.7 TOOLS

The following tool kit is recommended as standard service equipment.

KTT25-00-A Tool Kit, which includes:

Part No	Qty	Description
98002986	1	Fiber Optic Cutter
98003108	1	Torque Wrench, 30-150 ft/lb., 1/2" Drive
98003150	1	Tool Case
98003305	1	Handle, Soc, 1/4 Drive
98003306	1	Adjustable wrench
ST0018	1	Blade
T000B0014	1	Tool, Check Sleeve Puller
T0129	1	Tool, Strap Wrench
T0144	1	Tool, Wedge, Cleaning Tool
T0146	1	Tool, Pin, 3/4"x1/4" Drive
T0147	1	Tool, Pin, 1"x1/4" Drive
T0148	1	Tool, Pin, 1/2"x1/4" Drive
T0149	1	Tool, Pin, Optic Cap, 3/4"
T0182	1	3" Extender, 1/4" Drive
T0186	1	Check Sleeve Insertion Tool
T0187	1	Check Sleeve Alignment Tool
T0188	1	Bushing Insertion/Removal Tool
T0189	1	Group Rebuild Fixture
T0207	1	Tool, Pin, 7/8"x1/4" Drive
T0208	1	1/8" Allen Wrench
T0209	1	1/4" Allen Wrench
T0210	1	Torque Wrench, 0-75 in/lb, 1/4" Drive
T0211	1	Screwdriver, 1/4" Slotted
T0212	1	Tool, Ratchet Wrench, 1/2" Drive
T0213	1	Tool, Offset Wrench, 3/8" Drive x 1.0" Open End
T0214	1	Tool, Offset Wrench, 3/8" Drive x 1 1/4" Open End
T0215	1	Tool, Offset Wrench, 3/8" Drive x 11/16" Open End
T0216	1	Tool, Offset Wrench, 3/8" Drive x 3/4" Open End
T0217	1	Tool, Offset Wrench, 3/8" Drive x 5/8" Open End
T0218	1	Tool, Drive Adapter, 1/4"F x 3/8"M
T0219	1	Tool, Ratchet Wrench, 1/4" Drive

8 TESTING

8.1 PERFORMANCE TEST

- Connect the pump to a fluid and air supply. See above instructions.
- With the air supply at 0 psi open the air supply valve
- Increase the air pressure until the pump starts to cycle. (Note: Pump cycling is controlled by the external control system. The pump will not operate without an operating external controller.)
- Record the start pressure, Target = 20psig
- Pump must prime and even cycling must be achieved before continuing
- Increase pressure to 60 psi and allow pump to run for 5 minutes
- Check for fluid leaks, listen for air leaks, and check for irregular operation
- Close the air supply valve and disconnect the pump
- If required, prepare the pump for drying

8.2 PUMP DRYING PROCEDURE

- Connect vacuum hose to fluid discharge
- Connect purge line to fluid inlet
- Apply 60 psig air pressure to the fluid inlet
- Cycle pump & vacuum dry by rotating pump side to side for 30 seconds.
- Turn off Air Supply and allow the pump to purge for 5 minutes.

8.3 DRY SUCTION TEST

- Connect to air supply. See above instructions.
- Connect a vacuum capable line with instrumentation to the pump fluid inlet
- Apply 20 psig air pressure to the pump
- Measure and Record the Suction Value
- Target = 10 in-Hg.

9 TROUBLESHOOTING

Pump Will Not Start, Fails to Operate

Cause:

- Insufficient air pressure.
- Air lines not attached properly.
- Insufficient air volume (low supply pressure during running).
- Fluid discharge line blocked. Downstream valve closed, filter plugged or other obstruction.
- Probe failure.

Solution:

- Must be minimum 20 psig at pump air connection.
- Check external controller.
- See Performance Charts (Section 4) for requirements. Check for both regulator and control valve C_vs >.85 capabilities.
- Remove obstruction.
- Check fiber optic probes for correct operation.
- Check external controller.
- Check for excessive bends in fiber optic cable.
- Clean or trim fiber optic cable at the sensor.

