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...Innovative liquid vaporizing and gas mixing solutions

TORREXX

Vertical electric single core vaporizer

Operations & Maintenance Manual

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WARNING

Read the OPERATION MANUAL before operating this equipment.

- **NOTE:** Algas-SDI reserves the right to use alternate manufacturers' components as vendor delivery applicability dictates. Vendors have supplied literature contained in the Operation Manual. Please check to be sure supplied data matches your configuration. Contact Algas-SDI if any questions exist.
- This equipment uses LPG - a flammable fuel, or NH₃ - a toxic gas, (depending on the model), handled under pressure. Inherent hazards exist and a thorough understanding of the equipment is required to allow safe operation and maintenance.
- Allow only a **TRAINED and FULLY QUALIFIED PERSON** to service this equipment.
- Any time a component must be replaced use the same type, model etc. **DO NOT SUBSTITUTE!** The consequence from such actions is unpredictable and may lead to dire consequences. When components are replaced with components not approved for use in our FM/CSA listed equipment, the FM/CSA listing becomes void for that unit.

WARRANTY REGISTRATION

To register your new equipment: Visit **Algas-SDI's** web site at: algas-sdi.com, then click on the "Tech Support" button. Select online Registration or print out the Acrobat Warranty Registration.

OR

Fill out the Warranty Registration information on the last page of this manual. Then make a photocopy and mail to the address shown at the bottom.

WARRANTY, COPYRIGHTS AND APPROVALS

WARRANTY

Algas-SDI International, LLC (**ASDI**) warrants that the equipment is free of defects in materials and workmanship under normal use and service. **ASDI** agrees to repair or replace, at our option, without charge f.o.b. factory, any part which has proven defective to the satisfaction of Algas-SDI International, LLC within one (1) year from the date of the original installation or within 18 months from the date of shipment, whichever is earlier. Equipment, which in the opinion of **ASDI**, has been damaged by improper installation or operation, or has been abused or tampered with in any way, will not be accepted for return under warranty.

Algas-SDI International, LLC will not accept back charges for work performed by others upon or in conjunction with **ASDI** equipment, unless prior authorization is given by means of an Algas-SDI International, LLC purchase order. Algas-SDI International, LLC will not be liable by reason of shutdown, non-operation or increased expense of operation of other equipment, or any other loss or damage of any nature, whether direct or consequential, arising from any cause whatsoever.

Algas-SDI International, LLC makes NO other warranty of any kind, whatsoever expressed or implied; and all warranties of merchantability and fitness for a particular purpose are hereby disclaimed by Algas-SDI International, LLC and excluded from these terms of sale. No person has any authority to bind Algas-SDI International, LLC to any representation or warranty other than this warranty.

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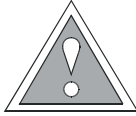
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APPROVALS



SYMBOLS AND CONVENTIONS

Special symbols are used to denote hazardous or important information. You should familiarize yourself with their meaning and take special notice of the indicated information. Please read the following explanations thoroughly.



GENERAL WARNING OR CAUTION

This symbol indicates hazards or unsafe practices, which can result in damage to the equipment or cause personal injury. Use care and follow the instructions given.



FLAMMABLE GAS HAZARD

This symbol indicates a potential hazard, which can result in severe personal injury or death. Use extreme care and follow the instructions given.



ELECTRICAL DISCONNECT REQUIRED

This symbol indicates a potentially dangerous situation, which can result in severe personal injury or death or damage to equipment. Use great care and follow the instructions given.

ASDI CONTACT NUMBERS

If you have questions, need help with your equipment, or want information on other products, contact Algas-SDI at:

Telephone: 206.789.5410

Facsimile: 206.789.5414

Email: sales@algas-sdi.com

Internet: <http://www.algas-sdi.com>

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TORREXX AMMONIA VAPORIZER DATA SHEET (NEMKO)	
HEATER BUSSING DIAGRAMS	
COMPONENT SPECIFICATION	
Warranty Registration – Refer to the nameplate on the unit to fill out the product registration. Then photocopy and mail to address shown.	

DESCRIPTION

The dimensional drawing (see below) identifies the various components of the **Algas-SDI TORREXX** vaporizer. Multiple resistance heating elements provide thermal energy to the finned aluminum heat exchanger. A solid state controller monitors the heat exchanger temperature and regulates the operating temperature to a predetermined set point. The controls consist of 2 individual K-type thermocouple sensors with independent high temperature limits. One sensor monitors operating temperature and the other controls the liquid inlet solenoid valve. The liquid inlet solenoid valve does not open until a predetermined warm-up temperature is reached. The vaporizer reaches operating temperature in approximately 60 seconds from a cold start. The vaporized LPG rises into the vapor header and exits through the vapor outlet. The Liqui-SAFE™ Valve is specially developed to prevent liquid from going downstream.

The TORREXX Vaporizer can be configured for many applications.

- ◆ Standard configuration for Class I, Division 1, Group D for use with propane and LPG applications, FM and cFM approvals
- ◆ European configuration for propane and LPG, NEMKO & CE mark.
- ◆ Feedback configuration for Class I, Division 1, Group D for Propane, LPG and Ammonia (NH₃ Version) for tank heater applications where adequate tank pressure must be maintained.
- ◆ Ammonia (NH₃ Version) configuration for Class I, Division 1, Group D applications with FM and cFM approval for use with ammonia.
- ◆ The TORREXX™ vaporizer can be manifolded together for increased capacity on a single skid. Consult Algas-SDI for Configuration information.
- ◆ The TORREXX™ vaporizer can be packaged with an Algas-SDI mixing system on a single skid. Consult Algas-SDI for Configuration information.
- ◆ For customizing the TORREXX™ vaporizer to your requirements consult Algas-SDI for information.

Figure 1 – TORREXX Dimensional Drawing (LPG Version)

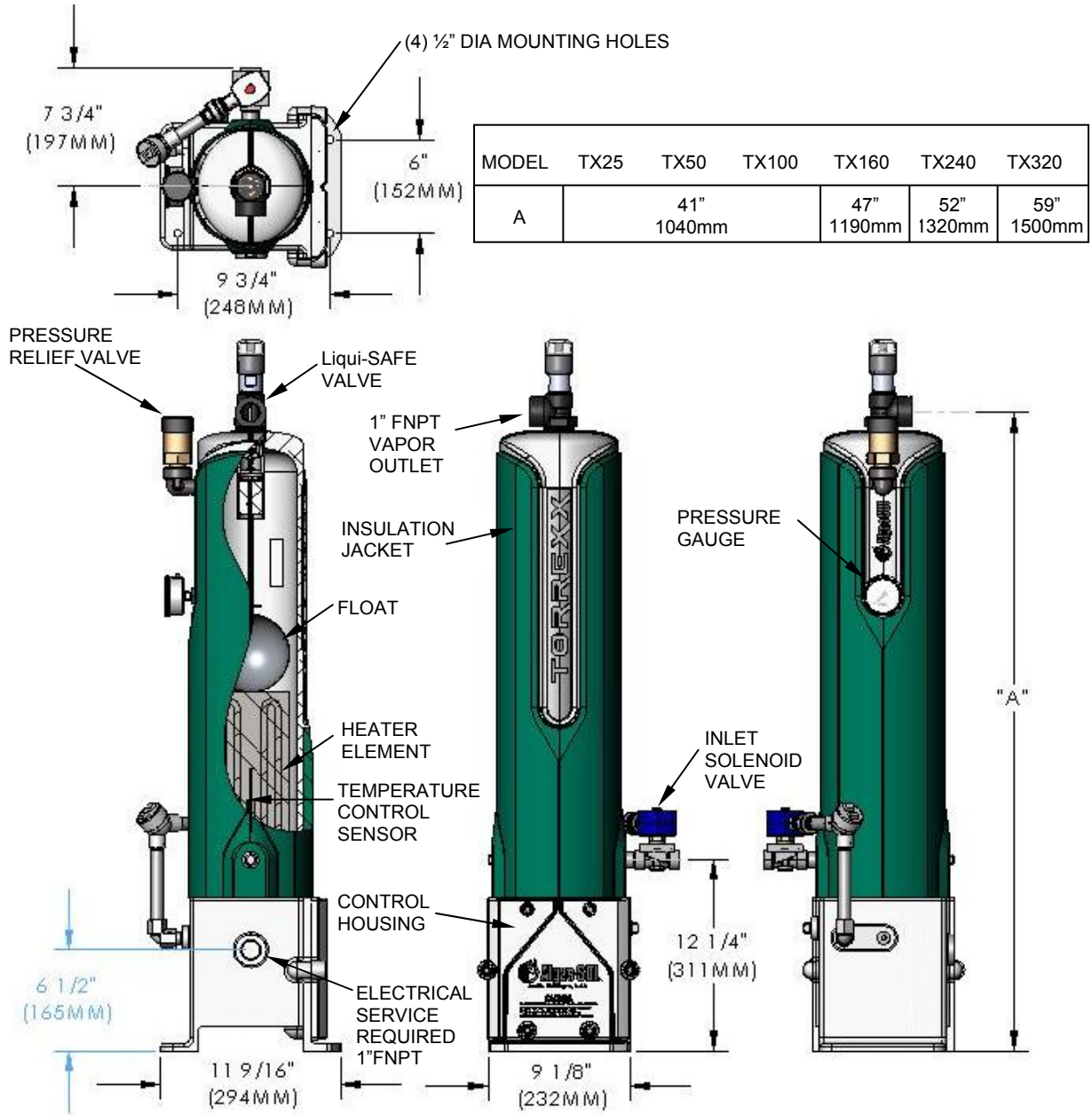
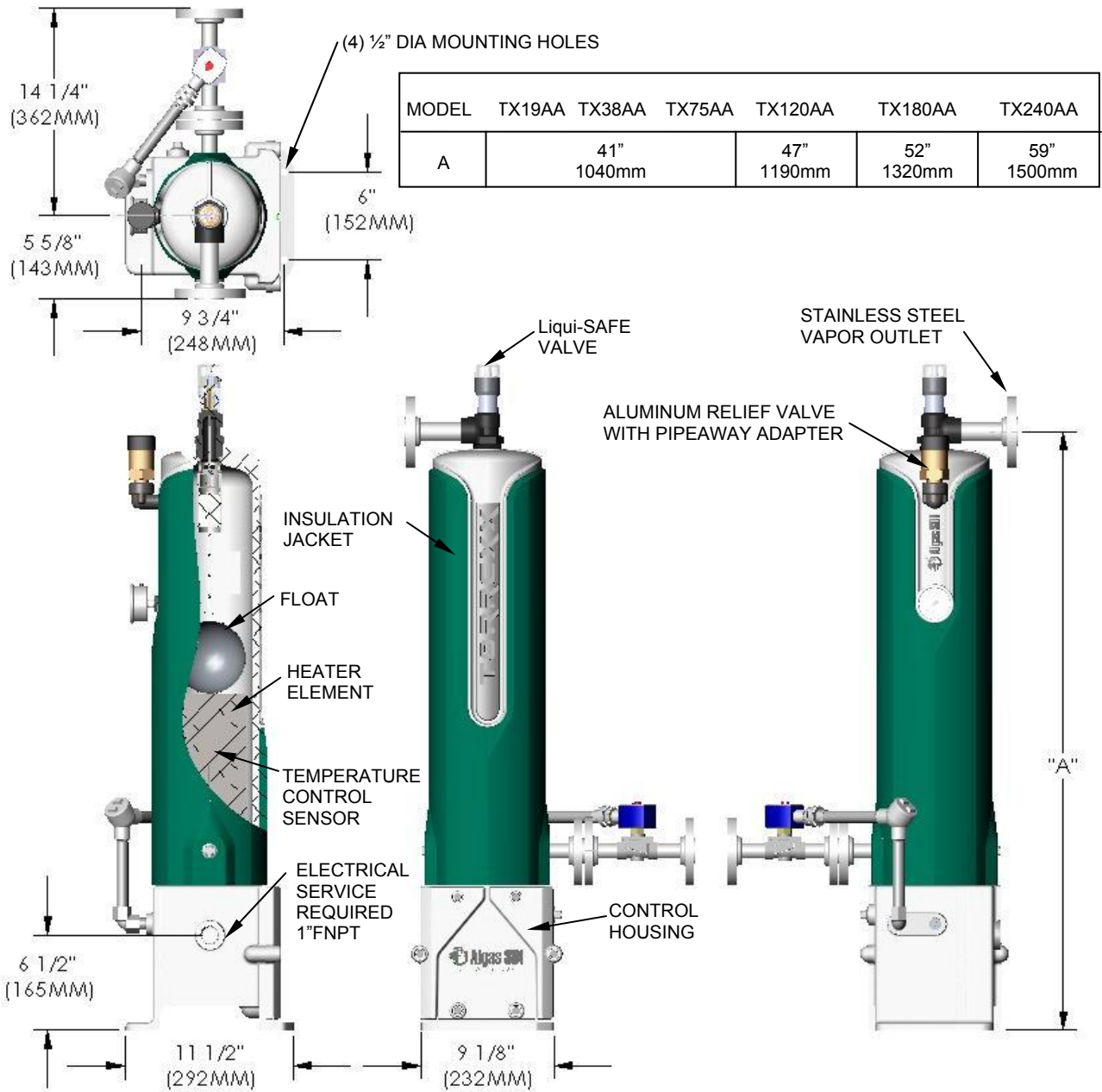


Figure 2 – TORREXX Dimensional Drawing (NH₃ Version)



TORREXX VAPORIZER OPTIONS

Your TORREXX™ vaporizer may be equipped with one or several of the factory options. All the options can be integrated to your TORREXX™ vaporizer and are designed to enhance convenience to the user.

Below is a brief introduction to the options available for the TORREXX™ vaporizer. See SECTION 8 of this manual or contact Algas-SDI for more information.

- 1) **Valve and Strainer Package** – This kit includes the correct sized ball valve, globe valve and strainer for the vaporizer installation.
- 2) **Contaminant Separator (Filtaire)** – The Algas-SDI Filtaire™ is a filtering device design to trap heavy hydrocarbons commonly present in LPG gas vapor. It also traps other materials, which may be in the gas due to storage conditions and internal condition of the equipment.
- 3) **Pipe Away Adapter** – Allows relief valve to be piped away.
- 4) **TORREXX Stand** – Elevates TORREXX Vaporizer 1 foot off the ground for access and protection from the elements.
- 5) **Stabilaire Pump Package** – Consult factory
- 6) **Economy** – Consult factory
- 7) **Remote Control** – Consult Factory

MAJOR COMPONENTS

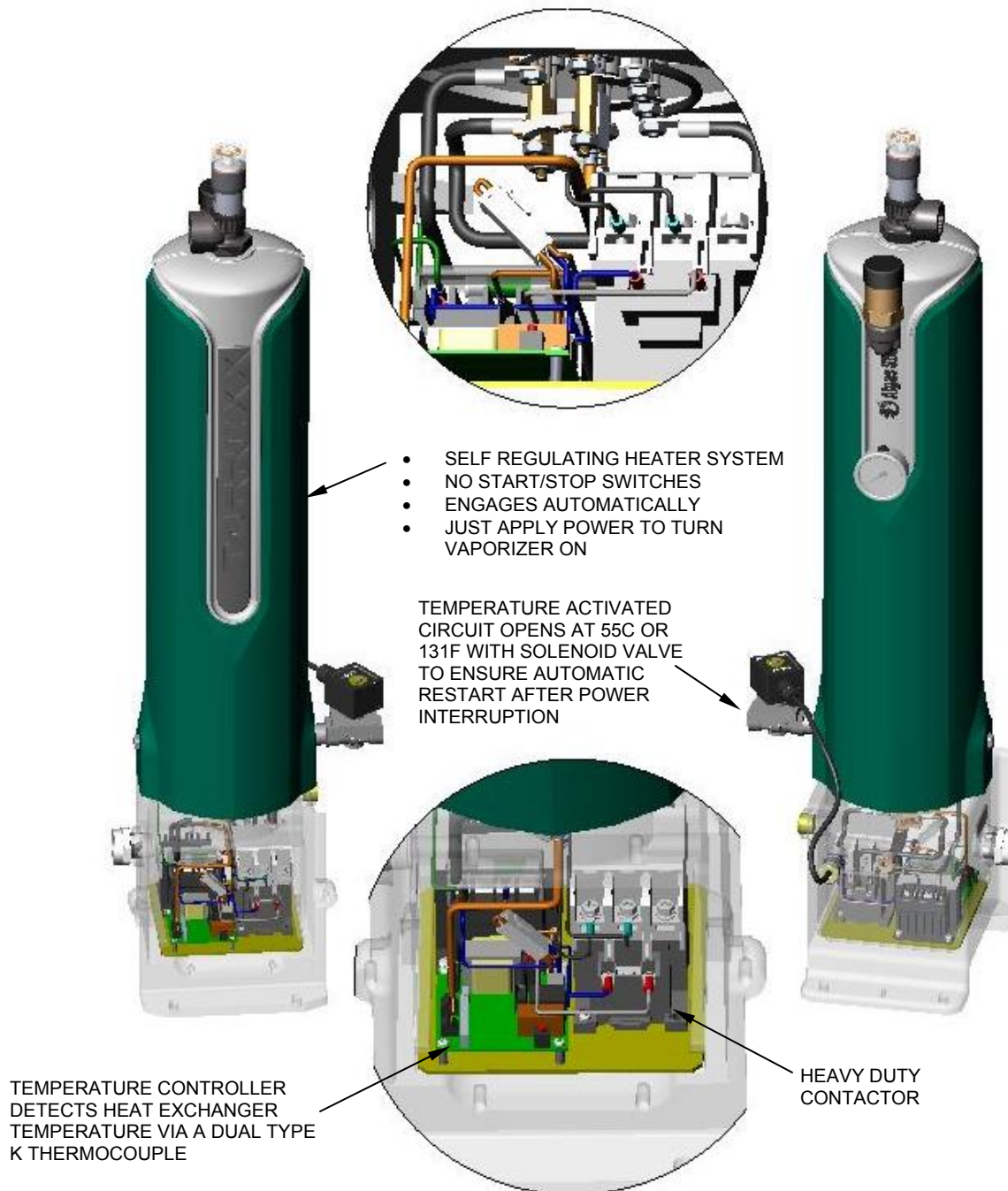
2

Your New TORREXX™ vaporizer is designed to be reliable and user friendly. Several features allow you to quickly determine the status of your vaporizer.

There are two basic control systems within a TORREXX™:

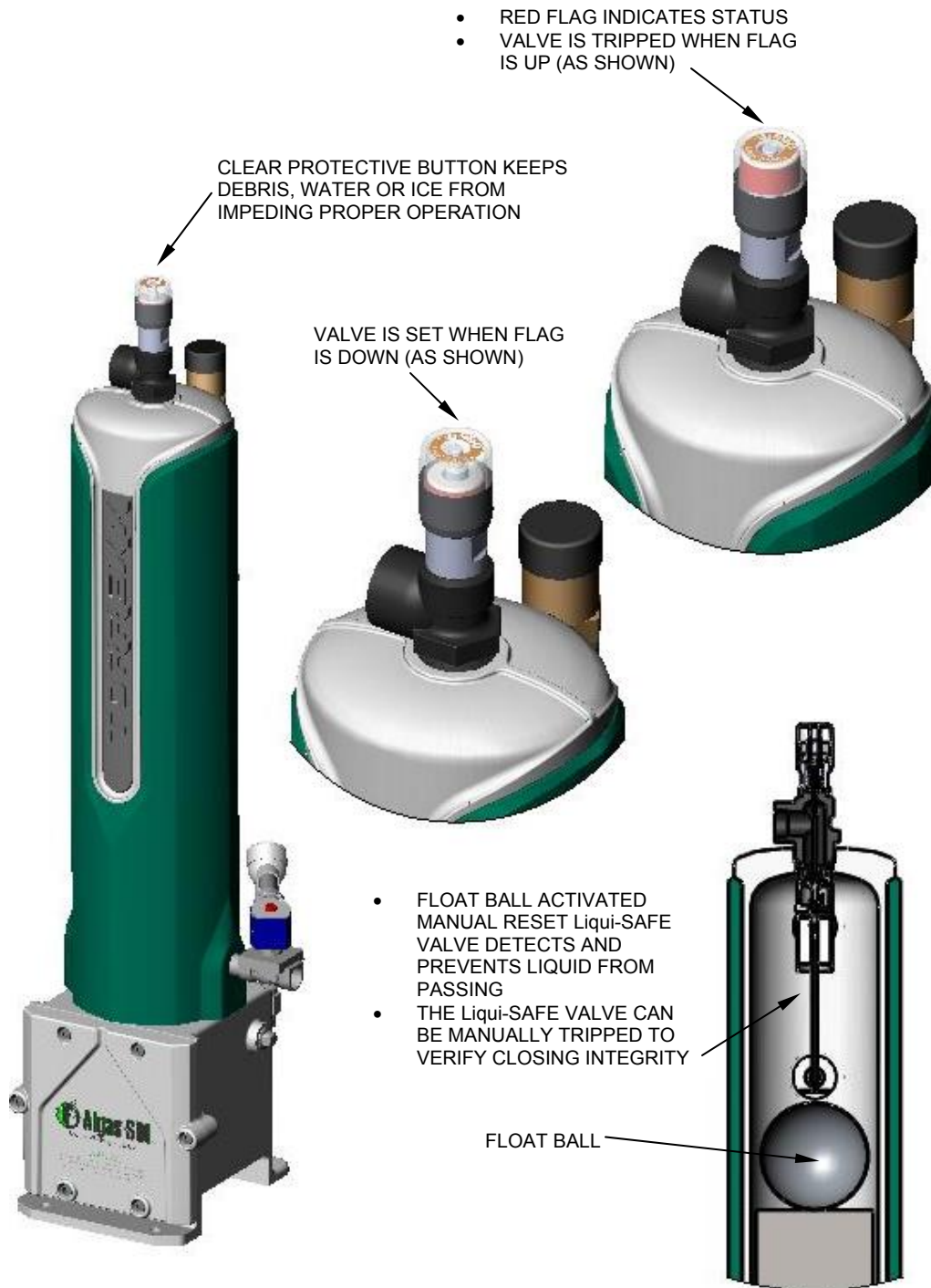
- 1) Heating system – Figure 3
- 2) Liquid Passage Prevention system – Figure 4

Figure 3 – Heating system



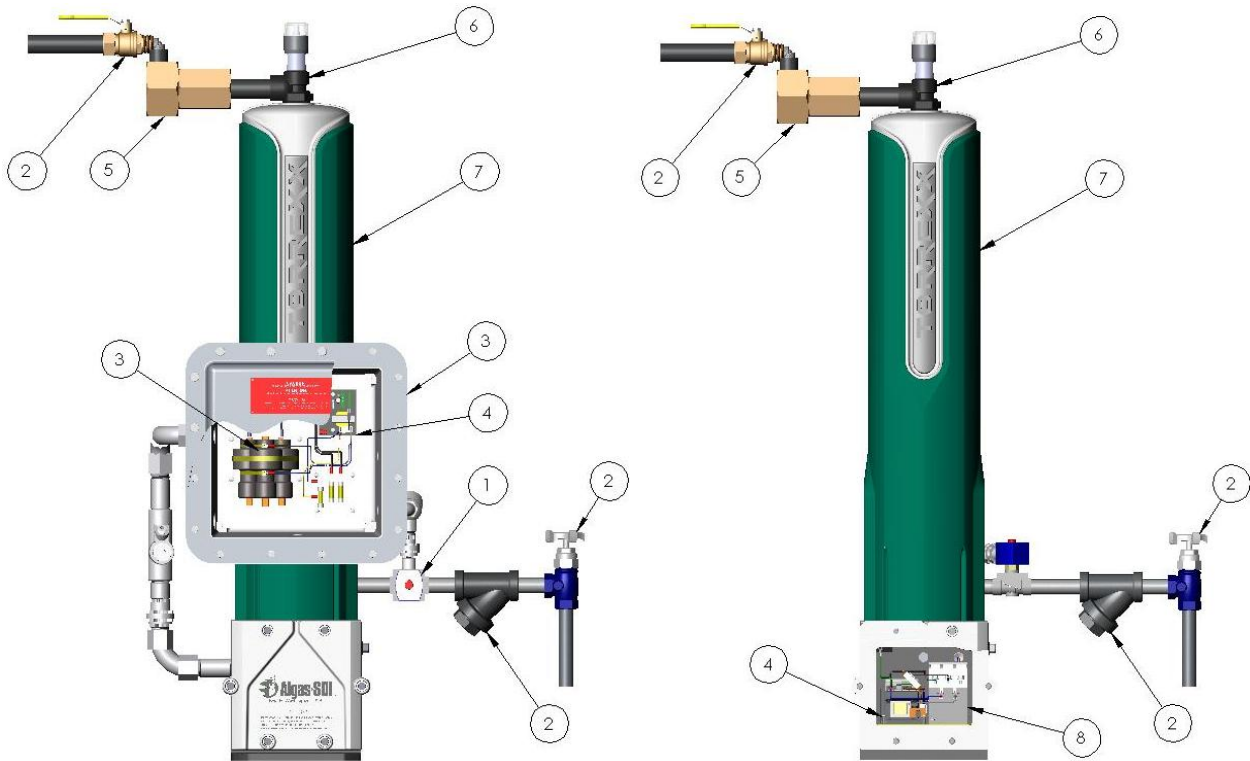
TX100 SHOWN (CE CONFIGURATION) WITH NO OPTIONS

Figure 4 – Liquid Passage Prevention system



TX100 SHOWN (FM/cFM CONFIGURATION) WITH NO OPTIONS

Figure 5 – TORREXX Major Components Drawing (LPG CONFIGURATION)



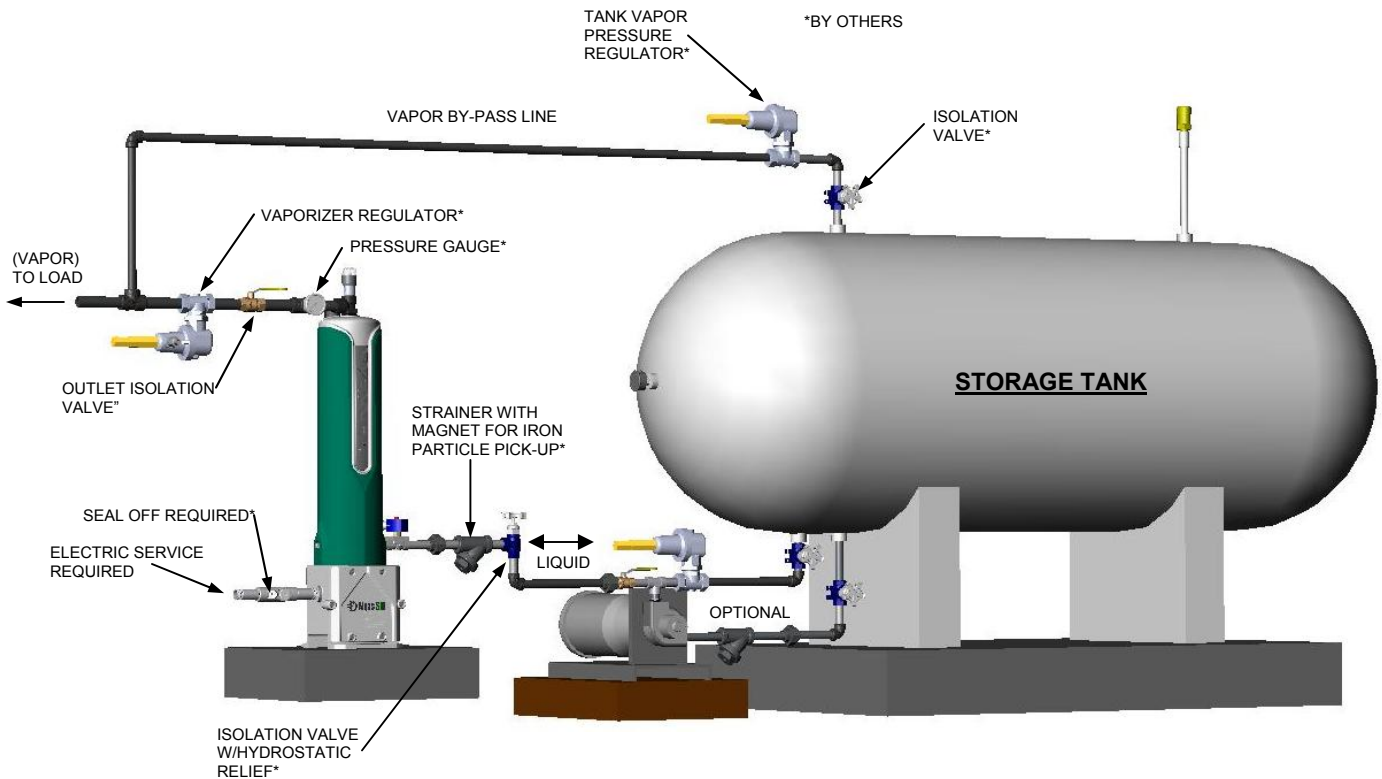
- 1) Liquid Inlet Solenoid Valve
- 2) Valve, Gauge and Strainer kit components (Optional)
- 3) Mercury Relay kit (Optional)
- 4) Control Circuit Board
- 5) Economy Valve (Optional)
- 6) Liqui-SAFE™ Valve with manual reset
- 7) Insulation Jacket
- 8) Contactor

GENERAL

Install the ASDI TORREXX vaporizer on a level firm base at least 6" above grade and secure it through the four 1/2" holes. Protect the equipment against damage by moving vehicles by use of an appropriate barrier. Consult state, provincial, insurance carriers, and local authorities for installation requirements. Clean all foreign material from all pipelines prior to making final connections. All joints require a pipe sealant approved for LPG, depending on type of service. Test for leaks using an inert gas, such as compressed carbon dioxide or nitrogen, at 1 1/2 times the working pressure or as required by applicable codes. Check all connections using an appropriate leak detection solution or device. Even very small leaks are unacceptable. Eliminate all leaks prior to operation.

Install in accordance with applicable codes and local regulations as required.

Figure 6 - Typical TORREXX Installation Drawing with Pump & Vapor Bypass



NOTES

1. LIQUID PIPING LOSSES BETWEEN VAPORIZER AND THE TANK MUST NOT EXCEED HYDROSTATIC HEAD WHEN THE PUMP IS SHUT OFF.
2. INSTALL VAPORIZER 1ST STAGE REGULATOR UPSTREAM OF THE TANK VAPOR PRESSURE CONNECTION POINT.
3. SET 1ST STAGE VAPORIZER REGULATOR 2-4 PSIG HIGHER THAN TANK VAPOR PRESSURE REGULATOR SET-POINT.
4. NO CHECK VALVES IN LIQUID LINE. LIQUID MUST BE ABLE TO FLOW IN BOTH DIRECTIONS

Note: The vapor bypass line is not required except when you have the Economy Operation option. In other installations, it is recommended because it will provide vapor from the tank to the load in case of vaporizer failure or power failure but it is not required. The vaporizer will operate properly without the bypass.

Figure 7 - Typical TORREXX Installation Drawing with Vapor Bypass and No Pump

NOTES

1. LIQUID PIPING LOSSES BETWEEN VAPORIZER AND THE TANK MUST NOT EXCEED HYDROSTATIC HEAD WHEN THE PUMP IS SHUT OFF.
2. INSTALL VAPORIZER 1ST STAGE REGULATOR UPSTREAM OF THE TANK VAPOR PRESSURE CONNECTION POINT.
3. SET 1ST STAGE VAPORIZER REULATOR 2-4 PSIG HIGHER THAN TANK VAPOR PRESSURE REGULATOR SET-POINT.
4. NO CHECK VALVES IN LIQUID LINE. LIQUID MUST BE ABLE TO FLOW IN BOTH DIRECTIONS

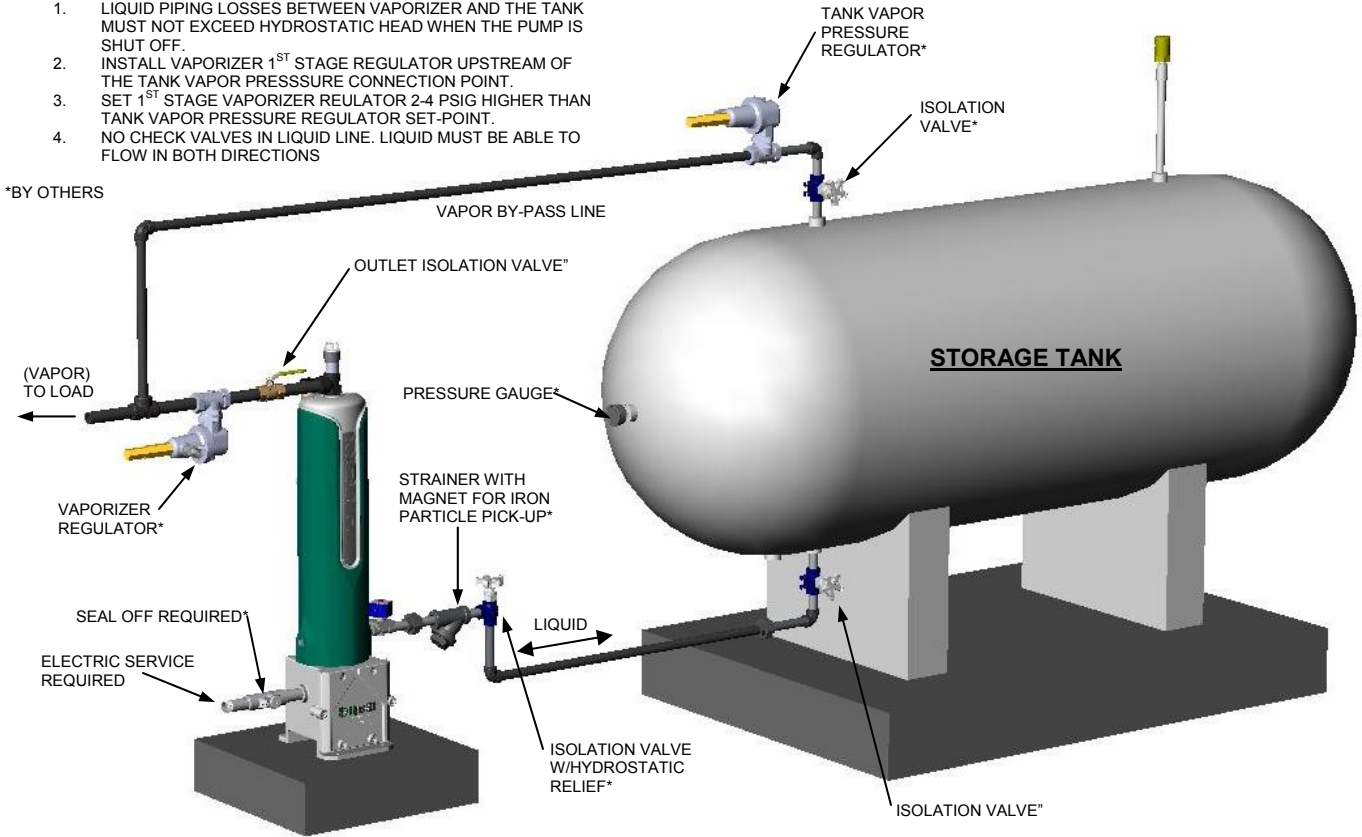
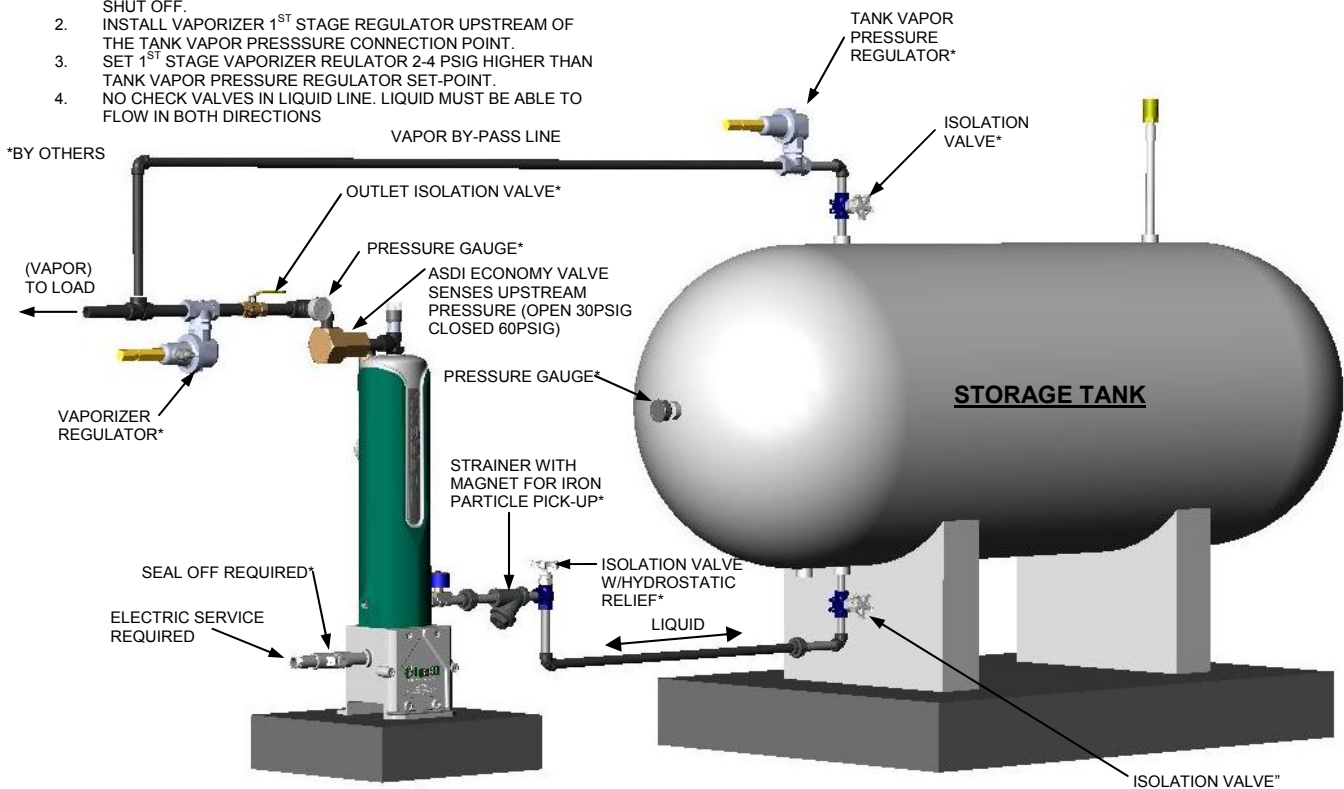


Figure 8 - Typical TORREXX Installation Drawing with Economy Operation and Vapor Bypass

NOTES

1. LIQUID PIPING LOSSES BETWEEN VAPORIZER AND THE TANK MUST NOT EXCEED HYDROSTATIC HEAD WHEN THE PUMP IS SHUT OFF.
2. INSTALL VAPORIZER 1ST STAGE REGULATOR UPSTREAM OF THE TANK VAPOR PRESSURE CONNECTION POINT.
3. SET 1ST STAGE VAPORIZER REULATOR 2-4 PSIG HIGHER THAN TANK VAPOR PRESSURE REGULATOR SET-POINT.
4. NO CHECK VALVES IN LIQUID LINE. LIQUID MUST BE ABLE TO FLOW IN BOTH DIRECTIONS



Note: Economy option cannot be used on an installation that requires a pump.

Figure 9 – Typical TORREXX Installation Drawing for Manifolding 2 Vaporizers

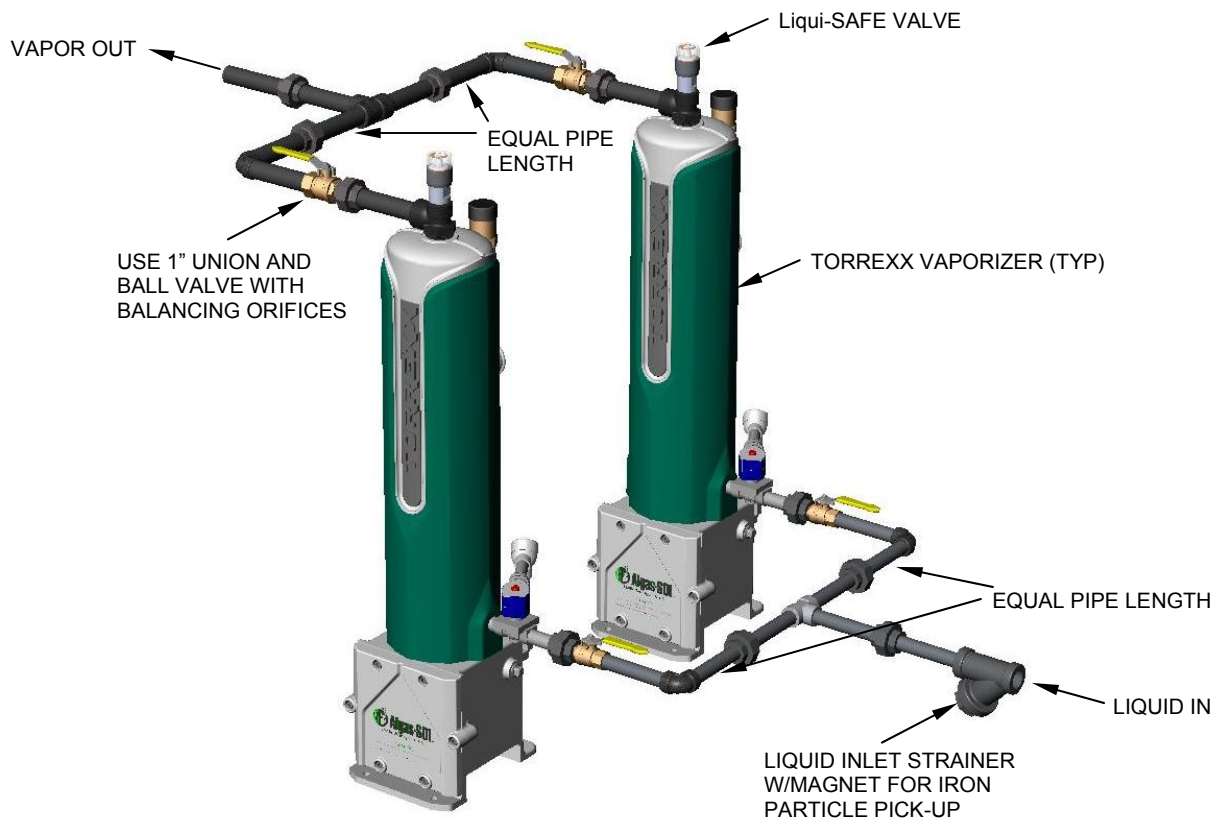
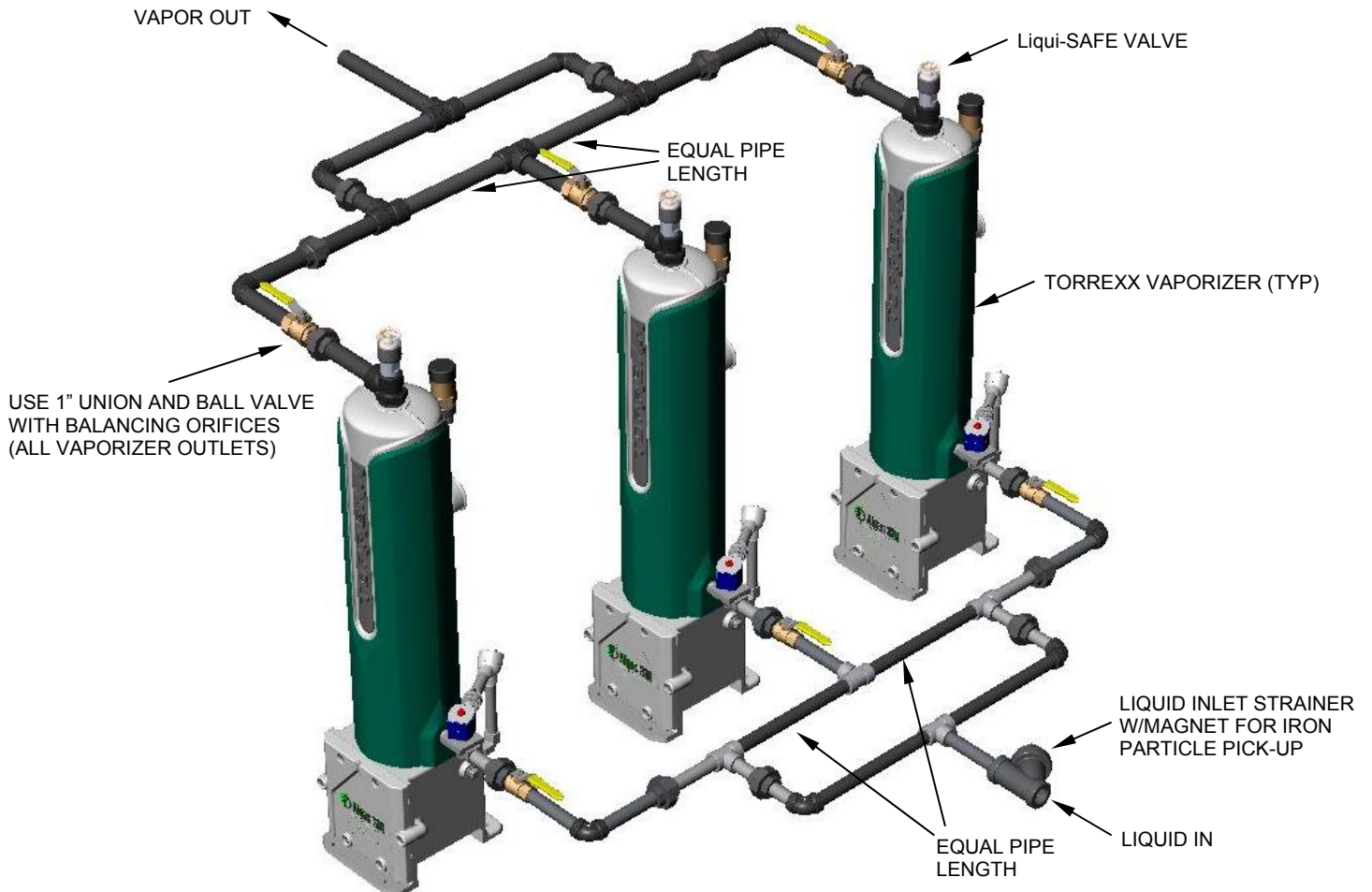
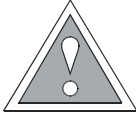


Figure 10 – Typical TORREXX Installation Drawing for Manifolding 3 Vaporizers



LIQUID LINE

Size the liquid line from the storage tank to the vaporizer to supply the vaporizer at full capacity with a minimal pressure drop. A liquid line-sizing chart is provided in **Table 6**. Install a liquid line strainer with magnet for iron particle pickup at the vaporizer inlet.



