Phone: 800-669-1303 or 801-561-0303
Fax: 801-255-2312
e-mail: treborservice@idexcorp.com

TREBOR®
IDEX Health & Science

MAGNUM 620E PUMP

External Control

Operation / Maintenance Manual

SERIAL NUMBER (located on top of product):

IDEX CORPORATION

PATENTS: U.S. 06106246, U.S. 6402486, U.S. 6695593, U.S. 65957952

CONTENTS

1 INSTALLATION

1.1 UNPACKING

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	620E	Magnum 620E Pump
1	M620E	Operation/Maintenance Manual
Optional Accessories:		
1 or 2	DP-C-6	End-of-Stroke Probe
		(1) Required for Cycle (2) Required for EOS
2	DP-L-32	Leak Probe

1.2 UTILITIES / HOOK-UP

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. The pump mounting is shown in Fig. 1-1 below.

Air connections are typically made using 3/8" OD x 1/4" ID tubing up to 12 ft. If more distance is required it is recommended to increase tubing size to ½" tube for the air lines to minimize losses.

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

Air Supply: 20-80 psig (1.4 – 5.5 bar) clean dry air or nitrogen (see Performance Charts, Section **Error! Reference source not found.**).

Fluid Ports: 1" NPSM – additional adaptor port options available. Inlet/Outlet adaptor fittings and Surge Suppressor require torqueing during pump installation. See Section 2 for hook-up diagram and torque values.

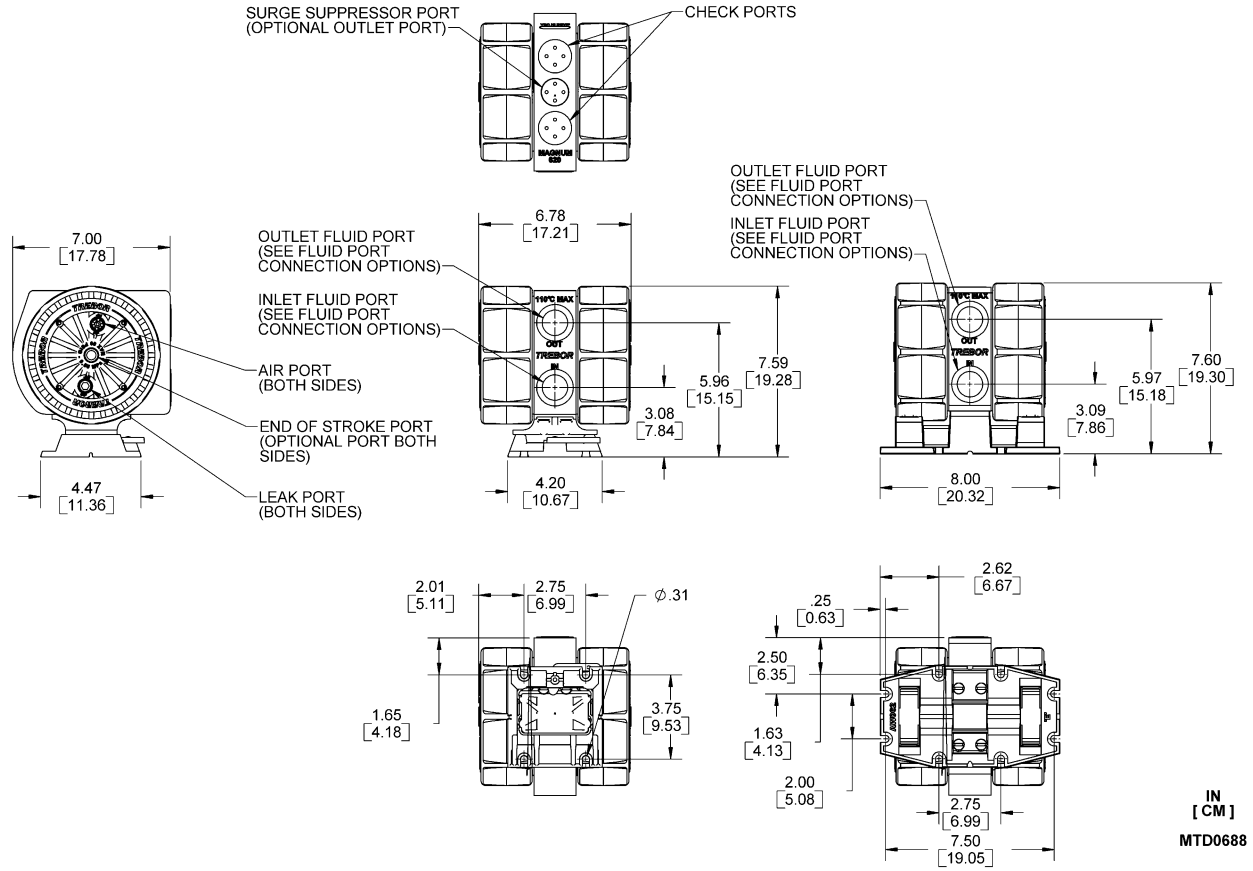

Figure 1-1 Pump Dimensions (Standard & Optional Quick Change Base)

ATTENTION: The pump should be operated with clean, dry air or nitrogen. Particulate, water and oils in the air supply can damage the pump.

NOTE:

1. It is recommended that a filter be placed on the discharge side of the pump.
2. Although extensive efforts are made to deliver pumps to our customers completely dry, new pumps may contain residual moisture from their final DI water test.

Recommended Maximum Operating Levels:

Temperature Range	Supply Pressure Max
< 60°C	80 PSI (5.5 bar)
60°C - 110°C**	60 PSI (4.1 bar)
*110°C Maximum Fluid Temperature	

2 OPTIONS

2.1 FLUID PORT CONNECTION OPTIONS

NOTE 1: Use O-ring to seal stainless steel or other rigid plumbing.

