Algas-SDI™

...Innovative liquid vaporizing and gas mixing solutions

ISO 9001 Certified

POWER XP

Vertical electric single core vaporizer

Operations & Maintenance Manual

151 South Michigan Street, Seattle, Washington, USA 98108
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ECLIPSE Innovative Thermal Solutions

FILE: MANUAL PN 52518 REV 03-31-08 POWER XP.doc

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 NH_3 - 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

Fill out the Warranty Registration information on the last page of this manual. Refer to the nameplate on the unit to fill out the product registration. 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.

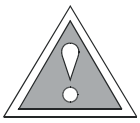
COPYRIGHT

APPROVALS

FM APPROVED

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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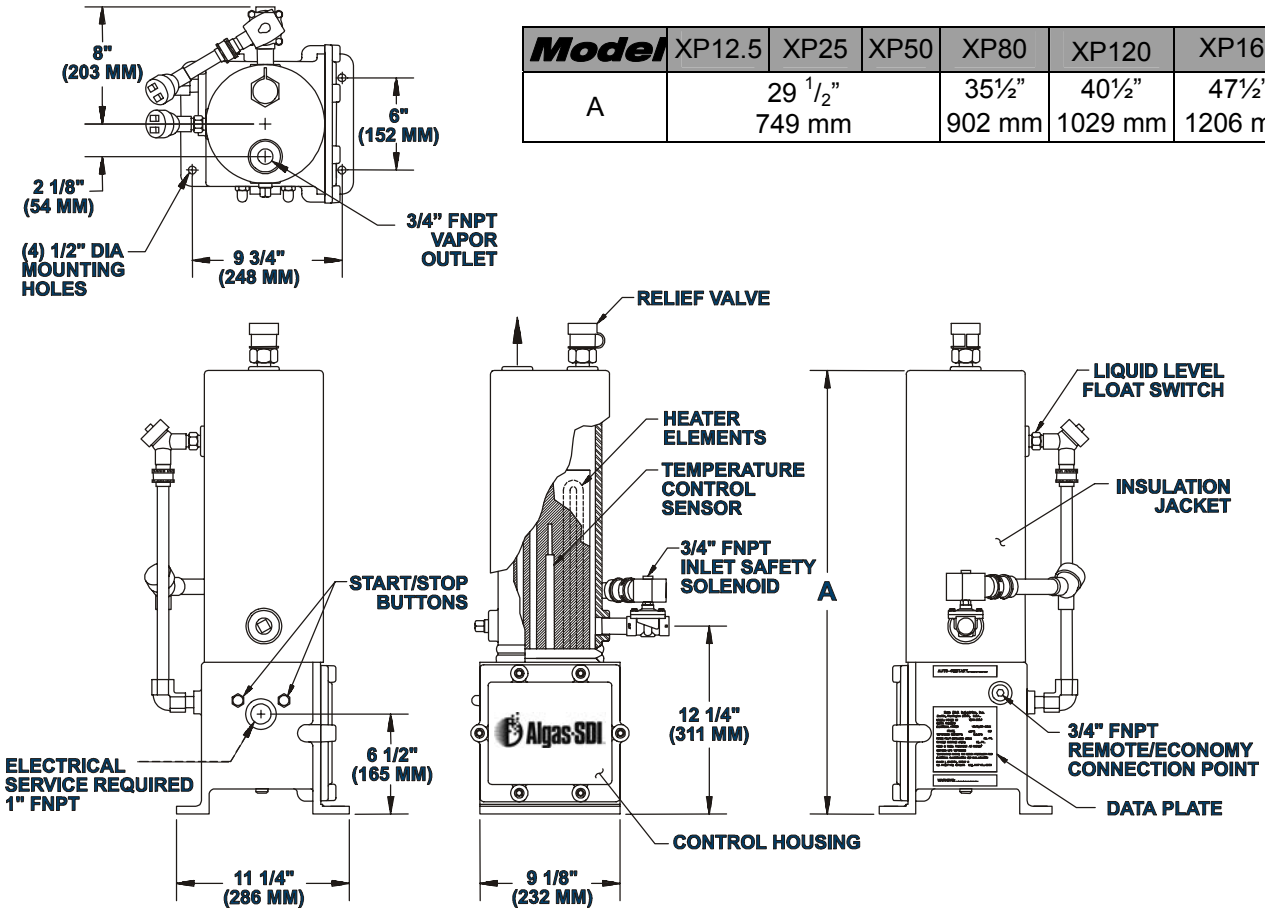
Introduction 1

Description

The dimensional drawing (see below) identifies the various components of the **Algas-SDI POWER XP** vaporizer. Multiple resistance heating elements provide thermal energy to the finned aluminum heat exchanger. The vaporizer requires less than 50 seconds to attain operating temperature from a cold start. A solid state controller monitors the heat exchanger temperature and regulates the **ON/OFF** cycle of the heaters at a predetermined set point. The vaporized LPG or NH_3 rises into the vapor header and exits through the vapor outlet. *Additional information can be found in* ***Chapter 4*** on operation.