Bubbles in Fluid Discharge

Cause:

- Leaking fluid inlet fitting.
- Leaking main seal.
- Pump inlet line pressure reached saturation point (due to high suction requirement).
- Ruptured (perforated) diaphragm.
- Check bore caps leaking.

Solution:

- Tighten fittings or replace adapter seal.
- Tighten union nuts (first loosen three union nut screws and re-tighten after union nut torqued).
Replace diaphragms
Check head and body grooves for nicks or scratches.
- Increase diameter of suction supply line (reduces restriction).
Reduce output flow.
- Replace diaphragms.
- Tighten check bore caps or replace seals.

Fluid Leaks

Cause:

- Leaking main seal.
- Check bore cap.
- Ruptured diaphragm(s) can result in fluid leaks through air exhaust port.

Solution:

- Tighten union nuts (first loosen three union nut screws and re-tighten after union nut torqued).
Replace diaphragms.
Check head and body seal grooves for nicks and scratches.
- Tighten, or remove and replace seal.
- Replace diaphragms and any parts that may have been damaged by fluid exposure.

Erratic Cycling

Cause:

- Air line or fittings leak in external controller.
- Suction line restricted (cavitation).
- Check ball(s) not seating.
- Over pressurization of pump discharge.

Solution:

- Replace tubing or tighten fittings.
- Replace controller.
- Reduce fluid restriction
- Check O-rings, check balls, and check cages for damage; replace if necessary.
 - Make sure check balls move freely in sleeves.
- Reduce discharge pressure by reducing restriction.

For controller troubleshooting refer to PC15 manual.

10 WARRANTY



T25 PUMP

Trebor International, Inc. (“Trebor”) warrants to the original end-use purchaser that no product sold by Trebor that bears a Trebor brand* (“Trebor Product”) shall fail under normal use and service due to a defect in material or workmanship for **24 months** from date of shipment from Trebor’s factory.

If Trebor determines that Trebor Product has failed under normal use and service due to a defect in material or workmanship within the warranty period for such Trebor Product, Trebor will repair or replace such Trebor Product at no charge to the original end-use purchaser. The determination to repair or replace shall be made by Trebor in its sole discretion. The repaired or replacement Trebor Product shall be shipped to the original end-user purchaser freight collect unless the original end-user purchaser makes other arrangements for shipment. The original end-user purchaser shall bear all risk of loss or damage during shipment. Repaired and replacement Trebor Product shall be warranted only for the remainder of the original warranty period.

The above warranty and repair or replacement obligation does not apply if: (i) a Trebor Product is altered, changed, modified or tampered with in any way, other than an alteration, change or modification made by or with the authorization of Trebor, (ii) a Trebor Product is damaged after deposit with the carrier for shipment, (iii) a Trebor Product is not used and maintained in accordance with Trebor’s recommended operating and maintenance manuals, instructions and procedures, (iv) a Trebor Product is not properly incorporated or installed in, or not properly combined with, another product, component or part with which such Trebor Product is used (“Other Product”), (v) the failure or substandard performance of a Trebor Product is directly or indirectly attributable to, or directly or indirectly results from or arises out of, the failure or substandard performance of an Other Product, (vi) the failure or substandard performance of a Trebor Product is directly or indirectly attributable to, or directly or indirectly results from or arises out of, compliance with any design, specification or requirement of the original end-use purchaser, (vii) a Trebor Product is used in a manner, with a substance or for a purpose other than the normal manner, substance and purpose for which it is intended or is otherwise subjected to abnormal use or service, (viii) a Trebor Product is subjected to a power surge, brown out or other similar occurrence, or (ix) the failure or substandard performance of a Trebor Product is directly or indirectly attributable to, or directly or indirectly results from or arises out of, normal wear and tear of the Trebor Product (including, without limitation, things such as worn seals, clogged passages or valves, damage due to corrosive, insoluble, or abrasive substances, etc.).