Available Options

A) Flare style tube adapter….1/2” and 3/4"
B) PFA tube stub out……...3/4"
C) Pillar Super 300……..3/4” OR 1”
D) PFA Weldable pipe…….3/4"

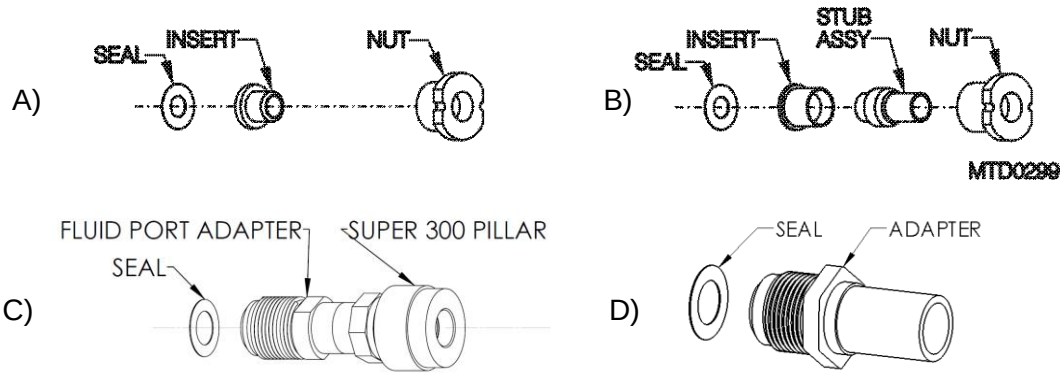

Figure 2-1

2.2 FLUID FITTINGS / SURGE SUPPRESSOR HOOK-UP

Surge Suppressor	Assembled Height: IN (CM)
MODEL SS40	12.63 (32.08)
MODEL SS85	14.97 (38.02)

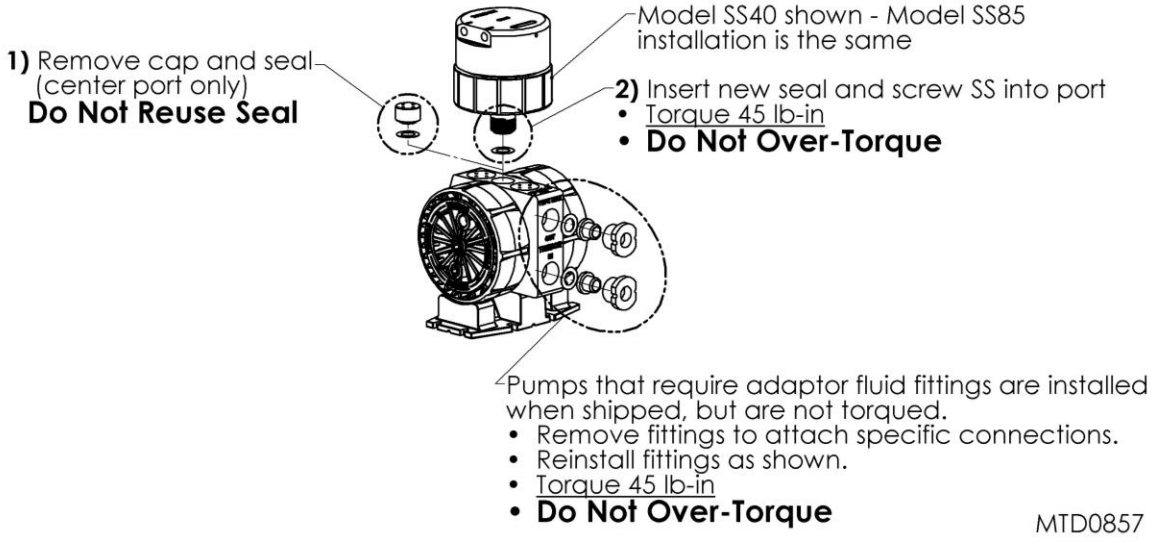

Figure 2-2

NOTE: See Surge Suppressor Operation Manual for detailed installation instructions.

2.3 END OF STROKE (EOS) ASSEMBLY INSTALLATION

EOS probes use fiber optic cable (Acrylic Optic Cable: 1mm core) attached to an optic sensor that transmits light in order to detect diaphragm end of stroke within the air chambers.

2.3.a Installation

- Remove Center Port Plug.
- Install o-ring seal into center port.
- Install Spacer onto probe.
- Install EOS probe assembly into port.
- Thread probe fitting into head and tighten until spacer is flush with head surface.
- Connect fiber optic cable to optic amplifier. NOTE: Limit bends in fiber optic cable to 1" radius minimum to help ensure optimum signal strength. NOTE: Standard cable length is 12.5 ft. [4 meters].