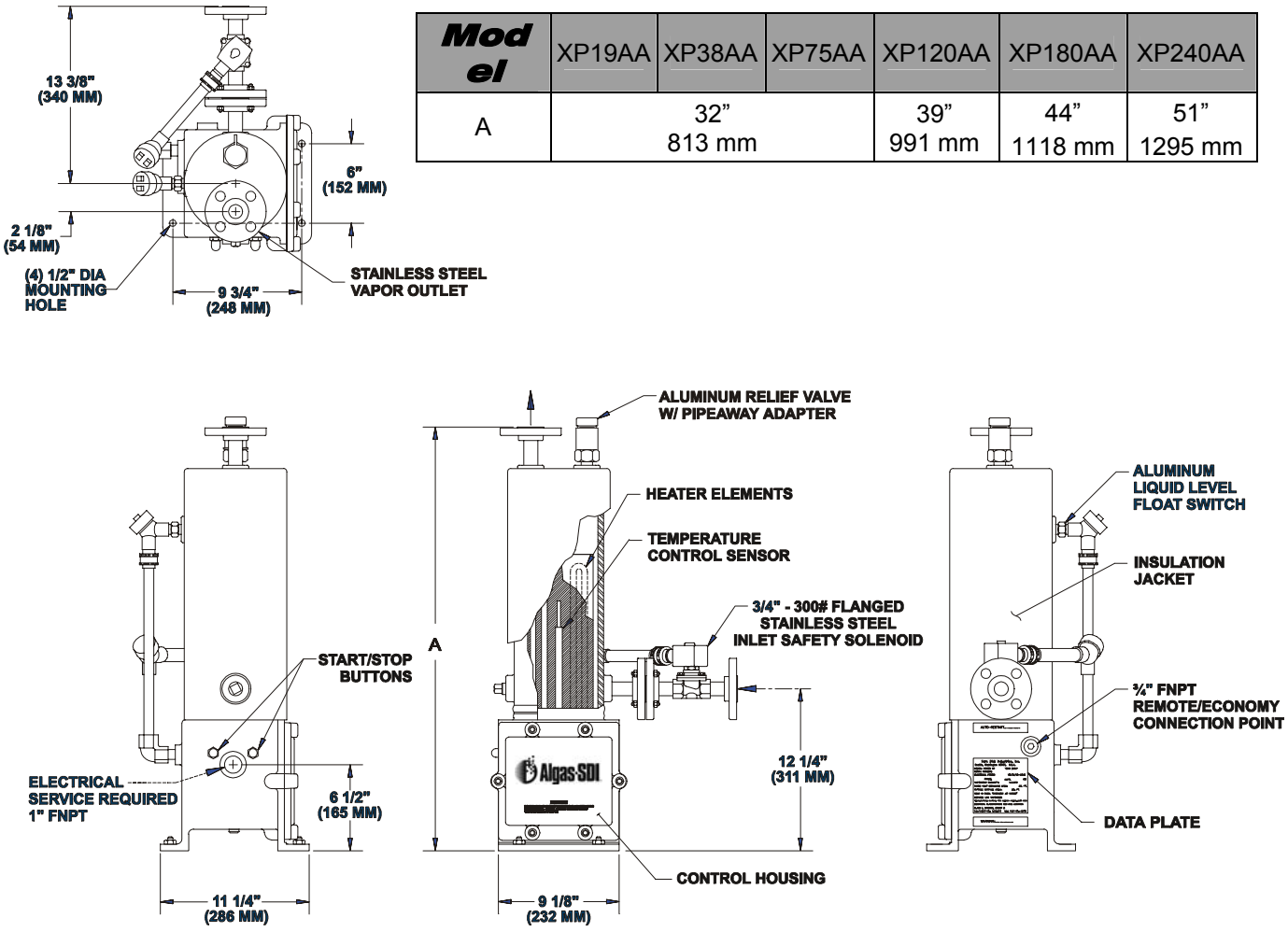
Figure 1 *– POWER XP Dimensional Drawing (LPG Version)*

Model	XP12.5	XP25	XP50	XP80	XP120	XP160
A	29 1/2" 749 mm			35½" 902 mm	40½" 1029 mm	47½" 1206 mm



XP LPG Dimensional Draw.wmf

Figure 2 *– POWER XP Dimensional Drawing (NH_3 Version)*

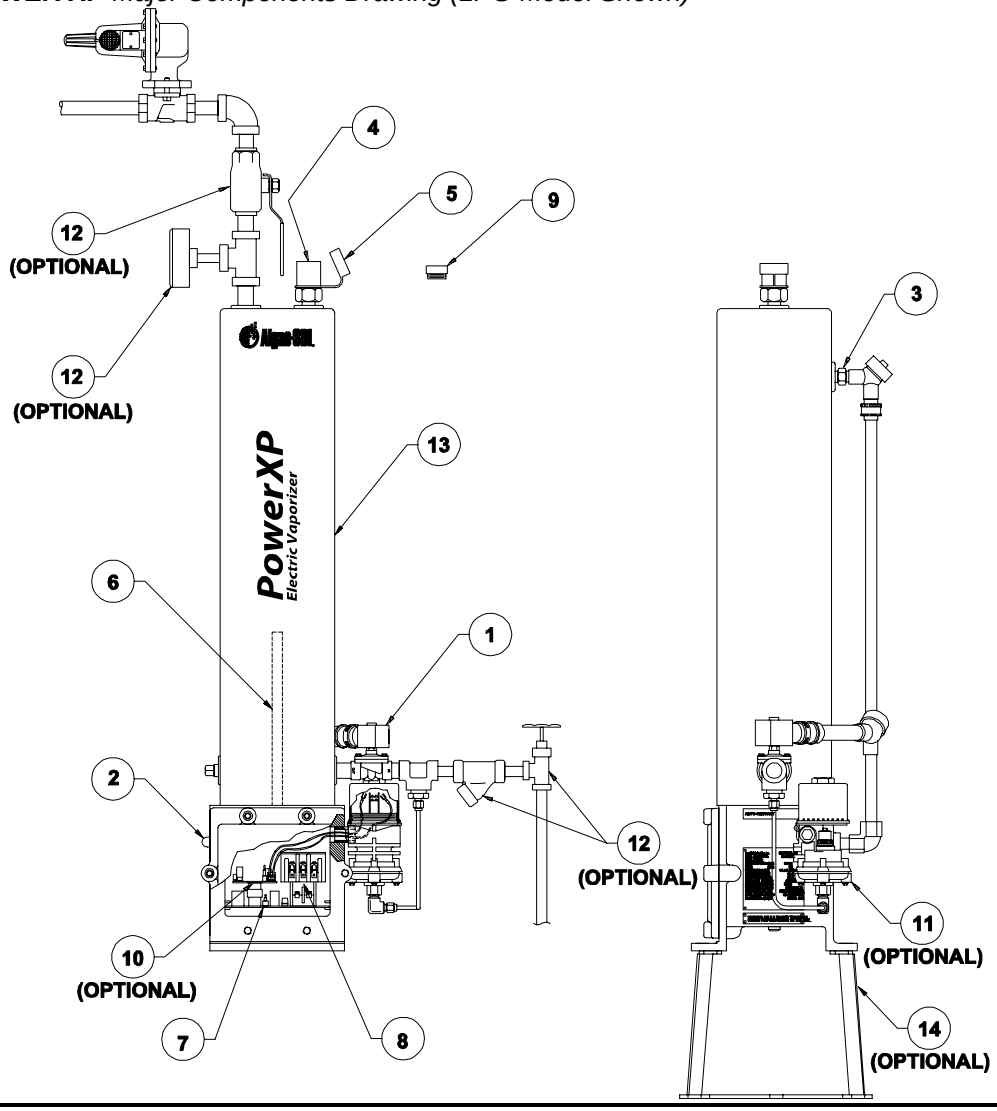


Model	XP19AA	XP38AA	XP75AA	XP120AA	XP180AA	XP240AA
A	32” 813 mm			39” 991 mm	44” 1118 mm	51” 1295 mm