CAUTION

A liquid pump must be installed if the pressure drop in the liquid line between the vaporizer and the tank exceeds the hydrostatic liquid head in the storage tank. ONE FOOT OF LIQUID PROPANE EQUALS .21 PSI! Liquid line frosting is a sure indication of too much pressure drop in the liquid line.

LIQUID PUMP

Is a Liquid Pump necessary? What are your vapor pressure requirements?

Pressure in the storage tank depends on temperature See Table 5. A good “rule of thumb” for determining when a Liquid Pump is necessary is this: If the storage pressure will not always exceed the required distribution pressure by 5 psig (0.35 kg/cm²), a pump is necessary. Install an ASDI STABILAIRE Liquid Pump in the liquid line close to the storage tank. To prevent cavitation, place the liquid strainer at least five feet upstream of the pump inlet. Typically a pump is not required unless a mixing system is used or temperature at the installation will be extremely low, causing the pressure to drop below the required process pressure.

VAPOR LINE

Install an appropriate regulator immediately downstream of the vapor outlet port. Pipe from the outlet port of the regulator to the distribution system. Further reduction of downstream pressure requires a “Second Stage” regulator close to the consuming equipment. Properly sized piping and regulators will insure satisfactory service.

NOTE

For safety reasons both FIRST and SECOND stage regulators must be 250 psig (17.58 cm/kg²) inlet pressure rated!

SAFETY RELIEF VALVE

If the vaporizer is to be installed within an enclosure or building, VENT THE SAFETY RELIEF VALVE OUTSIDE THE ENCLOSURE AND REDIRECT THE DISCHARGE UPWARD. A pipe-away adapter must be used at the relief valve. Always install a rain-cap or similar device to prevent water and other debris from entering the relief discharge. If water enters, it may freeze and prevent the relief valve from proper discharge, creating a potentially hazardous situation.

ELECTRICAL SERVICE

The rating plate on the vaporizer and the data sheet provided with the manual provides your specific vaporizer's electrical power requirements and the drawing numbers of the appropriate wiring diagrams and schematics. This unit is constructed to meet NFPA 70 Class I, Division 1, Group D requirements. All wiring to the unit, including the ground connection, must meet the applicable codes for the area in which it is being installed. Wire size and type must comply with the applicable codes for the area in which it is being installed. The Tables 1 through 4 list the recommended wire size for the different models. Those tables are to be used as guides only. Provide a fused disconnect outside of the classified area. If it is not within sight of the vaporizer, the fused disconnect must have a locking device. Run wire within rigid conduit, and install a seal-off at the connection of the field conduit to the vaporizer.

WIRE SIZE

When selecting the type and size of wire used to install the TORREXX series electric vaporizers, please take into account the following environmental information:

- Maximum enclosure surface temperature: 65° C (150°F).
- Maximum enclosure ambient temperature: 65° C (150°F).
- Maximum temperature allowed at contactor terminals: 90° C (195° F).
- Current draw of vaporizer: Indicated on vaporizer rating plate and on the data sheet.
- Contactor terminal lug wire size range: #2 - 10.

As the length of the wire run affects the overall wire size requirements, always refer to NFPA 70 (NEC) for proper wire selection. Several wire-sizing charts have been provided for determining the size of wire required due to load and length of wire.

When installing the wire it is important to have a good connection at the terminal lugs. Loose terminals may cause an excessive temperature rise at the terminal lugs, which can lead, to premature contactor failure, transformer failure, and/or overheating and possible destruction of the transformer. For this reason it is strongly recommended that the wire terminations be checked and re-tightened periodically to prevent excessive overheating at the terminals due to loose connections.

Table 1 – Wire Length Chart [#4 AWG]

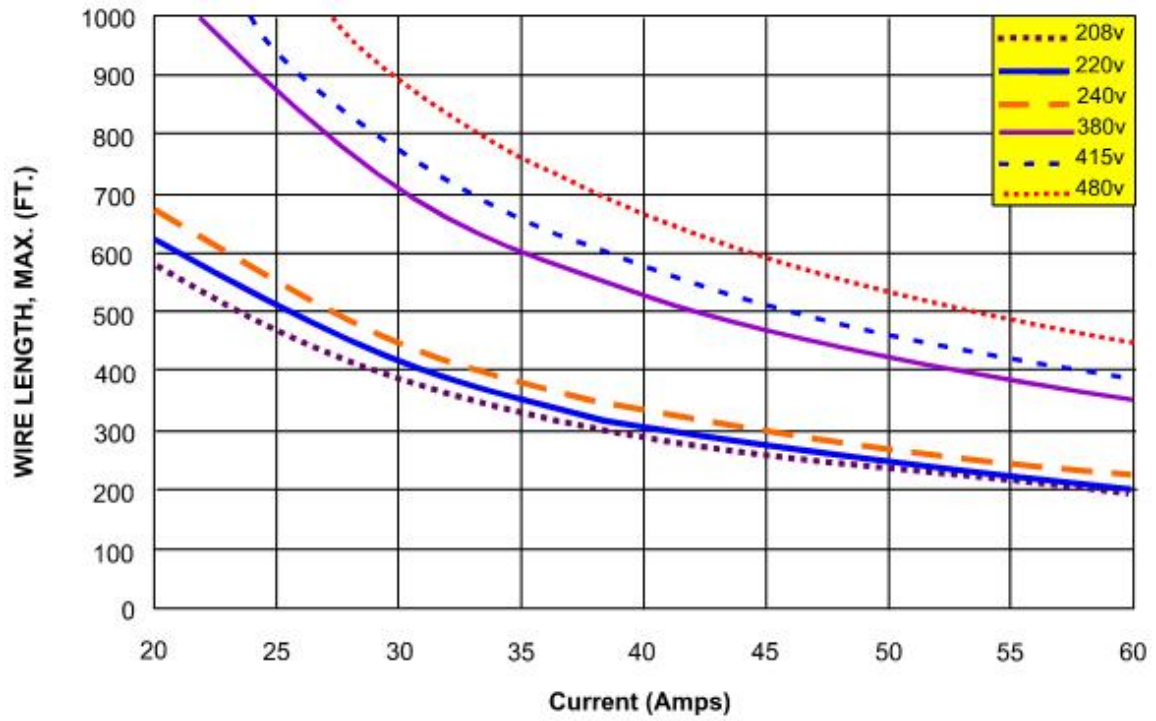


Table 2 – Wire Length Chart [#6 AWG]

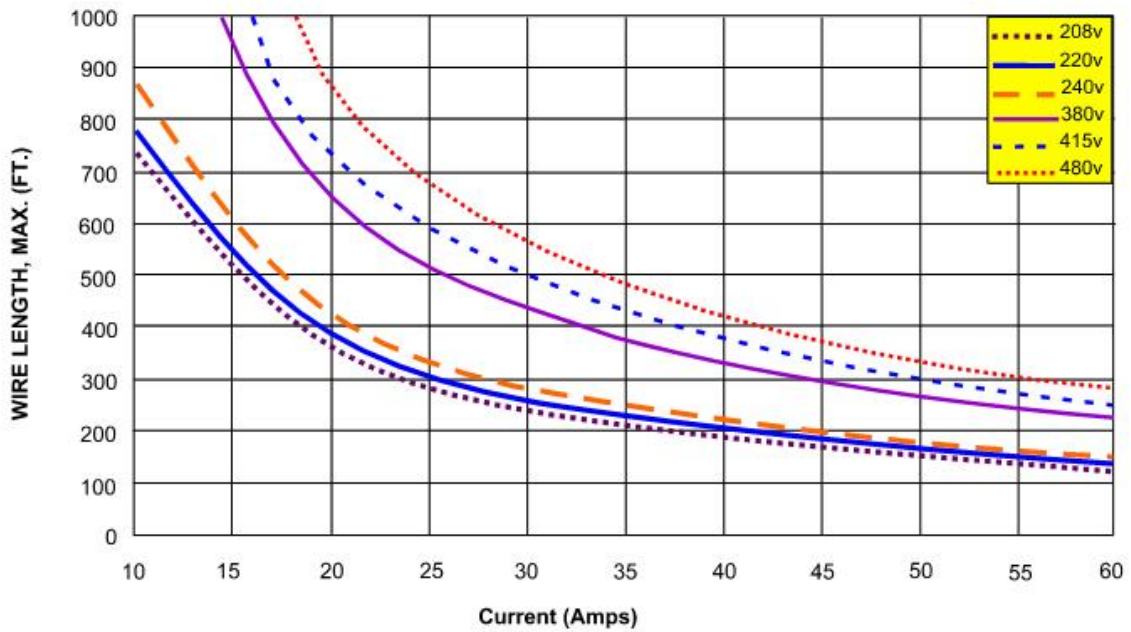


Table 3 – Wire Length Chart [#8 AWG]

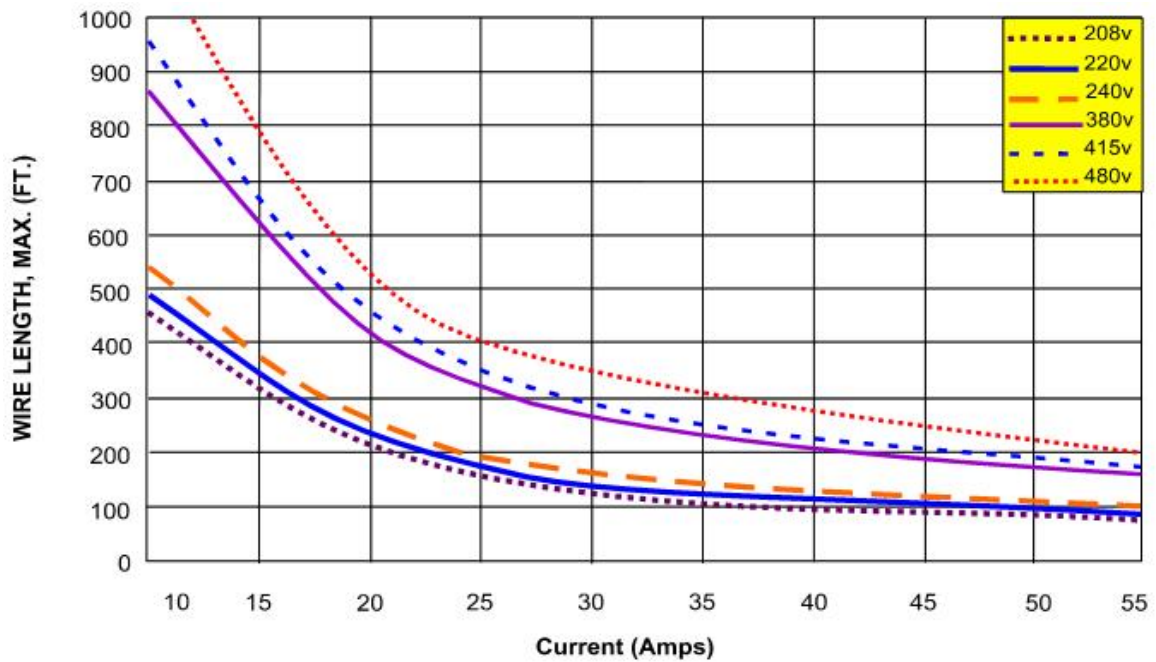


Table 4 – Wire Length Chart [10 AWG]

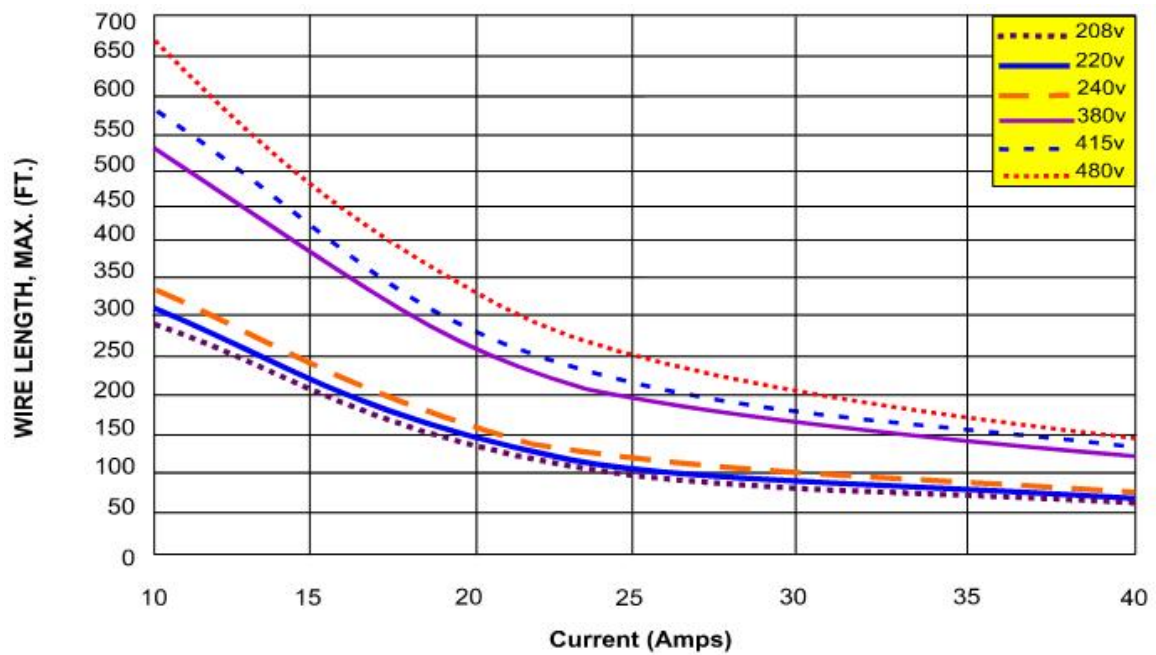


Table 5 – Liquid Temperature vs. Tank Pressure Chart

Liquid Temperature		Propane		Butane		Ammonia	
		Tank Gauge Pressure		Tank Gauge Pressure		Tank Gauge Pressure	
°F	°C	PSI	kPa	PSI	kPa	PSI	kPa
-43.73	-41.65	0	0				
-40	-39.6	1.3952	9.6196				
-30	-36.85	3.421	23.5871				
-30	-34.1	5.639	38.877				
-25	-31.35	8.06	55.57			1.234	8.511
-20	-28.6	10.697	73.751			3.539	24.401
-15	-25.85	13.561	93.503			6.156	42.648
-10	-23.1	16.666	114.91			8.968	61.834
				NOTE: Below 30°F or -10°C, Butane is a liquid at normal atmospheric pressure.			
-5	-20.35	20.024	136.06			12.216	84.228
0	-17.6	23.648	163.05			15.622	107.710
5	-14.85	27.551	189.96			19.565	134.893
10	-12.1	31.747	218.88			23.688	163.323
15	-9.35	36.248	249.92			28.424	195.977
20	-6.6	41.068	283.15			33.366	230.051
25	-3.85	46.222	318.69			39.001	268.899
30	-1.1	51.723	356.67			44.867	309.347
35	1.65	57.586	397.04	1.25	8.6185	51.513	355.168
40	4.4	63.825	440.06	2.92	20.133	58.418	402.778
45	7.15	70.455	485.77	4.82	33.233	66.035	455.295
50	9.9	77.49	534.27	6.85	47.229	74.254	511.963
55	12.65	84.945	585.68	9	62.053	83.106	572.996
60	15.4	92.836	640.08	11.32	78.049	92.622	638.606
65	18.15	101.179	697.6	13.82	95.286	102.84	709.057
70	20.9	109.988	758.34	16.5	113.76	113.78	784.486
75	23.65	119.28	822.4	19.3	133.07	125.49	865.223
80	26.4	129.0715	889.91	22.44	154.72	137.99	951.408
85	29.15	139.737	963.45	25.81	177.95	151.33	1043.384
90	31.9	150.215	1035.7	29.21	201.4	165.54	1141.358
95	34.65	161.603	1114.21	32.67	225.25	181.12	1248.778
100	37.4	173.558	1196.64	36.67	252.83	196.7	1356.199
105	40.15	186.098	1283.1	41.02	282.82	214.235	1477.098
110	42.9	199.241	1373.72	46.57	321.09	231.77	1597.998
115	45.65	213.007	1468.63	50.28	346.67	251.415	1733.445
120	48.4	227.414	1567.96	55.28	381.14	271.06	1868.893
125	51.15	242.483	1671.86	60.53	417.34	292.97	2019.957
130	53.9	258.235	1780.47	66.13	455.95	314.88	2171.021
135	56.65	274.691	1893.93	72.13	497.32	339.21	2338.771
140	59.4	291.875	2012.4	78.17	538.96	363.54	2506.520

Table 6 – LPG liquid line sizing chart (Minimum Pipe Size)

Capacity of units MMBTU (Kcal)	Distance from storage to vaporizer - feet (meters)*									
	Kg	LBS (GPH)	25 (8)	50 (15)	75 (23)	100 (31)	150 (36)	200 (61)	300 (92)	400 (122)
1.146 (288,792)	25	55 (12.5)	½"	½"	½"	½"	½"	¾"	¾"	¾"
2.292 (557,584)	50	110 (25)	½"	½"	½"	¾"	¾"	1"	1"	1"
4.584 (1,155,168)	100	220 (50)	½"	¾"	¾"	¾"	1"	1"	1"	1¼"
7.280 (1,834,537)	160	352 (80)	¾"	¾"	1"	1"	1"	1¼"	1¼"	1¼"
10.920 (2,751,806)	240	530 (120)	1"	1"	1¼"	1¼"	1¼"	1½"	1½"	1½"
14.665 (3,668,800)	320	530 (160)	1"	1"	1¼"	1¼"	1¼"	1½"	1½"	1½"

Table 7 – Equivalent Pipe Length of Various Valves and Fittings (Length in Feet/Meters)

Size/Description	½" (1.27 cm)	¾" (1.91 cm)	1" (2.54 cm)	1 ¼" (3.18 cm)	1 ½" (3.81 cm)
Globe Valve	15.5/4.72	21/6.40	27/8.23	36/10.97	43/13.11
Gate Valve	0.6/0.18	0.8/0.24	1/0.30	1.4/0.43	1.6/0.49
Angle Valve	8/2.44	11/3.35	14/4.23	18/5.49	21/6.40
Elbow, 90	1.4/0.43	1.9/0.58	2.4/0.73	3.2/0.98	3.8/1.19
Elbow, 45	0.7/0.21	1/0.30	1.2/0.37	1.6/0.49	2/0.61
Elbow, 90 STR	2.3/0.70	3.1/0.94	4/1.22	5.3/1.62	6.3/1.92
Tee	2.7/0.82	3.7/1.13	4.8/1.46	6.4/1.95	7.5/2.29

GENERAL

The TORREXX Electric Vaporizer utilizes a finned cast aluminum heater core. The heater core contains multiple cast-in resistance heater elements. Multiple wiring configurations allow a variety of AC input voltages to suit local power supply requirements.

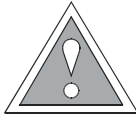
Liquid LPG enters the vaporizer through the Liquid Inlet Solenoid Valve at the base of the pressure vessel.

During operation, a K-type thermocouple temperature sensor and solid state control system maintain the core temperature at 165°F (74°C) for LPG models and 195°F (90°C) for Ammonia models. As the temperature increases on start the Liquid Inlet Solenoid Valve opens at 131°F (55°C) liquid enters the vaporizer and comes in contact with the heater core. Vaporization results as the liquid extracts energy (heat) from the heater core. As the heater core cools, the Temperature Sensor provides a signal to the control system to energize the heater power contactor, applying power to the heater elements.

OPERATING INSTRUCTION

- 1) Complete the installation and leak test.
- 2) Check current and voltage to verify proper operation of the vaporizer.
- 3) This unit will not be damaged by operating the unit in a “dry” condition. It is not necessary to have liquid in the unit for testing or evaluation.
- 4) Normal operating temperature is 165°F (74°C). Use caution when working around vaporizer.

STARTING THE VAPORIZER



CAUTION

Do not start the vaporizer when both inlet and outlet hand valves are closed. Pressure can build in the vaporizer during startup and blow the relief valve.

- 1) Close the outlet isolation valve.
- 2) Open all valves between the storage tank and the vaporizer to allow liquid flow to the vaporizer when the solenoid valve opens.
- 3) Power unit. A small “click” should be heard immediately afterwards. The vaporizer heater elements are now energized. It will take approximately 60 seconds for the vaporizer to reach operating temperature. After the unit reaches operating temperature, the Inlet Solenoid Valve would open automatically to allow LPG to enter. Wait approximately 2 minutes so that excess LPG is pushed back to the storage tank.
- 4) Carefully press the Button on top of the Liqui-SAFE™ valve all the way down and SLOWLY release it. A latch mechanism inside the Liqui-SAFE™ valve will keep the Red Flag at the down position, indicating the valve is open.
- 5) The TORREXX vaporizer is now ready to supply vapor. Slowly open the outlet isolation valve to pressurize the supply piping. Then, fully open the outlet isolation valve to allow vapor to flow to the load. The heater will cycle automatically to match the flow conditions.

STOPPING THE VAPORIZER

- 1) Close the outlet isolation valve.
- 2) Disconnect power.

GENERAL

The TORREXX vaporizer is designed for long term trouble free operation. Because of the nature of its use, and the severe duty it receives, it is important to provide scheduled maintenance. A list of RECOMMENDED SPARE PARTS is located in the back of this manual.

- 1) Clean the liquid inlet strainer after the first month of operation. Thereafter, check every 6 months.
- 2) Annually, make a visual check of the safety relief valve located at the top of the unit. Replace if any sign of leaking is observed. The relief valve is not serviceable in the field. Be sure it is covered with an appropriate plastic cap to prevent rain and debris from entering.
- 3) Every 6 months, make a performance check on the Liqui-SAFE™ valve. Test the shut-off mechanism (See below for instructions).
- 4) Every two years, replace all the o-rings in the Liqui-SAFE™ valve. This service is not serviceable in the field. See ***“Liqui-SAFE™ valve – Service Instructions”*** below.
- 5) Annually, change the inlet solenoid diaphragm. See the enclosed Maintenance & Operation sheet for ASCO 2-way valves: **Appendix A**.
- 6) Make a visual inspection of the electrical wiring and connections in the control housing every time you inspect the contactor insuring that the connections are tight. **See Contactor Replacement Schedule.**

CONTACTOR INSPECTION



WARNING

The Contactor that powers the heaters produces sparks which may ignite any flammable vapors in the area when the control box cover is removed. If the cover must be removed, shut off the power, remove the cover and check very carefully for fumes, leaks, or any indication of flammable vapors in the atmosphere or in the control enclosure.

Do not re-apply power if fumes are present. They may ignite.

CAUTION

Keep a fire extinguisher available in the immediate vicinity before re-applying power when the control cover is removed.

The TORREXX vaporizer utilizes an electro-mechanical contactor to switch power to the heating elements. Since contactors wear out in normal operation, it is prudent industry practice to inspect them on a preventive maintenance basis. Manufacturers define a cycle life for contactors based upon operations at rated current. The cycle rate of the contactor in vaporizers varies due to liquid temperature/pressure, percent loading of the vaporizer, and installation specifics. Vaporizer testing has demonstrated that cycle rates are greatest at around 50% of the vaporizer loading and least when vaporizers are energized in a standby mode.

We recommend the following inspection schedule for contactors:

- ◆ 5000 hours for vaporizers in service
- ◆ 30,000 hours for vaporizers in standby mode
- ◆ For vaporizers operating in a combination of service and standby modes, we are providing a simple formula to help determine when contactors should be inspected.

Contactors life factor (LF) can be defined as follows:

$$LF = \frac{X}{5000} + \frac{Y}{30000}$$

When

X = hours of vaporizer operation mode

Y = hours of vaporizer in standby mode

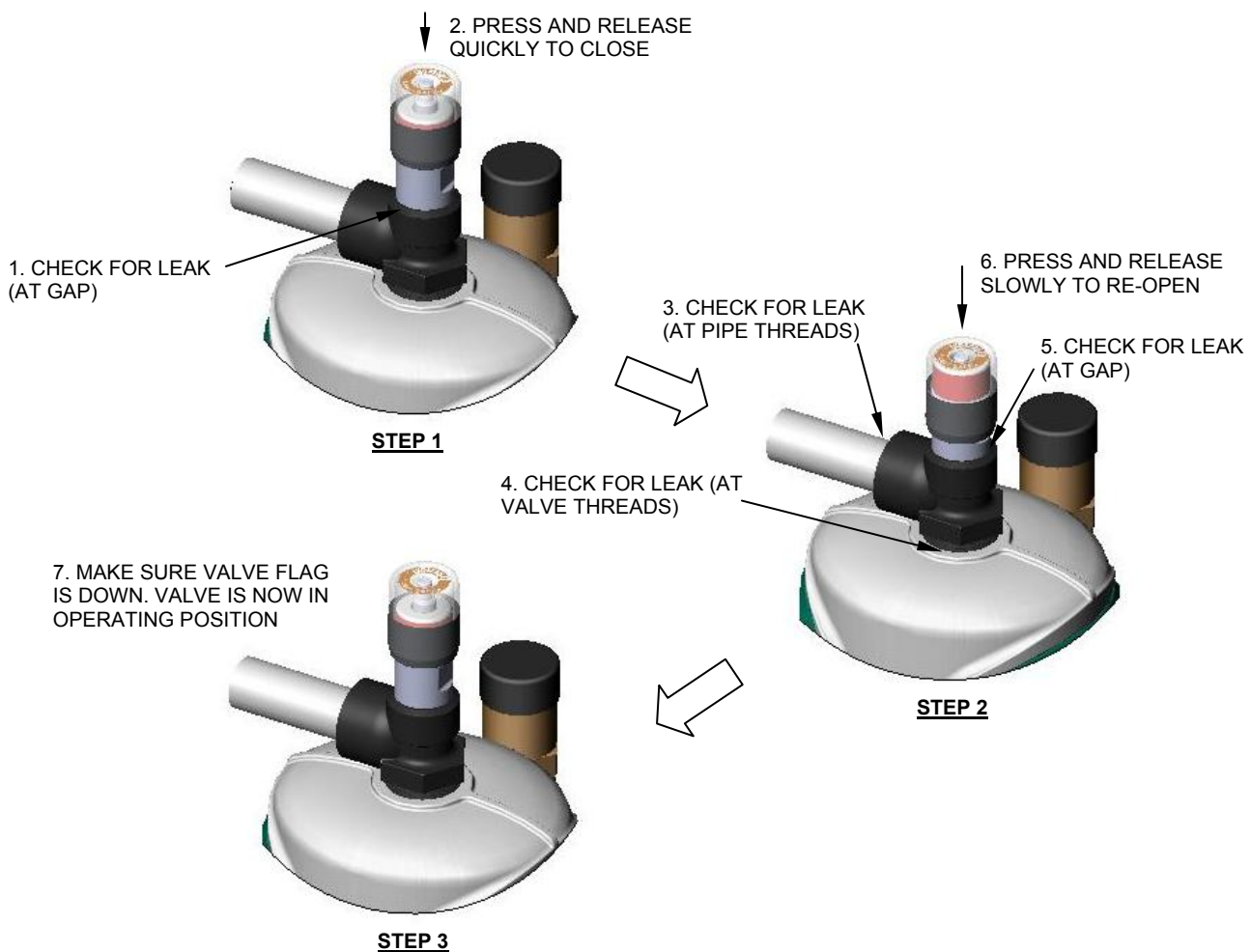
If LF is 1 or greater, the contactor should be replaced.

This data is to be used only as a guide. It is not "fool-proof" as the environment your vaporizer operates in and its load may affect the contactor life span.

Liqui-SAFE™ valve - Performance check (Every 6 months)

- I Latch operation. – While the valve is in the open position and the Red Flag is down, press Button and release QUICKLY. This will cause the valve to close and the Red Flag to pop up. Carefully press the Button again all the way down and release SLOWLY. The valve will stay open.
- II Leak detection. – Follow the instructions in “I” to manually open and close the valve. Perform leak tests in both conditions. If a leak is detected at the Valve Body (Step 1) when the valve is open, replace the Valve Body O-ring. If a leak is detected in Step 5 when the valve is closed (see Figure 11), follow the “Liqui-SAFE™ valve – Service Instructions” and change all the o-rings. (This service should not be performed in the field.)

Figure 11 – Follow 1 to 7 below to check the Liqui-SAFE™ valve operation



WARNING



Extreme caution must be taken due to the potential of flammable vapors being exposed to the atmosphere and create an ignition. Do not operate any equipment that may create a spark from this point. Do not open the explosion-proof enclosure.

Liqui-SAFE™ Valve - Service Instructions

There are four (4) o-rings in the Liqui-SAFE™ valve and these are the Button Post o-ring, Valve Body o-ring, Valve Seat o-ring and Valve Stem Base o-ring. In order to keep the valve working at its peak conditions, replacement of all the o-rings according to the maintenance schedule is strongly recommended. Due to the complexity of the valve and the number of parts involved, this service should NOT be done in the field. Follow the 7 Steps below to service the Liqui-SAFE™ valve. Clean all the metal parts with WD-40. Re-assemble all the parts. Simulate the tripping action of the valve and verify the tripping force applied on the Extension Stem be less than 0.5lbf (2.22 N).

Figure 12A – STEP 1 – Be sure that the Liqui-SAFE™ valve is at the closed position as shown



Figure 12B – STEP 2 – Unscrew reset button base and remove the spring



Figure 12C – STEP 3 – Replace button post internal o-ring

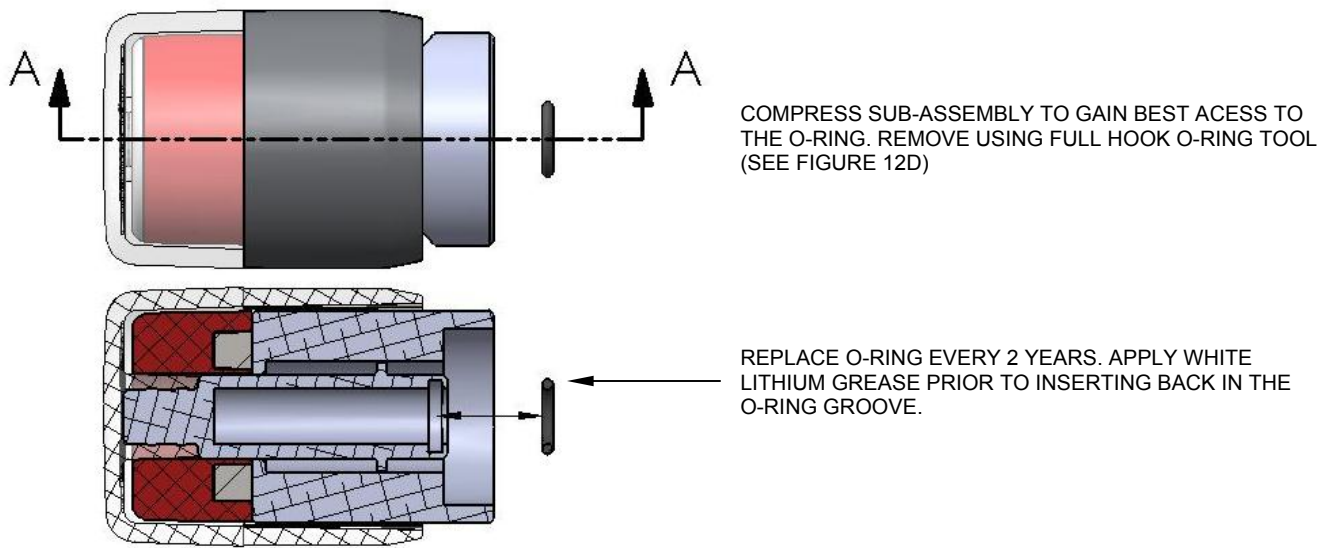


Figure 12D – Full hook o-ring tool



Figure 12E – STEP 4 – Unscrew valve latch body

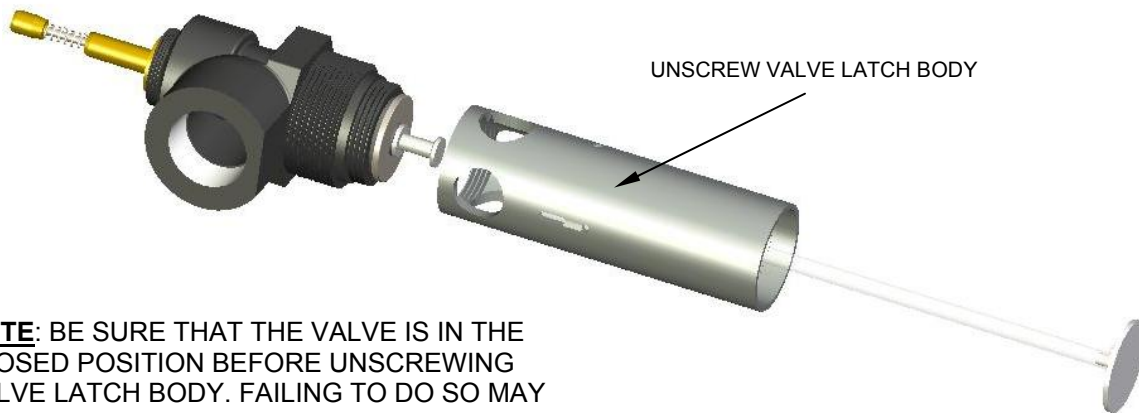


Figure 12F – STEP 5 – Remove drive magnet and e-clip

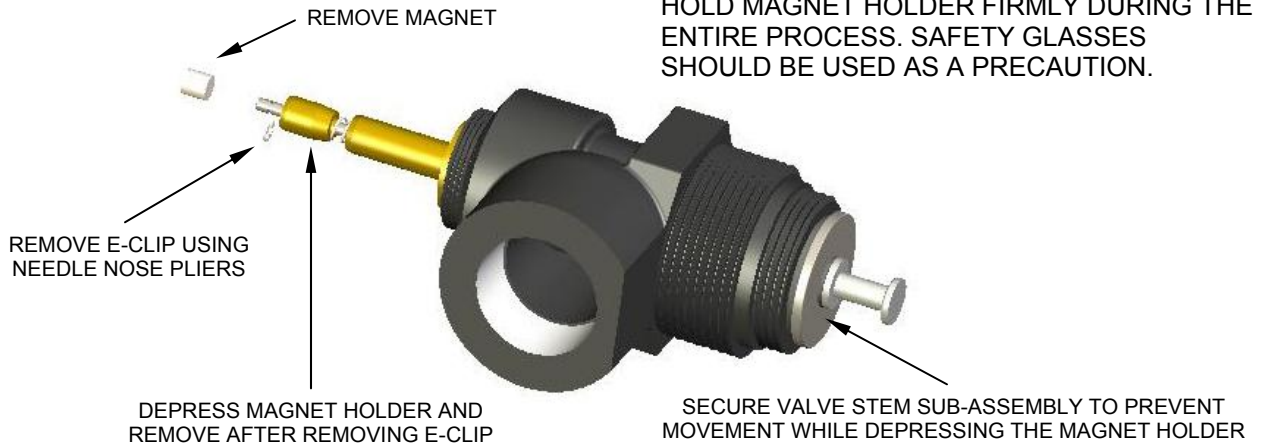
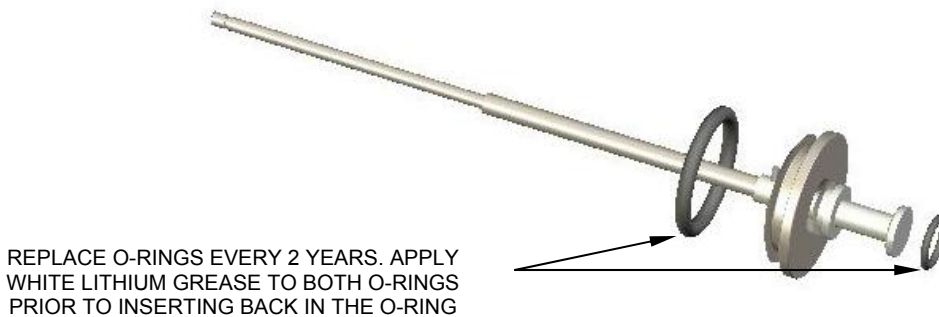


Figure 12G – STEP 6 – Remove Spring, valve stem guide and valve stem. Replace o-ring.



Figure 12H – STEP 7 – Replace valve seat and valve stem base o-rings.