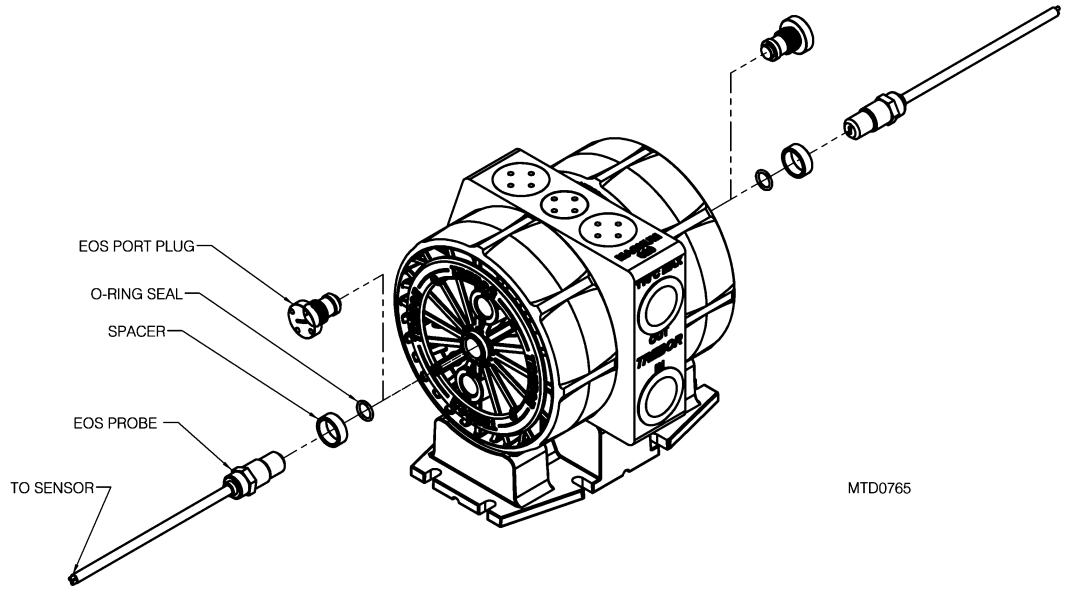

Figure 2-3

2.3.b Signal Specifications

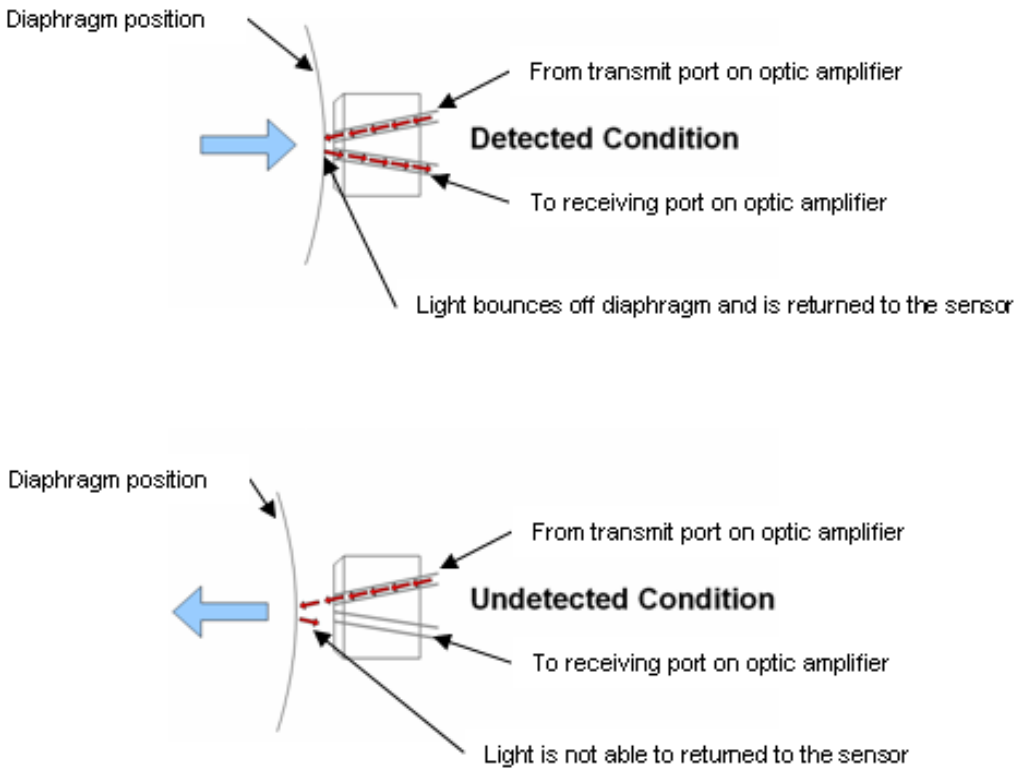

Figure 2-4

2.4 PLC CONTROL SCHEMATIC

Shown below is an example of a Programmable Logic Controller (PLC) control schematic shown will allow the Magnum to be controlled by a PLC for the Magnum pump. Some of the features that can be programmed are:

- Start and stop pump
- Monitoring approximate flow rate (contact factory for displacement factors)
- Leak sensing (section 2.5)
- Preventative maintenance counter
- Cycle counting or End-of-Stroke detection
- Oscillator control override

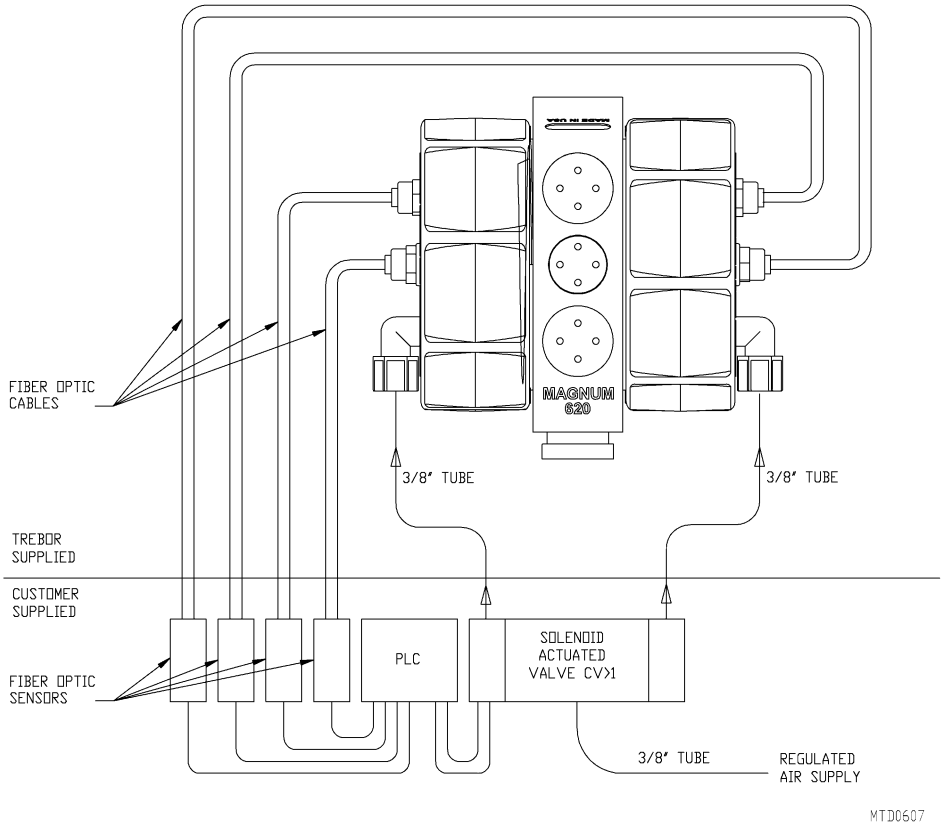

Figure 2-5

Note: The use of ONE EOS probe is applicable for cycle counting to monitor pump operation and monitor cycles for maintenance intervals. To control pump cycling requires 2 EOS probes and amplifiers.

2.5 LEAK PROBE OPTION

Leak probes use fiber optic cable (Acrylic Optic Cable: 1mm core) attached to an optic sensor that transmits light in order to detect the presence of fluid within the air chambers.

2.5.a Installation

- Remove plugs from lower ports (or existing leak detection if applicable)
- Install probe adapter fitting into lower leak sensor port (minimum of 4 turns)
- Arrange adapter fitting so that the leak sensor port is positioned in a downward angle (as shown in Figure 2-2). Note: If adapter fitting is in the vertical position leak detection may not occur.
- Thread probe fitting and spacer into adapter fitting and tighten until spacer is flush with adapter fitting face (as shown in Figure 2-3).
- Connect fiber optic cable to optic amplifier (NOTE: Limit bends in fiber optic cable to 1” radius minimum to help ensure optimum signal strength.) Fiber optic cable can be cut to desired length using the cable cutter provided.