XP NH3.wmf

Major Components 2

Figure 3 – ***POWER XP*** *Major Components Drawing (LPG Model Shown)*



POWER XP.wmf

1. **Inlet solenoid valve, 3/4”**
2. **START/STOP switch, 2 places**
3. **Liquid level float switch**
4. **Relief valve**
5. **Relief valve rain cap**
6. **RTD temperature sensor**
7. **Control circuit board**
8. **Contactor**
9. **Pipe away adapter, (LPG models optional; NH_3 models - standard)**
10. **Auto-restart/economy module (optional)**
11. **Economy pressure switch (optional)**
12. **Valve, gauge and strainer kit components (optional)**
13. **Insulation jacket**
14. **Stand 10” high (optional)**

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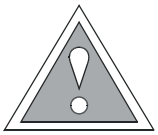
Installation 3



WARNING

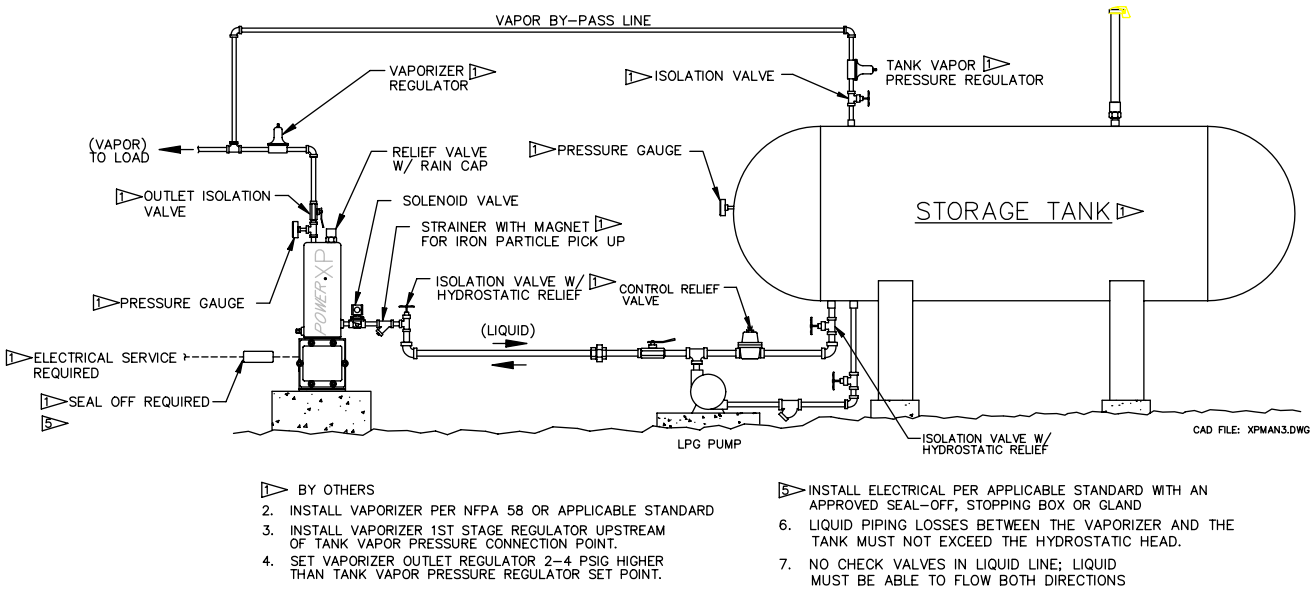
The equipment described in this manual is designed to operate with LP-gas, a flammable fuel under pressure. The nature of the application involves inherent hazards that could result in injury. ONLY a trained and fully qualified person should service this equipment.

General

Install the **ASDI POWER XP** vaporizer on a level firm base at least 6" above grade and secure it through the four ½" 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 or NH_3, depending on type of service. Test for leaks using an inert gas, such as compressed carbon dioxide or nitrogen, at 1½ 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.

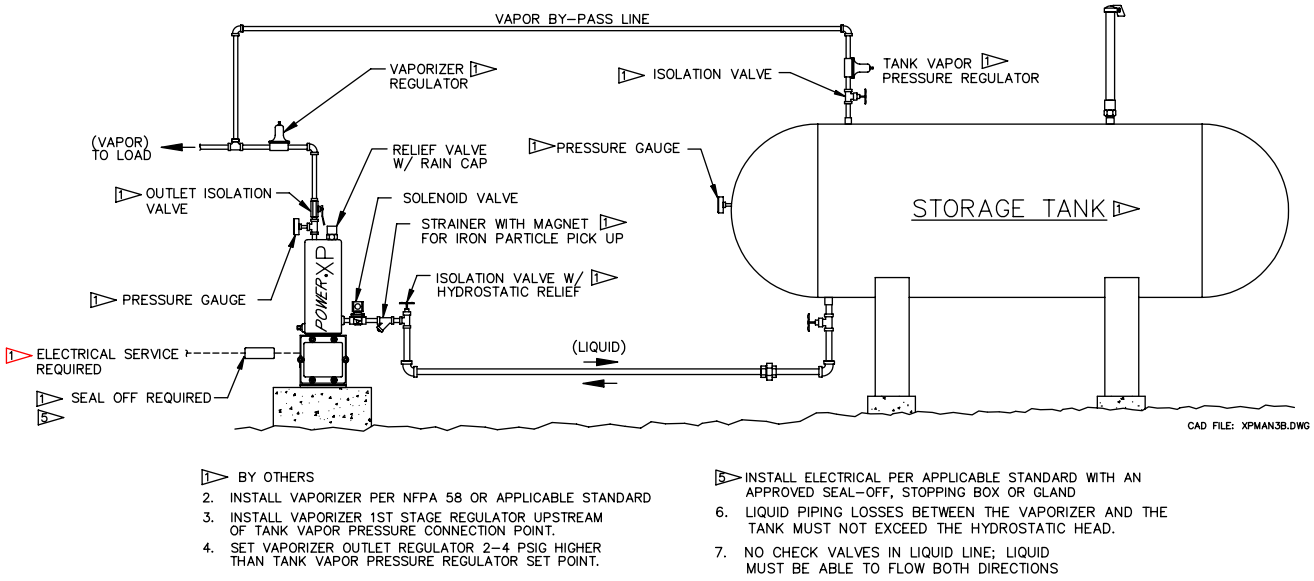
Figure 4A *- Typical* ***POWER XP*** *Installation Drawing with Pump & Vapor Bypass*