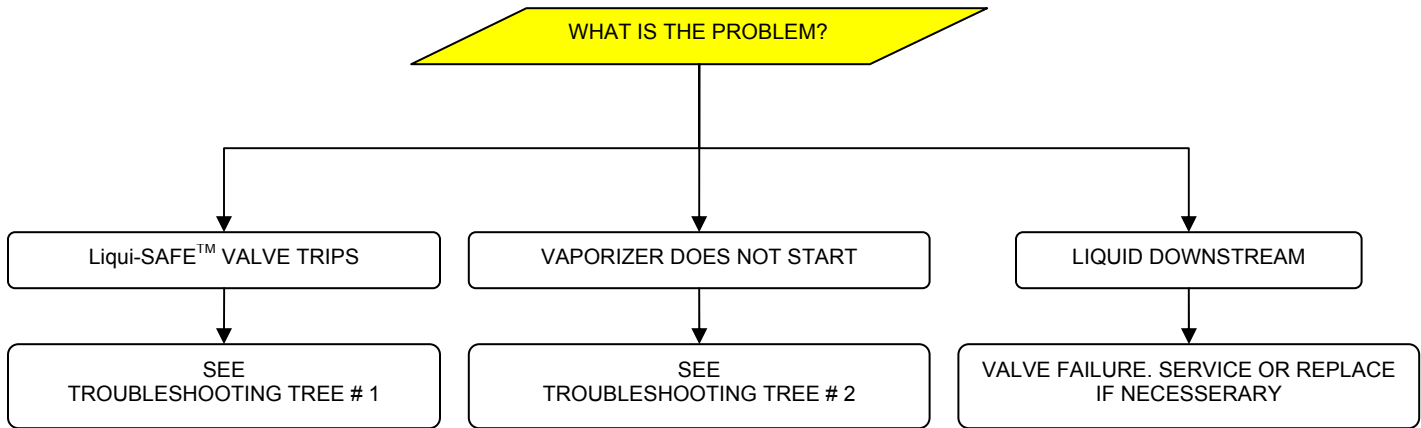


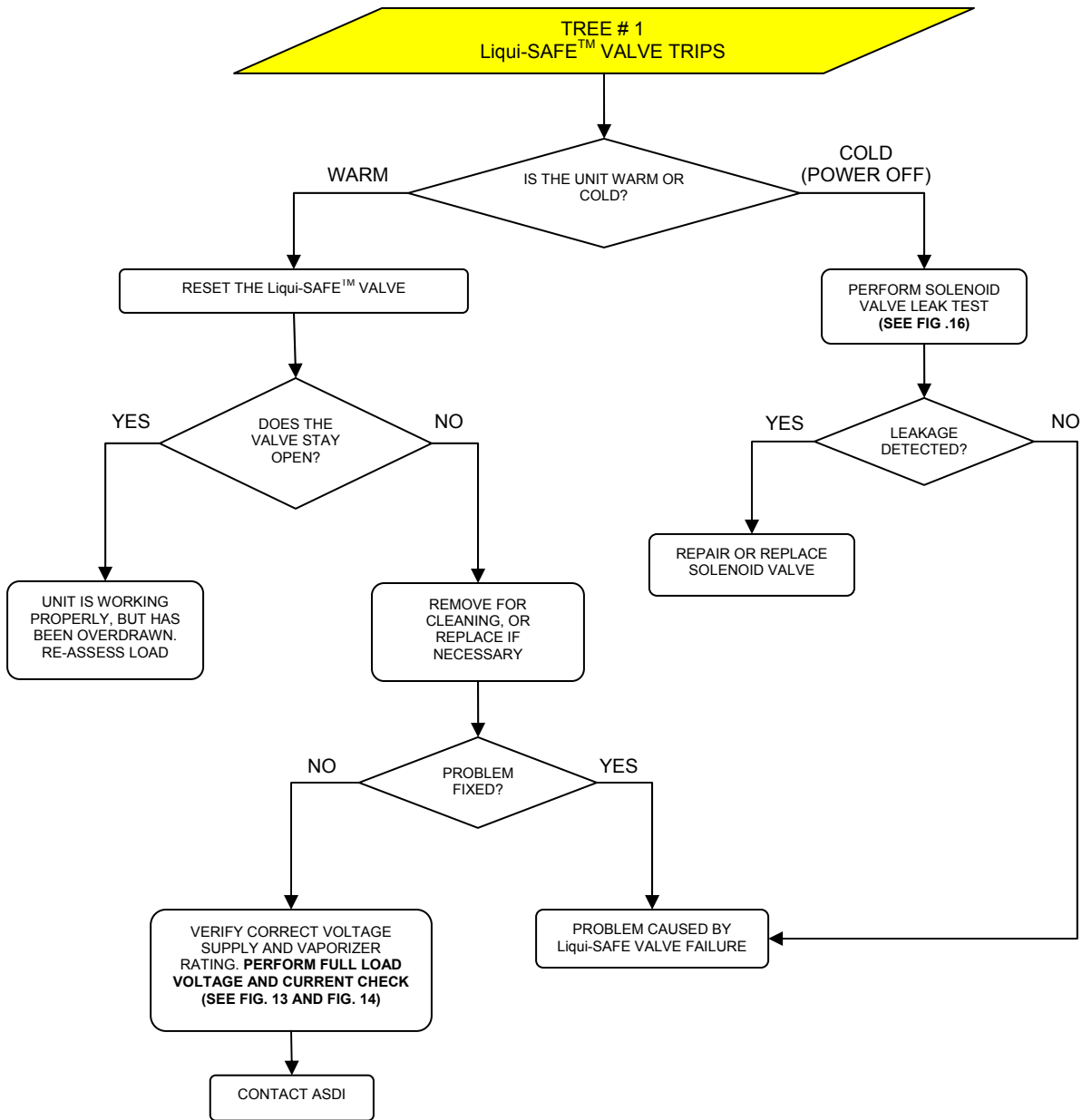
IMPORTANT:

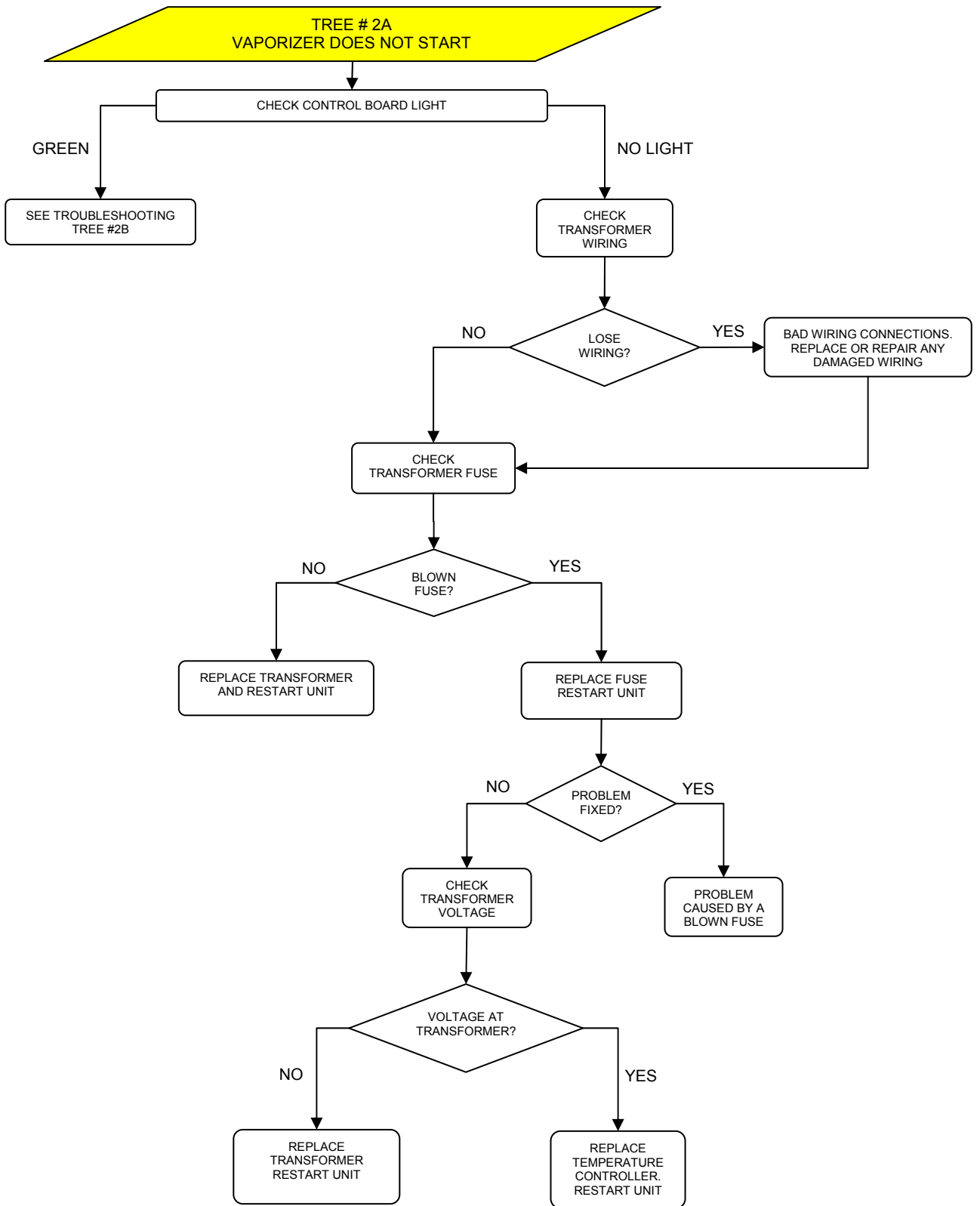
- When reassembling the valve after servicing o-rings make sure that you apply super glue to the inside of the magnet holder and press the magnet firmly in until it bottoms out. Allow sufficient time for glue to dry.
- Always perform a functional check and leak test (see *Figure 11*) of the re-assembled valve to ensure that it actuates per design and that valve seat o-ring seals properly against the valve body. *Figure 12F* shows proper sealing of valve seat o-ring against valve body that should be observed prior to conducting a leak test.

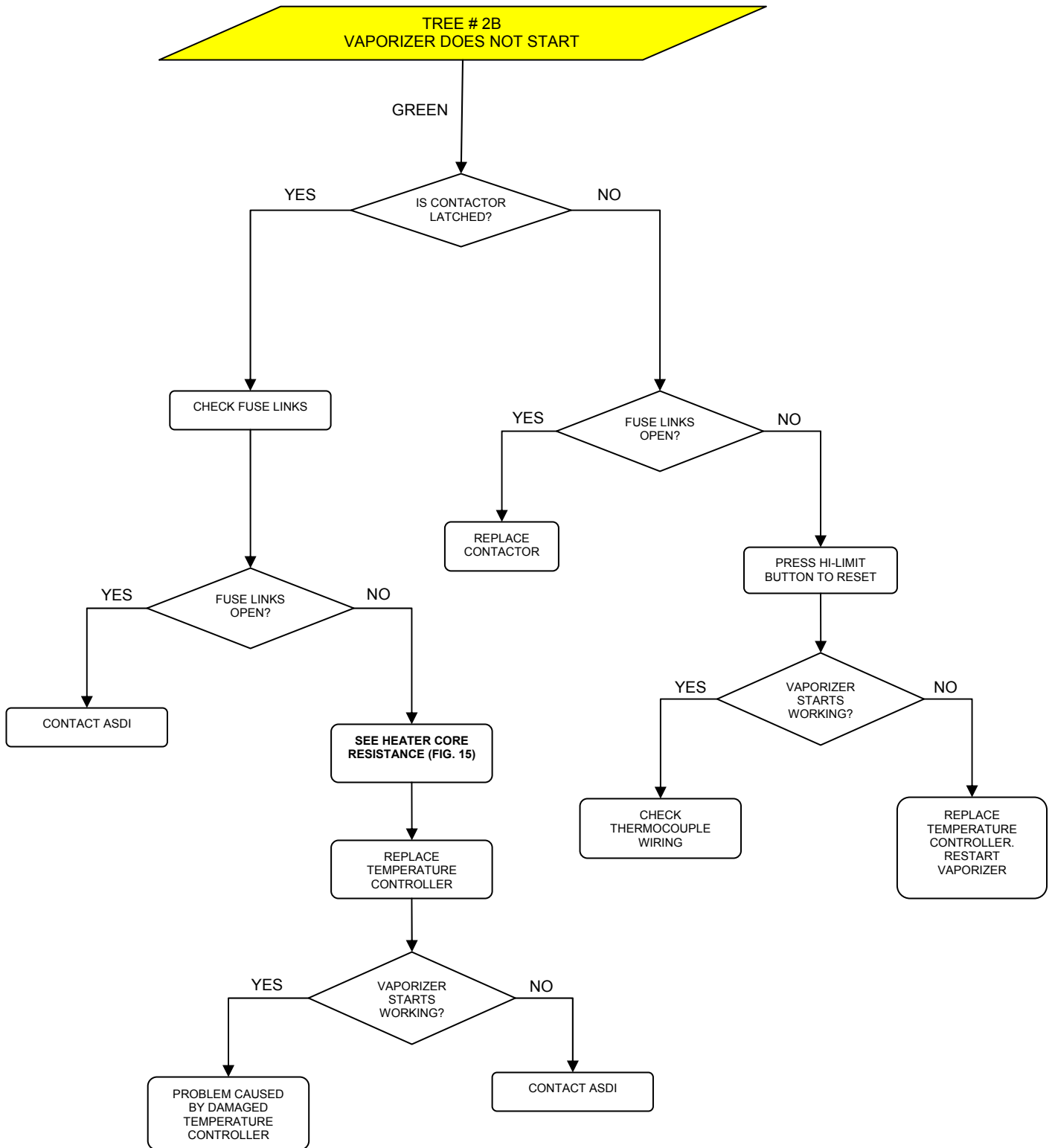
General

Follow the troubleshooting guide below to identify the problem:









Full Load Voltage Check

NOTE

Current flow depends on the applied voltage. Voltage lower than the specified voltage causes low current and may negatively affect operation. Make all measurements with the heater ON (Contactor closed).

WARNING

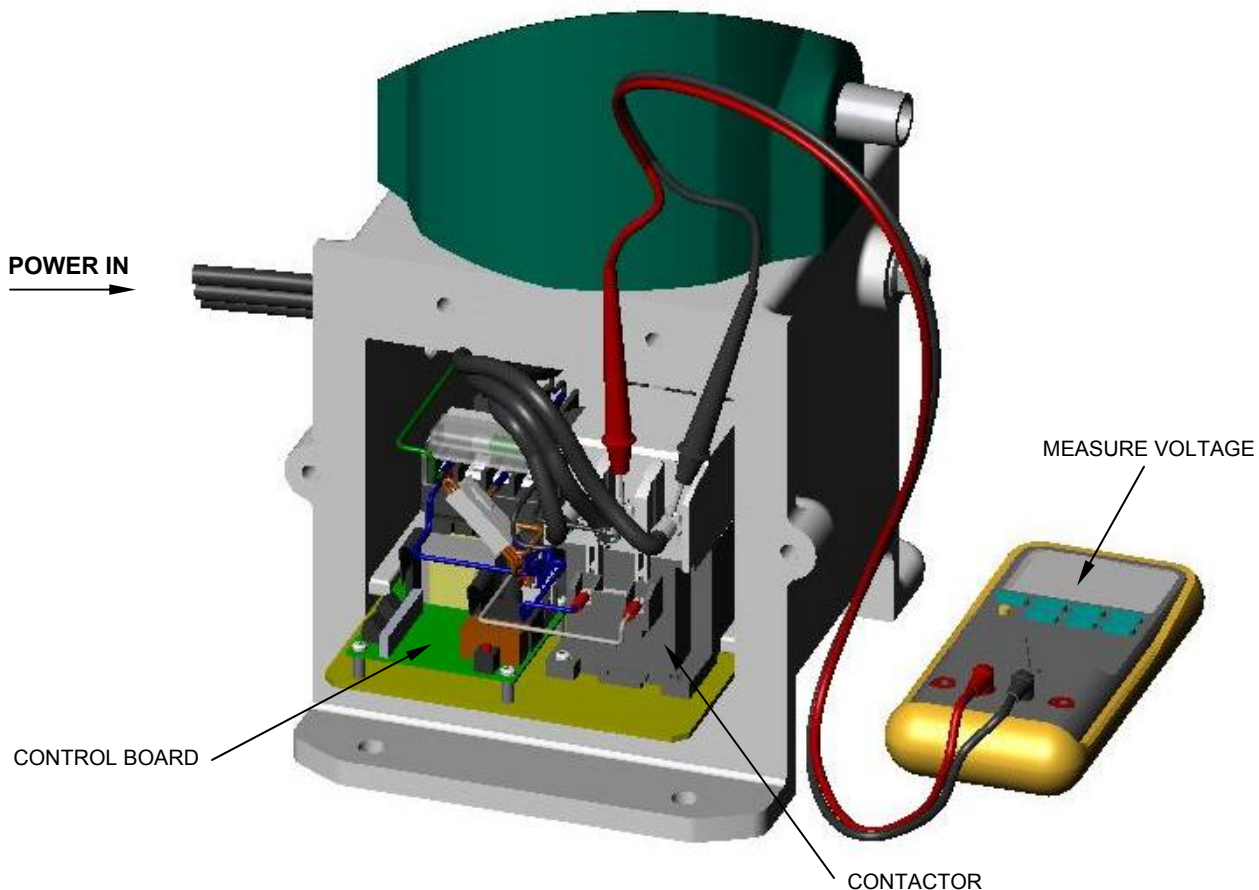
These tests include high voltage. Exercise great caution in making the following tests. Carelessness could result in severe injury or death. See additional warnings located at the beginning of this Chapter.



FULL LOAD VOLTAGE CHECK

Check heater voltage by measuring voltage at the contactor terminals. See Data sheet of your manual or rating plate on the vaporizer to determine the correct voltage reading of your vaporizer. Measure voltage between all connected poles of the contactor. The readings should be equal to +/- 3%.

Figure 13 – Full load voltage check



Full Load Current Check

NOTE

See fusible link detail below for typical fusible link installation.

WARNING

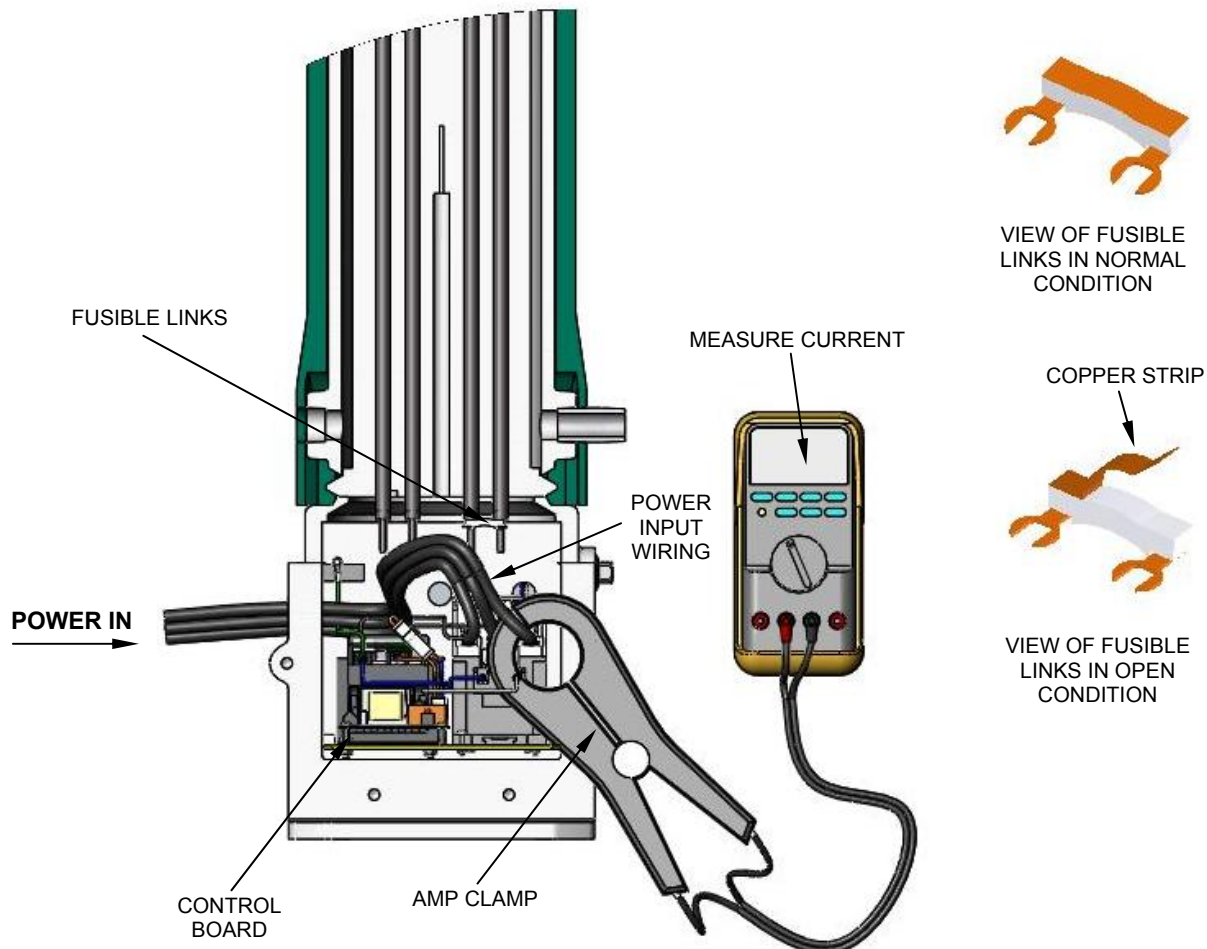


These tests include high voltage. Exercise great caution in making the following tests. Carelessness could result in severe injury or death. See additional warnings located at the beginning of this Chapter.

Measure the current on each of the heater AC power input wires. See **Data Sheet or rating plate** provided with your manual for the correct reading (line current) for your vaporizer. All wires should have equal readings +/- 3%.

Low current on all wires indicates low input voltage. Drastically different current readings may indicate a defective heater, defective wiring, or an open fusible link due to overheating. If a fusible link is open, contact the factory. Do not attempt to repair.

Figure 14 – Full Load Current Check



TORREXX Electric Vaporizer Data Sheet

MODEL	PHASE	VOLTAGE (VAC)	CURRENT (A)	HEATER RESISTANCE (OHMS)	WIRE-TO-WIRE RESISTANCE (OHMS)	POWER (kW)
TX25	1	120	32.4	22.2	3.7	3.9
TX25	1	208	14.1	22.2	14.8	2.9
TX25	1	220	14.9	22.2	14.8	3.3
TX25	1	240	16.2	22.2	14.8	3.9
TX50	1	208	28.1	22.2	7.4	5.8
TX50	3	208	16.3	22.2	14.8	5.8
TX50	1	220	29.7	22.2	7.4	6.5
TX50	3	220	17.1	22.2	14.8	6.5
TX50	1	240	32.4	22.2	7.4	7.8
TX50	3	240	18.7	22.2	14.8	7.8
TX50	3	380	9.9	22.2	44.4	6.5
TX50	3	415	10.8	22.2	44.4	7.8
TX100	1	208	56.2	22.2	3.7	11.7
TX100	3	208	32.4	22.2	7.4	11.7
TX100	1	220	59.5	22.2	3.7	13.1
TX100	3	220	34.3	22.2	7.4	13.1
TX100	1	240	54.1	22.2	4.4	13.0
TX100	3	240	37.4	22.2	7.4	15.6
TX100	3	380	19.8	22.2	22.2	13.0
TX100	3	415	21.6	22.2	22.2	15.5
TX100	3	440	17.1	22.2	29.6	13.1
TX100	3	480	18.7	22.2	29.6	15.5
TX160	3	208	49.6	14.5	4.8	17.8
TX160	3	220	52.4	14.5	4.8	20.0
TX160	3	240	61.9	16.0	5.3	21.5
TX160	3	380	30.3	14.5	14.5	19.9
TX160	3	415	30.0	16.0	16.0	21.5
TX160	3	440	26.2	14.5	19.4	20.0
TX160	3	480	26.0	16.0	21.3	21.5
TX240	3	380	45.4	9.7	9.7	29.8
TX240	3	415	49.6	9.7	9.7	35.6
TX240	3	440	39.3	9.7	12.9	29.9
TX240	3	480	42.9	9.7	12.9	35.6
TX320	3	380	50.2	8.8	8.8	33.0
TX320	3	415	54.8	8.8	8.8	39.3
TX320	3	440	43.4	8.8	11.7	33.1
TX320	3	480	47.4	8.8	11.7	39.4

Heater Core Resistance

NOTE

Refer to the *Bussing diagram in Appendix A* for wire to wire resistance for your vaporizer.

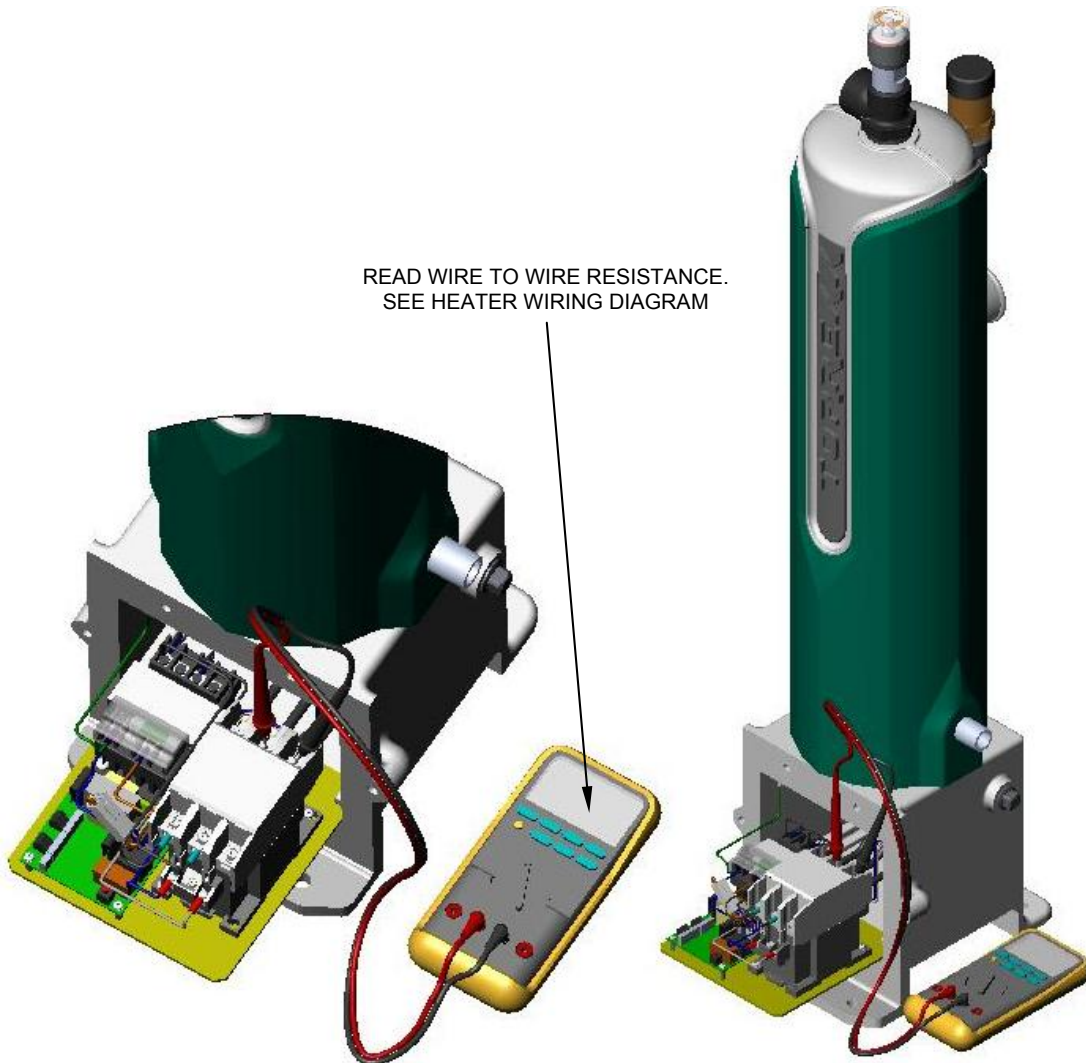
CAUTION

Turn off electrical power at the disconnect before proceeding.



Carefully slide out the control panel for access to the heater wire connections on the contactor. Measure the resistance across each pair of wires. An incorrect resistance reading indicates a faulty heater element, a wiring problem, or an open fusible link.

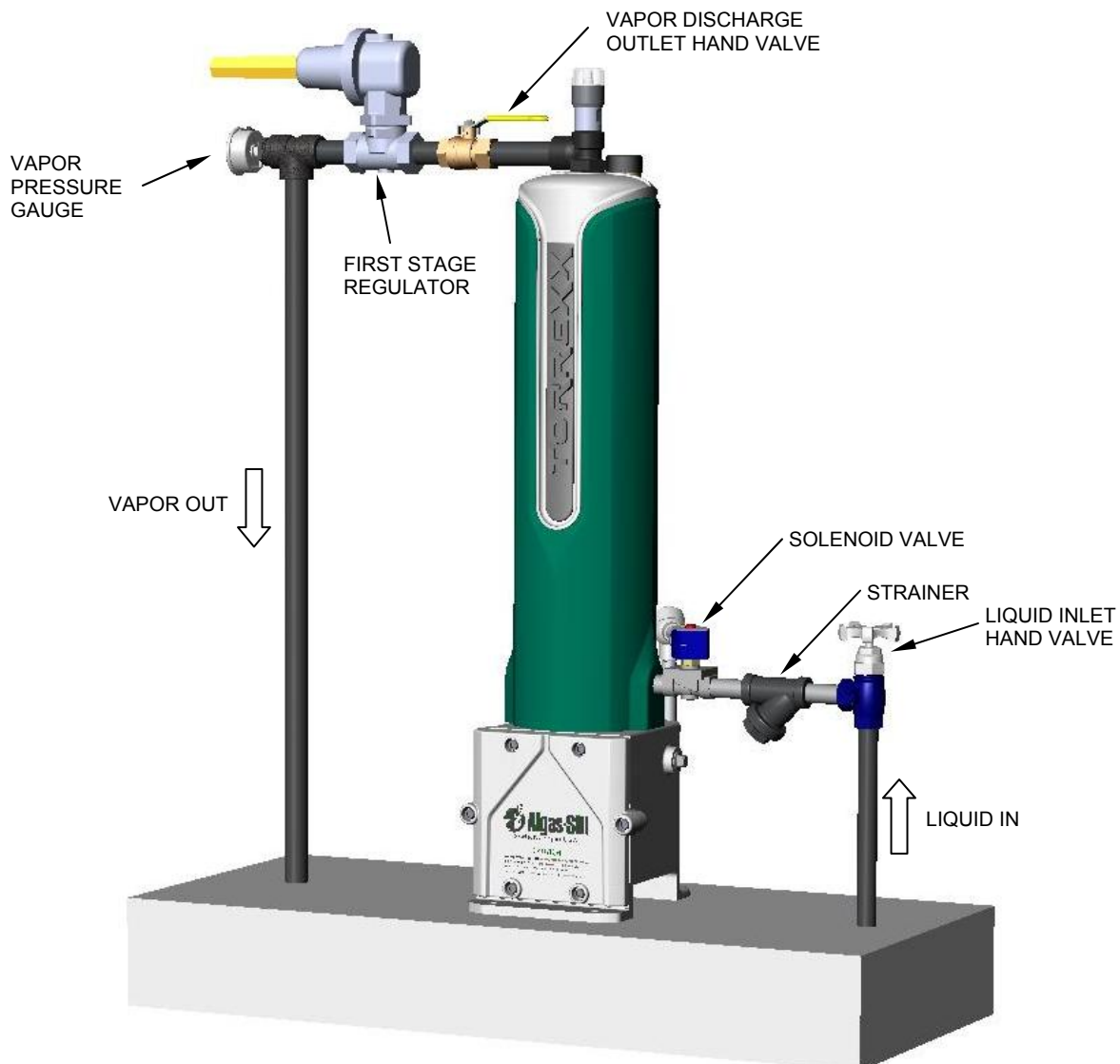
Figure 15 – Heater Core Resistance Wiring Connections



Solenoid Valve Leak Test

- 1) Shut off the outlet hand valve. The inlet hand valve should be open. Start the vaporizer and allow it to heat up until the heaters shutoff. This allows any accumulated liquid in the vaporizer to be forced back toward the supply tank.
- 2) Disconnect the vaporizer by shutting off the power at the disconnect. Shut off the inlet hand valve. Close the ball valve on the vaporizer pressure gauge and remove the pressure gauge. Cautiously bleed off any LPG pressure in the vaporizer and outlet supply piping. When the pressure reaches no pressure in the vaporizer, reinstall the pressure gauge and verify 0 pressure.
- 3) Turn on the inlet hand valve. The solenoid valve is closed and you should not have any pressure build up in the vaporizer. If pressure increases, the solenoid valve is leaking and needs to be repaired or replaced.

Figure 16 – Solenoid Valve Leak Test Components



Solenoid Valve Electrical Test

NOTE

A multimeter is required for the following test.

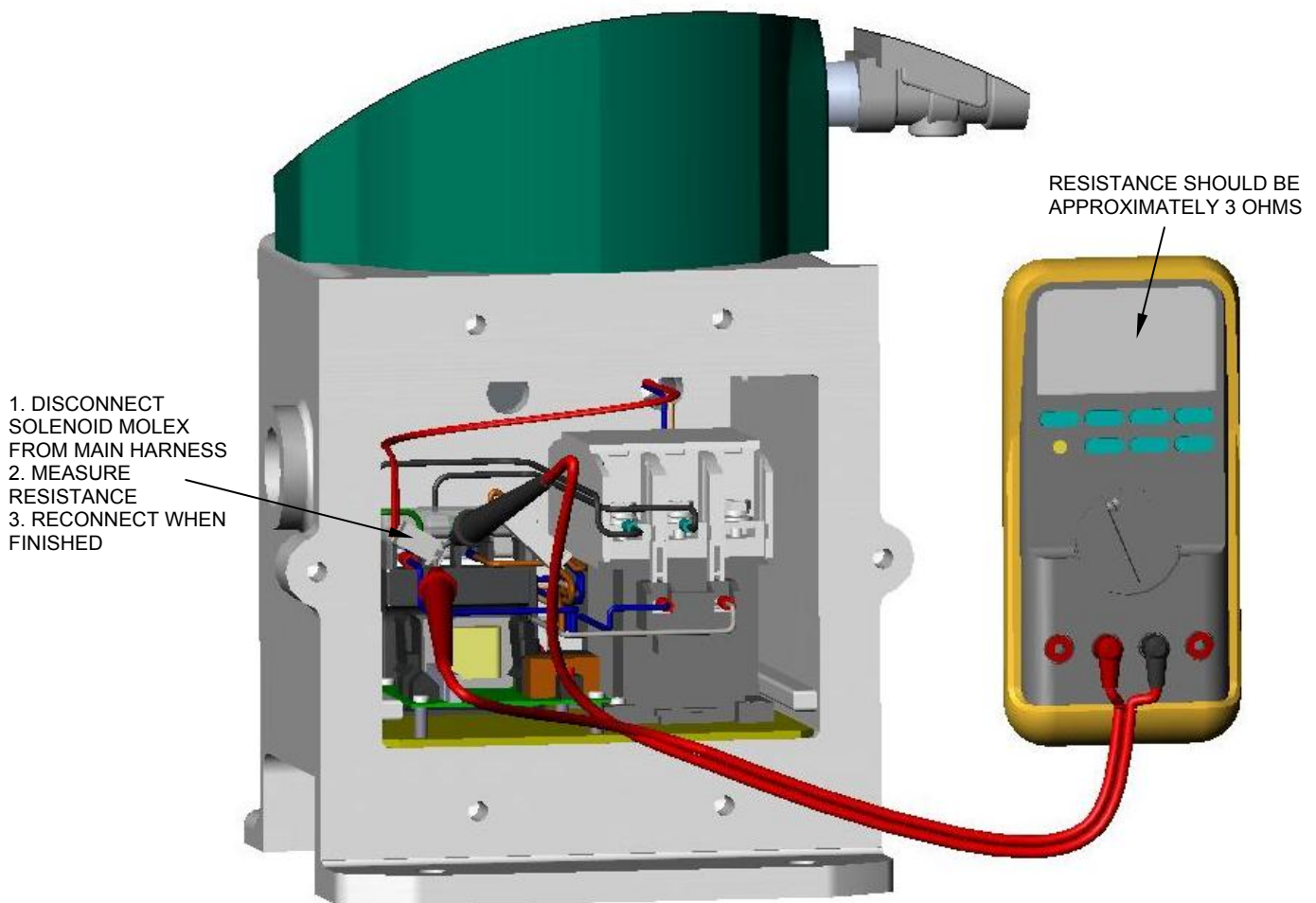
CAUTION

Turn off electrical power at the disconnect before performing this procedure.

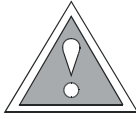


Open the electrical housing at the vaporizer base. Disconnect the 2-PIN Molex plug connector and measure resistance between the pins. You should measure approximately 3 ohms. If not, replace the solenoid coil.

Figure 17 – Solenoid Valve Electrical Test



Thermocouple Sensor Replacement



CAUTION

Always disconnect power to vaporizer before servicing.

- 1) Shut off power at the disconnect.
- 2) Remove the control box cover.
- 3) Disconnect the main power wires attached to the contactor and the wires going to the heaters.
- 4) Slide the circuit panel half way out of the control box.
- 5) Disconnect the wire connectors to the control board.
- 6) The thermocouple can now be removed from the center of the core (see below and Figure 18 and 19) Two types of locking collars have been used on the sensors.

Figure 18 – TORREXX Box showing Thermocouple location

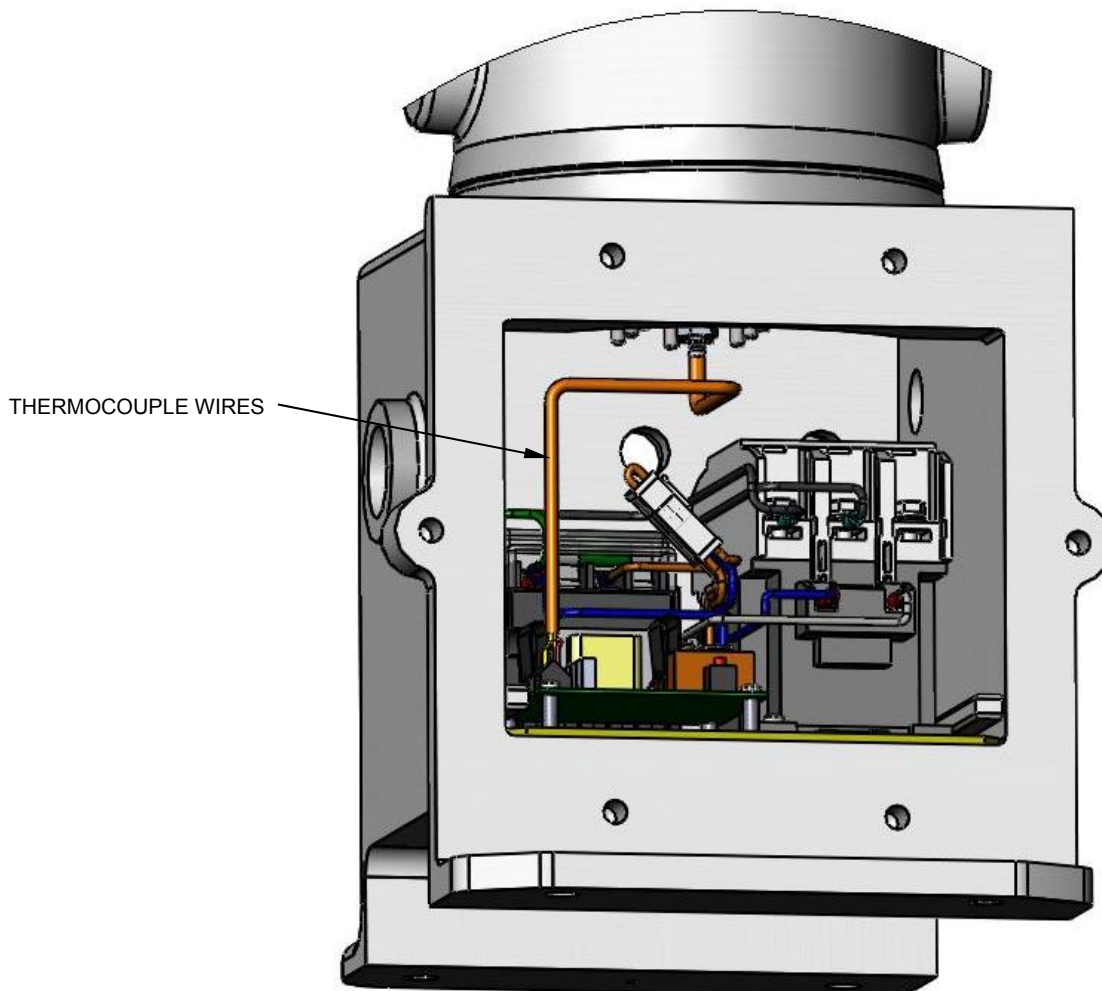
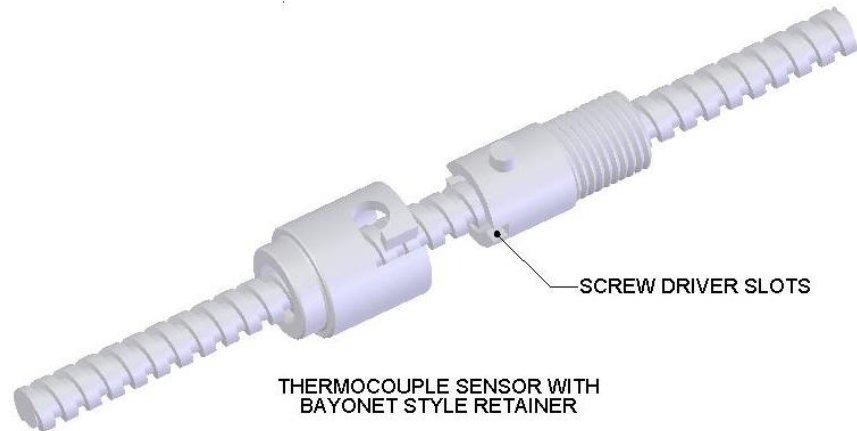


FIGURE 19 – Thermocouple Sensor with Bayonet Style Retainer



- 1) To remove a sensor fitted with the bayonet style retainer, push gently on the retainer while turning to the left. When the retainer is disengaged, pull out the old temperature sensor.
- 2) Use a short, flat-blade screwdriver to remove the adapter.
- 3) Install the new spring tab retainer using an appropriately sized open end wrench (1/2" or 13mm)
- 4) Install the new sensor by applying a small amount of heat transfer grease to the sensor tube and re-inserting in the unit. Squeeze the spring tab while inserting the sensor. Push firmly until the sensor is fully engaged. There should be at least 1/2" of sheath remaining.
- 5) Reinstall control board, connect all wires, and reinstall the enclosure cover. Torque cover bolts to 19.5 ft-lb. Check vaporizer operation.

Economy Operation

The Economy Option minimizes the electric power required to meet your vapor demand by shutting off the outlet of the vaporizer when the natural vaporization rate of the storage tank is able to supply enough vapor to meet the demand. A pressure sensing valve is specially developed to sense the upstream pressure. The valve opens when the tank pressure falls below 30PSIG, and closes at 60PSIG. The pressure sensing valve is a mechanical device and it operates independently to the electrical controls.

The Economy Option will **NOT** function if a pump is used.

The pressure set-point of the TORREXX Economy Valve is nonadjustable. Consult ASDI for any custom set-point.

The Economy is normally a factory-installed option. However, a separate Economy valve can be purchased as an add-on in the field.

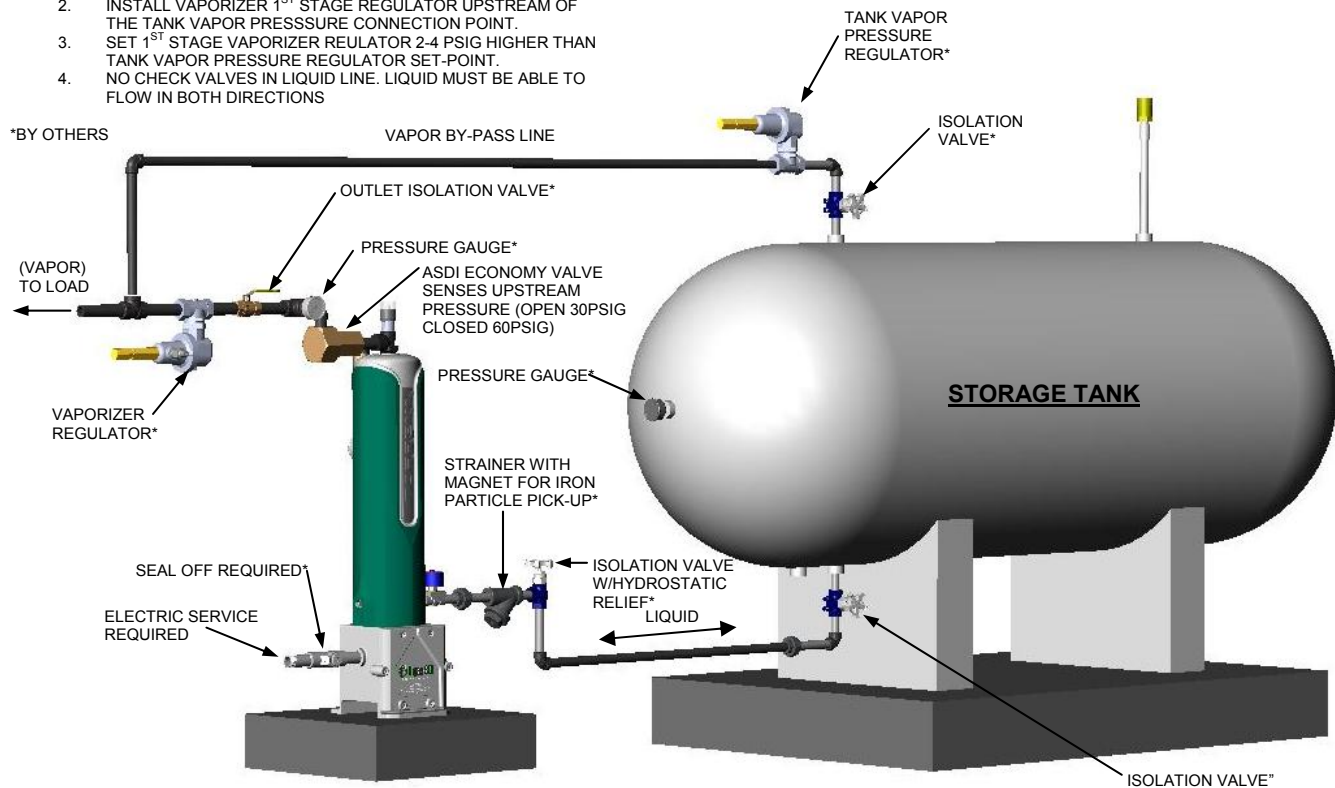
For the Economy Valve field installation kit, use ASDI PN: 41051.

Make sure that the Economy Valve is correctly installed. Verify the flow direction on the Rating Plate.

Figure 20 – TORREXX Economy valve installation

NOTES

1. LIQUID PIPING LOSSES BETWEEN THE VAPORIZER AND THE TANK MUST NOT EXCEED THE HYDROSTATIC HEAD WHEN THE PUMP IS SHUT OFF
2. INSTALL VAPORIZER 1ST STAGE REGULATOR UPSTREAM OF THE TANK VAPOR PRESSURE CONNECTION POINT.
3. SET 1ST STAGE VAPORIZER REGULATOR 2-4 PSIG HIGHER THAN TANK VAPOR PRESSURE REGULATOR SET-POINT.
4. NO CHECK VALVES IN LIQUID LINE. LIQUID MUST BE ABLE TO FLOW IN BOTH DIRECTIONS



Note: Economy option cannot be used on an installation that requires a pump.