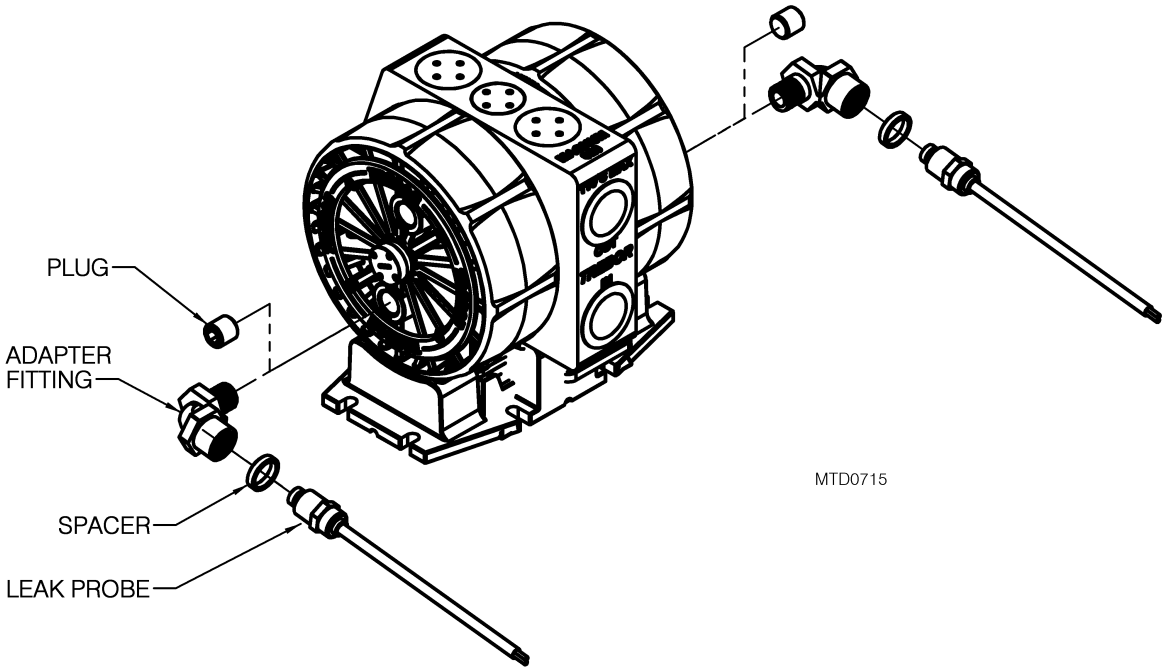

Figure 2-6

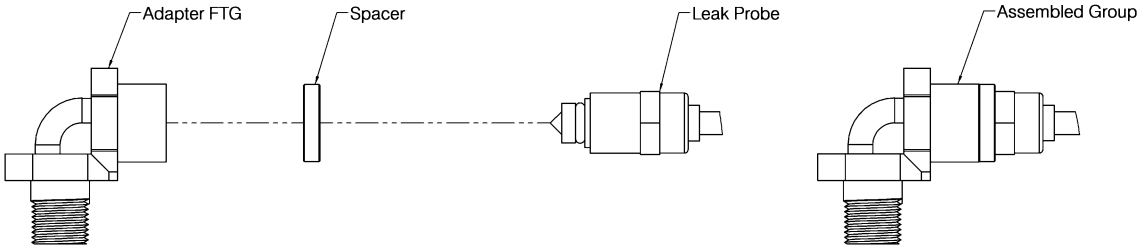

Figure 2-7

2.5.b Signal Specifications

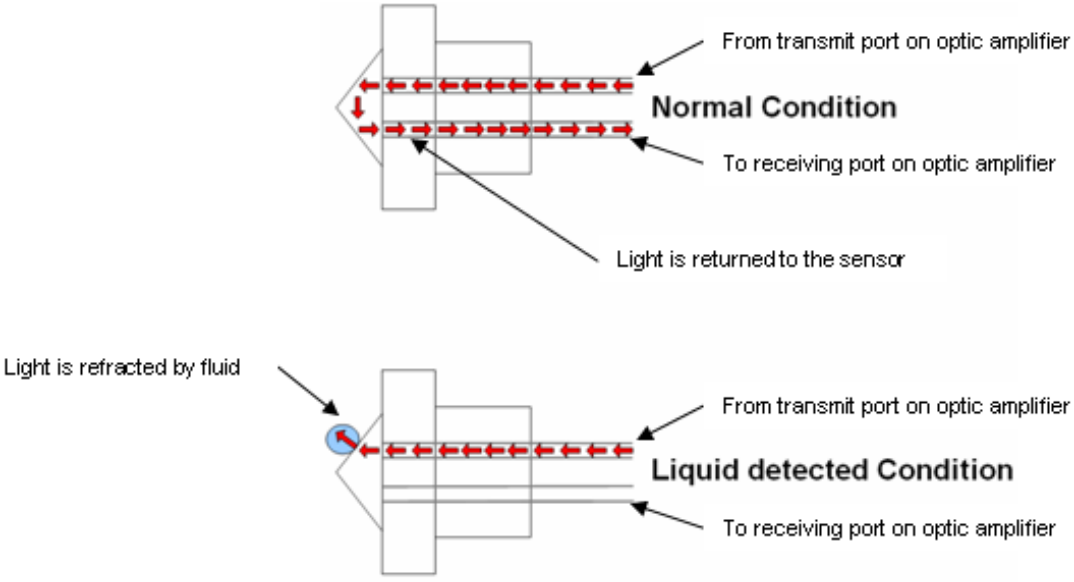

Figure 2-8

NOTE: See your Fiber Optic Sensor installation instructions for proper installation and adjustment.

3 START-UP

- Pump air supply pressure should be regulated. (See Figure 3-2: Pressure vs. Fluid Temperature Chart.)
- Open the fluid suction (IN) line valve, if necessary.
- Open the fluid discharge (OUT) line valve, if necessary.
- Start with air regulator at low (> 20 psi) pressure setting. Increase pressure to attain desired flow, up to the maximum rating (See Section 3.1).
- Table 1 can be used to determine approximate air consumption.
- Refer to Troubleshooting, Section 5, if pump fails to start.

ATTENTION: Prolonged periods (> 5 minutes) of dry running can damage critical internal pump parts.

CAUTION: When handling potentially dangerous fluids under pressure, the pump and its fittings should be placed in a compatible enclosure.

3.1 PERFORMANCE CHARTS

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.