XP Install Bypass & Pump.wmf

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.

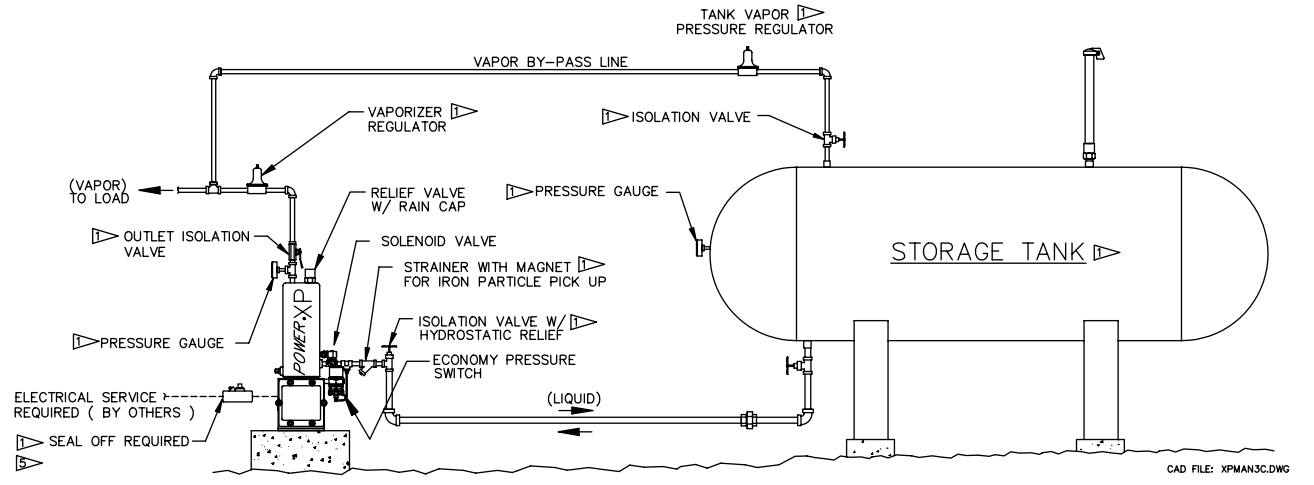
Figure 4B *- Typical* ***POWER XP*** *Installation Drawing with Vapor Bypass and No Pump.*



1. BY OTHERS
2. INSTALL VAPORIZER PER NFPA 58 OR APPLICABLE STANDARD
3. INSTALL VAPORIZER 1ST STAGE REGULATOR UPSTREAM OF TANK VAPOR PRESSURE CONNECTION POINT.
4. SET VAPORIZER OUTLET REGULATOR 2-4 PSIG HIGHER THAN TANK VAPOR PRESSURE REGULATOR SET POINT.
5. INSTALL ELECTRICAL PER APPLICABLE STANDARD WITH AN APPROVED SEAL-OFF, STOPPING BOX OR GLAND
6. LIQUID PIPING LOSSES BETWEEN THE VAPORIZER AND THE TANK MUST NOT EXCEED THE HYDROSTATIC HEAD.
7. NO CHECK VALVES IN LIQUID LINE; LIQUID MUST BE ABLE TO FLOW BOTH DIRECTIONS

XP Install Bypass-No Pump.wmf

Figure 4C *- Typical* ***POWER XP*** *Installation Drawing with Economy Operation and Vapor Bypass*

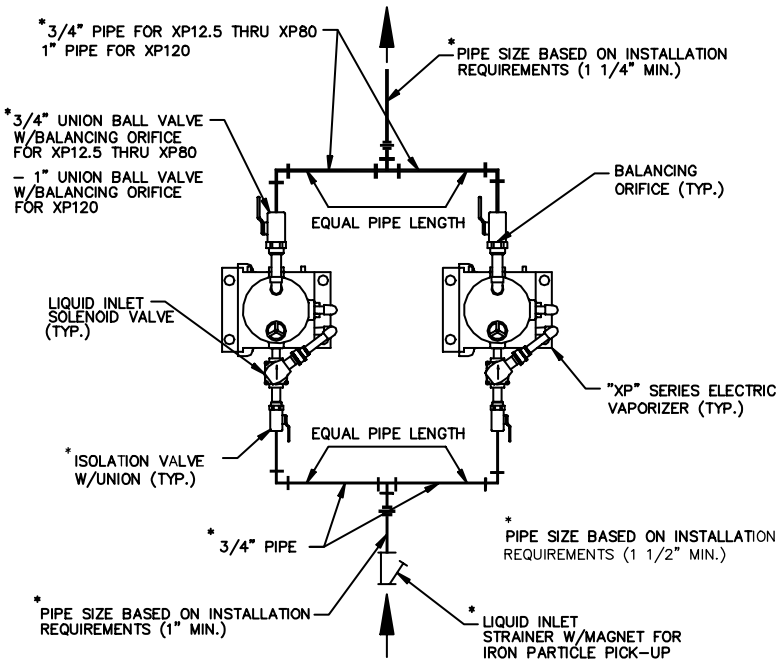


1. BY OTHERS
2. INSTALL VAPORIZER PER NFPA 58 OR APPLICABLE STANDARD
3. INSTALL VAPORIZER 1ST STAGE REGULATOR UPSTREAM OF TANK VAPOR PRESSURE CONNECTION POINT.
4. SET VAPORIZER OUTLET REGULATOR 2-4 PSIG HIGHER THAN TANK VAPOR PRESSURE REGULATOR SET POINT.
5. INSTALL ELECTRICAL PER APPLICABLE STANDARD WITH AN APPROVED SEAL-OFF, STOPPING BOX OR GLAND
6. LIQUID PIPING LOSSES BETWEEN THE VAPORIZER AND THE TANK MUST NOT EXCEED THE HYDROSTATIC HEAD.
7. NO CHECK VALVES IN LIQUID LINE; LIQUID MUST BE ABLE TO FLOW BOTH DIRECTIONS