TORREXX Economy Valve Maintenance

The TORREXX Economy Valve operates by sensing the pressure of the Vaporizer and Storage Tank. The Economy Valve consists of a moving piston which opens and closes the valve's outlet. The movement of the piston is driven by the pressure force balance between two different sized o-rings and a spring. Follow the instructions below and perform maintenance on the Economy Valve once every two years:

Figure 21A – STEP 1 – Unscrew the Inlet Housing from the Outlet Housing.

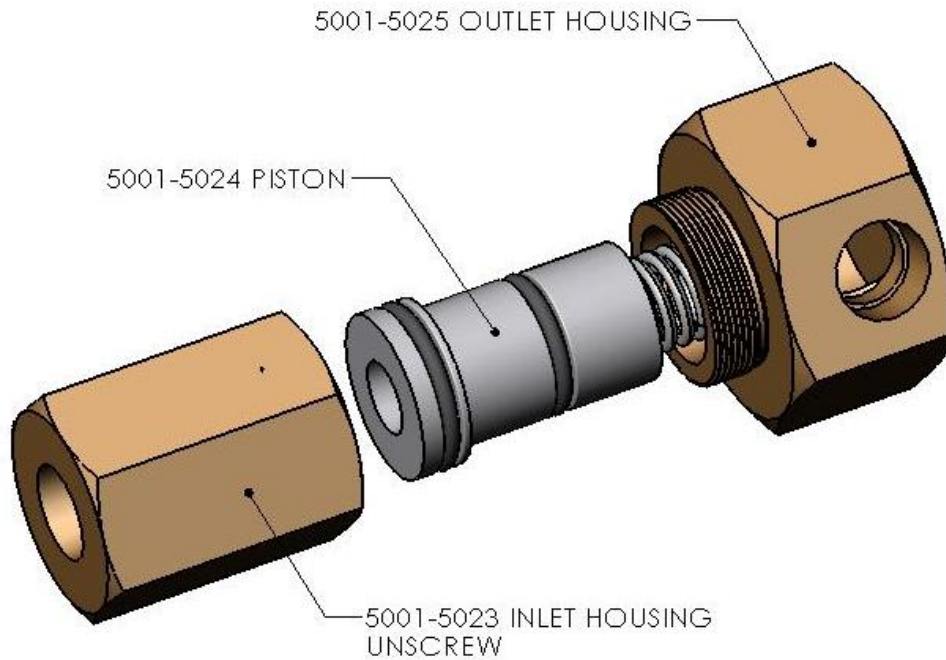


Figure 21B – STEP 2 – Replace the two O-rings (ASDI PN 39013 and 39014). Apply excess lithium o-ring grease.

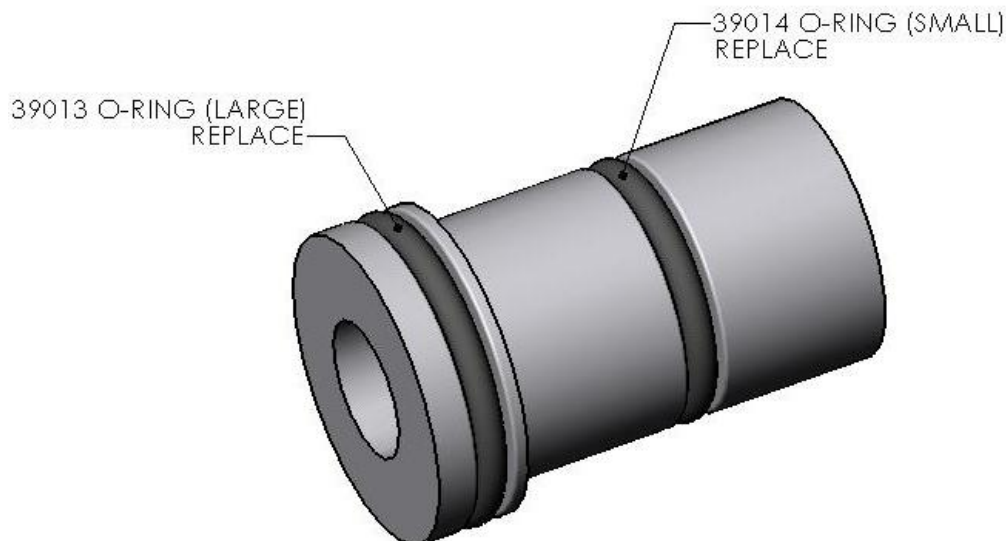


Figure 21C – STEP 3 – Clean all o-ring contact surfaces and the bottom surface of the Outlet Housing. Apply excess lithium o-ring grease.

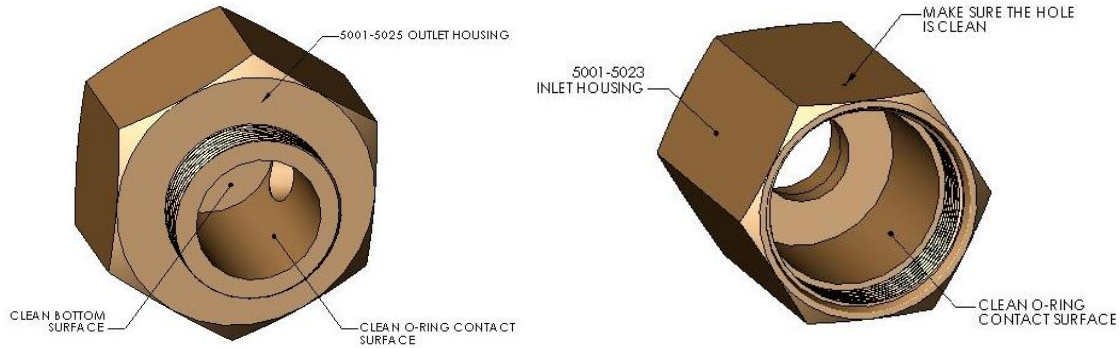


Figure 21D – STEP 4 – Clean all piston surfaces. Apply excess lithium grease on o-rings.

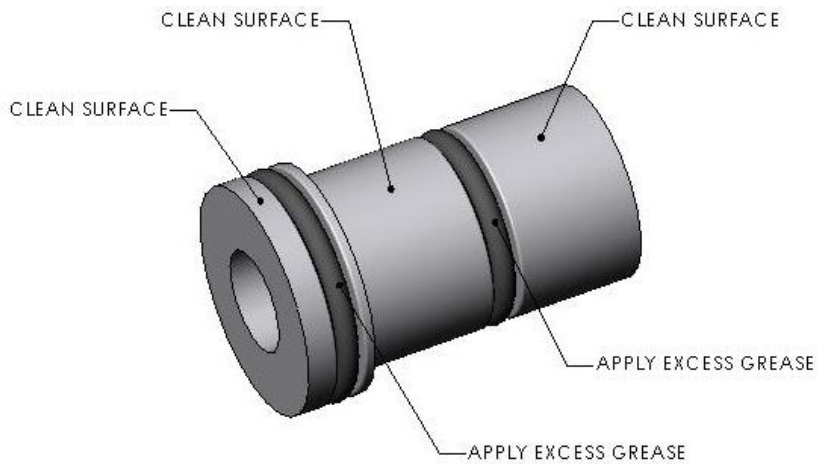
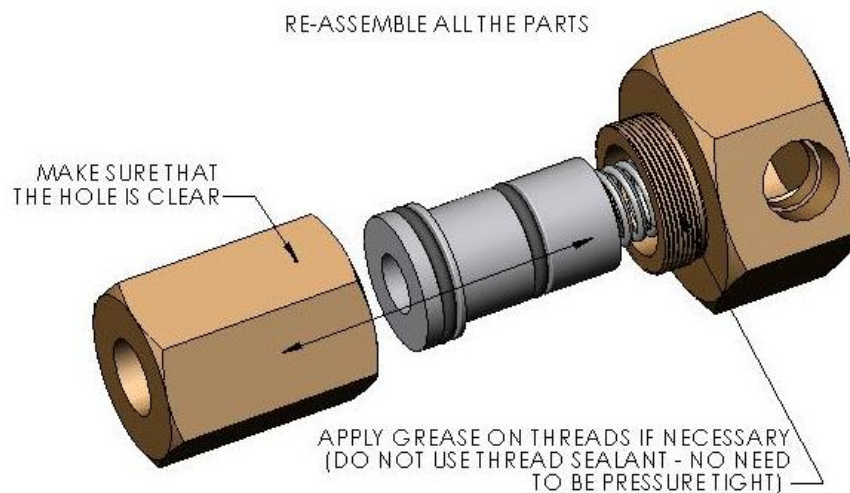


Figure 21E – STEP 5 – Make sure that the Pin Hole is clear and the spring is undamaged. Carefully reassemble all the parts. Apply lubrication grease on the straight threads if necessary.*



* - The threads between the Inlet Housing and the Outlet Housing are straight threads and are designed to be hand tightened. Gas will NOT leak through these threads because of the seals from the two o-rings. However, the Inlet Housing MUST be screwed all the way down for the Valve to accurately function at the set pressure. Do NOT apply sealing agent or Teflon tape on these threads.

Refer to the table below for any replacement parts in the TORREXX Economy Valve.

QUANTITY	ASDI PART NO.	DESCRIPTION
1	5001-5023	INLET HOUSING
1	5001-5025	OUTLET HOUSING
1	5001-5024	VALVE PISTON
1	39013	VALVE O-RING (LARGE)
1	39014	VALVE O-RING (SMALL)
1	39018	VALVE SPRING
1	5001-5026	VALVE RATING PLATE
2	60204	RIVET

Mercury Relay

The life of the vaporizer can be further extended by using a Mercury Relay. Compared to a “dry” contactor, a Mercury Relay reduces the wear and tear each time the heater cycles. A larger explosion-proof enclosure is also used which improves access to the electrical controls.

This option is suitable for Class I Division 1 Group D and is only available in the NEC configuration.

The Mercury Relay Option can be integrated with all the other TORREXX options (i.e. Economy, Remote, etc.) In addition, customized options such as external lamps/indicators, on/off switches are also available. Please consult ASDI for details.

TX Remote Box

Please contact ASDI for options available for remote control.

Valve and Strainer Package

For TX25 to TX320 ASDI PN: 36922 ¾" NPT inlet, 1" NPT outlet

For TX19AA to TX240AA ASDI PN: 36925

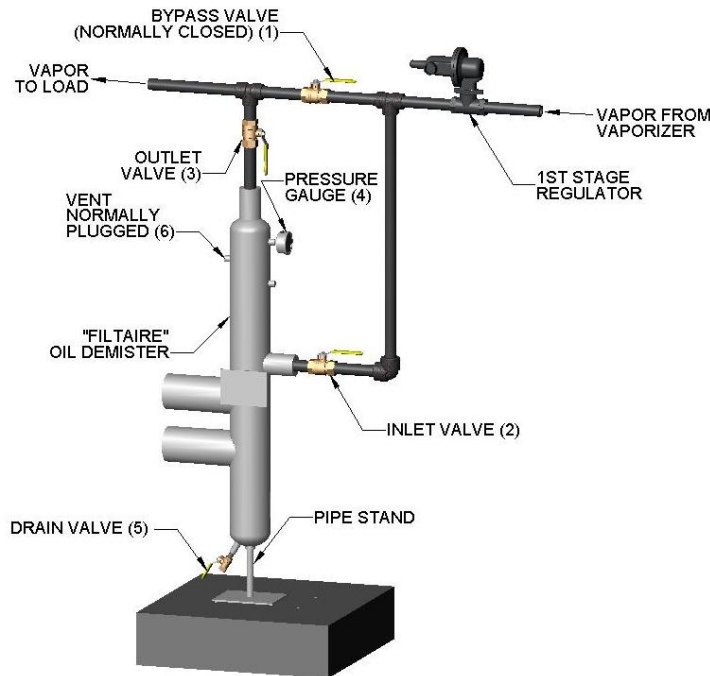
Filtaire - Contaminant Separator

The Filtaire is a filtering device designed to trap heavy hydrocarbons commonly present in LPG vapor. It also traps other materials, which may be in the gas due to storage conditions and internal condition of the equipment.

Impurities are collected in the system and periodically removed through the system blow down drain. Residual heavy end hydrocarbons with boiling points higher than pure LPG are trapped by the filter and fall to the bottom for removal.

A complete Filtaire system consists of inlet and outlet connections, a blow-down drain (5), a pressure gauge (4), a vent which is normally plugged (6), and a bypass valve system for cleaning (1, 2, and 3). The bypass valves enable the system to continue operating when the Filtaire is removed for cleaning.

FIGURE 22 – Filtaire Operation



Leak Test

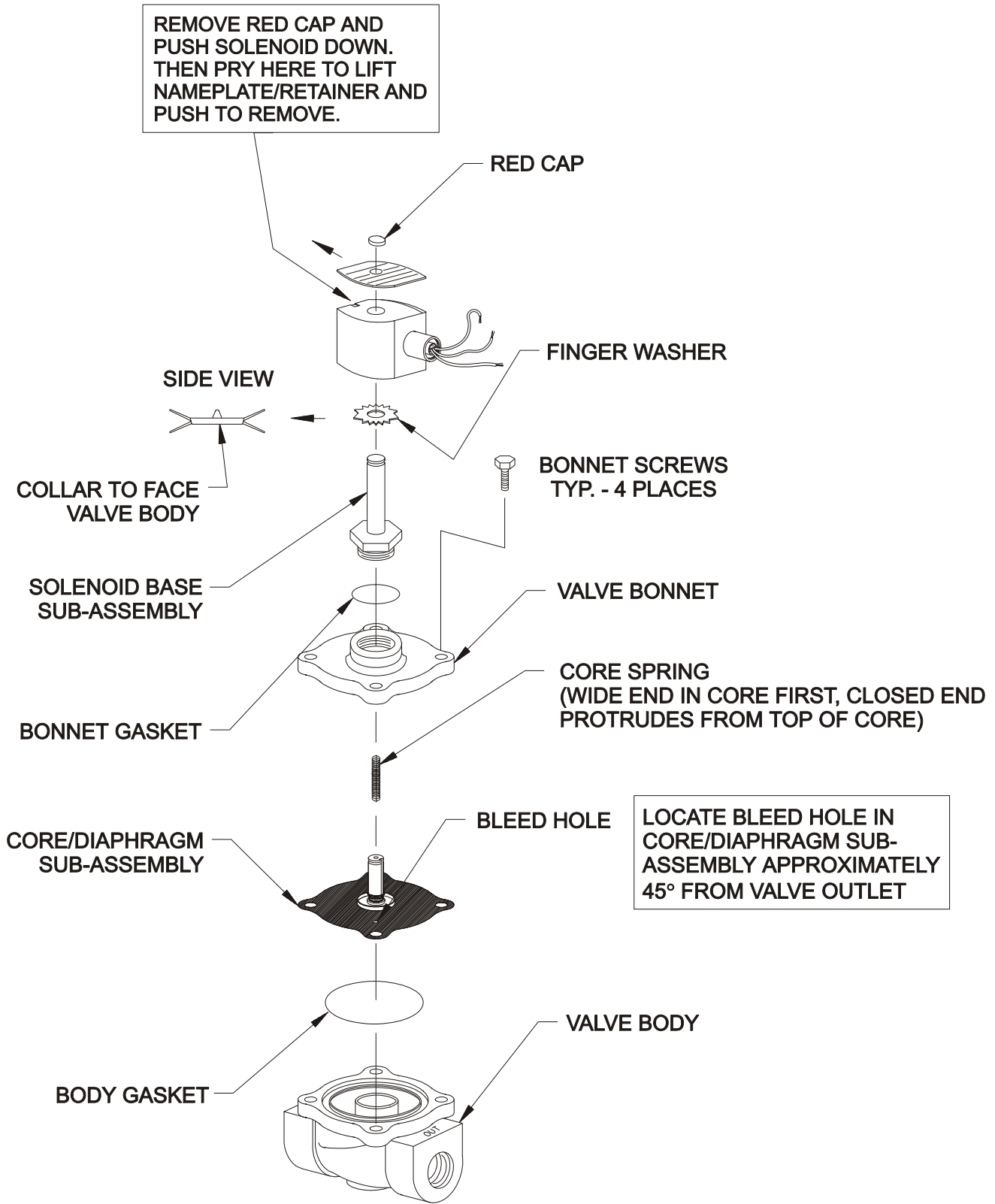
1. Close outlet valve.
2. Slowly open inlet valve and allow pressure to equalize in the vaporizer.
3. Apply a small amount of soap/water solution to ALL pipe connections.
4. Check for any leaks by observing new bubble formation in the soap/water solution.

Repair any leaks before continuing.

APPENDIX A

*TECHNICAL
INFORMATION*

ASCO Valve used by Algas-SDI



SOLENOID NOISE

Solenoid valves emit a sound when operated. When energized, they emit a clicking sound. Also, accompanying the operation of most AC valves, is AC hum. Whether or not AC hum is objectionable actually depends on the requirements and opinion of the user. Normal AC hum is the result of the constantly reversing magnetic field produced by alternating current. The constantly reversing magnetic field can cause vibrations in the solenoid parts.

1. Solenoid noise due to damage solenoid parts such as bent solenoid base assembly, stretched return springs, loose parts, etc.

Solution: Inspect valve internals and exterior. Replaced damaged parts.

2. Solenoid noise due to foreign matter between the core and plug-nut. When foreign matter is trapped between the core and plug-nut, the core assembly will rock back and forth at 60 hertz. Eventually, the core and plug-nut face will be distorted, at which time the noise can continue even though the foreign material may have been flushed or removed from the valve.

Solution: Replace damaged parts entirely, clean and reassemble.

3. Solenoid noise due to damaged coil. On rare occasions, a severe voltage spike or over voltage can potentially short a small portion of the coil winding. This shorting can cause solenoid noise and coil overheating. However, it would normally lead to rapid coil burnout. The solenoid parts, however, could be damaged enough that the noise would continue even after the coil was replaced due to the deformation produced during the peening process.
4. Missing solenoid parts can severely weaken the magnetic circuit. This can produce a solenoid noise condition. As discussed above, it will probably also result in coil burn-out.

Solution: Replace damaged parts, replace lost parts, clean and re-assemble.

In general, when a noise condition has been encountered, the source of the problem should be determined and eliminated. The valve should then be thoroughly inspected to insure that it is yet repairable. Most times, simple installation of a spare parts kit and a solenoid base sub assembly can restore a valve to like new condition. The restored and reinstalled solenoid valve should be tested to insure proper operation, and a voltage check should be made at the solenoid valve while the valve is energized. In addition, a current reading can be obtained and compared with catalog specifications to verify normal solenoid and coil operation.

Note: The coil may have been damaged due to excessive current draw of at damaged shading coil within the solenoid valve. A partial rebuilding of a valve damaged by a noise condition can prove useless as the noise condition would continue. The entire valve should be dismantled and inspected and cleaned. All parts supplied in a spare parts kit should be installed. Further, and additional solenoid parts damaged by a noise condition such as a solenoid base sub assembly, should be replaced. Examine valve seating, pistons and the valve body to verify that they have not been damaged. Damage to major portions of the valve may make repairing the valve uneconomical.

Should a noise condition be encountered, immediate action may prevent any damage to the solenoid valve itself.

TORREXX Vertical Electric Vaporizer Data Sheet LPG Systems

Refer to Nameplate on unit for the model and voltage information then look up specific information on the tables below.

General Specifications: Applies to all units

Electrical: 50 – 60 Hz, NEMA 4, 1 Phase units are 2 wire, 3 Phase units are 3 wire

Starting Temperature: 54 Deg. C 130 Deg. F

Operating Temperature: 71-79 Deg. C 160-175 Deg. F

High Temperature Limit: 171 Deg. C 340 Deg. F

Connections: 3/4" FNPT – Inlet; 1" FNPT – Outlet

Conduits: 1" FNPT, Conduit Seal-Off by others

Type of Service: Propane Vaporization

ASME Pressure Vessel: 250 PSIG MAWP

Heat Exchanger Area: 2.9 ft² / 0.269 m² TX25, TX50 and TX100

4.3 ft² / 0.399 m² TX160

5.4 ft² / 0.503 m² TX240

7.1 ft² / 0.660 m² TX320

Dry Weight: 128 lbs / 58.1 kg TX25, TX50 and TX100

145 lbs* / 65.8 kg* TX160

155 lbs* / 70.3 kg* TX240

173 lbs* / 78.5 kg* TX320

* - Add 50 lbs / 22.7 kg if vaporizer if the Mercury Relay option is installed.

Wiring: Meets NFPA Pamphlet 70 requirements for Class I Division 1 Group D

Other: Meets NFPA Pamphlet 58 requirements for electric vaporizers and may be installed per indirect fired vaporizers limitations.



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TORREXX VERTICAL ELECTRIC VAPORIZER DATA SHEET FOR LPG SYSTEMS

Table: LPG VAPORIZER DATA TABLE

MODEL	PHASE	VOLTAGE	CURRENT Amps.	POWER kW	EQUIPMENT DRAWING	ELECTRICAL DRAWING	BUSSING DIAGRAM
TX-25	1	120	32.4	4	5001 - 6001	5001-7008	0620 - 7007
TX-25	1	208	14.1	3	5001 - 6001	5001-7008	0620 - 7003
TX-25	1	220	14.9	3	5001 - 6001	5001-7008	0620 - 7003
TX-25	1	240	16.2	3	5001 - 6001	5001-7008	0620 - 7003
TX-50	1	208	28.1	6	5001 - 6001	5001-7008	0620 - 7004
TX-50	1	220	29.7	7	5001 - 6001	5001-7008	0620 - 7004
TX-50	1	240	32.4	8	5001 - 6001	5001-7008	0620 - 7004
TX100	1	208	56.2	12	5001 - 6001	5001-7008	0620 - 7007
TX100	1	220	59.5	13	5001 - 6001	5001-7008	0620 - 7007
TX100	1	240	54.1	13	5001 - 6001	5001-7008	0620 - 7008
TX-50	3	208	16.2	6	5001 - 6001	5001-7008	0620 - 7005
TX-50	3	220	17.1	7	5001 - 6001	5001-7008	0620 - 7005
TX-50	3	240	18.7	8	5001 - 6001	5001-7008	0620 - 7005
TX-50	3	380	9.9	7	5001 - 6001	5001-7008	0620 - 7028
TX-50	3	400	10.4	7	5001 - 6001	5001-7008	0620 - 7028
TX-50	3	415	10.8	8	5001 - 6001	5001-7008	0620 - 7028
TX100	3	208	32.4	12	5001 - 6001	5001-7008	0620 - 7009
TX100	3	220	34.3	13	5001 - 6001	5001-7008	0620 - 7009
TX100	3	240	37.4	16	5001 - 6001	5001-7008	0620 - 7009
TX100	3	380	19.8	13	5001 - 6001	5001-7008	0620 - 7010
TX100	3	400	20.8	14	5001 - 6001	5001-7008	0620 - 7010
TX100	3	415	21.6	16	5001 - 6001	5001-7008	0620 - 7010
TX100	3	440	17.1	13	5001 - 6001	5001-7008	0620 - 7011
TX100	3	480	18.7	16	5001 - 6001	5001-7008	0620 - 7011
TX160	3	208	49.6	18	5001 - 6001	5001-7008	0620 - 7009
TX160	3	220	52.4	20	5001 - 6001	5001-7008	0620 - 7009
TX160	3	240	51.9	22	5001 - 6001	5001-7008	0620 - 7012
TX160	3	380	30.3	20	5001 - 6001	5001-7008	0620 - 7010
TX160	3	400	28.9	20	5001 - 6001	5001-7008	0620 - 7010
TX160	3	415	30.0	22	5001 - 6001	5001-7008	0620 - 7010
TX160	3	440	26.2	20	5001 - 6001	5001-7008	0620 - 7011
TX160	3	480	26.0	22	5001 - 6001	5001-7008	0620 - 7011
TX240	3	380	45.4	30	5001 - 6001	5001-7008	0620 - 7010
TX240	3	400	47.8	33	5001 - 6001	5001-7008	0620 - 7010
TX240	3	415	49.6	36	5001 - 6001	5001-7008	0620 - 7010
TX240	3	440	39.3	30	5001 - 6001	5001-7008	0620 - 7011
TX240	3	480	42.9	36	5001 - 6001	5001-7008	0620 - 7011
TX320	3	380	33.0	33	5001 - 6001	5001-7008	0620 - 7010
TX320	3	400	36.6	37	5001 - 6001	5001-7008	0620 - 7010
TX320	3	415	39.3	39	5001 - 6001	5001-7008	0620 - 7010
TX320	3	440	33.1	33	5001 - 6001	5001-7008	0620 - 7011
TX320	3	480	39.4	39	5001 - 6001	5001-7008	0620 - 7011
TX320	3	575	39.2	39	5001 - 6001	5001-7008	0620 - 7010

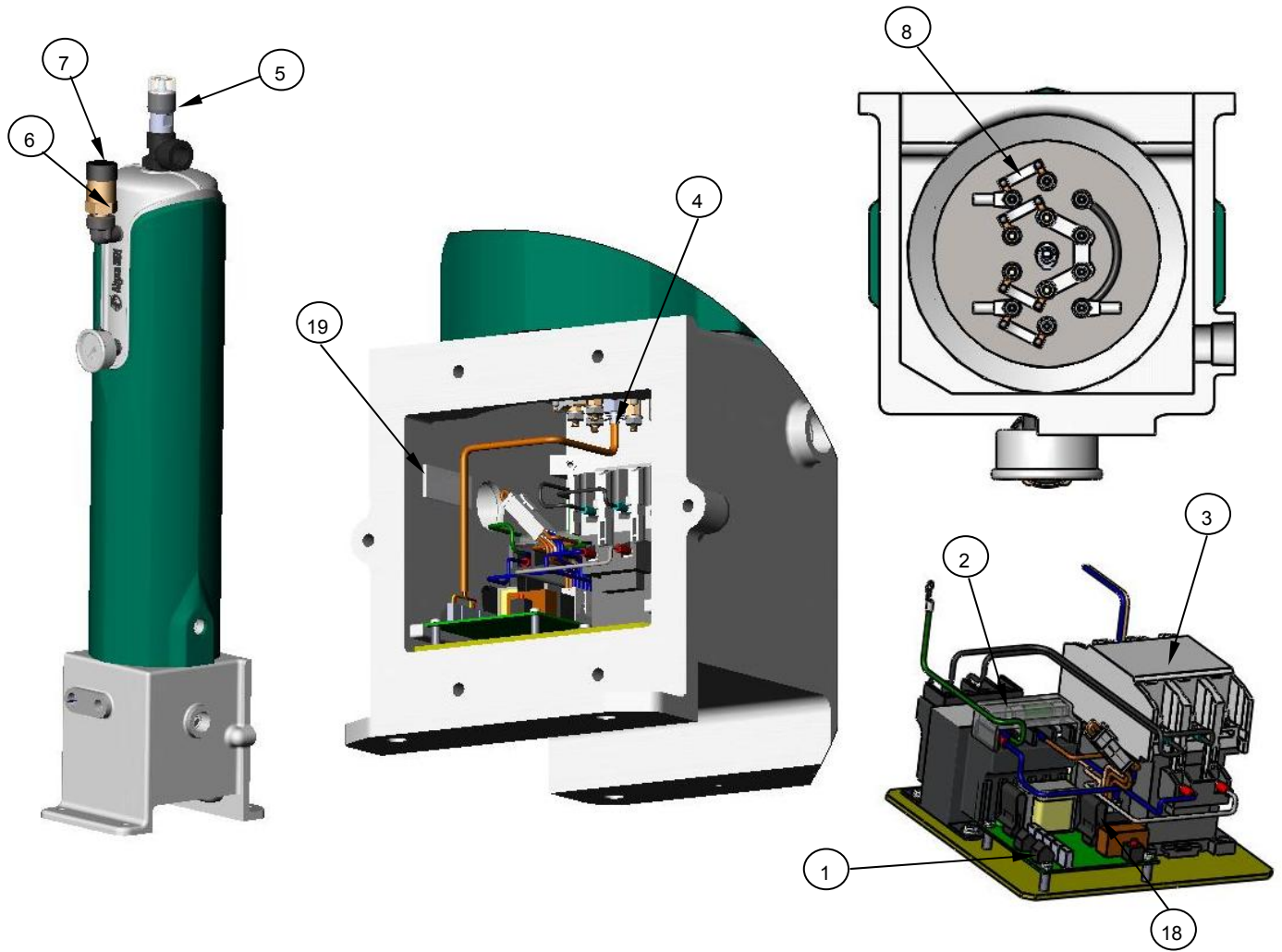
TORREXX Electric Vaporizer Spare Parts and Accessories

REFERENCE KEY	SPARE PARTS	TX25	TX25	TX50	TX50	TX100
		120V	208V 220V 240V	208V 220V 240V	380V 400V 415V	208V 220V 240V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890	53890
2	TRANSFORMER	52605-01	52606-01	52606-01	52607-01	52606-01
3	CONTACTOR	53630	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-01	5001-4009-01	5001-4009-01	5001-4009-01	5001-4009-01
5	Liqui-SAFE VALVE	5001-3003	5001-3003	5001-3003	5001-3003	5001-3003
6	PRESSURE RELIEF VALVE	35009	35009	35009	35009	35009
7	RAIN CAP	35379	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111	36111
10	FUSE KIT	52222	52222	52222	52222	52222
11	ECONOMY VALVE FIELD INSTALL KIT	41051	41051	41051	41051	41051
12	MERCURY RELAY CONTACTOR	53325	53325	53325	53325	53325
13	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD	TBD
14	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033	5001-5033
15	PIPE AWAY ADAPTOR	30752	30752	30752	30752	30752
16	VALVE, GAUGE AND STRAINER KIT	36922	36922	36922	36922	36922
17	STAND	20437	20437	20437	20437	20437
18	WIRE HARNESS (MAIN)	53820	53820	53820	53820	53820
19	CORROSION INHIBITING TAPE	60806	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40421	40421	40421	40421	40421

REFERENCE KEY	SPARE PARTS	TX100	TX100	TX160	TX160	TX160
		380V 400V 415V	440V 480V 575V	208V 220V 240V	380V 400V 415V	440V 480V 575V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890	53890
2	TRANSFORMER	52607-01	52608-01	52606-01	52607-01	52608-01
3	CONTACTOR	53630	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-01	5001-4009-01	5001-4009-02	5001-4009-02	5001-4009-02
5	Liqui-SAFE VALVE	5001-3003	5001-3003	5001-3003	5001-3003	5001-3003
6	PRESSURE RELIEF VALVE	35009	35009	35009	35009	35009
7	RAIN CAP	35379	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111	36111
10	FUSE KIT	52222	52222	52222	52222	52222
11	ECONOMY VALVE FIELD INSTALL KIT	41051	41051	41051	41051	41051
12	MERCURY RELAY CONTACTOR	53325	53325	53325	53325	53325
13	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD	TBD
14	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033	5001-5033
15	PIPE AWAY ADAPTOR	30752	30752	30752	30752	30752
16	VALVE, GAUGE AND STRAINER KIT	36922	36922	36922	36922	36922
17	STAND	20437	20437	20437	20437	20437
18	WIRE HARNESS (MAIN)	53820	53820	53820	53820	53820
19	CORROSION INHIBITING TAPE	60806	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40421	40421	40421	40421	40421

REFERENCE KEY	SPARE PARTS	TX240	TX240	TX320	TX320
		380V	440V	380V	440V
		400V	480V	400V	480V
		415V	575V	415V	575V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890
2	TRANSFORMER	52607-01	52608-01	52607-01	52608-01
3	CONTACTOR	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-03	5001-4009-03	5001-4009-04	5001-4009-04
5	Liqui-SAFE VALVE	5001-3003	5001-3003	5001-3003	5001-3003
6	PRESSURE RELIEF VALVE	35009	35009	35009	35009
7	RAIN CAP	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111
10	FUSE KIT	52222	52222	52222	52222
11	ECONOMY VALVE FIELD INSTALL KIT	41051	41051	41051	41051
12	MERCURY RELAY CONTACTOR	53325	53325	53325	53325
13	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD
14	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033
15	PIPE AWAY ADAPTOR	30752	30752	30752	30752
16	VALVE, GAUGE AND STRAINER KIT	36922	36922	36922	36922
17	STAND	20437	20437	20437	20437
18	WIRE HARNESS (MAIN)	53820	53820	53820	53820
19	CORROSION INHIBITING TAPE	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40421	40421	40421	40421

FIGURE 23 – TORREXX electric vaporizer major components and accessories



TORREXX Vertical Electric Vaporizer Data Sheet
Ammonia Systems

Refer to Nameplate on unit for the model and voltage information then look up specific information on the tables below.

General Specifications: Applies to all units

Electrical: 50 – 60 Hz, NEMA 4, 1 Phase units are 2 wire, 3 Phase units are 3 wire

Starting Temperature: 54 Deg. C 130 Deg. F

Operating Temperature: 90 Deg. C 195 Deg. F

High Temperature Limit: 171 Deg. C 340 Deg. F

Connections: ¾" NPT 300# Flanged SST Inlet; 1" NPT 300# Flanged SST Outlet

Conduits: 1" FNPT, Conduit Seal-Off by others

Type of Service: Ammonia Vaporization

ASME Pressure Vessel: 250 PSIG MAWP

Heat Exchanger Area: 2.9 ft² / 0.269 m² TX19AA, TX38AA and TX75AA

4.3 ft² / 0.399 m² TX120AA

5.4 ft² / 0.503 m² TX180AA

7.1 ft² / 0.660 m² TX240AA

Dry Weight: 128 lbs / 58.1 kg TX19AA, TX38AA and TX75AA

145 lbs* / 65.8 kg* TX120AA

155 lbs* / 70.3 kg* TX180AA

173 lbs* / 78.5 kg* TX240AA

* - Add 50 lbs / 22.7 kg if vaporizer if the Mercury Relay option is installed.

Wiring: Meets NFPA Pamphlet 70 requirements for Class I Division 1 Group D

Other: Meets NFPA Pamphlet 58 requirements for electric vaporizers and may be installed per indirect fired vaporizer limitations.



“TORREXX” is a trademark of Algas-SDI International LLC.

TORREXX VERTICAL ELECTRIC VAPORIZER DATA SHEET FOR AMMONIA SYSTEMS

Table: AMMONIA VAPORIZER DATA TABLE

MODEL	PHASE	VOLTAGE	CURRENT Amps.	POWER kW	EQUIPMENT DRAWING	ELECTRICAL DRAWING	BUSSING DIAGRAM
TX-19AA	1	120	32.4	4	5001 - 6002	5001-7008	0620 - 7007
TX-19AA	1	208	14.1	3	5001 - 6002	5001-7008	0620 - 7003
TX-19AA	1	220	14.9	3	5001 - 6002	5001-7008	0620 - 7003
TX-19AA	1	240	16.2	3	5001 - 6002	5001-7008	0620 - 7003
TX-38AA	1	208	28.1	6	5001 - 6002	5001-7008	0620 - 7004
TX-38AA	1	220	29.7	7	5001 - 6002	5001-7008	0620 - 7004
TX-38AA	1	240	32.4	8	5001 - 6002	5001-7008	0620 - 7004
TX-75AA	1	208	56.2	12	5001 - 6002	5001-7008	0620 - 7007
TX-75AA	1	220	59.5	13	5001 - 6002	5001-7008	0620 - 7007
TX-75AA	1	240	54.1	13	5001 - 6002	5001-7008	0620 - 7008
TX-38AA	3	208	16.2	6	5001 - 6002	5001-7008	0620 - 7005
TX-38AA	3	220	17.1	7	5001 - 6002	5001-7008	0620 - 7005
TX-38AA	3	240	18.7	8	5001 - 6002	5001-7008	0620 - 7005
TX-38AA	3	380	9.9	7	5001 - 6002	5001-7008	0620 - 7028
TX-38AA	3	400	10.4	7	5001 - 6002	5001-7008	0620 - 7028
TX-38AA	3	415	10.8	8	5001 - 6002	5001-7008	0620 - 7028
TX-75AA	3	208	32.4	12	5001 - 6002	5001-7008	0620 - 7009
TX-75AA	3	220	34.3	13	5001 - 6002	5001-7008	0620 - 7009
TX-75AA	3	240	37.4	16	5001 - 6002	5001-7008	0620 - 7009
TX-75AA	3	380	19.8	13	5001 - 6002	5001-7008	0620 - 7010
TX-75AA	3	400	20.8	14	5001 - 6002	5001-7008	0620 - 7010
TX-75AA	3	415	21.6	16	5001 - 6002	5001-7008	0620 - 7010
TX-75AA	3	440	17.1	13	5001 - 6002	5001-7008	0620 - 7011
TX-75AA	3	480	18.7	16	5001 - 6002	5001-7008	0620 - 7011
TX120AA	3	208	49.6	18	5001 - 6002	5001-7008	0620 - 7009
TX120AA	3	220	52.4	20	5001 - 6002	5001-7008	0620 - 7009
TX120AA	3	240	51.9	22	5001 - 6002	5001-7008	0620 - 7012
TX120AA	3	380	30.3	20	5001 - 6002	5001-7008	0620 - 7010
TX120AA	3	400	28.9	20	5001 - 6002	5001-7008	0620 - 7010
TX120AA	3	415	30.0	22	5001 - 6002	5001-7008	0620 - 7010
TX120AA	3	440	26.2	20	5001 - 6002	5001-7008	0620 - 7011
TX120AA	3	480	26.0	22	5001 - 6002	5001-7008	0620 - 7011
TX180AA	3	380	45.4	30	5001 - 6002	5001-7008	0620 - 7010
TX180AA	3	400	47.8	33	5001 - 6002	5001-7008	0620 - 7010
TX180AA	3	415	49.6	36	5001 - 6002	5001-7008	0620 - 7010
TX180AA	3	440	39.3	30	5001 - 6002	5001-7008	0620 - 7011
TX180AA	3	480	42.9	36	5001 - 6002	5001-7008	0620 - 7011
TX240AA	3	380	33.0	33	5001 - 6002	5001-7008	0620 - 7010
TX240AA	3	400	36.6	37	5001 - 6002	5001-7008	0620 - 7010
TX240AA	3	415	39.3	39	5001 - 6002	5001-7008	0620 - 7010
TX240AA	3	440	33.1	33	5001 - 6002	5001-7008	0620 - 7011
TX240AA	3	480	39.4	39	5001 - 6002	5001-7008	0620 - 7011
TX240AA	3	575	39.2	39	5001 - 6002	5001-7008	0620 - 7010

TORREXX Electric Vaporizer Spare Parts and Accessories (Ammonia)

REFERENCE KEY	SPARE PARTS	TX19AA	TX19AA	TX38AA	TX38AA	TX75AA
		120V	208V	208V	380V	208V
			220V	220V	400V	220V
			240V	240V	415V	240V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890	53890
2	TRANSFORMER	52605-01	52606-01	52606-01	52607-01	52606-01
3	CONTACTOR	53630	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-01	5001-4009-01	5001-4009-01	5001-4009-01	5001-4009-01
5	Liqui-SAFE VALVE	5001-3004	5001-3004	5001-3004	5001-3004	5001-3004
6	PRESSURE RELIEF VALVE	30749	30749	30749	30749	30749
7	RAIN CAP	35379	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111	36111
10	FUSE KIT	52222	52222	52222	52222	52222
11	ECONOMY VALVE FIELD INSTALL KIT	41053	41053	41053	41053	41053
12	MERCURY RELAY CONTACTOR	53325	53325	53325	53325	53325
13	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD	TBD
14	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033	5001-5033
15	PIPE AWAY ADAPTOR	30967	30967	30967	30967	30967
16	VALVE, GAUGE AND STRAINER KIT	36925	36925	36925	36925	36925
17	STAND	20437	20437	20437	20437	20437
18	WIRE HARNESS (MAIN)	53820	53820	53820	53820	53820
19	CORROSION INHIBITING TAPE	60806	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40422	40422	40422	40422	40422

REFERENCE KEY	SPARE PARTS	TX75AA	TX75AA	TX120AA	TX120AA	TX120AA
		380V	440V	208V	380V	440V
		400V	480V	220V	400V	480V
		415V	575V	240V	415V	575V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890	53890
2	TRANSFORMER	52607-01	52608-01	52606-01	52607-01	52608-01
3	CONTACTOR	53630	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-01	5001-4009-01	5001-4009-02	5001-4009-02	5001-4009-02
5	Liqui-SAFE VALVE	5001-3004	5001-3004	5001-3004	5001-3004	5001-3004
6	PRESSURE RELIEF VALVE	30749	30749	30749	30749	30749
7	RAIN CAP	35379	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111	36111
10	FUSE KIT	52222	52222	52222	52222	52222
11	ECONOMY VALVE FIELD INSTALL KIT	41053	41053	41053	41053	41053
12	MERCURY RELAY CONTACTOR	53325	53325	53325	53325	53325
13	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD	TBD
14	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033	5001-5033
15	PIPE AWAY ADAPTOR	30967	30967	30967	30967	30967
16	VALVE, GAUGE AND STRAINER KIT	36925	36925	36925	36925	36925
17	STAND	20437	20437	20437	20437	20437
18	WIRE HARNESS (MAIN)	53820	53820	53820	53820	53820
19	CORROSION INHIBITING TAPE	60806	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40422	40422	40422	40422	40422

REFERENCE KEY	SPARE PARTS	TX150AA	TX150AA	TX200AA	TX200AA
		380V	440V	380V	440V
		400V	480V	400V	480V
		415V	575V	415V	575V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890
2	TRANSFORMER	52607-01	52608-01	52607-01	52608-01
3	CONTACTOR	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-03	5001-4009-03	5001-4009-04	5001-4009-04
5	Liqui-SAFE VALVE	5001-3004	5001-3004	5001-3004	5001-3004
6	PRESSURE RELIEF VALVE	30749	30749	30749	30749
7	RAIN CAP	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111
10	FUSE KIT	52222	52222	52222	52222
11	ECONOMY VALVE FIELD INSTALL KIT	41053	41053	41053	41053
12	MERCURY RELAY CONTACTOR	53325	53325	53325	53325
13	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD
14	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033
15	PIPE AWAY ADAPTOR	30967	30967	30967	30967
16	VALVE, GAUGE AND STRAINER KIT	36925	36925	36925	36925
17	STAND	20437	20437	20437	20437
18	WIRE HARNESS (MAIN)	53820	53820	53820	53820
19	CORROSION INHIBITING TAPE	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40422	40422	40422	40422

TORREXX Vertical Electric Vaporizer Data Sheet
NEMKO LPG Systems

Refer to Nameplate on unit for the model and voltage information then look up specific information on the tables below.

General Specifications: Applies to all units

Electrical: 50 – 60 Hz, NEMA 4, 1 Phase units are 2 wire, 3 Phase units are 3 wire

Starting Temperature: 54 Deg. C 130 Deg. F

Operating Temperature: 71-79 Deg. C 160-175 Deg. F

High Temperature Limit: 171 Deg. C 340 Deg. F

Connections: 3/4" FNPT – Inlet; 1" FNPT – Outlet

Conduits: 1" FNPT, Conduit Seal-Off by others

Type of Service: Propane Vaporization

ASME Pressure Vessel: 250 PSIG MAWP

Heat Exchanger Area: 2.9 ft² / 0.269 m² TX25, TX50 and TX100

4.3 ft² / 0.399 m² TX160

5.4 ft² / 0.503 m² TX240

7.1 ft² / 0.660 m² TX320

Dry Weight: 128 lbs / 58.1 kg TX25, TX50 and TX100

145 lbs / 65.8 kg TX160

155 lbs / 70.3 kg TX240

173 lbs / 78.5 kg TX320

Hazardous Area Rating: NEMKO 04 ATEX 1026X

Ex d IIB T3

TO AVOID POTENTIAL ELECTROSTATIC CHARGING HAZARD, ALWAYS USE A DAMP CLOTH FOR CLEANING THE INSULATION JACKET. AVOID DRY RUBBING OF THE INSULATION JACKET.