Air Supply Pressure (PSIG)	Discharge Fluid Pressure (PSIG)	Air Used (SCFM)
20	0	4.5
20	10	3.4
30	0	7.1
30	15	5.6
40	0	9.8
40	20	7.7
50	0	12.6
50	25	10.1
60	0	15.3
60	30	12.2
70	0	18
70	35	14.9
80	0	20.6
80	40	18.3

Table 1: Air Consumption

NOTE: Specification to be used to size regulators and control valves.

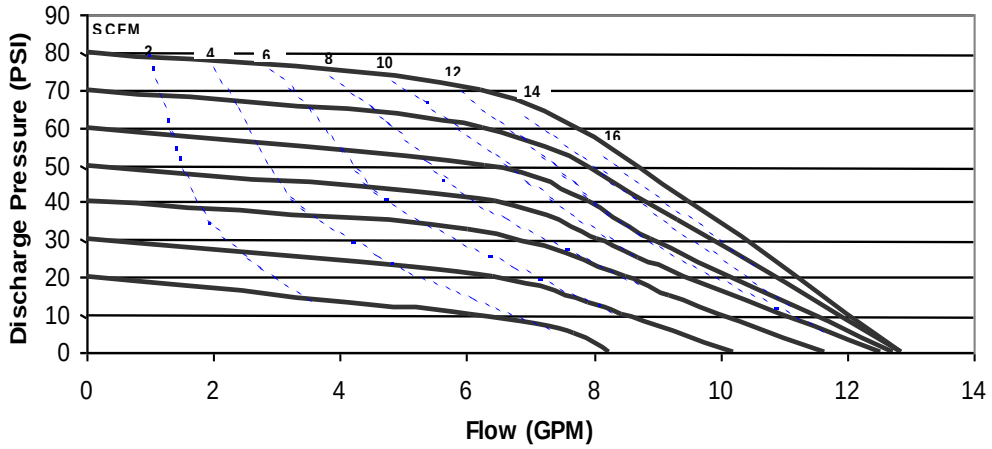

Figure 3-1: Pressure & Capacity Chart

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

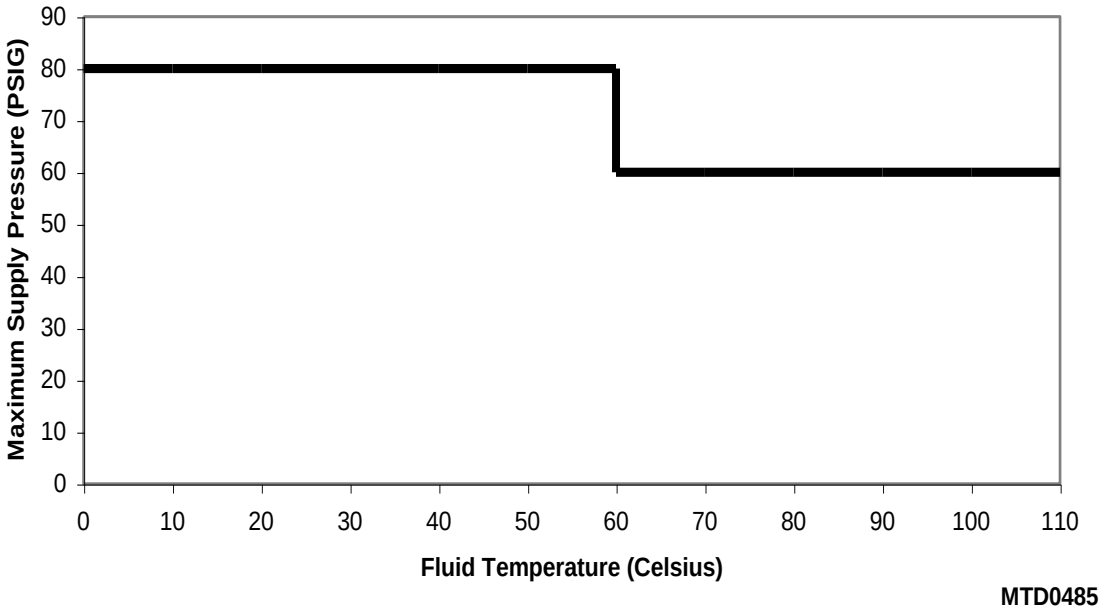

Figure 3-2: Pressure vs. Fluid Temperature Chart
Recommended Maximum Pump Operating Levels

NOTE: Be sure that fittings and tubing used are capable of these operating conditions.

4 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.

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, a $150.00 evaluation charge 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. Each pump will be evaluated and repaired within 5 working days of the receipt of pump at Trebor facility.

4.1 PREVENTIVE MAINTENANCE SCHEDULE

The following maintenance schedule is recommended to optimize pump performance and minimize failures. Certain operating conditions that require more frequent maintenance intervals have been noted. 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 (Section 0) be copied, maintained and kept with this unit for future reference.

MAGNUM 620E Maintenance Schedule

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

Preventive Maintenance Record

Company Name: _____

Company Address: _____

_____

Product: _____ Serial Number: _____

Date: _____ Tech: _____ Notes: _____

Date: _____ Tech: _____ Notes: _____

Date: _____ Tech: _____ Notes: _____

Date: _____ Tech: _____ Notes: _____

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4.2 RECOMMENDED SPARE PARTS

KR620E-00-A Spares Rebuild Kit, which includes:

Part No	Qty	Description
KD620-00-A	1	**Diaphragm Kit**
		Includes: (2) AW004 Diaphragm
98001415	4	Check Ball
98002334	4	O-ring, PTFE
98003322	2	Shaft Seal
AM072	1	Shaft
AM083	2	Check Cap Seal
AW017	1	Damper Port Seal

In critical applications a spare pump is recommended to minimize possible down time during service intervals.