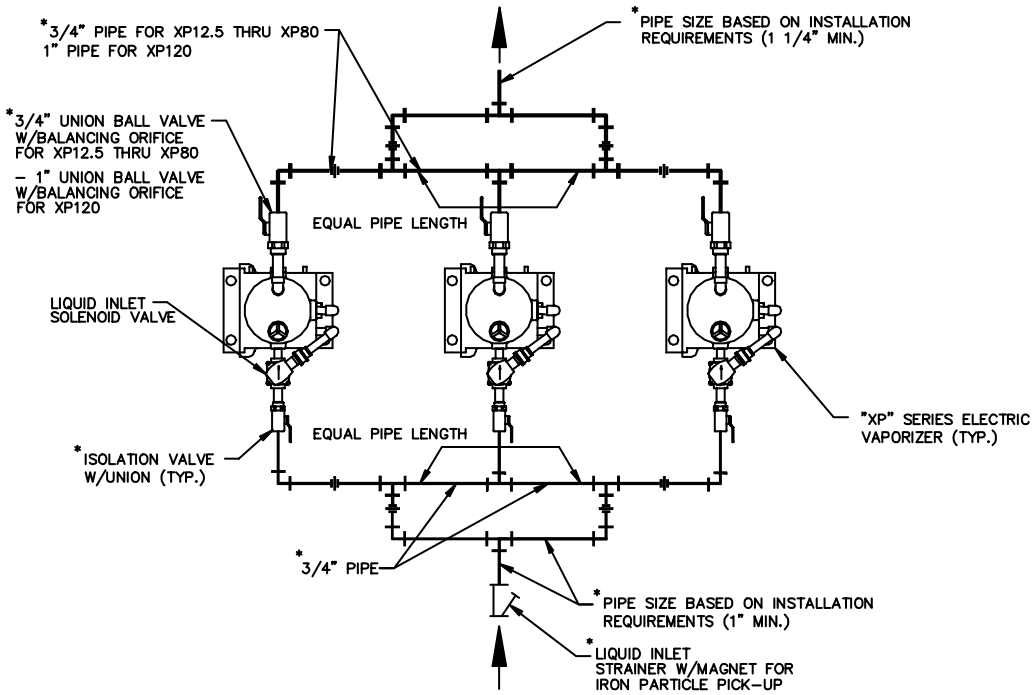
XP Install Econ & Vapor Bypass.wmf

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

Figure 4D *– Typical* ***POWER XP*** *Installation Drawing for Manifolding 2 and 3 Vaporizers*