“TORREXX” is a trademark of Algas-SDI International LLC.

TORREXX VERTICAL ELECTRIC VAPORIZER DATA SHEET FOR LPG SYSTEMS (NEMKO)

Table: NEMKO LPG VAPORIZER DATA TABLE

MODEL	PHASE	VOLTAGE	CURRENT Amps.	POWER kW	EQUIPMENT DRAWING	ELECTRICAL DRAWING	BUSSING DIAGRAM
TX-25	1	220	14.9	3	5001 - 6003	5001-7008	0620 - 7003
TX-25	1	240	16.2	3	5001 - 6003	5001-7008	0620 - 7003
TX-50	1	220	29.7	7	5001 - 6003	5001-7008	0620 - 7004
TX-50	1	240	32.4	8	5001 - 6003	5001-7008	0620 - 7004
TX100	1	220	59.5	13	5001 - 6003	5001-7008	0620 - 7007
TX100	1	240	54.1	13	5001 - 6003	5001-7008	0620 - 7008
TX-50	3	220	17.1	7	5001 - 6003	5001-7008	0620 - 7005
TX-50	3	240	18.7	8	5001 - 6003	5001-7008	0620 - 7005
TX-50	3	380	9.9	7	5001 - 6003	5001-7008	0620 - 7028
TX-50	3	400	10.4	7	5001 - 6003	5001-7008	0620 - 7028
TX-50	3	415	10.8	8	5001 - 6003	5001-7008	0620 - 7028
TX100	3	220	34.3	13	5001 - 6003	5001-7008	0620 - 7009
TX100	3	240	37.4	16	5001 - 6003	5001-7008	0620 - 7009
TX100	3	380	19.8	13	5001 - 6003	5001-7008	0620 - 7010
TX100	3	400	20.8	14	5001 - 6003	5001-7008	0620 - 7010
TX100	3	415	21.6	16	5001 - 6003	5001-7008	0620 - 7010
TX160	3	220	52.4	20	5001 - 6003	5001-7008	0620 - 7009
TX160	3	240	51.9	22	5001 - 6003	5001-7008	0620 - 7012
TX160	3	380	30.3	20	5001 - 6003	5001-7008	0620 - 7010
TX160	3	400	28.9	20	5001 - 6003	5001-7008	0620 - 7010
TX160	3	415	30.0	22	5001 - 6003	5001-7008	0620 - 7010
TX240	3	380	45.4	30	5001 - 6003	5001-7008	0620 - 7010
TX240	3	400	47.8	33	5001 - 6003	5001-7008	0620 - 7010
TX240	3	415	49.6	36	5001 - 6003	5001-7008	0620 - 7010
TX320	3	380	33.0	33	5001 - 6003	5001-7008	0620 - 7010
TX320	3	400	36.6	37	5001 - 6003	5001-7008	0620 - 7010
TX320	3	415	39.3	39	5001 - 6003	5001-7008	0620 - 7010

TORREXX Electric Vaporizer Spare Parts and Accessories (NEMKO)

REFERENCE KEY	SPARE PARTS	TX25	TX25	TX50	TX50	TX100
		120V	208V 220V 240V	208V 220V 240V	380V 400V 415V	208V 220V 240V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890	53890
2	TRANSFORMER	52605-01	52606-01	52606-01	52607-01	52606-01
3	CONTACTOR	53630	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-01	5001-4009-01	5001-4009-01	5001-4009-01	5001-4009-01
5	Liqui-SAFE VALVE	5001-3003	5001-3003	5001-3003	5001-3003	5001-3003
6	PRESSURE RELIEF VALVE	35009	35009	35009	35009	35009
7	RAIN CAP	35379	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111	36111
10	FUSE KIT	52222	52222	52222	52222	52222
11	ECONOMY VALVE FIELD INSTALL KIT	41051	41051	41051	41051	41051
12	MERCURY RELAY CONTACTOR	53325	53325	53325	53325	53325
13	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD	TBD
14	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033	5001-5033
15	PIPE AWAY ADAPTOR	30752	30752	30752	30752	30752
16	VALVE, GAUGE AND STRAINER KIT	36922	36922	36922	36922	36922
17	STAND	20437	20437	20437	20437	20437
18	WIRE HARNESS (MAIN)	53820	53820	53820	53820	53820
19	CORROSION INHIBITING TAPE	60806	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40421	40421	40421	40421	40421

REFERENCE KEY	SPARE PARTS	TX100	TX100	TX160	TX160	TX160
		380V 400V 415V	440V 480V 575V	208V 220V 240V	380V 400V 415V	440V 480V 575V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890	53890
2	TRANSFORMER	52607-01	52608-01	52606-01	52607-01	52608-01
3	CONTACTOR	53630	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-01	5001-4009-01	5001-4009-02	5001-4009-02	5001-4009-02
5	Liqui-SAFE VALVE	5001-3003	5001-3003	5001-3003	5001-3003	5001-3003
6	PRESSURE RELIEF VALVE	35009	35009	35009	35009	35009
7	RAIN CAP	35379	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111	36111
8	FUSE KIT	52222	52222	52222	52222	52222
10	ECONOMY VALVE FIELD INSTALL KIT	41051	41051	41051	41051	41051
11	MERCURY RELAY CONTACTOR	53325	53325	53325	53325	53325
12	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD	TBD
13	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033	5001-5033
14	PIPE AWAY ADAPTOR	30752	30752	30752	30752	30752
15	VALVE, GAUGE AND STRAINER KIT	36922	36922	36922	36922	36922
16	STAND	20437	20437	20437	20437	20437
17	WIRE HARNESS (MAIN)	53820	53820	53820	53820	53820
18	CORROSION INHIBITING TAPE	60806	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40421	40421	40421	40421	40421

REFERENCE KEY	SPARE PARTS	TX240	TX240	TX320	TX320
		380V	440V	380V	440V
		400V	480V	400V	480V
		415V	575V	415V	575V
1	TEMPERATURE CONTROL BOARD	53890	53890	53890	53890
2	TRANSFORMER	52607-01	52608-01	52607-01	52608-01
3	CONTACTOR	53630	53630	53630	53630
4	THERMOCOUPLE	5001-4009-03	5001-4009-03	5001-4009-04	5001-4009-04
5	Liqui-SAFE VALVE	5001-3003	5001-3003	5001-3003	5001-3003
6	PRESSURE RELIEF VALVE	35009	35009	35009	35009
7	RAIN CAP	35379	35379	35379	35379
8	FUSIBLE LINK	33139	33139	33139	33139
9	INLET SOLENOID	36111	36111	36111	36111
10	FUSE KIT	52222	52222	52222	52222
11	ECONOMY VALVE FIELD INSTALL KIT	41051	41051	41051	41051
12	MERCURY RELAY CONTACTOR	53325	53325	53325	53325
13	TRANSFORMER (MERCURY RELAY)	TBD	TBD	TBD	TBD
14	WIRE HARNESS (MERCURY RELAY)	5001-5033	5001-5033	5001-5033	5001-5033
15	PIPE AWAY ADAPTOR	30752	30752	30752	30752
16	VALVE, GAUGE AND STRAINER KIT	36922	36922	36922	36922
17	STAND	20437	20437	20437	20437
18	WIRE HARNESS (MAIN)	53820	53820	53820	53820
19	CORROSION INHIBITING TAPE	60806	60806	60806	60806
20	INLET SOLENOID KIT	40287	40287	40287	40287
21	Liqui-SAFE VALVE O-RING KIT	40421	40421	40421	40421

**TORREXX Vertical Electric Vaporizer Data Sheet
Ammonia Systems (NEMKO)**

Refer to Nameplate on unit for the model and voltage information then look up specific information on the tables below.

General Specifications: Applies to all units

Electrical: 50 – 60 Hz, NEMA 4, 1 Phase units are 2 wire, 3 Phase units are 3 wire

Starting Temperature: 54 Deg. C 130 Deg. F

Operating Temperature: 90 Deg. C 195 Deg. F

High Temperature Limit: 171 Deg. C 340 Deg. F

Connections: ¾" NPT 300# Flanged SST Inlet; 1" NPT 300# Flanged SST Outlet

Conduits: 1" FNPT, Conduit Seal-Off by others

Type of Service: Ammonia Vaporization

ASME Pressure Vessel: 250 PSIG MAWP

Heat Exchanger Area: 2.9 ft² / 0.269 m² TX19AA, TX38AA and TX75AA

4.3 ft² / 0.399 m² TX120AA

5.4 ft² / 0.503 m² TX180AA

7.1 ft² / 0.660 m² TX240AA

Dry Weight: 128 lbs / 58.1 kg TX19AA, TX38AA and TX75AA

145 lbs / 65.8 kg TX120AA

155 lbs / 70.3 kg TX180AA

173 lbs / 78.5 kg TX240AA

Hazardous Area Rating: NEMKO 04 ATEX 1026X

EEx d IIB T3

TO AVOID POTENTIAL ELECTROSTATIC CHARGING HAZARD, ALWAYS USE A DAMP CLOTH FOR CLEANING THE INSULATION JACKET. AVOID DRY RUBBING OF THE INSULATION JACKET.



“TORREXX” is a trademark of Algas-SDI International LLC.

TORREXX VERTICAL ELECTRIC VAPORIZER DATA SHEET FOR AMMONIA SYSTEMS (NEMKO)

Table: NEMKO AMMONIA VAPORIZER DATA TABLE

MODEL	PHASE	VOLTAGE	CURRENT Amps.	POWER kW	EQUIPMENT DRAWING	ELECTRICAL DRAWING	BUSSING DIAGRAM
TX-19AA	1	220	14.9	3	5001 - 6004	5001 - 7008	0620 - 7003
TX-19AA	1	240	16.2	3	5001 - 6004	5001 - 7008	0620 - 7003
TX-38AA	1	220	29.7	7	5001 - 6004	5001 - 7008	0620 - 7004
TX-38AA	1	240	32.4	8	5001 - 6004	5001 - 7008	0620 - 7004
TX-75AA	1	220	59.5	13	5001 - 6004	5001 - 7008	0620 - 7007
TX-75AA	1	240	54.1	13	5001 - 6004	5001 - 7008	0620 - 7008
TX-38AA	3	220	17.1	7	5001 - 6004	5001 - 7008	0620 - 7005
TX-38AA	3	240	18.7	8	5001 - 6004	5001 - 7008	0620 - 7005
TX-38AA	3	380	9.9	7	5001 - 6004	5001 - 7008	0620 - 7028
TX-38AA	3	400	10.4	7	5001 - 6004	5001 - 7008	0620 - 7028
TX-38AA	3	415	10.8	8	5001 - 6004	5001 - 7008	0620 - 7028
TX-75AA	3	220	34.3	13	5001 - 6004	5001 - 7008	0620 - 7009
TX-75AA	3	240	37.4	16	5001 - 6004	5001 - 7008	0620 - 7009
TX-75AA	3	380	19.8	13	5001 - 6004	5001 - 7008	0620 - 7010
TX-75AA	3	400	20.8	14	5001 - 6004	5001 - 7008	0620 - 7010
TX-75AA	3	415	21.6	16	5001 - 6004	5001 - 7008	0620 - 7010
TX120AA	3	220	52.4	20	5001 - 6004	5001 - 7008	0620 - 7009
TX120AA	3	240	51.9	22	5001 - 6004	5001 - 7008	0620 - 7012
TX120AA	3	380	30.3	20	5001 - 6004	5001 - 7008	0620 - 7010
TX120AA	3	400	28.9	20	5001 - 6004	5001 - 7008	0620 - 7010
TX120AA	3	415	30.0	22	5001 - 6004	5001 - 7008	0620 - 7010
TX180AA	3	380	45.4	30	5001 - 6004	5001 - 7008	0620 - 7010
TX180AA	3	400	47.8	33	5001 - 6004	5001 - 7008	0620 - 7010
TX180AA	3	415	49.6	36	5001 - 6004	5001 - 7008	0620 - 7010
TX240AA	3	380	33.0	33	5001 - 6004	5001 - 7008	0620 - 7010
TX240AA	3	400	36.6	37	5001 - 6004	5001 - 7008	0620 - 7010
TX240AA	3	415	39.3	39	5001 - 6004	5001 - 7008	0620 - 7010




EC Declaration of Conformity

WE, Algas-SDI
151 South Michigan
Seattle, WA 98108 USA

Declare, solely under own responsibility, that the product

Model: TX Series, LPG vaporizer for converting liquefied petroleum to vapor by means of an electric heater/heat exchanger.

Mentioned in this declaration, complies with the following standards and/or normative documents:

Requirements	Remarks	Certificates No.
94/9/EC, Annex VII	Product Quality Assurance ATEX Directive	DNV-2006-OSL-ATEX-0166Q
Notified Body:	Det Norske Veritas AS Veritasveien 1 N-1322 Hovik, Norway	0575
	CE  II 2 G EEx d IIB T3	NEMKO 04ATEX1026X
EN 50014: June 1997	Electrical Apparatus for Potentially Explosive Atmospheres – General Requirements	
February 1999	Amendment 1	
February 1999	Amendment 2	
EN 50018: November 2000	Electrical Apparatus for Explosive Gas Atmospheres – Flame proof Enclosures “d”	
September 2002	Amendment 1	
Type Examination Body:	NEMKO P.O. Box 73 Blindern N-0314 OSLO, Norway	0470
97/23/EC	Pressure Equipment Directive Module H	PED-H-40065-2008-CE-USA-NA
Technical Standards Applied: ASME B&PV Code, Section VIII, Div. 1		
Notified Body:	Det Norske Veritas AS Veritasveien 1 N-1322 Hovik, Norway	0575



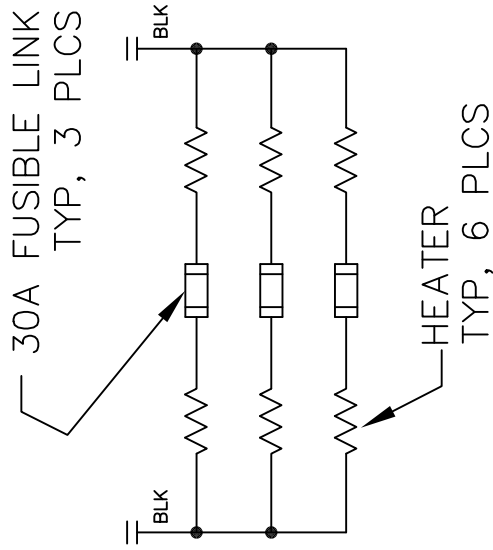
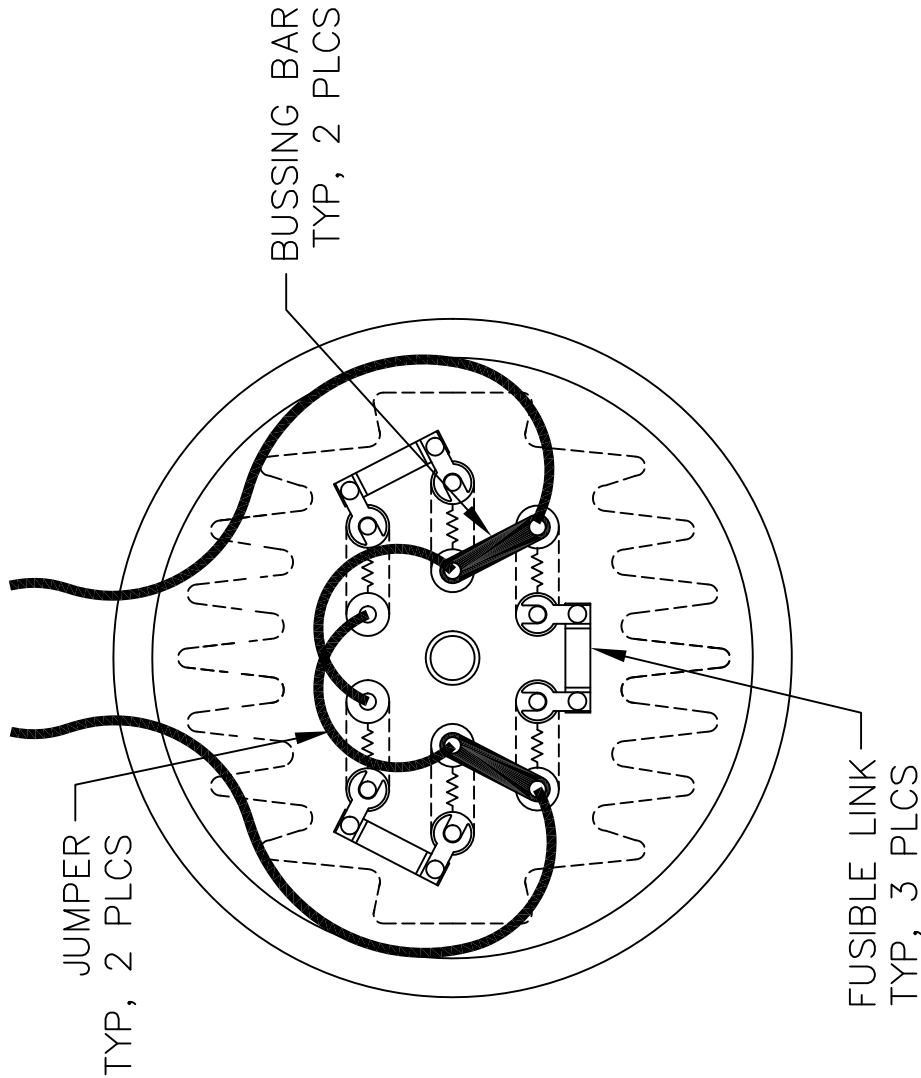
Algas-SDITM
...Innovative liquid vaporizing and gas mixing solutions

ISO 9001
Certified

CE Declaration of Conformity Continued:

Requirements	Remarks	Certificates No.
89/336/EEC	EMC Directive	ETL/017/1998
EN 50082-2	Electromagnetic Compatibility – Generic Immunity Standard, Part 2. Industrial Environment	
EN 61000-4-2	Electrostatic Discharge	
ENV 50140	Radiated Electromagnetic Field	
ENV 50204	Radiated Electromagnetic Field from Digital Radio Telephones	
EN 61000-4-4	Electrical Fast Transient/Burst	
ENV 50141	Conducted Disturbances Induced By Radio-Frequency Fields	
EN 61000-4-8	Power Frequency Magnetic Field Immunity	
Conformity Assessment:	Quest Engineering Solutions 7 Sterling Road, PO Box 125 N. Billerica, MA 01862	US0030

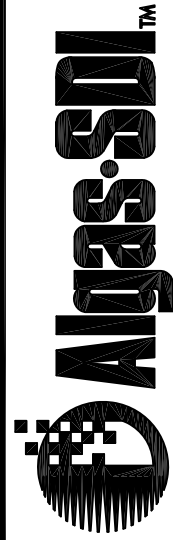
Mike Zimmer, PE
Director of Engineering
May 15, 2009



NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG				
25	200V/208V/220V/ 240V, 1PH	2595 WATTS @ 240VAC	22.2 OHMS	14.8 OHMS

1 CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3 (AA)

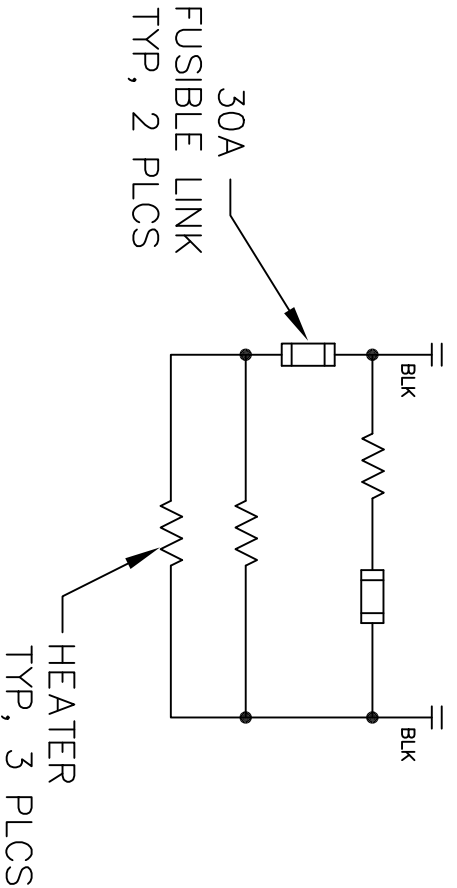
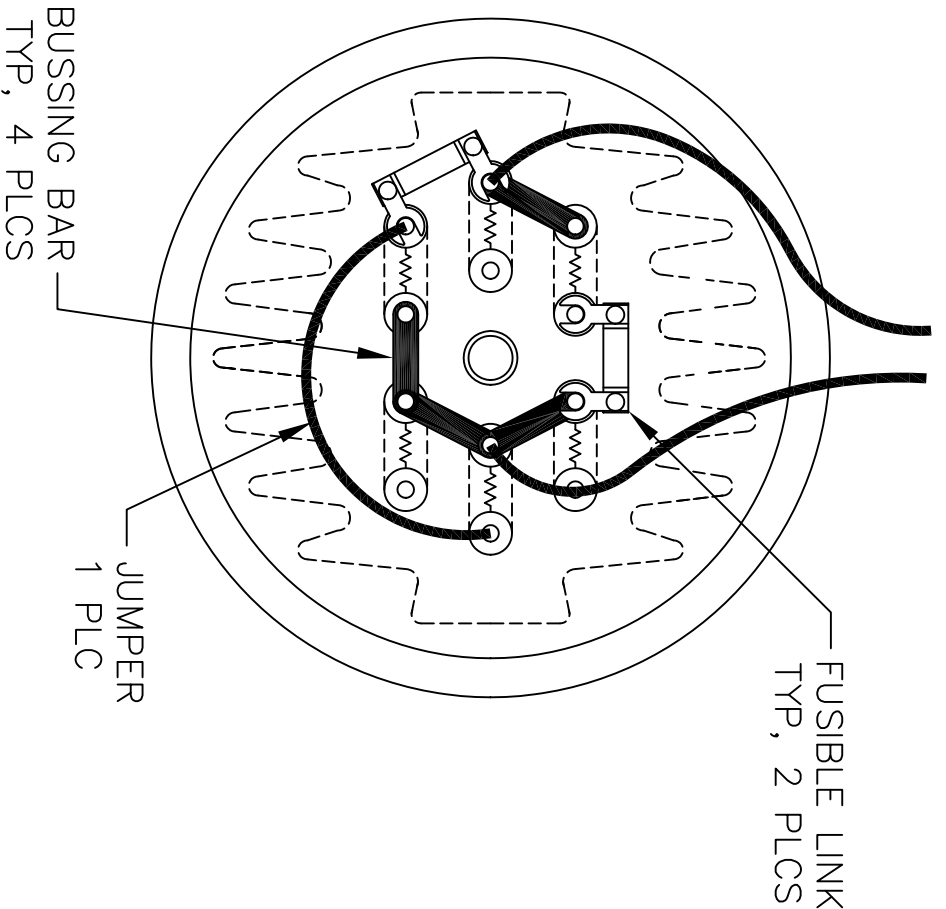


151 S. Michigan St., Seattle, Washington, USA 98108
 Tel: (206) 789-5410 Fax: (206) 789-5414

Title

BUSSING DIAGRAM

CAPACITY SIZE 25 & 19AA
 200V/208V/220V/240V, 1 PH
 TORREX ELECTRIC VAPORIZER
 (REFERENCE 0620-7003A1D)



NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA			
50	38AA	2595 WATTS @ 240VAC	22.2 OHMS	7.4 OHMS

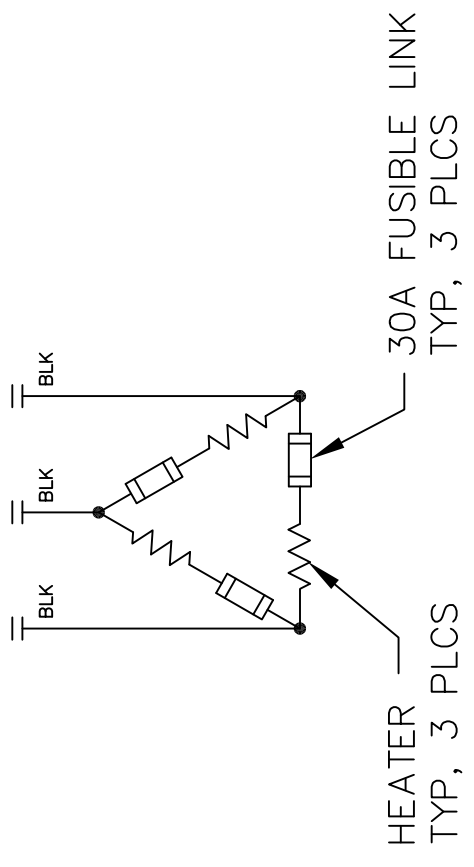
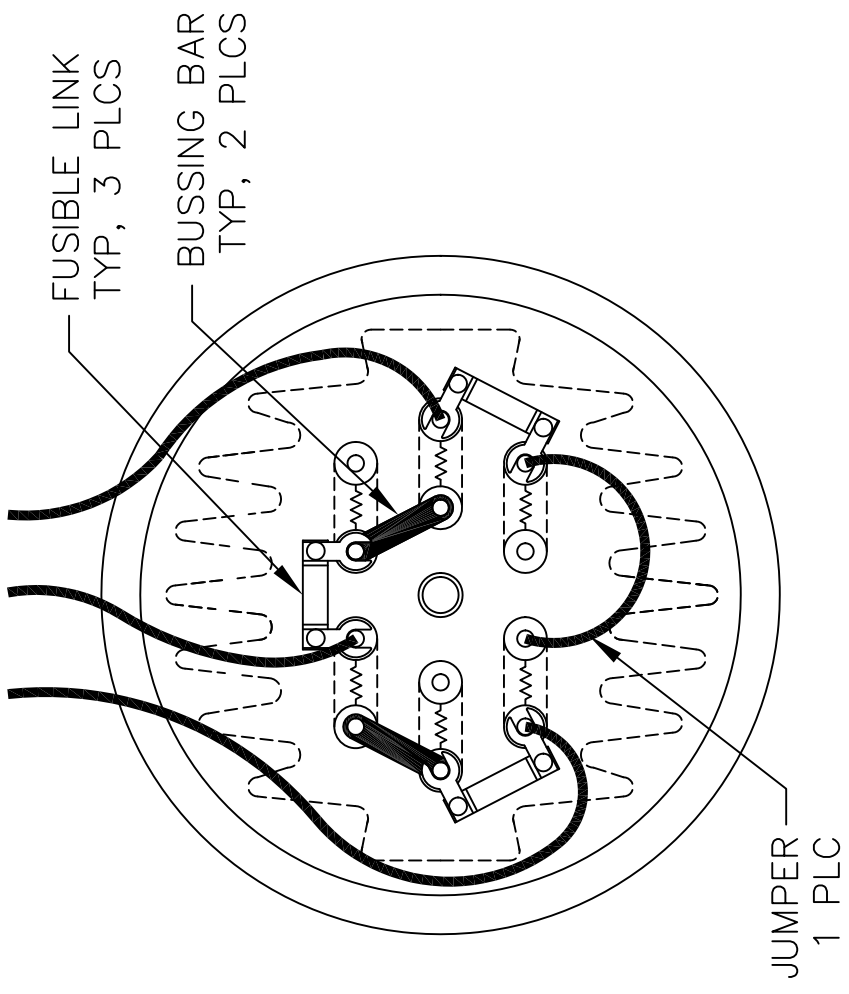
1 CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3

Algas-SOITM

151 S. Michigan St., Seattle, Washington, USA 98108
 Tel: (206) 789-5410 Fax: (206) 789-5414

Title

BUSSING DIAGRAM
 CAPACITY SIZE 50 & 38AA
 200V/208V/220V/240V 1PH
 TORREXX ELECTRIC VAPORIZER
 (REFERENCE 0620-7004A1C)



NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

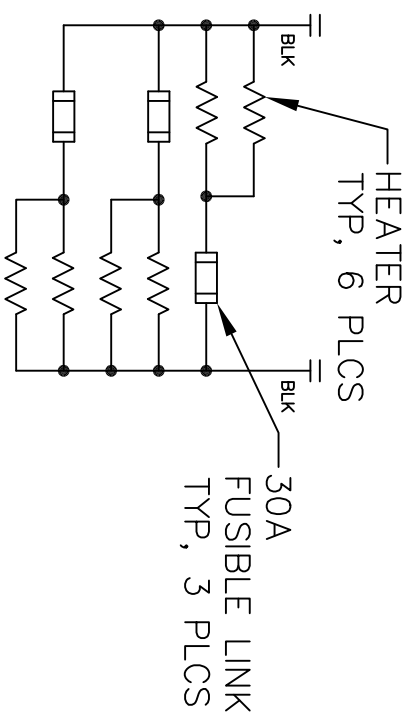
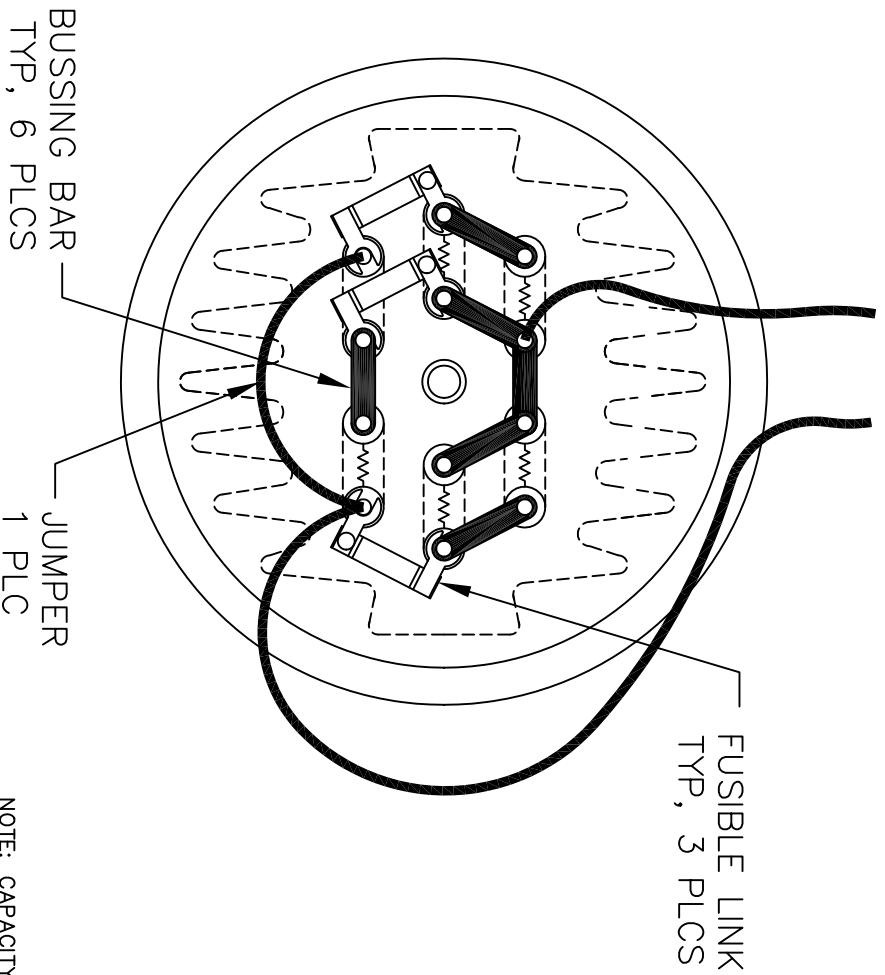
CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG				
50	200V/208V/220V/ 240V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS	14.8 OHMS

△ CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3 (AA)

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Title

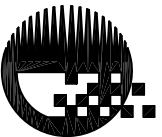
BUSSING DIAGRAM
 CAPACITY SIZE 50 & 38AA
 200V/208V/220V/240V, 3 PH
 TORREXX ELECTRIC VAPORIZER
 (REFERENCE 0620-7005A1C)



NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA			
25	19AA	2595 WATTS @ 240VAC	22.2 OHMS	3.7 OHMS
100	75AA	2595 WATTS @ 240VAC	22.2 OHMS	3.7 OHMS

1 CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3 (AA)



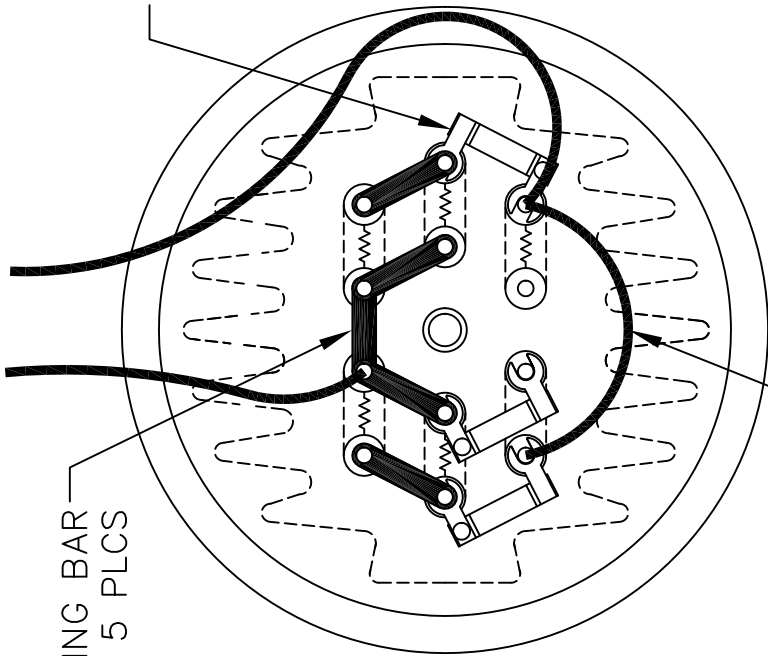
Algas-SOI
TM

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Tel: (206) 789-5410 Fax: (206) 789-5414

Title

BUSSING DIAGRAM

CAPACITY SIZE 25, 19AA, 100, & 75AA
110V/120V/200V/208V/220V, 1PH
TORREXX ELECTRIC VAPORIZER
(REFERENCE 0620-7007A1D)



BUSSING BAR
TYP, 5 PLCS

FUSIBLE LINK
TYP, 3 PLCS

HEATER
TYP, 5 PLCS

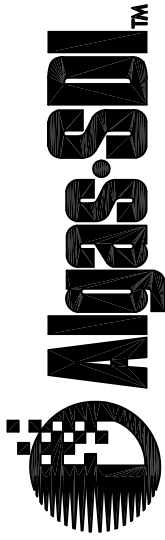
30A
FUSIBLE LINK
TYP, 3 PLCS

JUMPER
1 PLC

NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG 100	240V, 1PH			
AA 75AA	240V, 1PH	2595 WATTS @ 240VAC	22.2 OHMS	4.4 OHMS

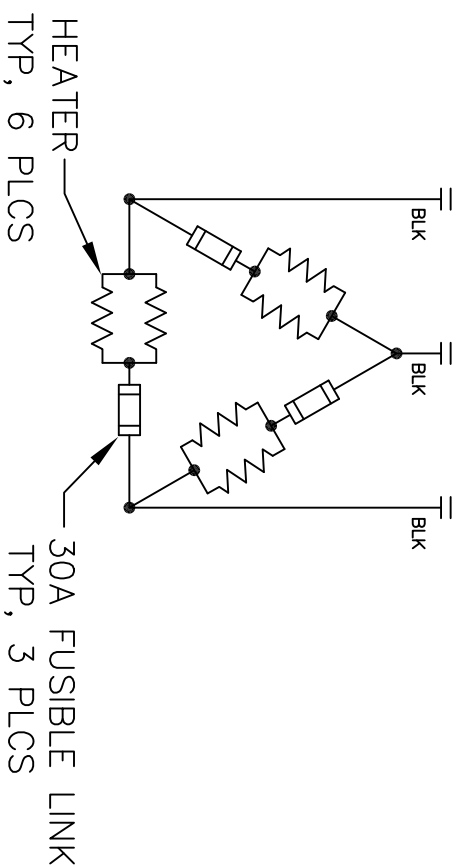
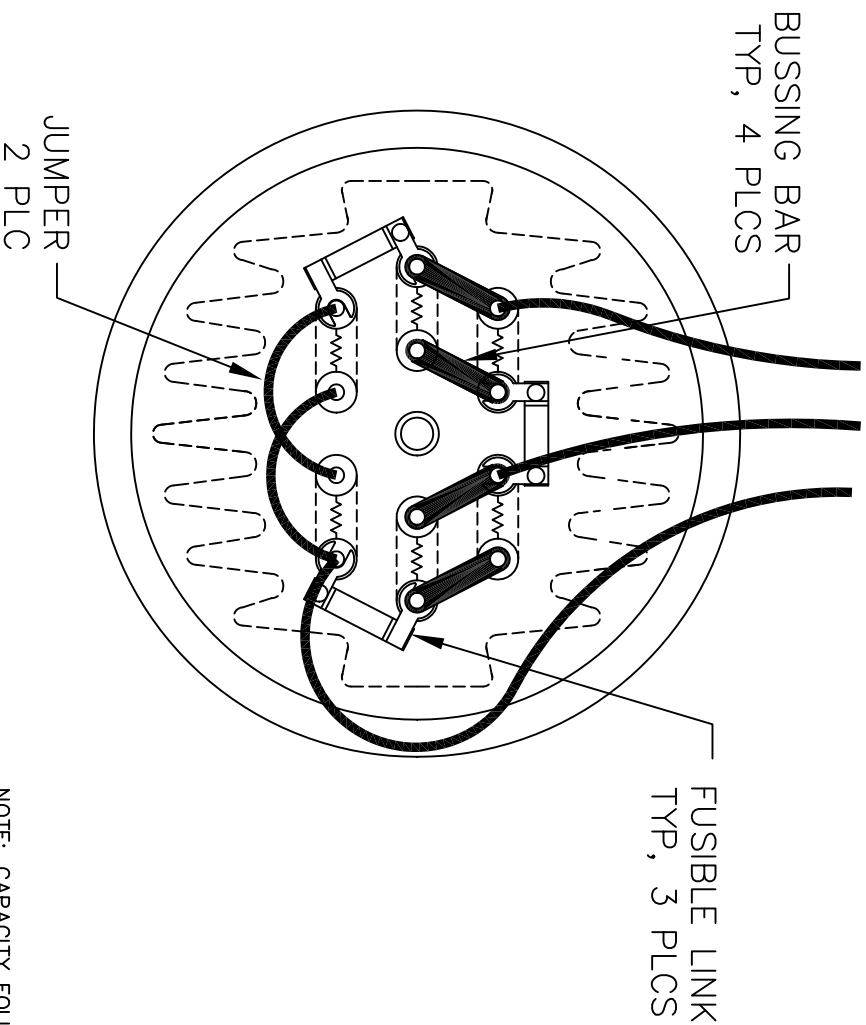
△ CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3 (AA)



151 S. Michigan St., Seattle, Washington, USA 98108
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Title


BUSSING DIAGRAM
CAPACITY SIZE 100 & 75AA
240V 1 PH
TORREXX ELECTRIC VAPORIZER
(REFERENCE 0620-7008A1C)



NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA			
100	75AA	200V/208V/220V/ 240V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS
160	120AA	200V/208V/220V/ 3PH	3333 WATTS @ 220VAC	14.5 OHMS
				7.4 OHMS
				4.8 OHMS

1 CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3 (AA)



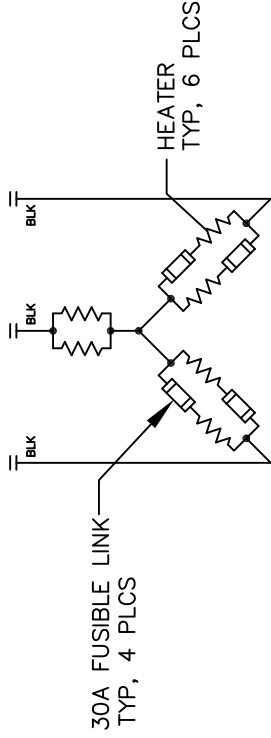
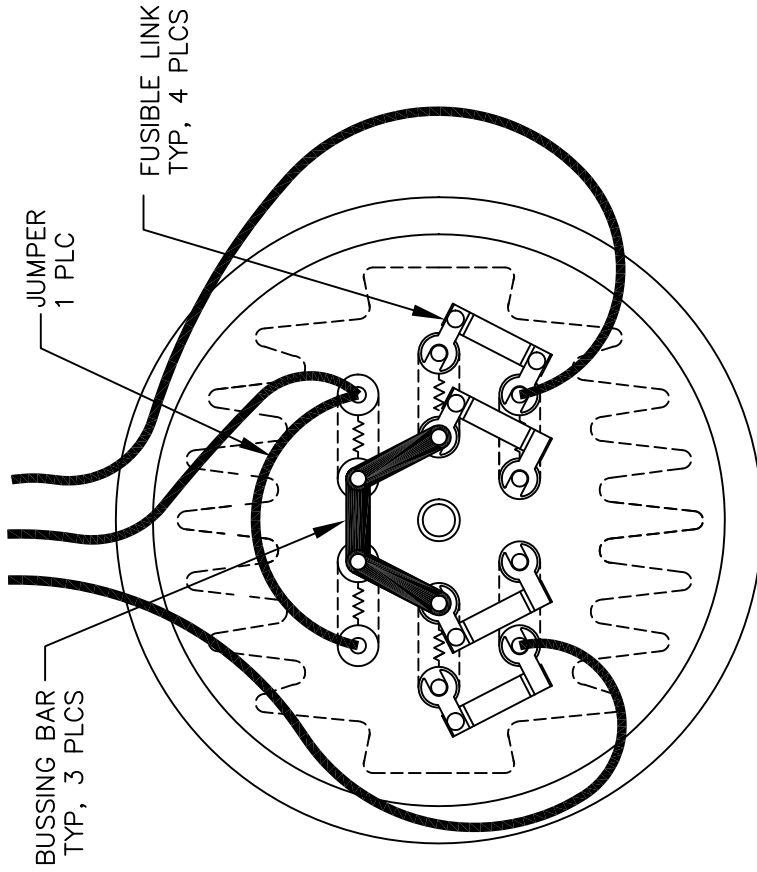
Algas-SOITM

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 Tel: (206) 789-5410 Fax: (206) 789-5414

Title

BUSSING DIAGRAM

CAPACITY SIZE 100, 75AA, 160, & 120AA
 200V/208V/220V/3PH & TX100/240V
 TORREXX ELECTRIC VAPORIZER
 (REFERENCE 0620-7009A1C)



NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG				
100	380V/415V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS	22.2 OHMS
160	380V/415V, 3PH	3333 WATTS @ 220VAC	14.5 OHMS	14.5 OHMS
160	380V/400V/415V 3PH	3600 WATTS @ 240VAC	16.0 OHMS	16.0 OHMS
240	380V/415V, 3PH	5000 WATTS @ 220VAC	9.7 OHMS	9.7 OHMS
320	380V/400V/415V 3PH	6580 WATTS @ 240VAC	8.8 OHMS	8.8 OHMS
TX320 ONLY	380V/415V, 3PH	6580 WATTS @ 240VAC	8.8 OHMS	8.8 OHMS
100	575V 3PH	2595 WATTS @ 333VAC	42.7 OHMS	42.7 OHMS
160	575V 3PH	3333 WATTS @ 333VAC	33.3 OHMS	33.3 OHMS
240	575V 3PH	5000 WATTS @ 333VAC	22.2 OHMS	22.2 OHMS
320	575V 3PH	6580 WATTS @ 333VAC	16.9 OHMS	16.9 OHMS

△ CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3 (AA)

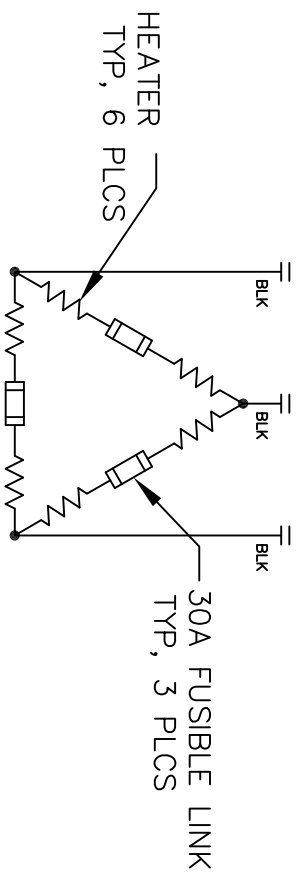
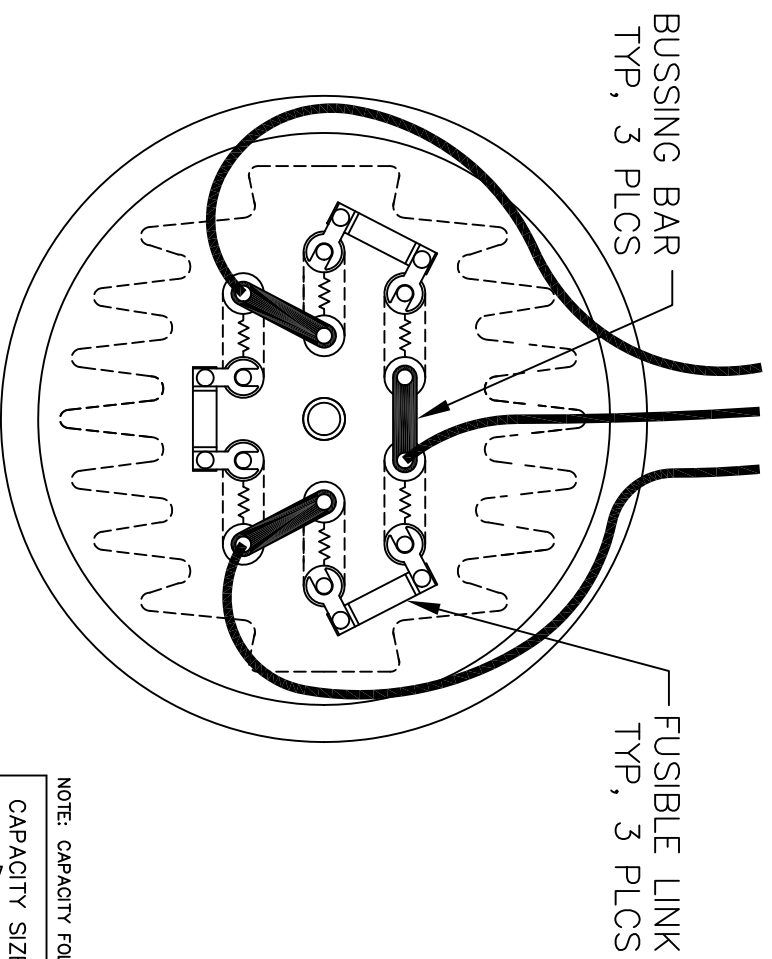


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Title BUSSING DIAGRAM

CAPACITY SIZE

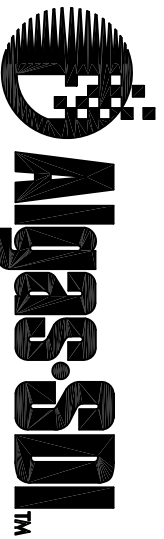
100 THRU 320 & 75AA THRU 240AA
 380V/415V/575V, 3 PH
 TORREXX ELECTRIC VAPORIZER
 (REFERENCE 0620-7010A1E)



NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA			
80	120AAA	440V/480V, 3PH	3600 WATTS @ 240VAC	16.0 OHMS
100	75AAA	440V/480V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS
160	120AAA	440V/480V, 3PH	3333 WATTS @ 220VAC	14.5 OHMS
240	180AAA	440V/480V, 3PH	5000 WATTS @ 220VAC	9.7 OHMS
320	240AAA	440V/480V, 3PH	6580 WATTS @ 240VAC	8.8 OHMS

1 CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3 (AA)



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Title

BUSSING DIAGRAM

CAPACITY SIZE 80 THRU 320 &

75AA THRU 240AA

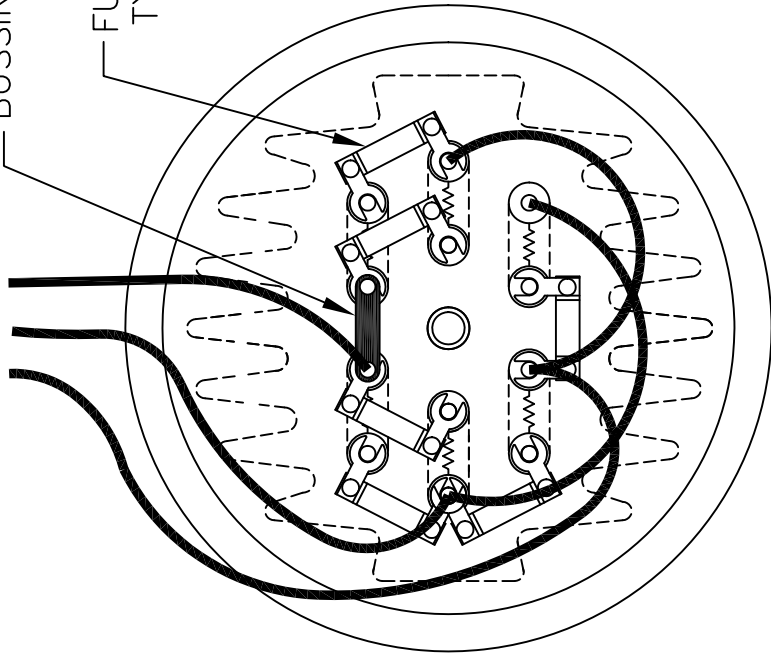
440V, 480V, 3 PH

TORREXX ELECTRIC VAPORIZER

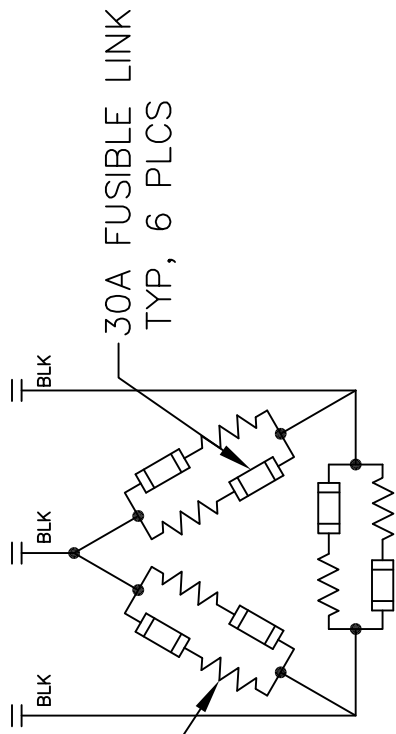
(REFERENCE 0620-7011A1D)

BUSSING BAR

FUSIBLE LINK
TYP, 6 PLCS



HEATER
TYP, 6 PLCS



30A FUSIBLE LINK
TYP, 6 PLCS

NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE 1	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG AA				
160 120AA	240V, 3PH	3333 WATTS @ 220VAC	14.5 OHMS	4.8 OHMS
160 120AA	208V/220V/240V 3PH	3600 WATTS @ 240VAC	16.0 OHMS	5.3 OHMS
240 180AA	200V/208V/ 220V/240V, 3PH	5000 WATTS @ 220VAC	9.7 OHMS	3.2 OHMS

1 CAPACITY SIZES SHOWN ARE IN KG/HR FOR LPG AND LB/HR FOR NH3 (AA)



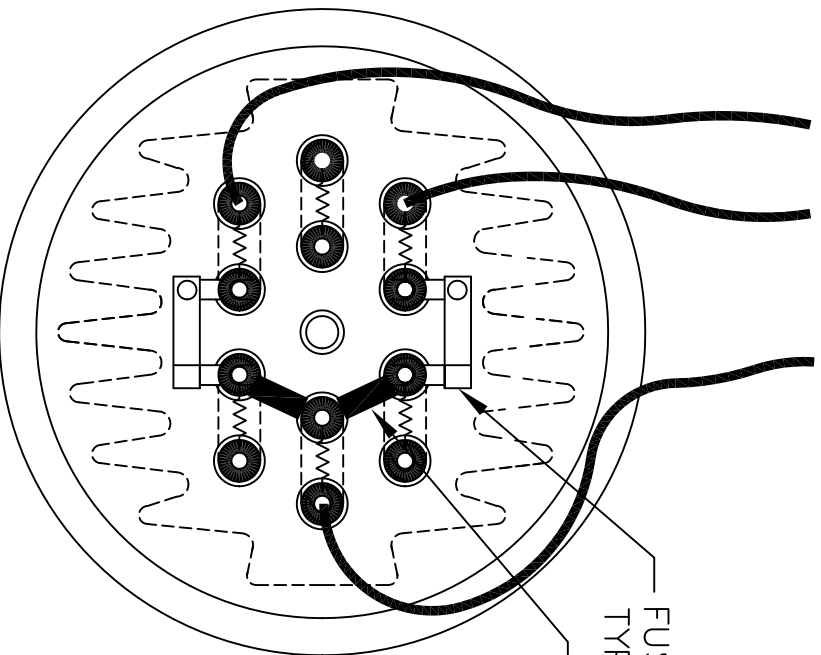
151 S. Michigan St., Seattle, Washington, USA 98108
Tel: (206) 789-5410 Fax: (206) 789-5414

Title

BUSSING DIAGRAM

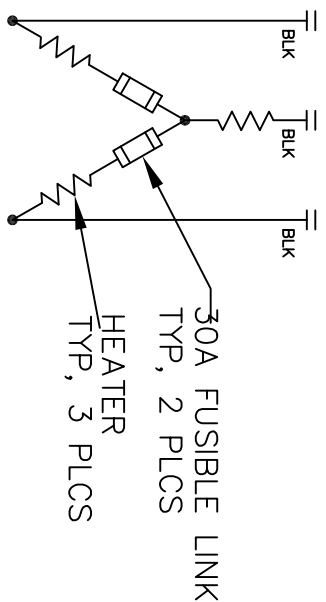
CAPACITY SIZE 160, 120AA, 240 & 180AA

200V/208V/220V/240V, 3PH
TORREXX ELECTRIC VAPORIZER
(REFERENCE 0620-7012A1E)



FUSIBLE LINK
TYP, 2 PLCS

BUSSING STRIP
TYP 2 PLCS



30A FUSIBLE LINK
TYP, 2 PLCS

HEATER
TYP, 3 PLCS

NOTE: CAPACITY FOLLOWED BY "AA" DENOTES AMMONIA CAPACITIES.

CAPACITY SIZE	VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA			
25	31AA	2595 WATTS @ 240VAC	22.2 OHMS	44.4 OHMS
*60	75AA	5000 WATTS @ 220VAC	9.68 OHMS	4.84 OHMS
**80	100AA	6580 WATTS @ 220VAC	7.36 OHMS	3.68 OHMS
**80	100AA	6580 WATTS @ 240VAC	8.75 OHMS	4.38 OHMS

* USES 120 SIZE CORE

**USES 160 SIZE CORE

△ CAPACITY SIZES SHOWN ARE FOR LPG EX, XP, P, XPV, & XPM SERIES POWER VERTICAL VAPORIZERS

Algas-SOITM

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Title BUSSING DIAGRAM

CAPACITY SIZE 50, 38AA, 120, 75AA
160 & 120AA
380V/415V 3PH
TORREXX ELECTRIC VAPORIZER
(REFERENCE 0620-7028A1B)

Installation & Maintenance Instructions

2-WAY INTERNAL PILOT-OPERATED SOLENOID VALVES HUNG DIAPHRAGM — 3/8, 1/2 AND 3/4 NPT NORMALLY CLOSED OPERATION

BULLETINS

8210

8211

Form No.V5825R1

DESCRIPTION

Bulletin 8210's are 2-way, normally closed, internal pilot operated solenoid valves. Valve body and bonnet are of brass construction. Standard valves have a General Purpose, NEMA Type 1 Solenoid Enclosure.

Bulletin 8211's are the same as Bulletin 8210's except the solenoids are equipped with an enclosure which is designed to meet NEMA Type 4 Watertight, NEMA Type 7 (C or D) Hazardous Locations - Class I, Group C or D, and NEMA Type 9 (E, F or G) Hazardous Locations - Class II, Group E, F or G. The explosion-proof/watertight solenoid enclosure is shown on a separate sheet of Installation and Maintenance Instructions, Form No. V-5380.

Bulletin 8210 and 8211 valves with suffix 'HW' in the catalog number are specifically designed for hot water service.

OPERATION

Normally Closed: Valve is closed when solenoid is de-energized and opens when solenoid is energized.

MANUAL OPERATOR (Optional)

Valves with suffix 'MO' in catalog number are provided with a manual operator which allows manual operation when desired or during an interruption of electrical power. To operate valve manually, push in knurled cap and rotate clockwise 180°. Disengage manual operator by rotating knurled cap counterclockwise 180° before operating electrically.

MANUAL OPERATOR LOCATION (Refer to Figure 3)

Manual operator (when shipped from factory) will be located over the valve outlet. Manual operator may be relocated at 90° increments by rotating valve bonnet. Remove bonnet screws (4) and rotate valve bonnet with solenoid to desired position. Replace bonnet screws (4) and torque in a crisscross manner to 110 ± 10 inch pounds.

If valve is installed in system and is operational, proceed in the following manner:

WARNING: Depressurize valve and turn off electrical power supply.

1. Remove retaining cap or clip and slip the entire solenoid enclosure off the solenoid base sub-assembly. CAUTION: When metal retaining clip disengages, it will spring upwards.
2. Remove bonnet screws (4) and rotate valve bonnet to desired position.
3. Replace bonnet screws (4) and torque in a crisscross manner to 110 ± 10 inch pounds.
4. Replace solenoid enclosure and retaining clip or cap.

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage and service.

TEMPERATURE LIMITATIONS

For maximum valve ambient and fluid temperatures refer to chart. The temperature limitations listed are for UL applications. For non UL applications, higher ambient and fluid temperature limitations are available. Consult factory. Check catalog number on nameplate to determine maximum temperatures.

Construction	Coil Class	Catalog Number Prefix	Maximum Ambient Temp. °F.	Maximum Fluid Temp. °F.
A-C Construction (Alternating Current)	A	None or DA	77	180
	F	DF or FT	122	180
	H	HT	140	180
D-C Construction (Direct Current)	A, F or H	None, FT or HT	77	150
Catalog Numbers Suffixed 'HW' A-C Construction (Alternating Current)	A	None or DA	77	210
	F	DF or FT	77	210
	H	HT	122	210

POSITIONING/MOUNTING

Valve may be mounted in any position. For mounting bracket (optional feature) dimensions, refer to Figure 1.

PIPING

Connect piping to valve according to markings on valve body. Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter the valve and cause operational difficulty. Pipe strain should be avoided by proper support and alignment of piping. When tightening the pipe do not use valve as a lever. Wrenches applied to valve body or piping are to be located as close as possible to connection point. **IMPORTANT: Valves with suffix 'HW' in the catalog number have a special diaphragm material which is specifically compounded for hot water service. This material can be attacked by oil and grease. Wipe the pipe threads clean of cutting oils and use teflon tape to seal pipe joints.**

IMPORTANT: For the protection of the solenoid valve, install a strainer or filter suitable for the service involved in the inlet side as close to the valve as possible. Periodic cleaning is required depending on the service conditions. See Bulletins 8600, 8601 and 8602 for strainers.

WIRING

Wiring must comply with Local and National Electrical Codes. Housings for all solenoids are provided with connections for 1/2 inch conduit. The general purpose solenoid enclosure may be rotated to facilitate wiring by removing the retaining cap or clip. CAUTION: When metal retaining clip disengages it will spring upwards. Rotate to desired position. Replace retaining cap or clip before operating.

NOTE: Alternating Current (A-C) and Direct Current (D-C) Solenoids are built differently. To convert from one to the other, it is necessary to change the complete solenoid including the solenoid base sub-assembly and core assembly.

SOLENOID TEMPERATURE

Standard catalog valves are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched with the hand for only an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

MAINTENANCE

WARNING: Turn off electrical power and depressurize valve before making repairs. It is not necessary to remove valve from pipe line for repairs.

CLEANING

A periodic cleaning of all solenoid valves is desirable. The time between cleanings will vary, depending on media and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive leakage or noise will indicate that cleaning is required.

PREVENTIVE MAINTENANCE

1. Keep the medium flowing through the valve as free from dirt and foreign material as possible.
2. While in service, operate valve at least once a month to insure proper opening and closing.
3. Periodic inspection (depending on media and service conditions) of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

IMPROPER OPERATION

1. **Faulty Control Circuit:** Check electrical system by energizing solenoid. A metallic click signifies the solenoid is operating. Absence of the click indicates loss of power supply. Check for loose or blown-out fuses, open circuited or grounded coil, broken lead wires or splice connections.
2. **Burned-Out Coil:** Check for open circuited coil. Replace coil if necessary.
3. **Low Voltage:** Check voltage across coil leads. Voltage must be at least 85% of nameplate rating.
4. **Incorrect Pressure:** Check valve pressure. Pressure to the valve must be within range specified on nameplate.
5. **Excessive Leakage:** Disassemble valve and clean all parts. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

COIL REPLACEMENT (Refer to Figure 2)

Turn off electrical power supply and disconnect coil leads. Proceed in the following manner:

1. Remove retaining cap or clip, nameplate and cover. CAUTION: When metal retaining clip disengages, it will spring upwards.
2. Remove spring washer, insulating washer and coil. Insulating washers are omitted when a molded coil is used.
3. Reassemble in reverse order of disassembly paying careful attention to exploded view provided for identification and placement of parts.

CAUTION: Solenoid must be fully reassembled as the housing and internal parts are part of and complete the magnetic circuit. Place insulating washer at each end of coil if required.

VALVE DISASSEMBLY (Refer to Figures 2 and 3)

Depressurize valve and turn off electrical power supply. Proceed in the following manner:

1. Remove retaining cap or clip and slip the entire solenoid enclosure off the solenoid base sub-assembly. CAUTION: When metal retaining clip disengages, it will spring upwards.
2. Unscrew solenoid base sub-assembly and remove bonnet gasket.
3. Remove valve bonnet screws (4) and valve bonnet.
4. For normal maintenance, it is not necessary to disassemble the manual operator (optional feature) unless external leakage is evident. To disassemble remove stem pin, manual operator stem, stem spring and stem gasket.
5. Remove core spring, core/diaphragm sub-assembly and body gasket. CAUTION: Do not damage or distort hanger spring between core/diaphragm sub-assembly.
6. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

VALVE REASSEMBLY

1. Reassemble in reverse order of disassembly paying careful attention to exploded views provided for identification and placement of parts.
2. Replace body gasket and core/diaphragm sub-assembly. Locate the bleed hole in core/diaphragm sub-assembly approximately 45° from the valve outlet.
3. Replace core spring with wide end in core first; closed end protrudes from top of core.
4. If removed, replace manual operator stem, stem spring, stem gasket and stem pin.
5. Replace valve bonnet and bonnet screws (4). Torque bonnet screws (4) in a crisscross manner to 110 ± 10 inch pounds.
6. Replace bonnet gasket and solenoid base sub-assembly. Put solenoid base sub-assembly to 175 ± 25 inch pounds.
7. Replace solenoid enclosure and retaining cap or clip.
8. After maintenance, operate the valve a few times to be sure of proper opening and closing.

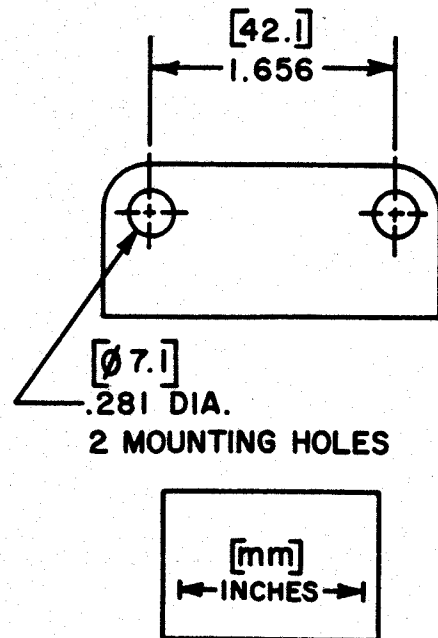
SPARE PARTS KITS

Spare Parts Kits and Coils are available for ASCO valves. Parts marked with an asterisk (*) are supplied in Spare Parts Kits.

ORDERING INFORMATION FOR SPARE PARTS KITS

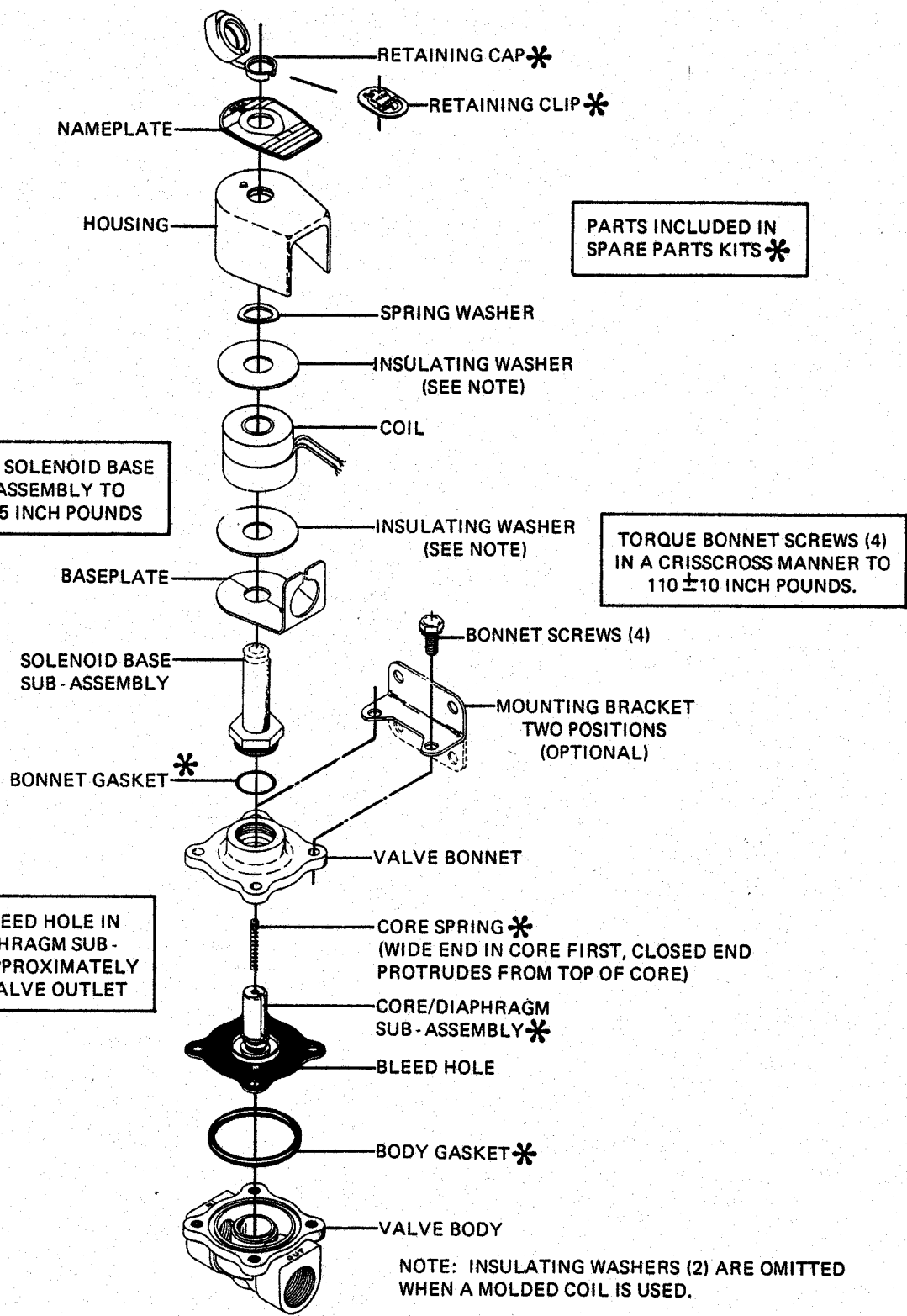
When Ordering Spare Parts Kits or Coils Specify Valve Catalog Number, Serial Number and Voltage.

PARTIAL VIEW OF MOUNTING BRACKET (OPTIONAL)



Dimensions For Mounting Bracket (Optional Feature)

Figure 1.



Bulletin 8210 — 3/8, 1/2 & 3/4 N.P.T. — A-C Construction
 General purpose solenoid enclosure shown.

For explosion-proof/watertight solenoid enclosure used on Bulletin 8211, see Form No. V-5380.

Figure 2.

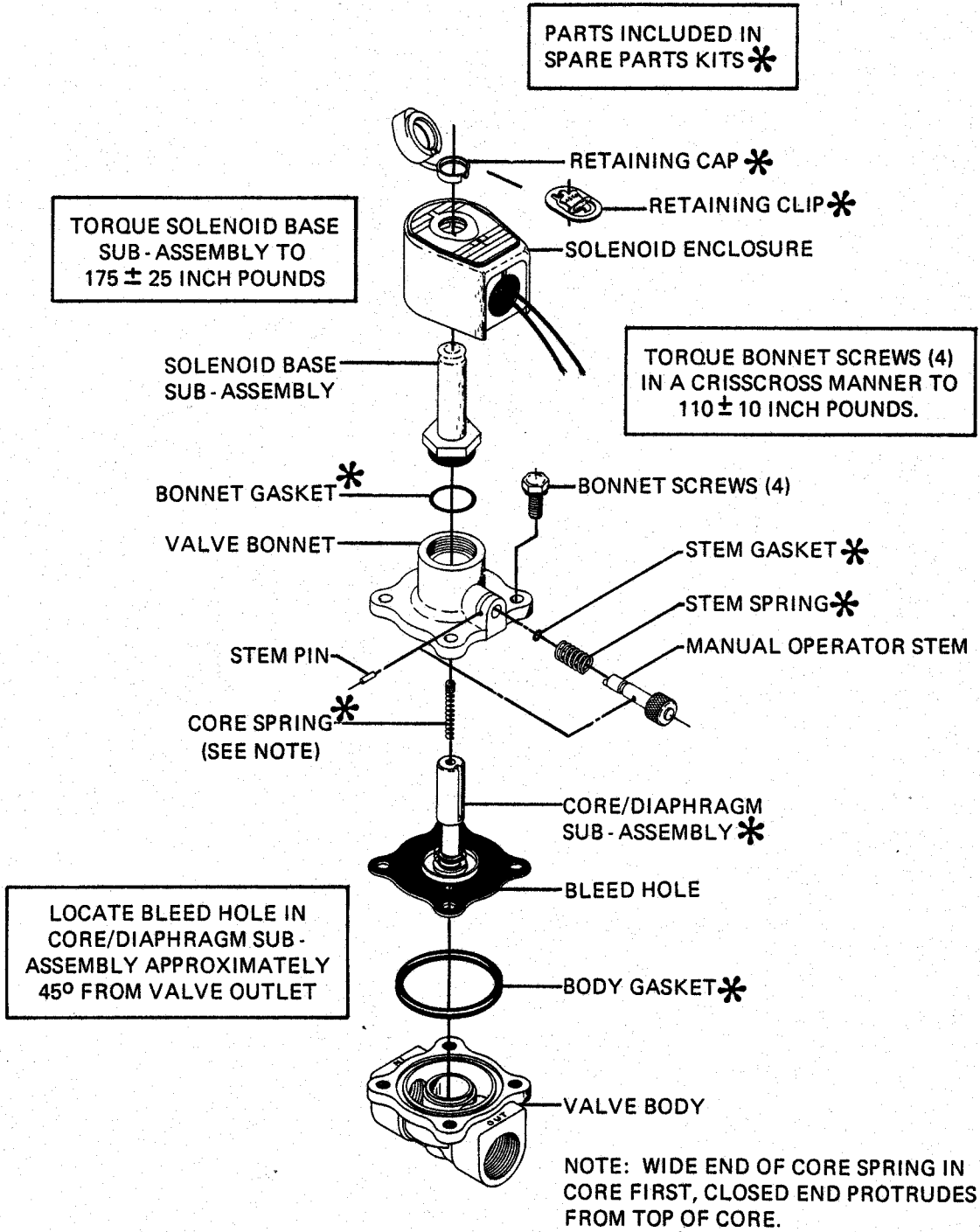


Figure 3.

**Bulletin 8210 — Manual Operator
General purpose solenoid enclosure shown.
For explosion-proof/watertight solenoid enclosure used on Bulletin 8211, see Form No. V-5380.**

Installation & Maintenance Instructions



OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS

SERIES

8003G

8202G

Form No.V6584R8

— SERVICE NOTICE —

ASCO® solenoid valves with design change letter “G” or “H” in the catalog number (ex. 8210G 1) have an epoxy encapsulated ASCO® Red Hat II® solenoid. This solenoid replaces some of the solenoids with metal enclosures and open-frame constructions. Follow these installation and maintenance instructions if your valve or operator uses this solenoid.

See separate instructions for basic valve.

DESCRIPTION

Catalog numbers 8003G and 8202G are epoxy encapsulated pull-type solenoids. The green solenoid with lead wires and 1/2" conduit connection is designed to meet Enclosure Type 1—General Purpose, Type 2—Dripproof, Types 3 and 3S—Raintight, and Types 4 and 4X—Watertight. The black solenoid on catalog numbers prefixed “EF” or “EV” is designed to meet Enclosure Types 3 and 3S—Raintight, Types 4 and 4X—Watertight, Types 6 and 6P—Submersible, Type 7 (A, B, C & D) Explosionproof Class I, Division 1 Groups A, B, C, & D and Type 9 (E, F, & G)—Dust—Ignitionproof Class II, Division 1 Groups E, F & G. The Class II, Groups F & G Dust Locations designation is not applicable for solenoids or solenoid valves used for steam service or when a class “H” solenoid is used. See *Temperature Limitations* section for solenoid identification and nameplate/retainer for service. When installed just as a solenoid and not attached to an ASCO valve, the core has a 0.250–28 UNF–2B tapped hole, 0.38 or 0.63 minimum full thread.

NOTE: Catalog number prefix “EV” denotes stainless steel construction.

Catalog numbers 8202G1, 8202G3, 8202G5 and 8202G7 are epoxy encapsulated push-type, reverse-acting solenoids having the same enclosure types as previously stated for Catalog numbers 8003G1 and 8003G2.

Series 8003G and 8202G solenoids are available in:

- **Open-Frame Construction:** The green solenoid may be supplied with 1/4" spade, screw or DIN terminals. (Refer to Figure 4)
- **Panel Mounted Construction:** These solenoids are specifically designed to be panel mounted by the customer through a panel having a .062 to .093 maximum wall thickness. Refer to Figure 1 and section on *Installation of Panel Mounted Solenoid*.

Optional Features For Type 1 – General Purpose Construction Only

- **Junction Box:** This junction box construction meets Enclosure Types 2,3,3S,4, and 4X. Only solenoids with 1/4" spade or screw terminals may have a junction box. The junction box provides a 1/2" conduit connection, grounding and spade or screw terminal connections within the junction box (See Figure 5).
- **DIN Plug Connector Kit No.K236034:** Use this kit only for solenoids with DIN terminals. The DIN plug connector kit provides a two pole with grounding contact DIN Type 43650 construction (See Figure 6).

OPERATION

Series 8003G – When the solenoid is energized, the core is drawn into the solenoid base sub-assembly. **IMPORTANT: When the solenoid is de-energized, the initial return force for the core, whether developed by spring, pressure, or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force for AC construction is 11 ounces, and 5 ounces for DC construction.**

Series 8202G – When the solenoid is energized, the disc holder assembly seats against the orifice. When the solenoid is de-energized, the disc holder assembly returns. **IMPORTANT: Initial return force for the disc or disc holder assembly, whether developed by spring, pressure, or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force is 1 pound, 5 ounces.**

INSTALLATION

Check nameplate for correct catalog number, service, and wattage. Check front of solenoid for voltage and frequency.

⚠ WARNING: Electrical hazard from the accessibility of live parts. To prevent the possibility of death, serious injury or property damage, install the open – frame solenoid in an enclosure.

FOR BLACK ENCLOSURE TYPES 7 AND 9 ONLY

⚠ CAUTION: To prevent fire or explosion, do not install solenoid and/or valve where ignition temperature of hazardous atmosphere is less than 165° C. On valves used for steam service or when a class “H” solenoid is used, do not install in hazardous atmosphere where ignition temperature is less than 180° C. See nameplate/retainer for service.

NOTE: These solenoids have an internal non-resettable thermal fuse to limit solenoid temperature in the event that extraordinary conditions occur which could cause excessive temperatures. These conditions include high input voltage, a jammed core, excessive ambient temperature or a shorted solenoid, etc. This unique feature is a standard feature only in solenoids with black explosionproof/dust-ignitionproof enclosures (Types 7 & 9).

⚠ CAUTION: To protect the solenoid valve or operator, install a strainer or filter, suitable for the service involved in the inlet side as close to the valve or operator as possible. Clean periodically depending on service conditions. See ASCO Series 8600, 8601, and 8602 for strainers.

Temperature Limitations

For maximum valve ambient temperatures, refer to chart. The temperature limitations listed, only indicate maximum application temperatures for field wiring rated at 90°C. Check catalog number prefix and watt rating on nameplate to determine maximum ambient temperature. See valve installation and maintenance instructions for maximum fluid temperature. NOTE: For steam service, refer to *Wiring* section, *Junction Box* for temperature rating of supply wires.

Temperature Limitations For Series 8003G or 8202G Solenoids for use on Valves Rated at 10.1, 11.6, 17.1, or 22.6 Watts			
Watt Rating	Catalog Number Coil Prefix	Class of Insulation	Maximum † Ambient Temp.
10.1 & 17.1	None, FB, KF, KP, SC, SD, SF, & SP,	F	125°F (51.7°C)
10.1 & 17.1	HB, HT, KB, KH, SS, ST, SU,	H	140°F (60°C)
11.6 & 22.6	None, FB, KF, KP, SC, SD, SF, & SP.	F	104°F (40°C)
11.6 & 22.6	HP, HT, KB, KH, SS, ST, SU, & SV	H	104°F (40°C)

† Minimum ambient temperature –40° F (–40° C).

Positioning

This solenoid is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area.

Wiring

Wiring must comply with local codes and the National Electrical Code. All solenoids supplied with lead wires are provided with a grounding wire which is green or green with yellow stripes and a 1/2" conduit connection. To

facilitate wiring, the solenoid may be rotated 360°. For the watertight and explosionproof solenoid, electrical fittings must be approved for use in the approved hazardous locations.

▲ CAUTION: Cryogenic Applications – Solenoid lead wire insulation should not be subjected to cryogenic temperatures. Adequate lead wire protection and routing must be provided.

Additional Wiring Instructions For Optional Features:

- **Open–Frame solenoid with 1/4" spade terminals.**

For solenoids supplied with screw terminal connections use #12–18 AWG stranded copper wire rated at 90°C or greater. Torque terminal block screws to 10 ± 2 in–lbs [1,0 ± 1,2 Nm]. A tapped hole is provided in the solenoid for grounding, use a #10–32 machine screw. Torque grounding screw to 15 – 20 in–lbs [1,7 – 2,3 Nm]. On solenoids with screw terminals, the socket head screw holding the terminal block to the solenoid is the grounding screw. Torque the screw to 15 – 20 in–lbs [1,7 – 2,3 Nm] with a 5/32" hex key wrench.

- **Junction Box**

The junction box is used with spade or screw terminal solenoids only and is provided with a grounding screw and a 1/2" conduit connection. Connect #12–18 AWG standard copper wire only to the screw terminals. Within the junction box use field wire that is rated 90°C or greater for connections. For steam service use 105°C rated wire up to 50 psi or use 125°C rated wire above 50 psi. After electrical hookup, replace cover gasket, cover, and screws. Tighten screws evenly in a crisscross manner.

- **DIN Plug Connector Kit No.K236034**

1. The open–frame solenoid is provided with DIN terminals to accommodate the plug connector kit.
2. Remove center screw from plug connector. Using a small screwdriver, pry terminal block from connector cover.
3. Use #12–18 AWG stranded copper wire rated at 90°C or greater for connections. Strip wire leads back approximately 1/4" for installation in socket terminals. The use of wire–end sleeves is also recommended for these socket terminals. Maximum length of wire–end sleeves is not recommended.
4. Thread wire through gland nut, gland gasket, washer and connector cover. NOTE: Connector housing may be rotated in 90° increments from position shown for alternate positioning of cable entry.
5. Check DIN connector terminal block for electrical markings. Then make electrical hookup to terminal block according to markings on it. Snap terminal block into connector cover and install center screw.
6. Position connector gasket on solenoid and install plug connector. Torque center screw to 5 ± 1 in–lbs [0,6 ± 1,1 Nm].

NOTE: Alternating current (AC) and direct current (DC) solenoids are built differently. To convert from one to the other, it may be necessary to change the complete solenoid including the core and solenoid base sub–assembly, not just the solenoid. Consult ASCO.

Installation of Solenoid

Solenoids may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid.

Installation of Panel Mounted Solenoid (See Figure 1)

1. Disassemble solenoid following instruction under *Solenoid Replacement* then proceed.
2. Install solenoid base sub–assembly through customer panel.
3. Position spring washer on opposite side of panel over solenoid base sub–assembly.
4. Replace solenoid, nameplate/retainer and red cap.
5. Make electrical hookup, see *Wiring* section.

Solenoid Temperature

Standard solenoids are designed for continuous duty service. When the solenoid is energized for a long period, the solenoid becomes hot and can be touched by hand only for an instant. This is a safe operating temperature.

MAINTENANCE

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize solenoid operator and/or valve, and vent fluid to a safe area before servicing.

Cleaning

All solenoid operators and valves should be cleaned periodically. The time between cleaning will vary depending on medium and service conditions. In general, if the voltage to the solenoid is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the solenoid operator or valve as free from dirt and foreign material as possible.
- While in service, the solenoid operator or valve should be operated at least once a month to insure proper opening and closing.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any worn or damaged parts.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* signifies that the solenoid is operating. Absence of the *click* indicates loss of power supply. Check for loose or blown fuses, open–circuited or grounded solenoid, broken lead wires or splice connections.
- **Burned–Out Solenoid:** Check for open–circuited solenoid. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate/retainer and marked on the solenoid. Check ambient temperature and check that the core is not jammed.
- **Low Voltage:** Check voltage across the solenoid leads. Voltage must be at least 85% of rated voltage.

Solenoid Replacement

1. Disconnect conduit, coil leads, and grounding wire.
NOTE: Any optional parts attached to the old solenoid must be reinstalled on the new solenoid. For 3–way construction, piping or tubing must be removed from pipe adapter.
2. Disassemble solenoids with optional features as follows:
 - **Spade or Screw Terminals**
Remove terminal connections, grounding screw, and terminal block (screw terminal type only).
NOTE: For screw terminals, the socket head screw holding the terminal block serves as a grounding screw.
 - **Junction Box**
Remove conduit and socket head screw (use 5/32" hex key wrench) from center of junction box. Disconnect junction box from solenoid.
 - **DIN Plug Connector**
Remove center screw from DIN plug connector. Disconnect DIN plug connector from adapter. Remove socket head screw (use 5/32" hex key wrench), DIN terminal adapter, and gasket from solenoid.
3. Snap off red cap from top of solenoid base sub–assembly. For 3–way construction with pipe adapter (Figure 3), remove pipe adapter, nameplate and solenoid. Omit steps 4 and 5.
4. Push down on solenoid. Then using a suitable screwdriver, insert blade between solenoid and nameplate/retainer. Pry up slightly and push to remove.
NOTE: Series 8202G solenoids have a spacer between the nameplate/retainer and solenoid.
5. Remove solenoid from solenoid base sub–assembly.
6. Reassemble in reverse order of disassembly. Use exploded views for identification and placement of parts.
7. Torque pipe adapter to 90 inch–pounds maximum [10,2 Nm maximum]. Then make up piping or tubing to pipe adapter on solenoid.

Disassembly and Reassembly of Solenoids

1. Remove solenoid, see *Solenoid Replacement*.
2. Remove spring washer from solenoid base sub–assembly. For 3–way construction, remove plugnut gasket.
3. Unscrew solenoid base sub–assembly from valve body.
4. Remove internal solenoid parts for cleaning or replacement. Use exploded views for identification and placement of parts.
5. If the solenoid is part of a valve, refer to basic valve installation and maintenance instructions for further disassembly.
6. Torque solenoid base sub–assembly and adapter to 175±25 in–lbs [19,8±2,8 Nm].

ORDERING INFORMATION FOR ASCO SOLENOIDS

When Ordering Solenoids for ASCO Solenoid Operators or Valves, order the number stamped on the solenoid. Also specify voltage and frequency.