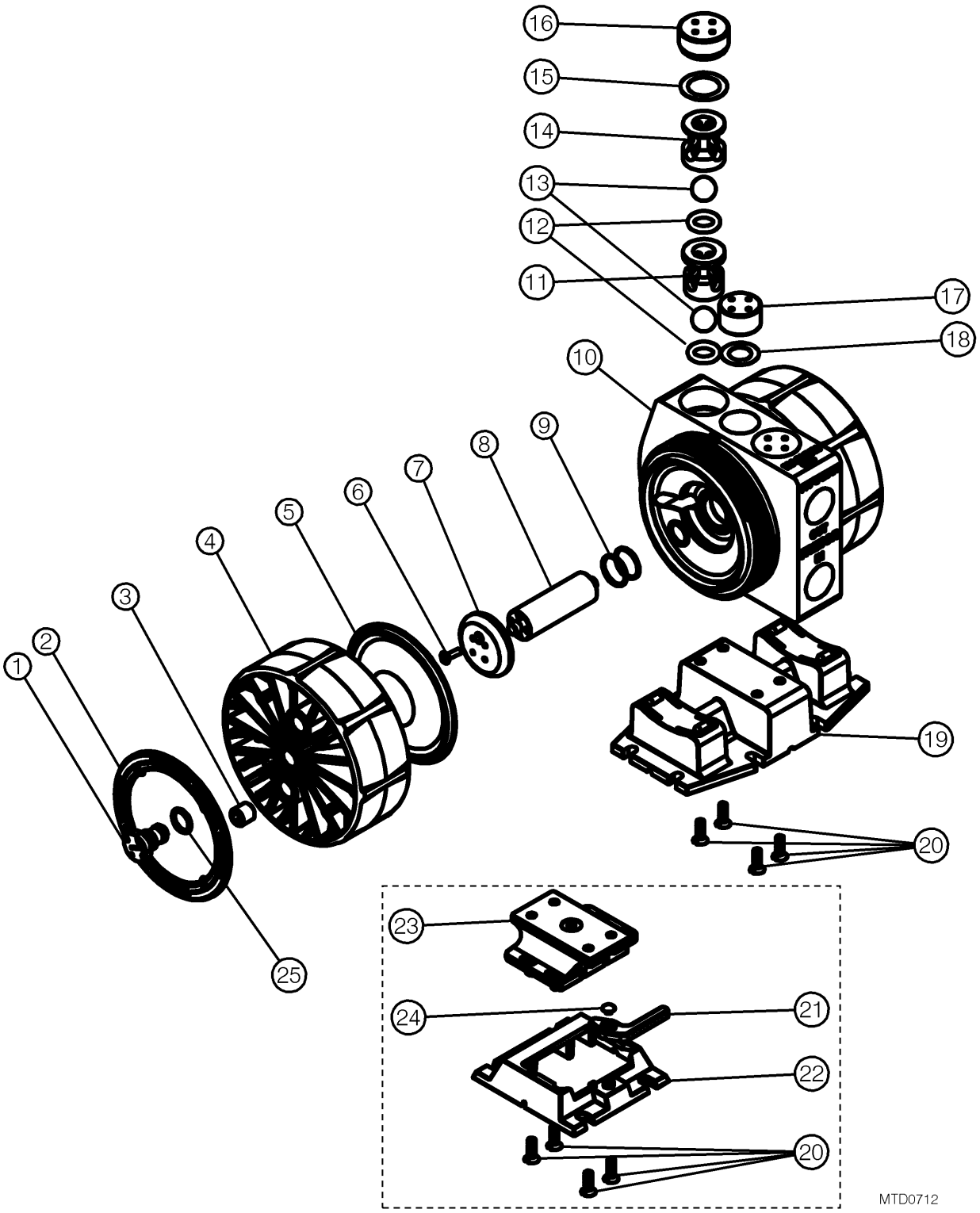
4.3 TOOLS

The following tool kit is recommended as standard service equipment.

KT620-00-A Tool Kit, which includes:

Part No	Qty	Description
98003108	1	Torque Wrench, 30-150 ft/lb., 1/2” Drive
98003150	1	Tool Case
98003305	1	1/4” Drive Handle
98003306	1	Adjustable End Wrench
T000B0014	1	Check Sleeve Removal Tool
T0137	1	Rebuild Fixture
T0129	1	Strap Wrench
T0144	1	Head Removal Wedge
T0146	1	3/4” Pin Tool
T0148	1	1/2” Pin Tool
T0149	1	Optic Cap Pin Tool
T0154	1	Check Sleeve Insertion Tool
T0155	1	Maxim 25 Bullet Shaft
T1044	1	Cleaning Tool
		Additional tools required not supplied with tool kit
		0-48 IN. – OZ, Dial Indicating Torque Screwdriver
		3 IN. LBS Torque Limiting Screwdriver (preset 48 in-oz)

4.4 PARTS ILLUSTRATION



OPTIONAL QUICK CHANGE BASE

4.5 PARTS LIST

ILL NO	PART NO	QTY	DESCRIPTION	MATERIAL
1	AW073*	2	EOS PLUG	PTFE
2	AW065	2	Dress Ring, Trebor	PP
3	98002243	2	Plug, 3/8 NPT	PE
4	AW070	2	Head, 620E, Molded, Multi Port, Diff	GFPP
	AW070-01*	2	Head, 620E, EOS , Molded, Multi Port, Diff	GFPP
5	AW004	2	Diaphragm	PTFE
6	98003722	2	Locking SCR Push Plate	PTFE
7	AW071	2	Push Plate	PTFE
8	AW072	1	Shaft	PTFE
9	98003322	2	Ring, PTFE, Backup	PTFE
10	AW001	1	Body	PTFE
11	AM060	2	Suction Sleeve	PTFE
12	98002334	4	O-ring, PTFE, -312	PTFE
13	98001415	4	Check Ball, PTFE, ¾”	PTFE
14	AM061	2	Discharge Sleeve	PTFE
15	AM083	2	Check Cap Seal	PTFE
16	AW003	2	Check Bore Cap	PTFE
17	AW014	1	Damper Port Cap	PTFE
18	AW017	1	Damper Port Seal	PTFE
19	AW062	1	Base, Non Quick Release	GFPP
20	98003207	4	Screw, GFPP, Black, ¼-20	PP
21	AM023**	1	Base Locking Lever	PP
22	C0102**	1	Base, Quick Release	PP
23	AW057**	1	Base. Pump Mount	PP
24	98003071**	1	Screw, PP, 10-32	PP
25	98003768*	2	EOS seal	Viton

* EOS (End-of-Stroke) Option only. ** Quick Change Base option only (A6)

4.6 DECONTAMINATION 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: When handling pump wear appropriate personal protection gear, including safety glasses.

4.7 DISASSEMBLY

4.7.a Head removal

- Loosen and remove all probes (if installed) and fluid and air fittings from heads.
- Loosen and remove pump from mounting base.
- Immerse or flush the pump assembly using DI water and a neutralizing agent if required.
- Install mounting fittings in pump adapter ports (figure 4-1) and lock body into bench mounting fixture. NOTE: Securely attach mounting fixture to work surface using hardware provided.