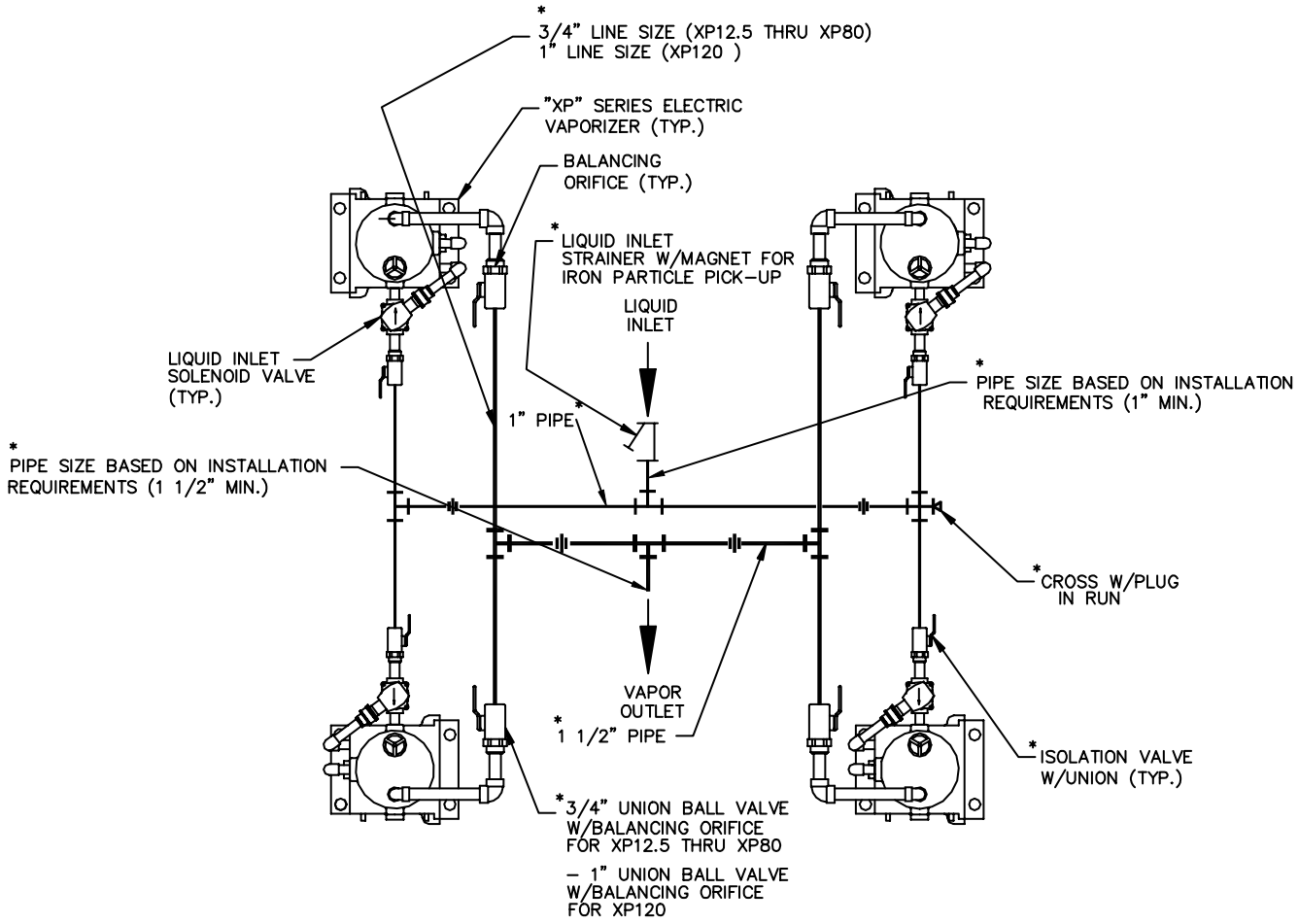


TYPICAL INSTALLATION USING (2) "XP" ELECTRIC VAPORIZERS



TYPICAL INSTALLATION USING (3) "XP" ELECTRIC VAPORIZERS

Figure 4E *– Typical* ***POWER XP*** *Installation Drawing for Manifolding 4 Vaporizers*



TYPICAL INSTALLATION USING (4) "XP" ELECTRIC VAPORIZERS

NOTES

1) INLET AND OUTLET PIPING MUST BE EQUAL BETWEEN VAPORIZERS TO BALANCE FLOW.
2) BALANCING ORIFICE DIMENSION: 7/8" O.D. X "Y" I.D. X 1/8" THK. FOR 3/4" UNION BALL VALVE
* BY OTHERS : 1.08" O.D. X "Y" I.D. X 3/16" THK. FOR 1" UNION BALL VALVE

MODEL	"Y" I.D.
XP12.5	.12
XP25	.17
XP50	.25
XP80	.31
XP120	.38

Safety Requirements (NH_3)

Anhydrous ammonia (NH_3) is both hazardous and corrosive. This section details the safety procedures as required by ANSI Standards and Occupational Health and Safety Administration (OSHA) codes. Please read carefully.

Installation of ammonia based equipment must comply with ANSI K61.1-1999, Storage and Handling of Anhydrous Ammonia and to OSHA codes 1910.111 for standards relating to the storage and handling of anhydrous ammonia. American National Standard K61.1-1999, 5.6.1 states that "all piping, tubing, and fittings shall be made of steel or other material suitable for anhydrous ammonia service." The American Society of Heating, Refrigerating and Air-Conditioning Engineers states that "Ammonia should never be used with copper, brass, or other alloys containing copper," (ASHRAE Handbook of Fundamentals). Additional installation requirements vary according to local, provincial, and state requirements. Refer to all applicable ANSI standards and consult the authorities in your area before proceeding.

NOTE

All users of ammonia equipment must comply with OSHA 29 CFR 1910.1200 and have a written Hazard Communication Plan.

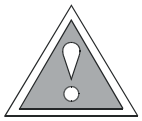
ANSI Standard K61.1-1999 Safety Requirements:

- 3.1 "Any person required to handle, transfer, transport, or otherwise work with ammonia shall be trained to understand the properties of ammonia, to become competent in safe operating practices, and to take appropriate actions in the event of a leak or an emergency."
- 3.2.1 "Any persons making, breaking, or testing any ammonia connection, transferring ammonia, or performing maintenance or repair on an ammonia system under pressure, shall wear protective gloves and chemical splash goggles. A full-face shield may be worn over the goggles. However, a face shield shall not be worn as a substitute for a primary eye protection device."
- 2.27 "Protective gloves, boots, and suits. Items made of rubber or other material impervious to ammonia. Gloves refer to gauntlet-style of sufficient length to allow for cuffing, and which provide thermal protection suitable for ammonia exposure."
- 3.4.1.5 - "Easily accessible emergency shower and plumbed eyewash unit or at least 150 gal (570 L) of clean water in an open top container shall not exceed 10 sec. Travel time or 100 ft. (30m)."
- 4.2.1 - "A water fog or spray device should also be located near the vaporizer (preferably 500 gal/min or more.)."

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/cm^2), 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 pressure 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/kg^2) 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** lists 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.

For European approved models use ATEX approved gland style fitting in lieu of the standard EX fitting.

Determining Wire Size

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

- Maximum enclosure surface temperature: 65º C (150ºF).
- Maximum enclosure ambient temperature: 65º C (150ºF).
- Maximum temperature allowed at contactor terminals: 90º C (195º 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) or applicable code for the installation area 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]*