Torque Chart

Part Name	Torque Value Inch-Pounds	Torque Value Newton-Meters
solenoid base sub-assembly & adapter	175 ± 25	19,8 ± 2,8
pipe adapter	90 maximum	10,2 maximum

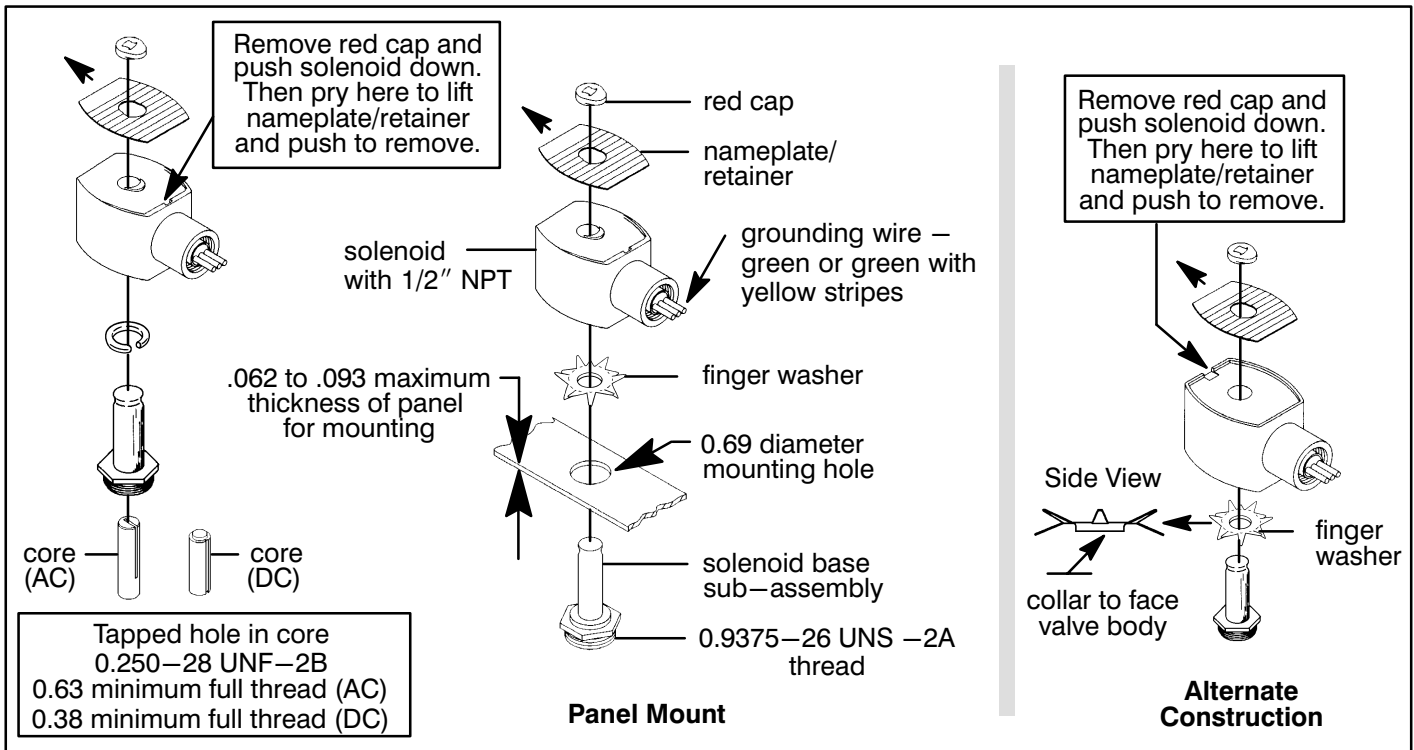


Figure 1. Series 8003G solenoids

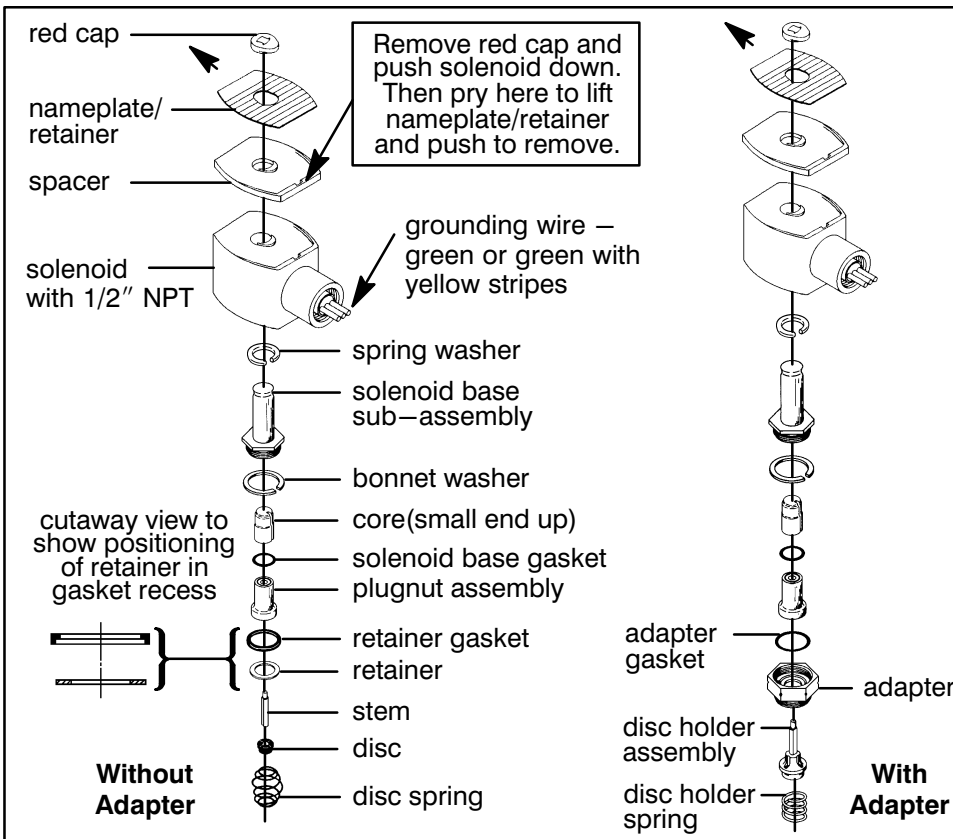


Figure 2. Series 8202G solenoids

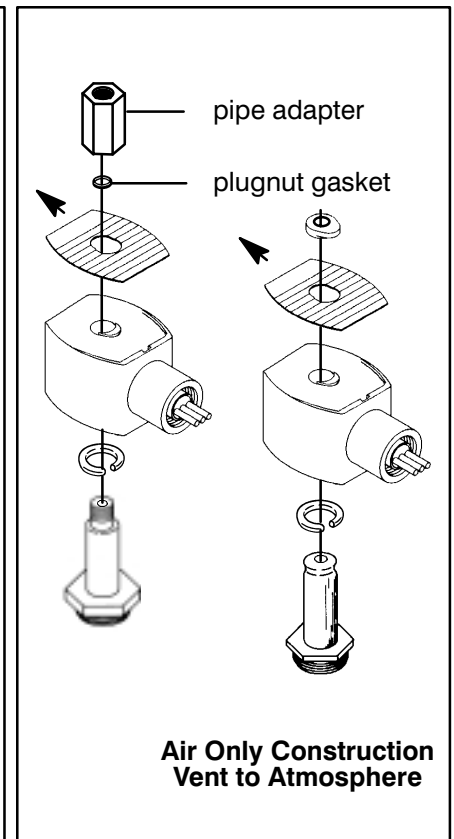


Figure 3. 3-Way Construction

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
terminal block screws	10 ± 2	1,1 ± 0,2
socket head screw	15 – 20	1,7 – 2,3
center screw	5 ± 1	0,6 ± 0,1

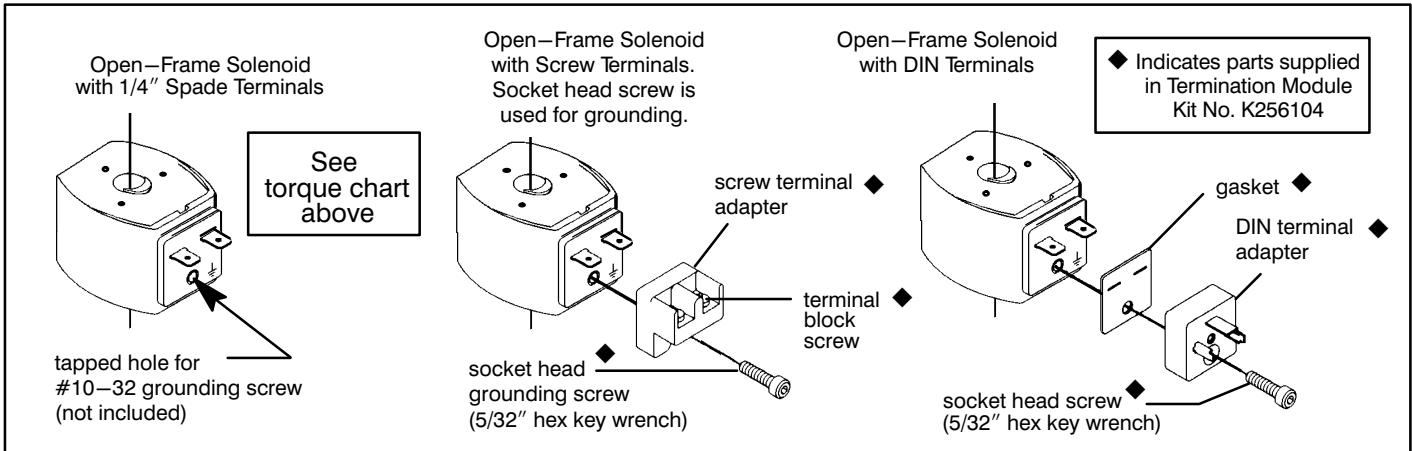


Figure 4. Open-frame solenoids

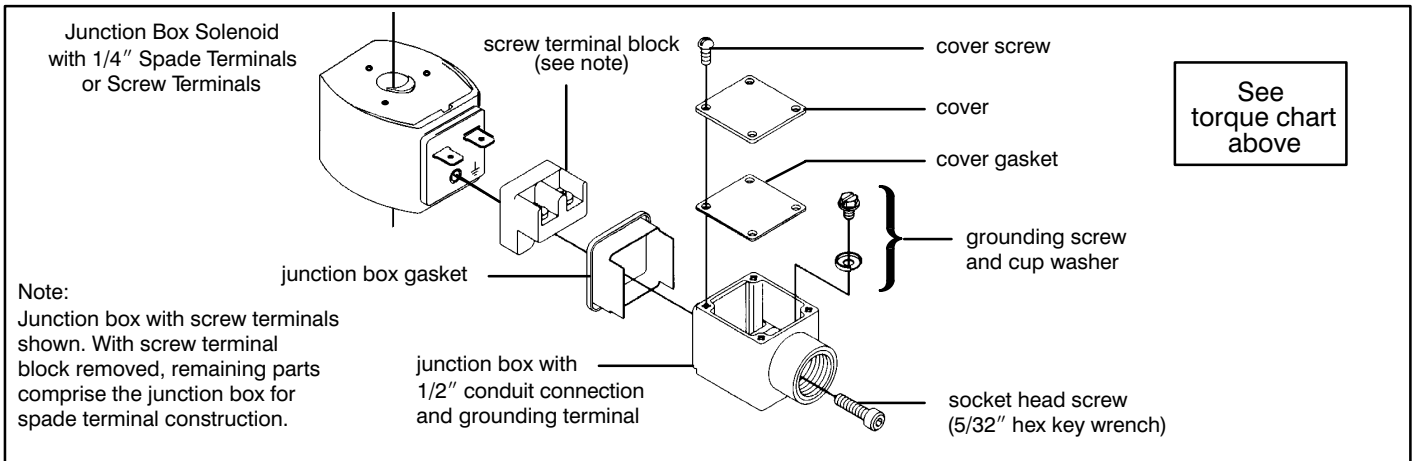


Figure 5. Junction box (optional feature)

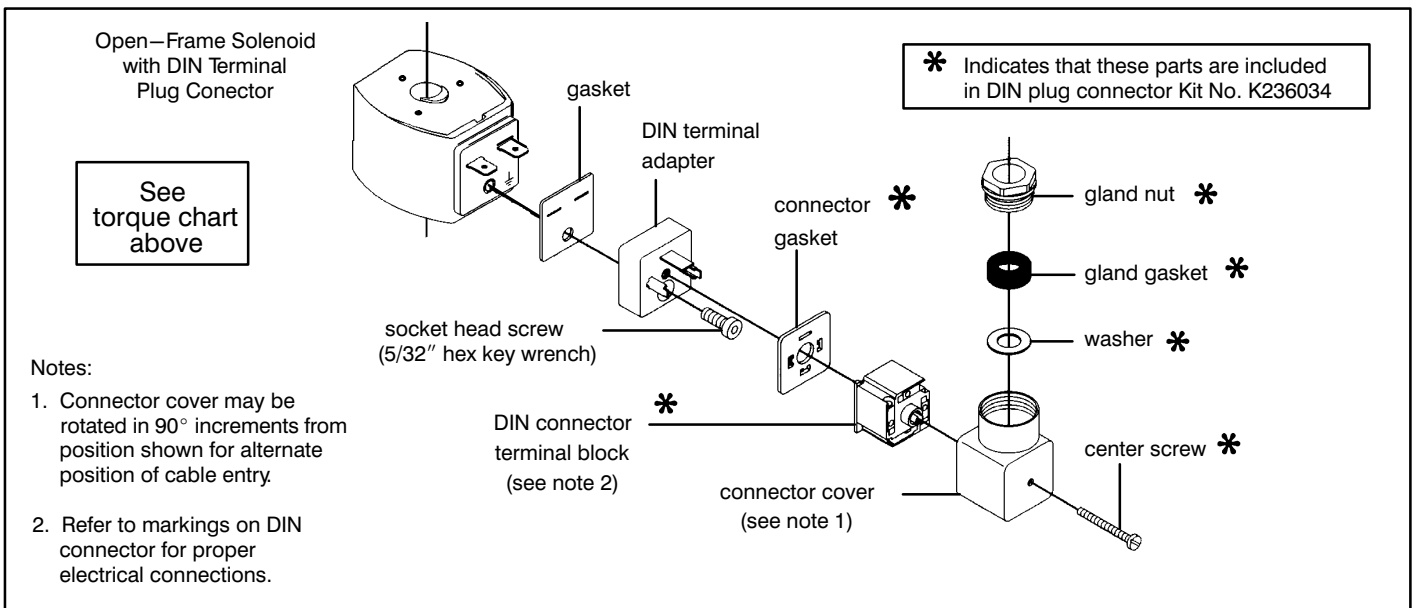


Figure 6. DIN plug connector kit No. K236034 (optional feature)



GENERAL INSTALLATION AND MAINTENANCE INSTRUCTIONS

Note: These General Installation and Maintenance Instructions must be read in conjunction with the instruction Sheet for the specific product.

INSTALLATION

ASCO/JOUCOMATIC components are intended to be used only within the technical characteristics as specified on the nameplate. Changes to the equipment are only allowed after consulting the manufacturer or its representative. Before installation depressurize the piping system and clean internally. The equipment may be mounted in any position if not otherwise indicated on the product by means of an arrow. The flow direction and pipe connection of valves are indicated on the body.

The pipe connections have to be in accordance with the size indicated on the nameplate and fitted accordingly.

Caution:

- Reducing the connections may cause improper operation or malfunctioning.
- For the protection of the equipment install a strainer or filter suitable for the service involved in the inlet side as close to the product as possible.
- If tape, paste, spray or a similar lubricant is used when tightening, avoid particles entering the system.
- Use proper tools and locate wrenches as close as possible to the connection point.
- To avoid damage to the equipment, DO NOT OVERTIGHTEN pipe connections.
- Do not use valve or solenoid as a lever.
- The pipe connections should not apply any force, torque or strain to the product.

ELECTRICAL CONNECTION

In case of electrical connections, they are only to be made by trained personnel and have to be in accordance with the local regulations and standards.

Caution:

- Turn off electrical power supply and de-energize the electrical circuit and voltage carrying parts before starting work.
- All electrical screw terminals must be properly tightened according to the standards before putting into service.
- Dependent upon the voltage electrical components must be provided with an earth connection and satisfy local regulations and standards

The equipment can have one of the following electrical terminals:

- Spade plug connections according to ISO-4400 or 3 x DIN-46244 (when correctly installed this connection provides IP-65 protection).
- Embedded screw terminals in metal enclosure with "Pg" cable gland.
- Spade terminals (AMP type).
- Flying leads or cables.

PUTTING INTO SERVICE

Before pressurizing the system, first carry-out an electrical test. In case of solenoid valves, energize the coil a few times and notice a metal click signifying the solenoid operation.

SERVICE

Most of the solenoid valves are equipped with coils for continuous duty service. To prevent the possibility of personal or property damage do not touch the solenoid which can become hot under normal operation conditions.

SOUND EMISSION

The emission of sound depends on the application, medium and nature of the equipment used. The exact determination of the sound level can only be carried out by the user having the valve installed in his system.

MAINTENANCE

Maintenance of ASCO/JOUCOMATIC products is dependent on service conditions. Periodic cleaning is recommended, the timing of which will depend on the media and service conditions. During servicing, components should be examined for excessive wear. A complete set of internal parts is available as a spare parts or rebuild kit. If a problem occurs during installation/maintenance or in case of doubt please contact ASCO/JOUCOMATIC or authorized representatives.

A separate Declaration of Incorporation relating to EEC-Directive 89/392/EEC Annex II B is available on request. Please provide product identification number and serial numbers of products concerned.

The product complies with the essential requirements of the EMC Directive 89/338/EEC and amendments and the Low Voltage directives 73/23/EEC and 93/68/EEC. A separate Declaration of Conformity is available on request. Please provide product identification number and serial numbers of the products concerned.



INSTRUCTIONS GÉNÉRALES D'INSTALLATION ET D'ENTRETIEN

Note : Ces instructions générales d'installation et d'entretien complètent la notice spécifique du produit.

MONTAGE

Les composants ASCO/JOUCOMATIC sont conçus pour les domaines de fonctionnement indiqués sur la plaque signalétique ou la documentation. Aucune modification ne peut être réalisée sur le matériel sans l'accord préalable du fabricant ou de son représentant. Avant de procéder au montage, dépressuriser les canalisations et effectuer un nettoyage interne.

A moins qu'une flèche ou la notice n'indique un sens de montage spécifique de la tête magnétique, le produit peut être monté dans n'importe quelle position.

Le sens de circulation du fluide est indiqué par repères sur le corps et dans la documentation.

La dimension des tuyauteries doit correspondre au raccordement indiqué sur le corps, l'étiquette ou la notice.

Attention :

- Une restriction des tuyauteries peut entraîner des dysfonctionnements.
- Afin de protéger le matériel, installer une crépine ou un filtre adéquat en amont, aussi près que possible du produit.
- En cas d'utilisation de ruban, pâte, aérosol ou autre lubrifiant lors du serrage, veiller à ce qu'aucun corps étranger ne pénètre dans le circuit.
- Utiliser un outillage approprié et placer les clés aussi près que possible du point de raccordement.
- Afin d'éviter toute détérioration, NE PAS TROP SERRER les raccords des tuyauteries.
- Ne pas se servir de la vanne ou de la tête magnétique comme d'un levier.
- Les tubes de raccordement ne devront exercer aucun effort, couple ou contrainte sur le produit.

RACCORDEMENT ÉLECTRIQUE

Le raccordement électrique doit être réalisé par un personnel qualifié et selon les normes et règlements locaux.

Attention :

- Avant toute intervention, couper l'alimentation électrique pour mettre hors tension les composants.
- Toutes les bornes à vis doivent être serrées correctement avant la mise en service.
- Selon la tension, les composants électriques doivent être mis à la terre conformément aux normes et règlements locaux.

Selon les cas, le raccordement électrique s'effectue par :

- Connecteur débrochable ISO4400 ou 3 x DIN46244 avec degré de protection IP65 lorsque le raccordement est correctement effectué.
- Bornes à vis solidaires du bobinage, sous boîtier métallique avec presse-étoupe "Pg - -".
- Cosses (type AMP).
- Fils ou câbles solidaires de la bobine.

MISE EN SERVICE

Avant de mettre le circuit sous pression, effectuer un essai électrique. Dans le cas d'une électrovanne, mettre la bobine sous tension plusieurs fois et écouter le "clac" métallique qui signale le fonctionnement de la tête magnétique.

FONCTIONNEMENT

La plupart des électrovannes comportent des bobinages prévus pour mise sous tension permanente. Pour éviter toute brûlure, ne pas toucher la tête magnétique qui, en fonctionnement normal et en permanence sous tension, peut atteindre une température élevée.

BRUIT DE FONCTIONNEMENT

Le bruit de fonctionnement varie selon l'utilisation, le fluide et le type de matériel employé. L'utilisateur ne pourra déterminer avec précision le niveau sonore émis qu'après avoir monté le composant sur l'installation.

ENTRETIEN

L'entretien nécessaire aux produits ASCO/JOUCOMATIC varie avec leurs conditions d'utilisation. Il est souhaitable de procéder à un nettoyage périodique dont l'intervalle varie suivant la nature du fluide, les conditions de fonctionnement et le milieu ambiant. Lors de l'intervention, les composants doivent être examinés pour détecter toute usure excessive. Un ensemble de pièces internes est proposé en pièces de rechange pour procéder à la réparation. En cas de problème lors du montage/entretien ou en cas de doute, veuillez contacter ASCO/JOUCOMATIC ou ses représentants officiels.

Conformément à la directive CEE 89/392/CEE Annexe II B, une Déclaration d'incorporation peut être fournie sur demande. Veuillez nous indiquer le numéro d'accusé de réception (AR) et les références ou codes des produits concernés.

Ce produit est conforme aux prescriptions les plus importantes de la directive CEM 89/338/CEE et amendements et aux directives basse tension 73/23/CEE et 94/68/CEE. Une déclaration de conformité peut être fournie sur simple demande. Veuillez nous indiquer le numéro d'accusé de réception (AR) ainsi que les numéros de série des produits concernés.



ALLGEMEINE BETRIEBSANLEITUNG

ACHTUNG: Diese Allgemeine Betriebsanleitung gilt in Zusammenhang mit der jeweiligen Betriebsanleitung für die speziellen Produkte.

EINBAU

Die ASCO/JOUCOMATIC-Komponenten dürfen nur innerhalb der auf den Typenschildern angegebenen Daten eingesetzt werden. Veränderungen an den Produkten sind nur nach Rücksprache mit ASCO/JOUCOMATIC zulässig. Vor dem Einbau der Ventile muß das Rohrleitungssystem drucklos geschaltet und innen gereinigt werden. Die Einbautage der Produkte ist generell beliebig. Ausnahme: Die mit einem Pfeil gekennzeichneten Produkte müssen entsprechend der Pfeilrichtung montiert werden. Die Durchflußrichtung und der Eingang von Ventilen sind gekennzeichnet.

Die Rohranschlüsse sollten entsprechend den Größenangaben auf den Typenschildern mit handelsüblichen Verschraubungen durchgeführt werden. Dabei ist folgendes zu beachten:

- Eine Reduzierung der Anschlüsse kann zu Leistungs- und Funktionsminderungen führen.
- Zum Schutz der Ventile sollten Schmutzfänger oder Filter so dicht wie möglich in den Ventileingängen integriert werden.
- Bei Abdichtung am Gewinde ist darauf zu achten, daß kein Dichtungsmaterial in die Rohrleitung oder das Ventil gelangt.
- Zur Montage darf nur geeignetes Werkzeug verwendet werden.
- Konische Verschraubungen sind sorgfältig anzuziehen. Es ist darauf zu achten, daß beim Anziehen das Gehäuse nicht beschädigt wird.
- Spule und Führungsrohr von Ventilen dürfen nicht als Gegenhalter benutzt werden.
- Die Rohrleitungsanschlüsse sollen fluchten und dürfen keine Spannungen auf das Ventil übertragen.

ELEKTRISCHER ANSCHLUß

Der elektrische Anschluß ist von Fachpersonal entsprechend den geltenden VDE- und CEE-Richtlinien auszuführen. Es ist besonders auf folgendes zu achten:

- Vor Beginn der Arbeiten ist sicherzustellen, daß alle elektrischen Leitungen und Netzteile spannungslos geschaltet sind.
- Alle Anschlußblöcke sind nach Beendigung der Arbeiten vorschriftsmäßig entsprechend den geltenden Regeln anzuziehen.
- Je nach Spannungsbereich muß das Ventil nach den geltenden Regeln einen Schutzleiteranschluß erhalten.

Der Magnetantrieb kann je nach Bauart folgende Anschlüsse haben:

- Anschluß für Gerüststeckdose nach DIN 43850 Form A/ISO 4400 oder 3x DIN 46244 (durch ordnungsgemäße Montage der Gerüststeckdose wird Schutzklasse IP 65 erreicht).
- Anschlüsse innerhalb eines Blechgehäuses mittels Schraubklammern. Kabeleinführung ins Gehäuse mit PG-Schraubung.
- Offene Spulen mit Flachstecker (AMP-Fahren) oder mit eingegossenen Kabelenden.

INBETRIEBNAHME

Vor Druckbeaufschlagung des Produktes sollte eine elektrische Funktionsprüfung erfolgen:

Bei Ventilen Spannung an der Magnetspule mehrmals ein- und ausschalten. Es muß ein Klicken zu hören sein.

BETRIEB

Die meisten Ventile sind mit Spulen für Dauerbetrieb ausgerüstet. Zur Vermeidung von Personen- und Sachschäden sollte jede Berührung mit dem Ventil vermieden werden, da die Magnetspule bei längerem Betrieb sehr heiß werden kann.

GERÄUSCHEMISSION

Diese hängt sehr stark vom Anwendungsfall, den Betriebsdaten und dem Medium, mit denen das Produkt beaufschlagt wird, ab. Eine Aussage über die Geräuschemission des Produktes muß deshalb von demjenigen getroffen werden, der das Produkt innerhalb einer Maschine in Betrieb nimmt.

WARTUNG

Die Wartung hängt von den Einsatzbedingungen ab. In entsprechenden Zeitabständen muß das Produkt geöffnet und gereinigt werden. Für die Überholung der ASCO/JOUCOMATIC-Produkte können Ersatzteilsätze geliefert werden. Treten Schwierigkeiten bei Einbau, Betrieb oder Wartung auf, sowie bei Unklarheiten, ist mit ASCO/JOUCOMATIC Rücksprache zu halten.

(ASCO/JOUCOMATIC Produkte sind entsprechend der EG-Richtlinie 89/392/EWG gefertigt.)

Eine separate Herstellererklärung im Sinne der Richtlinie 89/392/EWG Anhang II B ist auf Anfrage erhältlich. Geben Sie bitte für die Produkte die Nummer der Auftragsbestätigung und die Seriennummer an.

Dieses Produkt entspricht den grundlegenden Bestimmungen der EMV-Richtlinie 89/338/EWG, einschl. Nachträge, sowie den Niederspannungsrichtlinien 73/23/EWG u. 93/68/EWG. Bitte geben Sie die Auftragsbestätigungsnummer und die Seriennummern der betreffenden Produkte an.

ES CE

INSTRUCCIONES GENERALES DE INSTALACION Y MANTENIMIENTO

Nota: Estas Instrucciones Generales de Instalación y Mantenimiento deben considerarse en conjunción con la Hoja de Instrucciones de cada producto.

INSTALACION

Los componentes ASCO/JOUOMATIC sólo deben utilizarse dentro de las especificaciones técnicas que se especifican en su placa de características o catálogo. Los cambios en el equipo sólo estarán permitidos después de consultar al fabricante o a su representante. Antes de la instalación despresurice el sistema de tuberías y limpie internamente.

El equipo puede utilizarse en cualquier posición si no estuviera indicado lo contrario sobre el mismo mediante una flecha o en el catálogo.

En el cuerpo o en el catálogo se indican el sentido del fluido y la conexión de las válvulas a la tubería.

Las conexiones a la tubería deben corresponder al tamaño indicado en la placa de características la etiqueta o el catálogo y ajustarse adecuadamente.

Precaución:

- La reducción de las conexiones puede causar operaciones incorrectas o defectos de funcionamiento.
- Para la protección del equipo se debe instalar, en la parte de la entrada y tan cerca como sea posible del producto, un filtro adecuado.
- Si se utilizara cinta, pasta, spray u otros lubricantes en el ajuste, se debe evitar que entren partículas en el producto.
- Se debe utilizar las herramientas adecuadas y colocar llaves inglesas lo mas cerca posible del punto de conexión.
- Para evitar daños al equipo, NO FORZAR las conexiones a la tubería.
- No utilizar la válvula o el solenoide como palanca.
- Las conexiones a la tubería no producirán ninguna fuerza, por o tensión sobre el producto.

CONEXION ELECTRICA

Las conexiones eléctricas serán realizadas por personal cualificado y deberán adaptarse a las normas y regulaciones locales.

Precaución:

- Antes de comenzar el trabajo, desconecte el suministro de energía eléctrica y desenergice el circuito eléctrico y los elementos portadores de tensión.
- Todos los terminales eléctricos deben estar apretados adecuadamente según normas antes de su puesta en servicio.
- Según el voltaje, los componentes eléctricos deben disponer de una conexión a tierra y satisfacer las normas y regulaciones locales.

El equipo puede tener uno de los siguientes terminales eléctricos:

- Conexiones desenchufables según ISO 4400 o 3 x DIN-46244 (cuando se instala correctamente esta conexión proporciona una protección IP-65).
- Terminales de tornillo con carcasa metálica con entrada de cable de conexión roscada "PG".
- Conector desenchufable (tipo AMP).
- Salida de cables.

PUESTA EN MARCHA

Se debe efectuar una prueba eléctrica antes de someter a presión el sistema. En el caso de las válvulas solenoides, se debe energizar varias veces la bobina y comprobar que se produce un sonido metálico que indica el funcionamiento del solenoide.

SERVICIO

La mayor parte de las válvulas solenoides se suministran con bobinas para un servicio continuo. Con el fin de evitar la posibilidad de daños personales o materiales no se debe tocar el solenoide, ya que puede haberse calentado en condiciones normales de trabajo.

EMISION DE RUIDOS

La emisión de ruidos depende de la aplicación, medio y naturaleza del equipo utilizado. Una determinación exacta del nivel de ruido sólo puede ser hecha por el usuario que disponga la válvula instalada en su sistema.

MANTENIMIENTO

El mantenimiento de los productos ASCO/JOUOMATIC depende de las condiciones de servicio. Se recomienda una limpieza periódica, dependiendo de las condiciones del medio y del servicio. Durante el servicio, los componentes deben ser examinados por si hubieran desgastes excesivos. Se dispone de un juego completo de partes internas como recambio o kit de montaje. Si ocurriera un problema durante la instalación/mantenimiento o en caso de duda contactar con ASCO/JOUOMATIC o representantes autorizados.

Se dispone, por separado y bajo demanda, de una Declaración de Incorporación conforme a la Directiva CEE 89/392/EEC Anexo II B. Rogamos que nos faciliten los códigos y números de aceptación de pedido correspondientes.

Este producto es conforme a las principales prescripciones de la directiva CEM 89/336/CEE y a las enmiendas y directivas baja tensión 73/23/CEE y 94/68/CEE. Si lo desea, podemos facilitarle una Declaración de Conformidad por separado. Rogamos faciliten el número de confirmación de pedido y los números de serie de los respectivos productos.

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IT CE

ISTRUZIONI DI INSTALLAZIONE E DI MANUTENZIONE GENERALE

Nota: Queste istruzioni devono essere lette in congiunzione con il manuale specifico del prodotto.

INSTALLAZIONE

Le elettrovalvole devono essere utilizzate esclusivamente rispettando le caratteristiche tecniche specificate sulla targhetta. Variazioni sulle valvole o sui piloti sono possibili solo dopo aver consultato il costruttore o i suoi rappresentanti. Prima dell'installazione depressurizzare i tubi e pulire internamente.

Le elettrovalvole possono essere montate in tutte le posizioni. Diversamente, una freccia posta sulla valvola indica che deve essere montata in posizione verticale e dritta.

La direzione del flusso e' indicata sul corpo della valvola per mezzo di una freccia oppure con l'etichetta "IN", "1", "A", o "P".

I raccordi devono essere conformi alla misura indicata sulla targhetta apposta.

Attenzione:

- Ridurre i raccordi può causare operazioni sballgiate o malfunzionamento.
- Per proteggere il componente installare, il più vicino possibile al lato ingresso, un filtro adatto al servizio.
- Se si usano nastro, pasta, spray o lubrificanti simili durante il serraggio, evitare che delle particelle entrino nel corpo della valvola.
- Usare un'attrezzatura appropriata e utilizzare le chiavi solo sul corpo della valvola.
- Per evitare danni al corpo della valvola, NON SERRARE ECCESSIVAMENTE i tubi.
- Non usare la valvola o il pilota come una leva.
- I raccordi non devono esercitare pressione, torsione o sollecitazione sull'elettrovalvola.

ALLACCIAMENTO ELETTRICO

L'allacciamento elettrico deve essere effettuato esclusivamente dal personale specializzato e deve essere conforme alle Norme locali.

Attenzione:

- Prima di mettere in funzione togliere l'alimentazione elettrica, disaccettare il circuito elettrico e le parti sotto tensione.
- I morsetti elettrici devono essere correttamente avvitati, secondo le Norme, prima della messa in servizio.
- Le elettrovalvole devono essere provviste di morsetti di terra a seconda della tensione e delle Norme di sicurezza locali.

I piloti possono avere una delle seguenti caratteristiche elettriche:

- Connettore ISO-4400 o 3 x DIN-46244 (se installato correttamente e' IP-65).
- Morsetteria racchiusa in custodia metallica. Entrata cavi con pressacavi tipo "PG".
- Bobina con attacchi FASTON (tipo AMP).
- Bobine con fili o cavo.

MESSA IN FUNZIONE

Prima di dare pressione alla valvola, eseguire un test elettrico. Eccitare la bobina diverse volte fino a notare uno scatto metallico che dimostra il funzionamento del pilota.

SERVIZIO

Molte elettrovalvole sono provviste di bobine per funzionamento continuo. Per prevenire la possibilità di danneggiare cose o persone, non toccare il pilota. La custodia della bobina o del pilota può scaldarsi anche in normali condizioni di funzionamento.

EMISSIONE SUONI

L'emissione di suoni dipende dall'applicazione e dal tipo di elettrovalvola. L'utente può stabilire esattamente il livello del suono solo dopo aver installato la valvola sul suo impianto.

MANUTENZIONE

Generalmente questi componenti non necessitano spesso di manutenzione. Comunque, in alcuni casi e' necessario fare attenzione a depositi o ad eccessiva usura. Questi componenti devono essere puliti periodicamente, il tempo che intercorre tra una pulizia e l'altra varia a seconda delle condizioni di funzionamento. Il ciclo di durata dei componenti dipende dalle condizioni di funzionamento. Incaso di usura e' disponibile un set completo di parti interne per la revisione. Se si incontrano problemi durante l'installazione e la manutenzione o se si hanno dei dubbi, consultare ASCO/JOUOMATIC o i suoi rappresentanti.

L'utente può richiedere al costruttore una dichiarazione separata riguardante le Direttive EEC 89/392/EEC e 91/368/EEC (vedere allegato II B) fornendo il numero di serie e il riferimento dell'ordine relativo.

Questo prodotto soddisfa i requisiti essenziali della direttiva CEM 89/336/CEE nonché gli emendamenti e le direttive sulla bassa tensione 73/23/CEE e 93/68/CEE. Una Dichiarazione di Conformità separata può essere ottenuta su richiesta. Si prega di fornire il numero della conferma dell'ordinativo ed i numeri di serie dei relativi prodotti.

NL CE

ALGEMENE INSTALLATIE- EN ONDERHOUDSINSTRUKTIES

N.B.: Deze algemene instructies l.a.v. installatie en onderhoud moeten in acht worden genomen tezamen met de specifieke voorschriften van het product.

INSTALLATIE

ASCO/JOUOMATIC producten mogen uitsluitend toegepast worden binnen de op de naamplaat aangegeven specificaties. Wijzigingen, zowel elektrisch als mechanisch, zijn alleen toegestaan na overleg met de fabrikant of haar vertegenwoordiger. Voor het bouwen dient het leidingsstelsel drukloos gemaakt te worden en inwendig gereinigd.

De positie van de afsluiter is naar keuze te bepalen, behalve in die gevallen waarbij het tegendeel door pijlen wordt aangegeven. De doorstroomrichting wordt bij afsluiters aangegeven op het afsluiterhuis.

De pijp aansluiting moet overeenkomstig de naamplaatgegevens plaatsvinden.

Hierbij moet men letten op:

- Een reductie van de aansluitingen kan tot prestatie- en functioneelstoornissen leiden.
- Ter bescherming van de interne delen wordt een filter in het leidingsnet aanbevolen.
- Bij het gebruik van draadafsluitingsgestak of tape mogen er geen deeltjes in het leidingswerk geraak.
- Men dient uitsluitend geschikt gereedschap voor de montage te gebruiken.
- Bij konische/tapse koppelingen moet met een zodanig koppel worden gewerkt dat het product niet wordt beschadigd.
- Het product, de behuizing of de spoel mag niet als hefboom worden gebruikt.
- De pijp aansluitingen mogen geen krachten of momenten op het product overdragen.

ELEKTRISCHE AANSLUITING

In geval van elektrische aansluiting dient dit door vakkundig personeel te worden uitgevoerd volgens de door de plaatselijke overheid bepaalde richtlijnen.

Men dient in het bijzonder te letten op:

- Voordat men aan het werk begint moeten alle spanningsvoerende delen spanningsloos worden gemaakt.
- Alle aansluitklemmen moeten na het beëindigen van het werk volgens de juiste normen worden aangedraaid.
- Al naar gelang het spanningsbereik, moet het product volgens de geldende normen van een aarding worden voorzien.

Het product kan de volgende aansluitingen hebben:

- Steker aansluiting volgens ISO-4400 of 3x DIN-46244 (bij juiste montage wordt de dichtheidsklasse IP-65 verkregen).
- Aansluiting binnen in het metaalhuis d.m.v. schroefaansluiting. De kabeldoover heeft een "PG" aansluiting.
- Spoelen met platte stekker (AMP type).
- Losse of aangegoten kabels

IN GEBRUIK STELLEN

Voor dat de druk aangesloten wordt dient een elektrische test te worden uitgevoerd. Ingeval van magnetische afsluiters, legt men meerdere malen spanning op de spoel aan waarbij een duidelijk "klikken" hoorbaar moet zijn bij juist functioneren.

GEBRUIK

De meeste magnetische afsluiters zijn uitgevoerd met spoelen voor continu gebruik. Omdat persoonlijke of zakelijke schade kan ontstaan bij aanraking dient men dit te vermijden, daar bij langdurige inschakeling de spoel of het spoelhuis heet kan worden.

GELUIDSEMISSIE

Dit hangt sterk af van de toepassing en het gebruikte medium. De bepaling van het geluidsniveau kan pas uitgevoerd worden nadat het ventiel is ingebouwd.

ONDERHOUD

Het onderhoud aan de afsluiters is afhankelijk van de bedrijfsomstandigheden.

In bepaalde gevallen moet men bedacht zijn op media welke sterke vervuiling binnen in het product kunnen veroorzaken. Men dient dan regelmatig inspecties uit te voeren door de afsluiter te openen en te reinigen. Indien ongewone slijtage optreedt dan zijn reserve onderdelen sets beschikbaar om een inwendige revisie uit te voeren.

Ingeval problemen of onduidelijkheden tijdens montage, gebruik of onderhoud optreden dan dient men zich tot ASCO of haar vertegenwoordiger te wenden.

Een aparte fabrikanten verklaring van inbouw, in de zin van EU-richtlijn 89/392/EEG aanhangsel IIB kan door de afnemer na opgave van orderbevestigingsnummer en serienummer verkregen worden.

Dit product voldoet aan de essentiële vereisten van de EMC Richtlijn 89/336/EEG en amendementen, net als aan de richtlijnen 73/23/EEG en 93/68/EEG inzake laagspanning. Een afzonderlijke verklaring van overeenstemming is op verzoek verkrijgbaar. Vermeld a.u.b. het nummer van de opdrachtbevestiging en de serienummers van de betreffende producten.

UNDERWRITERS LABORATORIES, INC. LISTED

ASCO TRIPOINT® Pressure Switches



Form No. P7022R4

UL LISTINGS

This sheet is a listing of switch unit and transducer unit combinations that are Listed by Underwriters Laboratories, Inc. The table below is provided to ensure that the proper switch unit (section) is assembled to the proper transducer (section), thus providing a complete, UL Listed pressure switch. Only completely assembled combinations are UL Listed. See table and notes below for UL complementary product category listing and guide card numbers.

INSTALLATION INSTRUCTIONS

To determine the proper switch and transducer combinations, first locate the switch unit catalog number in the table below. Then going to the right on the same line (as the switch unit catalog number) find the transducer unit catalog number which may be used with this particular switch unit.

IMPORTANT: The third digit in both the switch unit and transducer unit catalog numbers must be identical. For example, a switch unit Catalog No. SC41D can be used with transducer unit Catalog No. TD40A11. The mating produces a complete pressure switch Catalog No. SC41D/TD40A11.

SWITCH UNITS See Notes ③ and ⑤				PRESSURE TRANSDUCER UNITS See Notes ①, ②, and ④					
Series: SA, SB, SC, SD, & SE Followed by nos. below									
General Purpose Enclosure Type 1	Watertight Enclosure Types 3, 3S, 4, & 4X	Explosion-proof Enclosure Types 3, 3S, 4, 4X, 7 & 9	Applicable Options	Air Non-Hazardous Oil & Gas Aluminum/Buna N Construction	Air-Water Non-Hazardous Oil & Steam 303 Stainless Steel & Buna N Construction	Fuel Gas Aluminum/Buna N Construction			Corrosive Fluids Air-Water Non-Hazardous Gas & Oil 303 or 316 Stainless Steel & VITON* Construction
40D	41D	42D	Switch unit option suffixes 1 or 2. Suffix "K" option is applicable to Series SA and SB only	TA40A11	TA40A31	-	-	-	TA40A32,-42
30D	31D	32D		TA30A11	TA30A31	-	TA31A11	-	TA30A32,-42
20D	21D	22D		TA20A11	TA20A31	-	TA21A11	-	TA20A32,-42
20D	21D	22D		TB20A11	TB20A31	-	TB21A11	-	TB20A32,-42
10D	11D	12D		TB10A11	TB10A31	-	TB11A11	-	TB10A32,-42
10D	11D	12D		TC10A11	TC10A31	-	TC11A11	-	TC10A32,-42
-	-	-		-	Brass & Buna N	Brass & Buna N ⑤			-
30D	31D	32D		TV34A11	TV34A21	-	-	-	TV34A32,-42
20D	21D	22D		TV24A11	TV24A21	-	-	-	TV24A32,-42
40D	41D	42D		TD40A11	TD40A21 ②	-	TK42A21	-	TD40A32,-42
30D	31D	32D		TD30A11	TD30A21 ②	TF32A21	TK32A21	TN32B21	TD30A32,-42
20D	21D	22D		TD20A11	TD20A21 ②	TF22A21	TK22A21	TN22B21	TD20A32,-42
10D	11D	12D		-	-	TF12A21	TK12A21	TN12B21	-
-	-	-		-	316 St. St. & VITON*	-	-	-	-
10D	11D	12D		-	TH13A42	-	-	-	-
10D	11D	12D		-	TG13A42	-	-	-	-
20D	21D	22D		-	TG23A42	-	-	-	-
30D	31D	32D		-	TG33A42	-	-	-	-
-	-	-		-	-	316 Stainless Steel & VITON*			-
30D	31D	32D		-	-	-	-	TN32B42	-
20D	21D	22D		-	-	-	-	TN22B42	-
10D	11D	12D		-	-	-	-	TN12B42	-
10D	11D	12D		-	-	-	-	TQ12B42	-
-	-	-		-	-	Fuel Oil-316 Stainless Steel			-
40D	41D	42D		-	-	-	TE40A44	-	-
30D	31D	32D		-	-	-	TE30A44	-	-
20D	21D	22D		TE20A11	TE20A21 ②	-	-	-	TE20A32,-42
10D	11D	12D		TE10A11	TE10A21 ②	-	TE10A44	-	TE10A32,-42
10D	11D	12D		TF10A11	TF10A21 ②	-	TF10A44	-	TF10A32,-42
10D	11D	12D		TG10A11	TG10A21 ②	-	TG10A44	-	TG10A32,-42
10D	11D	12D		TH10A11	TH10A21 ②	-	TH10A44	-	TH10A32,-42
10D	11D	12D		TJ10A11	TJ10A21 ②	-	TJ10A44	-	TJ10A32,-42
10D	11D	12D		-	TK10A21	-	-	-	TK10A32,-42
10D	11D	12D		-	TL10A21	-	-	-	TL10A32,-42
10D	11D	12D		-	TM10A21	-	-	-	TM10A32,-42
10D	11D	12D		-	TN10B21	-	-	-	TN10B42
10D	11D	12D		-	-	-	-	-	TQ10B42

NOTES:

① All transducers with general purpose and watertight switch units are UL Listed as Industrial Control Equipment—Enclosed, Motor Controllers—Pressure Operated, Guide NKPZ. Transducers which end in -11, -21, -22, -31, -32, -42 or -44 and used with general purpose and watertight switch units are also UL Listed as switches for Heating and Cooling Appliances, Guide MFHX. When used with explosionproof switch units, they are UL Listed Industrial Control Equipment for Hazardous Locations Guide NOWT.

② When used for steam service, these transducers with general purpose and watertight switch units are also UL Listed as Limit Controls, Guide MBPR.