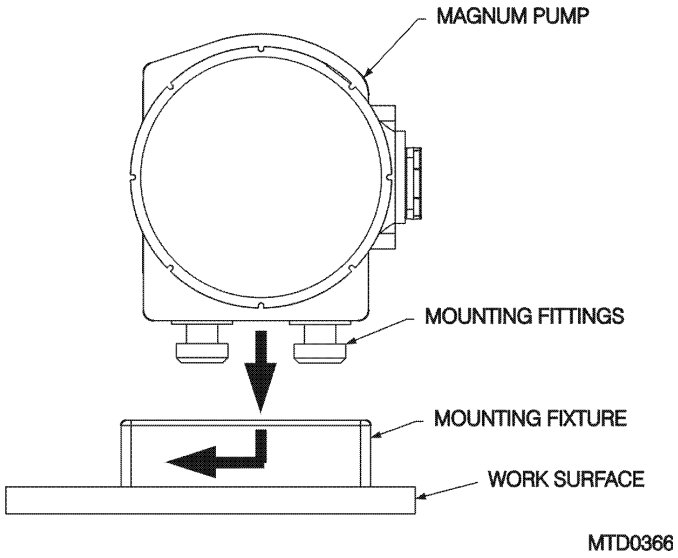


Figure 4-1

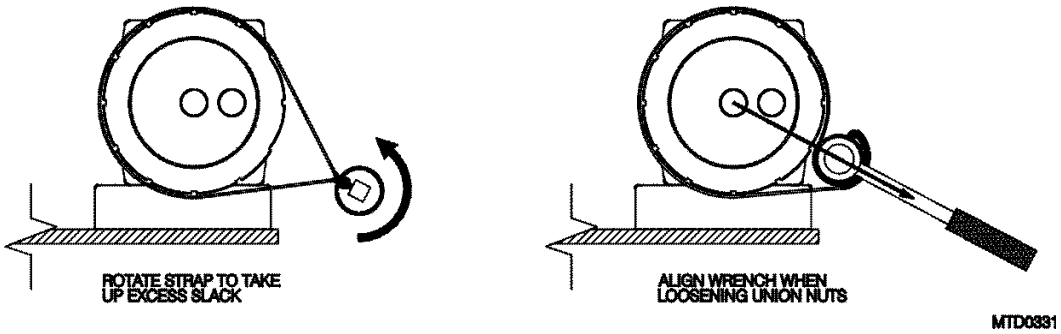


Figure 4-2

- Using strap wrench, turn head counter-clockwise to loosen (figure 4-2).
- Remove heads and check diaphragms for wear or damage.
- To remove diaphragms, it may be necessary to slit diaphragm (in the center) with a sharp knife and pull the diaphragms from the seal grooves. **(Do not pry on diaphragm seal groove, as this will damage the sealing surface.)**

4.7.b Body Disassembly

- Unscrew push plate locking screw and push plate from one side of the shaft.
- Remove shaft from pump body.
- Unscrew second push plate locking screw and push plate.
- Remove shaft seals from pump shaft seal groove in the center of the shaft bore. Take care not to damage the shaft bore. NOTE: Do not reuse seals.
- Remove check plugs and seals on top of pump body using 3/4” pin tool.
- Remove discharge sleeves using check sleeves removal tool.
- Remove PTFE balls and O-rings.
- Remove suction sleeves using check sleeve removal tool.
- Remove second set of O-rings and balls.
- Remove damper plug and seal using 3/4” pin tool.

4.8 CLEANING

ATTENTION: Following disassembly, parts should be thoroughly washed and be free from chemical residue for handling purposes.

- Gently spray clean or dunk rinse all components with DI water to remove any trace materials remaining after disassembly.

4.9 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 any of the air chamber surfaces with chemicals during handling.

4.9.a Body Assembly

NOTE: Check sleeves that do not install with ease or minimal effort should be placed in a freezer prior to assembly to assist insertion. Body must be upside down with check port extending over a table edge so that parts remain assembled during insertion of sleeves.

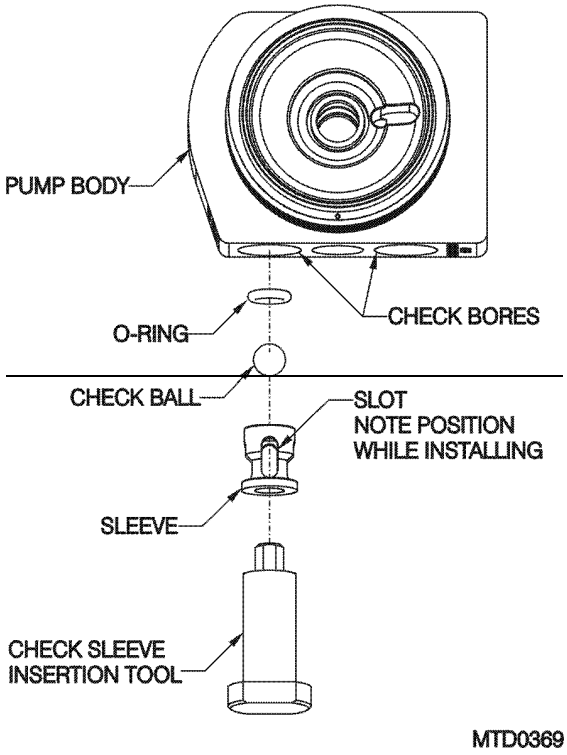


Figure 4-3

- Insert suction sleeve, check ball and O-ring carefully into check bore.

NOTE: The Suction Sleeves have a shoulder diameter larger than their body diameter. Additionally the Suction Sleeves when compared to the Discharge Sleeves have a thicker top region which acts as a robust contact point for the O-rings.

- Repeat insertion process with the discharge sleeve, check ball and O-ring.
- Repeat process for second check bore.
- Replace check cap seals and tighten check bore caps applying 45 in lbs.
- Replace damper port seal and tighten damper plug applying 45 in lbs.
- Install two shaft seals in shaft bore groove with slits 180° apart.
- Thread one push plate onto shaft until push plate bottoms out on shaft shoulder.
- Tighten push plate to 48 oz-in, and then rotate until locking screw hole is aligned with next available hole in shaft.
- Install locking screw and tighten to 12 oz-in.
- Place shaft insert tool onto shaft and insert shaft into bore (figure 4-4).