To be eligible for warranty repair or replacement, the original end-use purchaser must notify Trebor of the Trebor Product failure in writing within the warranty period for such Trebor Product and, if requested by Trebor, the product must be promptly returned for inspection and evaluation, freight prepaid, to either Trebor’s factory at 8100 South Temple Drive, West Jordan, Utah 84088 or to a Trebor authorized distributor. The original end-user purchaser must also promptly provide Trebor or its authorized distributor with all such information as either of them may request concerning the maintenance, operation, use and failure of any Trebor Product that is claimed to have failed due to a defect in material or workmanship. Return of a Trebor Product to Trebor’s factory requires a Return Material Authorization (RMA) from Trebor, and the RMA number must be included with the returned Trebor Product. The original end-user purchaser shall bear all risk of loss or damage during shipment.

THE ABOVE WARRANTY, RIGHTS AND REMEDIES ARE THE SOLE AND EXCLUSIVE WARRANTY, RIGHTS AND REMEDIES PROVIDED BY TREBOR TO ANY PURCHASER OR USER OF ANY PRODUCT AND ARE IN LIEU OF ALL OTHER WARRANTIES, RIGHTS AND REMEDIES, EXPRESS, STATUTORY OR IMPLIED, AND TREBOR DISCLAIMS ALL OTHER WARRANTIES, RIGHTS AND REMEDIES, EXPRESS, STATUTORY OR IMPLIED, IN RELATION TO ANY PRODUCTS, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES WITH RESPECT TO MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, COMPATIBILITY OR INTEROPERABILITY WITH OTHER PRODUCTS, ACCURACY, PERFORMANCE AND NON-INFRINGEMENT, AND ANY WARRANTIES ARISING FROM ANY COURSE OF DEALING, USAGE OR TRADE PRACTICE. EXCEPT FOR THE ABOVE LIABILITIES AND OBLIGATIONS, TREBOR SHALL HAVE NO LIABILITY OR OBLIGATION TO ANY PURCHASER OR USER OF ANY PRODUCT IN CONNECTION WITH THE FAILURE, IMPROPER PERFORMANCE, MALFUNCTION, INACCURACY OR NON-CONFORMANCE OF, OR ANY DEFECT OR DEFICIENCY IN, ANY PRODUCT.

Under no circumstances shall Trebor have (i) any liability for any claim, loss, damage, injury, liability, obligation, cost or expense that directly or indirectly relates to or arises out of the use or failure of any product or (ii) any liability for any penalties or any indirect, consequential, incidental, special, punitive or reliance damages, including, without limitation, lost or unrealized sales, revenues, profits, income, cost savings or business, lost or unrealized contracts, loss of goodwill, damage to reputation, loss of property, loss of material being processed, loss of information or data, loss of production, downtime, or increased costs, even if Trebor is advised or placed on notice of the possibility of such damages and notwithstanding the failure of any essential purpose of any product.

Statements and data relating to products on Trebor's website and in Trebor's promotional, marketing and technical literature and materials are not warranties. Purchasers and users of products have the sole responsibility for determining the suitability of products for specific uses and applications.

Trebor makes no warranty with respect to product that does not bear a Trebor brand ("Non-Trebor Products"). Any warranty with respect to Non-Trebor products is limited to a pass through of the manufacturer's warranty to the extent permitted or authorized by the manufacturer.

In any event, Trebor's total liability to any purchaser or user of any product shall limited to the original price paid to Trebor for such product.

No Trebor distributor or other person is authorized to modify this Standard Limited Warranty or impose any liability or obligation on Trebor other than expressly provided herein.

11 CONTACT INFORMATION

11.1 GENERAL CONTACT INFORMATION

Web: www.treborintl.com
Phone Number: (801) 561-0303
Toll Free Number: (800) 669-1303
Fax Number: (801) 255-2312
Email: treborinfo@idexcorp.com
treborsales@idexcorp.com
Address: Trebor International
8100 South Temple Drive
West Jordan, Utah 84088 U.S.A.

11.2 TECHNICAL SUPPORT

Email: treborservice@idexcorp.com
Phone Number: (801) 561-0303

11.3 REGIONAL REPRESENTATIVES

Web: http://www.treborintl.com/about_contact_us.asp#

APPENDIX

Maintenance Log

Product: T25X Serial Number: _____

Company Name: _____

Company Address: _____

Date: _____ Tech: _____ Notes: _____