*DuPont's Registered Trademark

③ Switch units with explosionproof enclosures are UL Listed for Class I, Groups B, C, and D (Types 7B, 7C, and 7D) and Class II, Groups E, F, and G (Types 9E, 9F, and 9G) Hazardous Locations.

④ Suffix B is an applicable option.

⑤ UL Listing also includes transducers TF_2A series with suffix 22, 31, or 32, and TK_2A series with suffix 22.

⑥ UL approval includes revisions identified by Fifth (V) character letter in industrial switch unit catalog number as follows:

General Purpose and Watertight Enclosures *Explosionproof Enclosures*

A – First Construction
 B – SC switch units redesigned
 D – Steel balance plate construction

B – Class I, Group B (Hydrogen)
 C – SC switch units redesigned
 D – Steel balance plate construction

UNDERWRITERS LABORATORIES, INC. LISTED

ASCO TRIPOINT® Temperature Switches



Form No. P7022R4

UL LISTINGS

This sheet is a listing of switch unit and transducer unit combinations that are Listed by Underwriters Laboratories, Inc. The table below is provided to ensure that the proper switch unit (section) is assembled to the proper transducer (section), thus providing a complete, UL Listed pressure switch. Only completely assembled combinations are UL Listed. See table and notes below for UL complementary product category listing and guide card numbers.

INSTALLATION INSTRUCTIONS

To determine the proper switch and transducer combinations, first locate the switch unit catalog number in the table below. Then going to the right on the same line (as the switch unit catalog number) find the transducer unit catalog number which may be used with this particular switch unit.

IMPORTANT: The third digit in both the switch unit and transducer unit catalog numbers must be identical. For example, a switch unit Catalog No. SA10D can be used with transducer unit Catalog No. QB10A4. The mating produces a complete temperature switch Catalog No. SA10D/QB10A4.

SWITCH UNITS See Notes ③ and ④				TEMPERATURE TRANSDUCER UNITS See Notes ① and ②				
Series: SA, SB, SC, SD, & SE Followed by numbers below								
General Purpose Enclosure Type 1	Watertight Enclosure Types 3, 3S,4, & 4X	Explosion-proof Enclosure Types 3, 3S, 4, 4X, 7 & 9	Applicable Options	Copper	316 Stainless Steel	Cooper (Armored Capillary)	316 Stainless Steel (Plain Capillary)	Applicable Options For Capillary & Bulb Only
10D	11D	12D	Optional Suffixes 1 or 2. Suffix "K" for Series SA or SB only.	QA10A1	QA10A4	QA11A1	QA11A4	Suffixes C, D, E, F, & G
10D	11D	12D		QB10A1	QB10A4	QB11A1	QB11A4	
10D	11D	12D		QD10A1	QD10A4	QD11A1	QD11A4	
10D	11D	12D		QF10A1	QF10A4	QF11A1	QF11A4	
10D	11D	12D		QJ10A1	QJ10A4	QJ11A1	QJ11A4	
10D	11D	12D		QL10A1	QL10A4	QL11A1	QL11A4	
10D	11D	12D		–	–	QN11A1	QN11A4	
10D	11D	12D		–	–	QT11A1	QT11A4	
10D	11D	12D		–	–	QU11A1	QU11A4	

NOTES:

- ① All transducers with general purpose and watertight switch units are UL Listed as Temperature – Indicating and Regulating Equipment, Guide XAPX. When used with explosionproof switch units, they are UL Listed Temperature–Indicating and Regulating Equipment for use in Hazardous Locations, Guide XBDV.
- ② Optional features, armored capillary and capillary length identified by the seventh, eighth, and ninth digit codes respectively of the transducer catalog number are also UL Listed.
- ③ Switch units with explosionproof enclosures are UL Listed for Class I, Groups B, C and D (Types 7B, 7C, and 7D) and Class II, Groups E, F, and G (Types 9E, 9F, and 9G) Hazardous Locations.
- ④ UL approval includes revisions identified by Fifth (V) character letter in industrial switch unit catalog number as follows:
 - General Purpose and Watertight Enclosures*
 - A – First Construction
 - B – SC switch units redesigned
 - D – Steel balance plate construction
 - Explosionproof Enclosures*
 - B – Class I, Group B (Hydrogen)
 - C – SC switch units redesigned
 - D – Steel balance plate construction

Installation & Maintenance Instructions

ASCO® TRIPPOINT® SWITCH UNITS

**ADJUSTABLE DEADBAND SWITCH UNIT WITH GENERAL PURPOSE,
WATERTIGHT, OR EXPLOSIONPROOF SWITCH ENCLOSURE**

SA-SERIES

Form No.V5720R2

DESCRIPTION

The SA-Series Adjustable Deadband Switch Units are used with transducer units to make Tripoint Pressure Switches or Temperature Switches. The switch units are made of aluminum alloy and designed for rugged industrial use. Switches are provided with a general purpose, watertight, or explosionproof enclosure. All wiring terminals, adjustments, and visual scales are accessible from the front of the switch.

The switch may be supplied as a complete unit or with the switch assembly unit and transducer completely assembled. The components may be separate units to be assembled upon installation. The actuation (set) point and the reactivation (reset) point are each independently adjustable over the full range of the switch. The switch assembly can be mated with a wide selection of pressure or temperature transducers to cover a broad range of pressures, fluids, or temperatures. The switch will control electrical circuits in response to changes in pressure or temperature.

IMPORTANT: These instructions cover the installation and use of this switch on pressure and temperature transducers. Select the paragraphs that apply to your particular installation and application. The word *signal* is used in place of pressure, or temperature changes.

INSTALLATION

Check the nameplate for the correct catalog number, pressure range, temperature range, media, and proof pressure or temperature. Never apply incompatible fluids or exceed the pressure or temperature rating of the switch. Installation and inspection to be performed by qualified personnel.

Nameplates are located on cover and on the bottom of the transducer. Check to be sure the third digit in each number is the same. If not, the unit should not be used. (Refer to Figure 3).

IMPORTANT: All internal adjustments have been made at the factory. Any adjustment, alteration or repair to the internal parts of the switch other than stated herein voids all warranties. The signal setting adjustments required are made by the adjusting nut on the outside of the switch.

Temperature Limitations

Ambient temperature limits are — 4_F(—20_C) to 140_F (60_C). To determine fluid temperature limitations, see form No.V5771 for Pressure Transducer catalog numbers and construction materials, then refer to chart below.

TRANSDUCER CONSTRUCTION MATERIALS	RATINGS FLUID TEMPERATURE
Buna N or Neoprene	— 4_F(—20_C) to 179_F(82_C)
VITON*	— 4_F(—20_C) to 250_F(121_C)
316 Stainless Steel	— 50_F(—45_C) to 300_F(149_C)

For steam service, the fluid temperature with a pigtail (siphon tube or condensate loop) installed directly into the transducer will be below 179_F (82_C).

Assembly of Switch and Transducer Units

IMPORTANT: The switch unit and transducer unit may be provided as a complete assembly or as separate units. If separate units are provided refer to Form No. V5771 for a complete listing of switch unit and transducer unit combinations. Form No.V5771 is provided to ensure that the proper switch unit is assembled to the proper transducer unit. Pay careful attention to exploded views provided in Figure 3 for assembly of switch unit and transducer unit. Proceed in the following manner:

CAUTION: The third digit in the catalog number on both the switch unit and transducer unit must be identical. If not, do not assemble to each other. If the same proceed.

1. Remove special instructions label and switch range scales from transducer unit.
2. For watertight and explosionproof construction place gasket on base of switch unit.
3. Place transducer unit on base of switch unit and assemble. Insert four bolts in a crisscross manner to 80 ± 10 in-lbs [9.0 ± 1.1 Nm].
4. Remove backing paper from range scale and install scale on the switch body behind adjusting nut. The scale is slotted to fit over a raised boss on the body. See Figure 1.

Positioning

Switch may be mounted in any position.

Mounting

Figure 1 shows partial view of switch body for mounting dimensions.

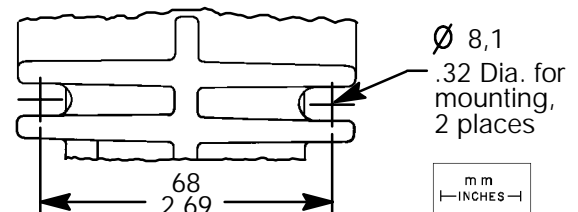


Figure 1. Mounting locations

Piping/Tubing (Pressure Transducer)

Adequate support of piping and proper mounting of switch should be made to avoid excessive shock or vibration. To minimize the effect of vibration on a switch, mount perpendicular to vibration. Connect piping or tubing to switch at base of transducer. It is recommended that flexible tubing be used whenever possible. Apply pipe compound sparingly to male pipe threads only. If applied to female threads, it may enter the transducer and cause operational difficulty. Avoid pipe strain on switch by properly supporting and aligning piping. When tightening pipe, do not use switch as a lever. Wrenches applied to transducer body or piping are to be located as close as possible to connection point.

IMPORTANT: For steam service, install a condensate loop (pigtail or steam syphon tube) directly into the pressure transducer.

CAUTION: To avoid damage to the transducer body, DO NOT OVERTIGHTEN PIPE CONNECTIONS. If TEFLON* tape, paste or similar lubricant is used, use extra care due to reduced friction.

IMPORTANT: To eliminate undesirable pressure fluctuations in the system, install a surge suppressor.

*DuPont's Registered Trademark

Wiring

Wiring must comply with local codes and the National Electrical Code. All switch enclosures are provided with two 3/4" NPT conduit hubs with one plugged when not in use. It is recommended that a flexible conduit connection be used. If rigid conduit is used, do not consider it or use it as a means of support (mounting). For general purpose and watertight constructions, the switch cover is removed by loosening two screws then twisting slightly and lifting. For explosionproof construction, the cover unscrews. When explosionproof cover is replaced, torque cover to 135 ± 10 in-lbs [10,7 ± 1,1 Nm]. Use No. 14 AWG copper wire rated for 60°C minimum. All switches have a grounding screw and clamp in the enclosure. For factory wired switch, black lead is common, red lead is normally open, blue lead is normally closed, and the green lead wire is a ground.

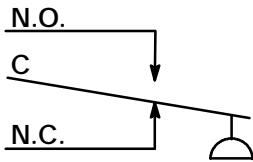
IMPORTANT: Electrical load must be within range stated on nameplate. Failure to stay within the electrical range of the switch rating may result in damage to or premature failure of electrical switch.

CAUTION: Do not exert excessive screw driver force on snap switch when making terminal connections. When connections are made, be sure there is no stress on the wire leads. Either condition may cause malfunction of switch.

ELECTRICAL RATINGS		
Switch Unit	Ratings for Limit Controls and Pressure Operated Switches	Ratings for Industrial Controls and Temperature Indicating and Regulating Equipment
Standard Switch Rating	5 Amps Res., 125/250 VAC 1/8 HP 125 VAC 1/4 HP 250 VAC 1/2 Amp Res., 125 VDC 1/4 Amp Res., 250 VDC	15 Amps Res., 125 VAC 10 Amps Res., 250 VAC 1/4 HP 125 VAC 1/2 HP 250 VAC 1/2 Amp Res., 125 VDC 1/4 Amp Res., 250 VDC
Option K Switch Rating	5 Amps Res., 125/250 VAC 1/8 HP 125 VAC 1/4 HP 250 VAC 1/2 Amp Res., 125 VDC 1/4 Amp Res., 250 VDC	5 Amps Res., 125/250 VAC 1/8 HP 125 VAC 1/4 HP 250 VAC 1/2 Amp Res., 125 VDC 1/4 Amp Res., 250 VDC

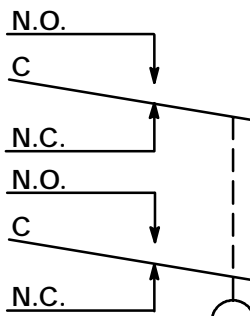
Schematics

SPDT



Standard Switch

DPDT



Suffix K Switch

INSTALLATION OF TEMPERATURE TRANSDUCERS

Direct Probe

The direct probe (local) temperature transducer is provided with 1/2" NPT connection. When installing, do not use switch unit as a lever for tightening. Use wrenching flats provided at base of transducer for tightening.

Capillary and Bulb

The capillary and bulb (remote) temperature transducers are provided with a length of capillary and a 3/8" diameter sensing bulb.

CAUTION: Do not bend capillary at sharp angles. For proper operation, be sure sensing bulb is completely immersed in fluid and not in contact with heating element or anything that would directly affect the temperature of the fluid being sensed.

Thermal Well (Optional Feature)

A thermal well may be used for capillary and bulb (remote) or direct probe (local) temperature transducers. The thermal well affords protection for the sensing bulb and allows removal of the sensing bulb while maintaining a pressure tight vessel. When installing sensing bulb in thermal well, be sure that it is fully inserted. Where a thermal well already exists, jam nuts may be obtained to adapt the capillary and bulb to the existing thermal well. The existing thermal well must be for a 3/8" diameter sensing bulb.

Union Connector (Optional Feature)

A union connector will allow direct mounting of the sensing bulb in the fluid being controlled. Install union into piping connection before tightening union onto bulb. For maximum performance, the bulb should be inserted in the union connection so that the end of the sensing bulb is even with the end of the union connector nut. Do not apply excessive torque when tightening union connector nut.

Adjustment (Signal Setting) of Adjustable Deadband Switch

To make adjustments, (signal setting) a 7/16" wrench and a pressure or temperature gage (within suitable range) are required. If electrical connection (to line of final application) of the switch is not desirable, a battery powered test lamp or ohm meter may be used. Pressure or temperature range scales should be used for initial signal setting. These will be accurate within 5%. Loosen lock ring and turn adjusting nut until red line is even with the desired range. For exact signal setting, proceed as follows:

WARNING: To prevent the possibility of personal injury or property damage, turn off electrical power when making permanent electrical connections to switch.

Adjustment (Signal Setting) of Normally Closed or Normally Open Switch, Increasing Signal (Refer to Figure 2)

1. If the switch is in the line of final application when adjustment (signal setting) is made, be sure switch can be test operated without affecting other equipment.
2. Loosen lock ring on adjustment nut and turn low signal adjustment nut full upwards and high signal adjustment full down using a 7/16" wrench.

CAUTION: Adjusting nut will turn easily until it hits a stop. Do not over torque; over torquing may cause internal damage resulting in malfunction.

3. Remove switch cover to gain access to snap switch. See section on *Wiring* for cover removal.
4. Follow the steps in the chart below to make signal setting:

Adjustment Procedure	NORMALLY CLOSED		NORMALLY OPEN	
	Switch Terminal	Test Lamp On-Off	Switch Terminal	Test Lamp On-Off
1. Starting at zero signal, connect test lamp to common.	NC	On (Closed Circuit)	NO	Off (Open Circuit)
2. Apply desired actuation signal. Then back off high signal adjusting nut until switch actuates.	NC	Off (Open Circuit)	NO	On (Closed Circuit)
3. Lower signal to desired reactivation signal. Then advance low signal adjusting nut until switch reactivates.	NC	On (Closed Circuit)	NO	Off (Open Circuit)

5. Cycle between signal settings and make minor adjustments to adjusting nuts as required to achieve the exact signal setting.
6. After setting has been made, make permanent electrical connections.

Adjustment (Signal Setting) of Normally Closed or Normally Open Switch, *Decreasing Signal* (Refer to Figure 2)

1. If the switch is in the line of final application when adjustment (signal setting) is made, be sure switch can be test operated without affecting other equipment.
2. Loosen lock ring on adjustment nuts and turn low signal adjustment nut full upwards and high signal adjustment nut slightly beyond desired actuation setting using a 7/161 wrench.

⚠ CAUTION: Adjustment nut will turn easily until it hits a stop. Do not over torque; over torquing may cause internal damage resulting in malfunction.

3. Remove switch cover to gain access to snap switch. See section on *Wiring* for cover removal.
4. Follow steps in chart below to make signal setting.

Adjustment Procedures	NORMALLY CLOSED		NORMALLY OPEN	
	Switch Terminal	Test Lamp On-Off	Switch Terminal	Test Lamp On-Off
1. Starting with initial signal above desired actuation signal, connect test lamp to common.	NC	Off (Open Circuit)	NO	On (Closed Circuit)
2. Decrease signal to desired actuation signal. Then advance low signal adjusting nut until switch actuates.	NC	On (Closed Circuit)	NO	Off (Open Circuit)
3. Apply desired re-actuation signal. Then back off high signal adjusting nut until switch re-actuates.	NC	Off (Open Circuit)	NO	On (Closed Circuit)

5. Cycle between actuation and re-actuation signals and make minor adjustment to adjusting nuts as required to achieve the exact signal settings.
6. After settings have been made, tighten lock rings and make permanent electrical connections.

Testing of Installation

If the adjustment of the switch has been made outside of the line of final application, the switch should be retested when installed in the line of final application. Follow adjustment instructions. Be sure switch can be test operated without affecting other equipment.

MAINTENANCE

⚠ WARNING: To prevent the possibility of personal injury or property damage, turn off electrical power and depressurize switch unit before inspection or removal.

IMPORTANT: Switch is not field repairable. The switch must be returned to the factory (Automatic Switch Company, Florham Park, New Jersey) or serviced only by an authorized factory representative. Address all service inquiries to Automatic Switch Company, 50-60 Hanover road, Florham Park, New Jersey 07932, Valve Service Department. The only maintenance which may be performed on the adjustable deadband switch is changing the setting of the adjusting nuts and replacement of the transducer unit. Replacement of transducer should be done only if external leakage is evident.

Preventive Maintenance

- S While in service, operate the switch (cycle between desired signals) at least once a month to insure proper operation. If necessary, electrical wiring and pipe connection should be made so that switch can be test operated without affecting other equipment.
- S Periodic inspection of the switch, external surfaces only, should be carried out. Switch should be kept clean and free from paint, foreign matter, corrosion, icing, and freezing conditions.
- S Keep the medium entering the transducer as free as possible from dirt and foreign material.

Causes of Improper Operation

Switch will not actuate or actuates and re-actuates undesirable.

- S **Incorrect Electrical Connection:** Check leads to switch. Be sure they are properly connected. Switch is marked *NO* for Normally Open, *NC* for Normally Closed and *C* for Common.
- S **Faulty Control Circuit:** Check electrical power supply to switch. Check for loose or blown fuses, open-circuited or grounded wires, loose connections at terminal block or switch. See nameplate for electrical rating and range.
- S **Incorrect Pressure:** Check pressure in system with suitable pressure gauge. Pressure must be within range specified on nameplate.
- S **Incorrect Adjustment:** Check adjustment nuts for proper setting. Refer to adjustment instructions.
- S **External Leakage:** Check to see that bolts (4) holding transducer to pressure switch are properly torqued to 80 ± 10 in-lbs [9.0 ± 1.1 Nm]. If bolts are tight and leakage is still evident, replace transducer. Refer to paragraph on *Assembly of Switch Unit and Transducer Unit*.
- S **Excessive Vibration or Surges Causing Switch to Actuate and Re-actuate:** Check for fluctuations in system and install pressure surge suppressor. Check switch mounting and be sure there is no excessive vibration.
- S **Incorrect Temperature:** Check temperature in system with suitable thermometer. Temperature must be within range specified on nameplate. Check location of capillary and bulb for incorrect mounting. Refer to paragraphs on *Installation of Temperature Transducers*.

If the operation of the switch cannot be corrected by the above means, the entire switch unit should be replaced or an authorized factory representative consulted.

Color Code Identification

When the switch cover is removed, the switch unit may be identified by the color of the sealant used on the locknuts of the snap switch. The color of the sealant will correspond directly to the third digit of the switch catalog number.

Third Digit In Catalog Number	Sealant Color Used On Snap Switch Locknuts
1	Yellow
2	Green
3	Red
4	Blue

Example: If the sealant color on the snap switch was red, this would mean that the third digit in the pressure switch catalog number would be 3, possibly SA 0D. It would not be, for example: SA 0D, SA 0D, or SA 0D.

FOR SERVICE, REPLACEMENT, OR NEW TRANSDUCER

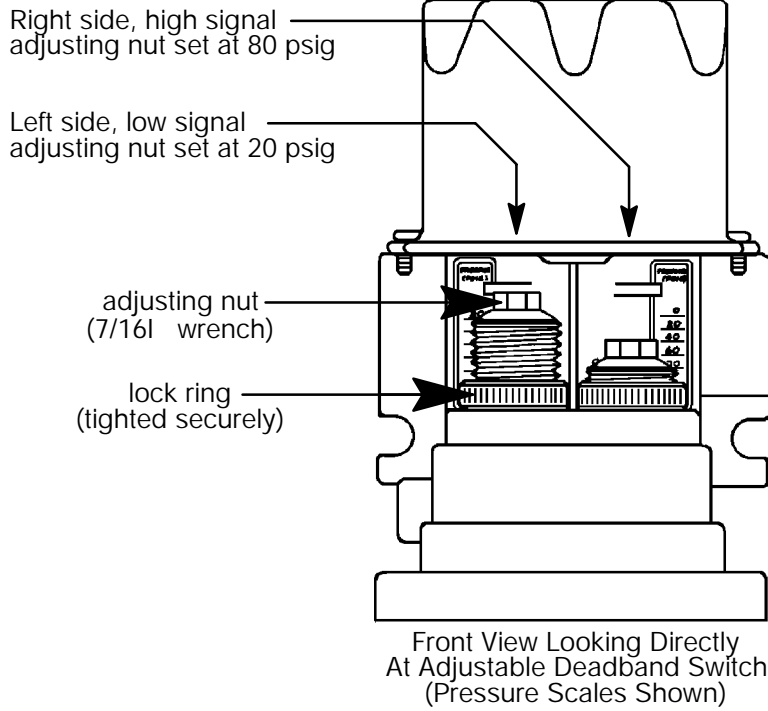
Consult Factory, or Authorized Factory Representative or Distributors

ORDERING INFORMATION

For Adjustable Deadband Switch or New Transducer
When Ordering, Specify Catalog Numbers, Fluid, Pressure Range, Temperature Range, Serial Numbers, and Proof Pressure or Rated Overrange Temperature.

NAMEPLATES ARE LOCATED ON SWITCH COVER AND BOTTOM OF TRANSDUCER.

Enlarged Isometric View Showing
Adjusting Nut And Lock Ring



CAUTION
Adjusting nut will turn
easily until it hits a stop.
DO NOT OVERTORQUE

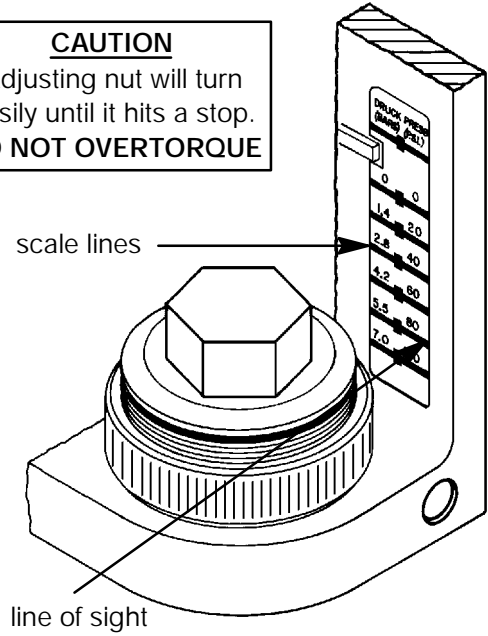
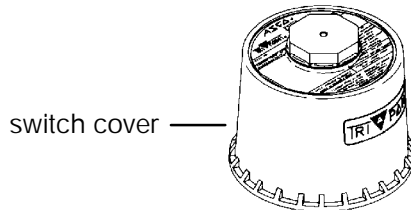


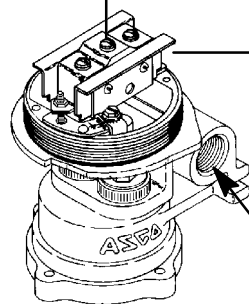
Figure 2. Adjustment (Signal Setting) of Adjustable Deadband Switch

Explosionproof
Switch Enclosure
Shown



IMPORTANT
The third digit in Catalog No.
on the switch unit and transducer
unit must be identical.
See example below.

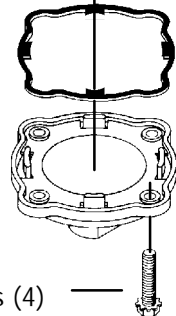
Torque switch cover to
135 ±10 in-lbs [15,3±1,1 Nm]



adjusting nut cover
(optional)

3/4" NPT for conduit
connection both ends

Torque bolts(4) in a
crisscross manner to
80 ±10 in-lbs [9,0±1,1 Nm]



bolts (4)

Figure 3. Switch Unit and Pressure Transducer Unit to be Assembled.

ASCO TRIPOINT Pressure Switches

ADJUSTABLE DEADBAND SWITCH UNIT AND TRANSDUCER UNIT COMBINATIONS

SA-SERIES

Form No.V5771R2

DESCRIPTION

This sheet is a listing of switch unit and transducer unit combinations. The table below is provided to ensure that the proper switch unit is assembled to the proper transducer unit, thus providing a complete adjustable deadband pressure switch. In the table below locate the switch unit catalog number being used. Then going to the right on the same line (as the switch unit catalog number) find the transducer unit catalog number which may be used with this particular switch unit.

IMPORTANT: The third digit in both the switch unit and transducer unit catalog numbers must be identical. For example, a switch unit Catalog No. SA41D can be used with transducer unit Catalog No. TD40A11. The mating produces a complete adjustable deadband pressure switch, Catalog No. SA41D/TD40A11. If the third digit is not identical it is an incorrect mate and the units should not be assembled.

NOTE: Switch units listed to left may be used with any transducer units listed to right provided they are on the same horizontal line.

SWITCH UNITS			SPECIFICATIONS		PRESSURE TRANSDUCER UNITS			
General Purpose Enclosure Type 1	Watertight Enclosure Types 3, 3S, 4, & 4X	Explosion-proof Enclosure Types 3, 3S, 4, 4X, 7 & 9	Adjustable Operating Range (psig)	Proof Pressure (psig)	Air Non-Hazardous Oil & Gas Aluminum/Buna N Construction	Air-Water Non-Hazardous Oil & Steam 303 Stainless Steel & Buna N Construction	Fuel Gas Aluminum/Buna N Construction	Corrosive Fluids Air-Water Non-Hazardous Gas & Oil 303 or 316 Stainless Steel & VITON* Construction
SA40D	SA41D	SA42D	0 – 12" W.C.	25	TA40A11	TA40A31	–	TA40A32
SA30D	SA31D	SA32D	0 – 27" W.C.	25	TA30A11	TA30A31	TA31A11 †	TA30A32
SA20D	SA21D	SA22D	0 – 65" W.C.	25	TA20A11	TA20A31	TA21A11 †	TA20A32
SA20D	SA21D	SA22D	15 – 140" W.C.	40	TB20A11	TB20A31	TB21A11 †	TB20A32
SA10D	SA11D	SA12D	15 – 250" W.C.	40	TB10A11	TB10A31	TB11A11 †	TB10A32
SA10D	SA11D	SA12D	25 – 400" W.C.	40	TC10A11	TC10A31	TC11A11 †	TC10A32
–	–	–	–	–	–	Brass & Buna N	–	–
SA30D	SA31D	SA32D	0 – 30" Hg	50	TV34A11	TV34A21	–	TV34A32
SA20D	SA21D	SA22D	15 psi – 30 Hg	50	TV24A11	TV24A21	–	TV24A32
SA40D	SA41D	SA42D	0.4 – 4.5	100	TD40A11	TD40A21	–	TD40A42
SA30D	SA31D	SA32D	0.7 – 9.0	100	TD30A11	TD30A21	–	TD30A42
SA20D	SA21D	SA22D	1.0 – 18	100	TD20A11	TD20A21	–	TD20A42
–	–	–	–	–	–	316 St. St. & VITON*	–	–
SA10D	SA11D	SA12D	10 – 300	3000	–	TH13A42	–	–
SA10D	SA11D	SA12D	5 – 200	3000	–	TG13A42	–	–
SA20D	SA21D	SA22D	5 – 120	3000	–	TG23A42	–	–
SA30D	SA31D	SA32D	5 – 60	3000	–	TG33A42	–	–
–	–	–	–	–	–	–	316 St. St. & VITON*	–
SA30D	SA31D	SA32D	200 – 1000	5000	–	–	TN32B42	–
SA20D	SA21D	SA22D	200 – 2100	5000	–	–	TN22B42	–
SA10D	SA11D	SA12D	200 – 3500	5000	–	–	TN12B42	–
SA10D	SA11D	SA12D	500 – 8000	9000	–	–	TQ12B42	–
–	–	–	–	–	–	Brass & Buna N	Fuel Oil – 316 St. St.	–
SA40D	SA41D	SA42D	0.8 – 9.0	150	–	–	TE40A44	–
SA30D	SA31D	SA32D	1.0 – 18	150	–	–	TE30A44	–
SA20D	SA21D	SA22D	1.5 – 36	150	TE20A11	TE20A21	–	TE20A42
SA10D	SA11D	SA12D	2 – 60	150	TE10A11	TE10A21	TE10A44	TE10A42
SA10D	SA11D	SA12D	3 – 100	200	TF10A11	TF10A21	TF10A44	TF10A42
SA10D	SA11D	SA12D	6 – 200	400	TG10A11	TG10A21	TG10A44	TG10A42
SA10D	SA11D	SA12D	13 – 300	600	TH10A11	TH10A21	TH10A44	TH10A42
SA10D	SA11D	SA12D	15 – 400	600	TJ10A11	TJ10A21	TJ10A44	TJ10A42
SA10D	SA11D	SA12D	30 – 600	900	–	TK10A21	–	TK10A42
SA10D	SA11D	SA12D	50 – 1000	1500	–	TL10A21	–	TL10A42
SA10D	SA11D	SA12D	75 – 1500	2300	–	TM10A21	–	TM10A42
SA10D	SA11D	SA12D	200 – 3500	5000	–	TN10B21	–	TN10B42
SA10D	SA11D	SA12D	500 – 8000	9000	–	–	–	TQ10B42
–	–	–	–	–	–	–	Brass & Buna N	–
SA30D	SA31D	SA32D	1.5 – 30	200	–	–	TF32A21	–
SA20D	SA21D	SA22D	2.0 – 60	200	–	–	TF22A21	–
SA10D	SA11D	SA12D	3.0 – 100	200	–	–	TF12A21	–
SA40D	SA41D	SA42D	10 – 75	200	–	–	TK42A21	–
SA30D	SA31D	SA32D	10 – 150	400	–	–	TK32A21	–
SA20D	SA21D	SA22D	10 – 300	400	–	–	TK22A21	–
SA10D	SA11D	SA12D	30 – 600	900	–	–	TK12A21	–
SA30D	SA31D	SA32D	200 – 1000	5000	–	–	TN32B21	–
SA20D	SA21D	SA22D	200 – 2100	5000	–	–	TN22B21	–
SA10D	SA11D	SA12D	200 – 3500	5000	–	–	TN12B21	–

† Proof pressure TA_1A_ 15 psig/TB_1A_ + TC_1A_ 25 psig.

*DuPont's Registered Trademark

DESCRIPTION

This sheet is a listing of switch unit and transducer unit combinations. The table below is provided to ensure that the proper switch unit is assembled to the proper transducer unit, thus providing a complete adjustable deadband temperature switch. In the table below locate the switch unit catalog number being used. Then going to the right on the same line (as the switch unit catalog number) find the transducer unit catalog number which may be used with this particular switch unit.

IMPORTANT: The third digit in both the switch unit and transducer unit catalog numbers must be identical. For example, a switch unit Catalog No. SA10D can be used with transducer unit Catalog No. QD10A1. The mating produces a complete temperature switch Catalog No. SA10D/QD10A1. If the third digit is not identical it is an incorrect mate and the units should not be assembled.

NOTE: Switch units listed to left may be used with any transducer units listed to right provided they are on the same horizontal line.

SWITCH UNITS			SPECIFICATIONS				TRANSDUCER UNITS			
General Purpose Enclosure Type 1	Water-tight Enclosure Types 3, 3S, 4, 4X	Explosion proof Enclosure Types 3, 3S, 4, 4X, 7 & 9	Adjustable Operating Range (°F and °C)	Maximum Rated Overrange Temperature (°F and °C)			Direct Mount		6' Capillary and Bulb	
				Direct Mount	Capillary		Copper	316 S.S.	Copper Armored Capillary	316 S.S. Plain Capillary
					Copper	S.S.				
SA10D	SA11D	SA12D	-30 to 60°F	250°F	250°F	250°F	QB10A1	QB10A4	QB11A1	QB11A4
			-34 to +16°C	121°C	121°C	121°C				
SA10D	SA11D	SA12D	0 to 90°F	260°F	300°F	300°F	QD10A1	QD10A4	QD11A1	QD11A4
			-18 to +32°C	127°C	149°C	149°C				
SA10D	SA11D	SA12D	50 to 160°F	260°F	350°F	350°F	QF10A1	QF10A4	QF11A1	QF11A4
			10 to 71°C	127°C	177°C	177°C				
SA10D	SA11D	SA12D	100 to 220°F	260°F	450°F	450°F	QJ10A1	QJ10A4	QJ11A1	QJ11A4
			38 to 104°C	127°C	232°C	232°C				
SA10D	SA11D	SA12D	160 to 260°F	260°F	500°F	500°F	QL10A1	QL10A4	QL11A1	QL11A4
			71 to 127°C	127°C	260°C	260°C				
SA10D	SA11D	SA12D	225 to 340°F	—	550°F	600°F	—	—	QN11A1	QN11A4
			107 to 171°C	—	287°C	316°C				
SA10D	SA11D	SA12D	300 to 450°F	—	550°F	700°F	—	—	QT11A1	QT11A4
			149 to 232°C	—	287°C	371°C				
SA10D	SA11D	SA12D	350 to 510°F	—	550°F	800°F	—	—	QU11A1	QU11A4
			177 to 266°C	—	287°C	427°C				
SA10D	SA11D	SA12D	425 to 640°F	—	—	890°F	—	—	—	QW11A4
			218 to 337°C	—	—	477°C				

ECII® Safety Warning — LP-Gas Pressure Relief Valves

Purpose

In its continuing quest for safety, Engineered Controls International, Inc. is publishing safety warning bulletins explaining the hazards associated with the use, misuse and aging of ECII®/ RegO® Products. LP-Gas dealer managers and service personnel must realize that the failure to exercise the utmost care and attention in the installation, inspection and maintenance of these products can result in personal injury and property damage.

The National Fire Protection Association Pamphlet #58 "Storage and Handling of Liquefied Petroleum Gases" states: "In the interests of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures." ECII® Warning Bulletins are useful in training new employees and reminding older employees of potential hazards.

This Warning Bulletin should be provided to all purchasers of ECII® / RegO® Products and all personnel using or servicing these products. Additional copies are available from Engineered Controls International, Inc. and your Authorized ECII®/ RegO® Products Distributor.

WARNING

What You Must Do:

- Read This Entire Warning
- Install Properly
- Inspect Regularly
- Replace In 10 Years or Less

Scope

This bulletin applies to pressure relief valves installed on stationary, portable and cargo containers and piping systems utilized with these containers. This bulletin is not intended to be an exhaustive treatment of this subject and does not cover all safety practices that should be followed in the installation and maintenance of LP-Gas systems. Each LP-Gas employee should be provided with a copy of NPGA Safety Pamphlet 306 "LP-Gas Regulator and Valve Inspection and Maintenance" as well as the NPGA "LP-Gas Training Guidebooks" relating to this subject.

Warnings should be as brief as possible. If there is a simple warning, it is:

Inspect pressure relief valves regularly. Replace unsafe or suspect valves immediately. Use common sense.

Install Properly

Consult NFPA Pamphlet #58 and/or any applicable regulations governing the application and use of pressure relief valves. Make sure you are thoroughly trained before you attempt any valve installation, inspection or maintenance.

Proper installation is essential to the safe operation of pressure relief valves. When installing ECII®/ RegO® pressure relief valves, consult warning # 8545-500 which accompanies each valve. Check for damage and proper operation after valve installation. Check that the valve is clean and free of foreign material.

Pipeaways and deflectors may be required by local codes, laws and regulations depending on the installation. Use only ECII®/ RegO® adapters on ECII®/ RegO® relief valves. Adapters not designed specifically for piping away ECII®/ RegO® relief valves, such as those with 90° turns or reduced internal diameters, will decrease flow dramatically. These should never be used as they can cause the relief valve to chatter and eventually destroy itself.

The addition of deflectors, pipeaway adapters and piping will restrict the flow. To properly protect any container, the total system flow must be sufficient to relieve pressure at the pressure setting of the relief valve in accordance with all applicable codes.

Inspect Regularly

A pressure relief valve discharges when some extraordinary circumstance causes an over pressure condition in the container. If a pressure relief valve is known to have discharged, the relief valve, as well as the entire system, should be immediately and thoroughly inspected to determine the reason for the discharge. In the case of discharge due to fire, the valve should be removed from service and replaced.

Relief valves should be inspected each time the container is filled but no less than once a year. If there is any doubt about the condition of the valve, it must be replaced.

Eye protection must be worn when performing inspection on relief valves under pressure. Never look directly into a relief valve under pressure or place any part of your body where the relief valve discharge could impact it. In some cases a flashlight and a small mirror are suggested to assist when making visual inspections.

To Properly Inspect A Pressure Relief Valve, Check For:

1. **A rain cap.** Check protective cap located in valve or at end of pipeaway for a secure fit. Protective caps help protect the relief valve against possible malfunction caused by rain, sleet, snow, ice, sand, dirt, pebbles, insects, other debris and contamination. **REPLACE DAMAGED OR MISSING CAPS AT ONCE AND KEEP A CAP IN PLACE AT ALL TIMES.**
2. **Open weep holes.** Dirt, ice, paint and other foreign particles can prevent proper drainage from the valve body. **IF THE WEEP HOLES CANNOT BE CLEARED, REPLACE THE VALVE.**
3. **Deterioration and corrosion on relief valve spring.** Exposure to high concentrations of water, salt, industrial pollutants, chemicals and roadway contaminants could cause metal parts to fail. **IF THE COATING ON THE RELIEF VALVE SPRING IS CRACKED OR CHIPPED, REPLACE THE VALVE.**
4. **Physical damage.** Ice accumulations and improper installation could cause mechanical damage. **IF THERE ARE ANY INDICATIONS OF DAMAGE, REPLACE THE VALVE.**
5. **Tampering or readjustment.** Pressure relief valves are factory set to discharge at specified pressures. **IF THERE ARE ANY INDICATIONS OF TAMPERING OR READJUSTMENT, REPLACE THE VALVE.**
6. **Seat leakage.** Check for leaks in the seating area using a non-corrosive leak detection solution. **REPLACE THE VALVE IF**

THERE IS ANY INDICATION OF LEAKAGE. Never force a relief valve closed and continue to leave it in service. This could result in damage to the valve and possible rupture of the container or piping on which the valve is installed.

7. **Corrosion and contamination. REPLACE THE VALVE IF THERE ARE ANY SIGNS OF CORROSION OR CONTAMINATION ON THE VALVE.**
8. **Moisture, foreign particles or contaminants in the valve.** Foreign material such as paint, tar or ice in relief valve parts can impair the proper functioning of the valves. Grease placed in the valve body may harden over time or collect contaminants, thereby impairing the proper operation of the relief valve. **DO NOT PLACE GREASE IN THE VALVE BODY, REPLACE THE VALVE IF THERE ARE ANY INDICATIONS OF MOISTURE OR FOREIGN MATTER IN THE VALVE.**
9. **Corrosion or leakage at container connection.** Check container to valve connection with a non-corrosive leak detection solution. **REPLACE THE VALVE IF THERE IS ANY INDICATION OF CORROSION OR LEAKAGE AT THE CONNECTION BETWEEN THE VALVE AND CONTAINER.**

CAUTION: Never plug the outlet of a pressure relief valve. Any device used to stop the flow of a properly operating pressure relief valve that is venting an overfilled or over pressurized container – raises serious safety concerns!

Replace Pressure Relief Valves In 10 Years Or Less

The safe useful life of pressure relief valves can vary greatly depending on the environment in which they live.

Relief valves are required to function under widely varying conditions. Corrosion, aging of the resilient seat disc and friction all proceed at different rates depending upon the nature of the specific environment and application. Gas impurities, product misuse and improper installations can shorten the safe life of a relief valve.

Predicting the safe useful life of a relief valve obviously is not an exact science. The conditions to which the valve is subjected will vary widely and will determine its useful life. In matters of this kind, only basic guidelines can be suggested. For example, the Compressed Gas Association Pamphlet S-1.1 Pressure Relief Device Standards — Cylinders, section 9.1.1 requires all cylinders used in industrial motor fuel service to have the cylinder's pressure relief valves replaced by new or unused relief valves within twelve years of the date of manufacture of cylinder and within each ten years thereafter. *The LP-Gas dealer must observe and determine the safe useful life of relief valves in his territory.* The valve manufacturer can only make recommendations for the continuing safety of the industry.

WARNING: Under normal conditions, the useful safe service life of a pressure relief valve is 10 years from the original date of manufacture. However, the safe useful life of the valve may be shortened and replacement required in less than 10 years depending on the environment in which the valve lives. Inspection and maintenance of pressure relief valves is very important. Failure to properly inspect and maintain pressure relief valves could result in personal injuries or property damage.

For Additional Information Read:

1. CGA Pamphlet S-1.1 Pressure Relief Standards — Cylinders, Section 9.1.1.
2. ECI® Catalog L-500.
3. ECI® Warning # 8545-500.
4. NPGA Safety Pamphlet 306 "LP-Gas Regulator and Valve Inspection and Maintenance" and "LP-Gas Training Guidebooks".
5. NFPA # 58, "Storage and Handling of Liquefied Petroleum Gases".
6. NFPA # 59, "LP-Gases at Utility Gas Plants".
7. ANSI K61.1 Safety Requirements for Storage and Handling of Anhydrous Ammonia.

RegO® Pressure Relief Valves

Requirements for Pressure Relief Valves

Every container used for storing or hauling LP-Gas and anhydrous ammonia must be protected by a pressure relief valve. These valves must guard against the development of hazardous conditions which might be created by any of the following:

- Hydrostatic pressures due to overfilling or the trapping of liquid between two points.

- High pressures resulting from exposure of the container to excessive external heat.
- High pressures due to the use of incorrect fuel.
- High pressures due to improper purging of the container.

Consult NFPA Pamphlet #58 for LP-Gas and ANSI #K61.1 for anhydrous ammonia, and/or any applicable regulations governing the application and use of pressure relief valves.



Innovative Liquid Vaporizing and Gas Mixing Solutions

WARRANTY REGISTRATION

Type of Equipment: _____ Serial Number: _____
 ASDI Sales Order #: _____ Order Date: _____
 Purchased By: _____

To help us give you better service, please fill out this warranty registration form and return it to ASDI to register your purchase and for follow up on the performance of ASDI equipment. We are dedicated to producing a quality product and if a problem occurs, ASDI wants to know about it.

Please help us with a small amount of information about your company and how the equipment will be used. When contacting ASDI, please have the type of equipment and the serial number handy so we can give you accurate information. If you have had any kind of problem with this equipment, or you have any comments, please attach a separate sheet to this form. Keep a copy for your records.

End Customer/Company Name: _____
 Address: _____ Tel: _____
 City: _____ Fax: _____
 State: _____ Zip: _____

Name of individual to contact for follow up information: _____
 Title: _____

Usage - Circle one: Base Load Standby System Peak Shaving
 Other: _____

In what application is the equipment being used? _____
 When was the equipment put in service? _____/_____/_____

Note: If you have more than one piece of ASDI equipment, fill out one warranty sheet and staple the others to it, ASDI will do the rest.

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