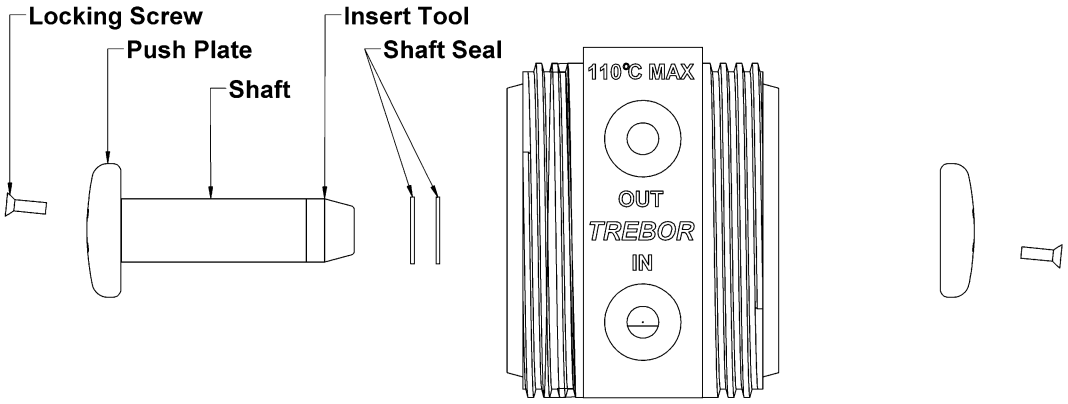


Figure 4-4

- Remove shaft insert tool and thread second push plate onto main shaft.
- Thread second push plate onto shaft until push plate bottoms out on shaft shoulder.
- Tighten push plate to 48 oz-in, and then rotate until locking screw hole is aligned with next available hole in shaft.
- Install locking screw and tighten to 12 oz-in.

4.9.b Final Assembly

- Reattach pump to assembly fixture.
- Attach head to one side of pump body (hand tight). Do not install diaphragm on this step. This will protect body during initial pump assembly.
- Remove pump from the assembly fixture.
- Place pump body with head down and place one diaphragm with “V” groove point away from the body.
- Install head on body hand tight.
- Turn pump over and remove head to install diaphragm on other side.
- Repeat diaphragm and head installation.
- Lock body into mounting fixture.
- Using strap wrench, torque heads slowly to a minimum of 100 ft-lbs (not to exceed 125 ft-lbs) with the wrench at 90° +/- 15° to the heads surface as shown.

Note: Leak ports must be at or below the center port (horizontal position) when standing on base.

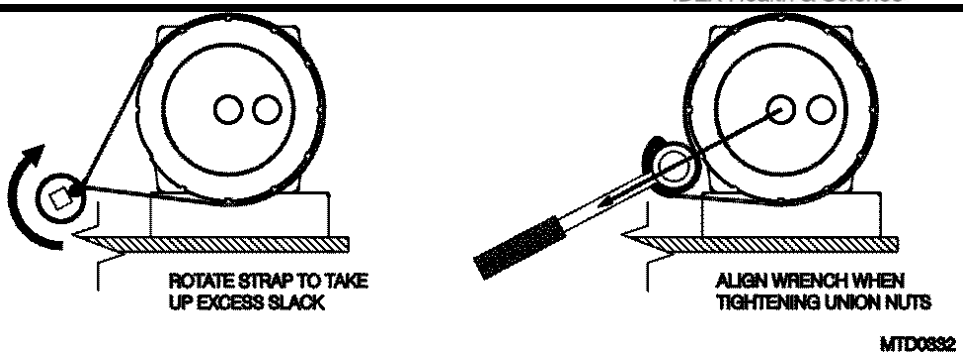


Figure 4-5

- Secure pump to base.
- If applicable, reinstall seals, optic probes into heads. **(Do not twist optic fibers as they could be damaged.)**
- Reconnect air supply and fluid lines.

4.10 TESTING

Performance Test

- Start with air regulator at low (< 15 psi) pressure setting.
- Pump must prime once pressure is increased
- Increase to 60 psig Supply Pressure
- Check for fluid leaks, listen for air leaks, check for irregularity
- Prepare the pump for drying

Dry Pump

- Connect vacuum hose to discharge line
- Connect purge line to fluid inlet
- 60 psig Supply Pressure
- 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.

Dry Suction

- 20 psig Supply Pressure Target
- Record Suction Value
- Target = 10 in-Hg.

5 TROUBLESHOOTING

Pump Will Not Start, Fails to Operate

Cause:	Solution:
• Insufficient air pressure.	• Must be minimum 15 psi at pump air hook-up.
• Air lines not attached properly.	• Check external controller.
• Insufficient air volume (low supply pressure during running).	• See Performance Charts (3.1) for requirements. Check for both regulators and control valve capabilities.
• Fluid discharge line blocked. Downstream valve closed, filter plugged or other obstruction.	• Remove obstruction.
• Probe failure	• 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:	Solution:
• Leaking fluid inlet fitting.	• Tighten inlet fitting. Replace adapter seal.
• Leaking main seal.	• Tighten head to 100 ft-lbs. or replace diaphragms, and check head and body seal grooves for nicks or scratches.
• Pump inlet line pressure reached saturation point (due to high suction requirement).	• Increase diameter of suction supply line (reduces restriction). Reduce output flow.
• Ruptured (perforated) diaphragm.	• Replace diaphragms.
• Check bore caps leaking.	• Tighten check bore caps or replace seals.

Fluid Leaks

Cause:	Solution:
• Head torque not enough to create seal.	• Tighten heads to 100 ft-lbs.
• Leaking main seal.	• Replace diaphragms. Check head and body seal grooves for nicks or scratches.
• Check bore cap.	• Tighten, or remove and replace seal.
• Ruptured diaphragm(s) can result in fluid leaks through air exhaust port.	• Replace diaphragms, and any parts that may have been damaged by fluid exposure.

Erratic Cycling

Cause:	Solution:
• Air line or fittings leak in external controller.	• Replace tubing or tighten fittings. Replace controller.
• Suction line restricted (cavitation).	• Reduce fluid restriction.
• Check ball(s) not seating.	• Check O-rings for damage; replace if necessary. Make sure check balls move freely in sleeves.
• Transfer tube leaking.	• Tighten transfer tubes and quick grip nuts as described in Section 4.9.b.

6 WARRANTY AND EXCLUSIONS

See the Trebor Standard Limited Warranty at: www.idex-hs.com/support/trebor/downloads/TreborStandardLimitedWarranty_02-07.pdf

7 CONTACT INFORMATION

7.1 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 1300 West
West Jordan, Utah 84088 U.S.A.

7.2 TECHNICAL SUPPORT

Email: treborservice@idexcorp.com

Phone Number: (801) 244-6156

7.3 REGIONAL REPRESENTATIVES

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