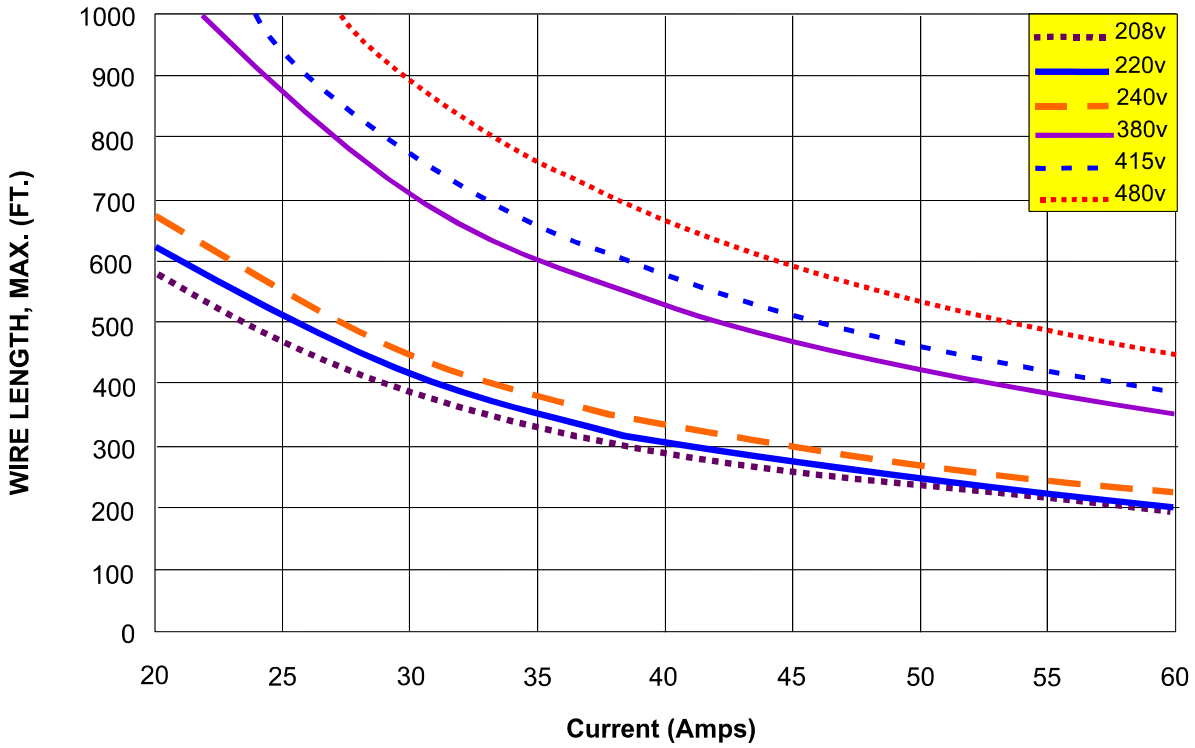


Table 2 *– Wire Length Chart [#6 AWG]*

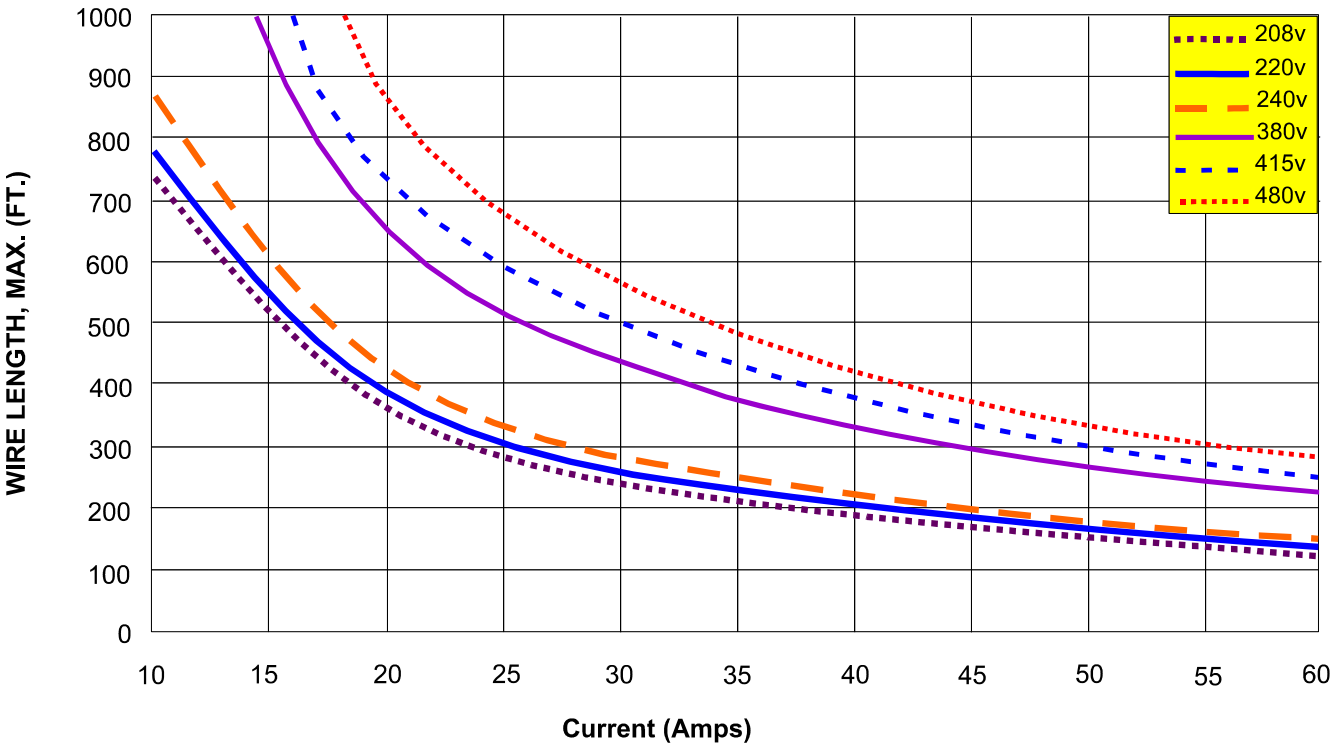


Table 3 *– Wire Length Chart [8 AWG]*

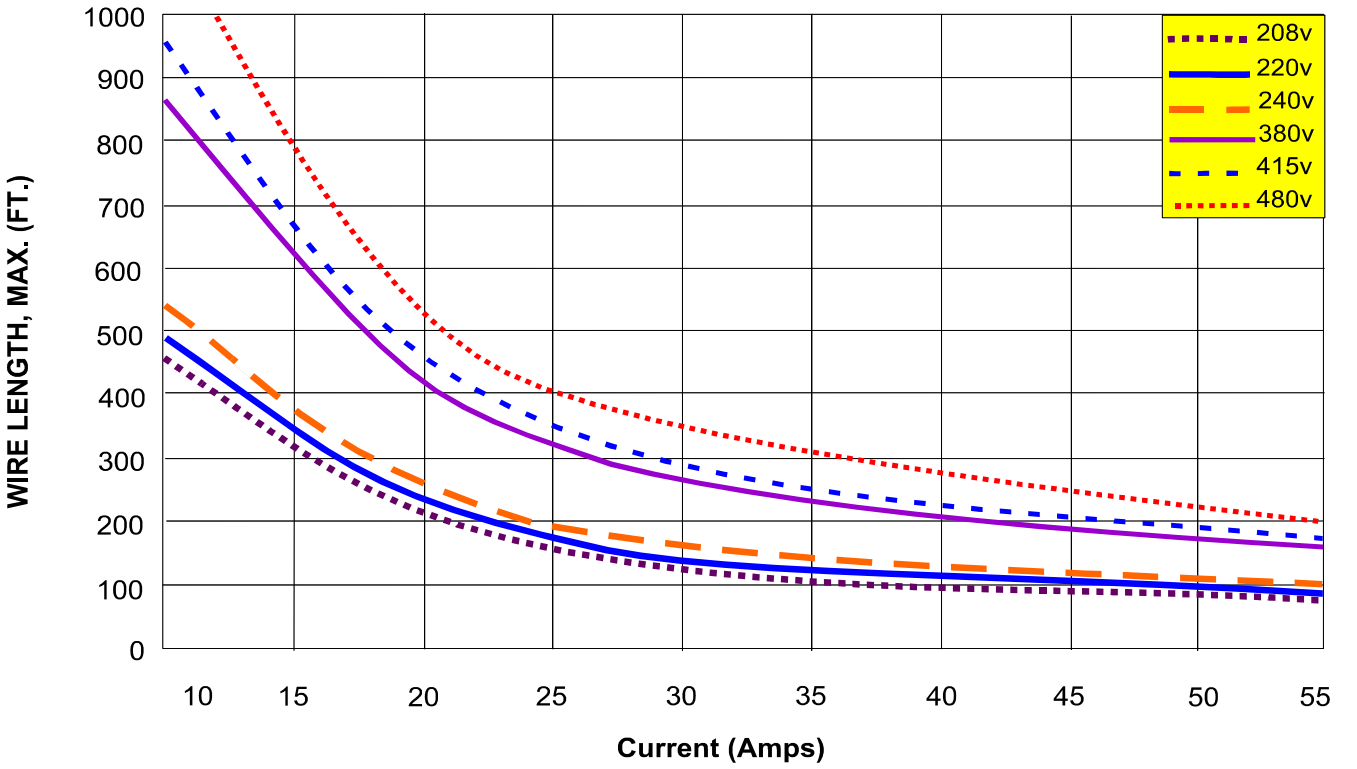


Table 4 *– Wire Length Chart [10 AWG]*

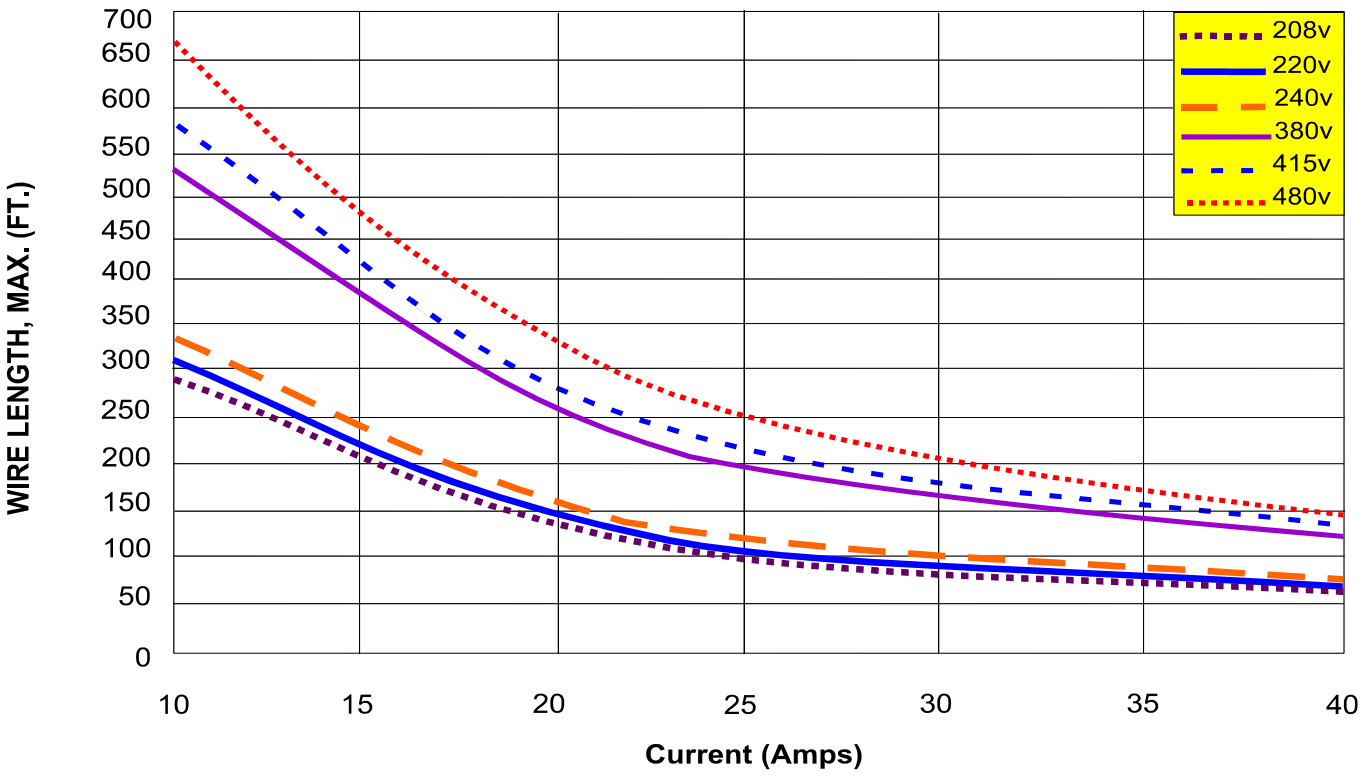


Table 5 *– Liquid Temperature vs. Tank Pressure Chart*

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	**NOTE:** Below 30°F or -10°C, Butane is a liquid at normal atmospheric pressure.		8.968	61.834
-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			Distance from storage to vaporizer - feet (meters)*							
MMBTU (Kcal)	**GPH**	**LBS (Kg)**	**25 (8)**	**50 (15)**	**75 (23)**	**100 (31)**	**150 (36)**	**200 (61)**	**300 (92)**	**400 (122)**
1.146 (288,792)	12.5	55 (25)	½"	½"	½"	½"	½"	¾"	¾"	¾"
2.292 (557,584)	25	110 (50)	½"	½"	½"	¾"	¾"	1"	1"	1"
4.584 (1,155,168)	50	220 (100)	½"	¾"	¾"	¾"	1"	1"	1"	1¼‘
7.280 (1,834,537)	80	352 (160)	¾"	¾"	1"	1"	1"	1¼‘	1¼‘	1¼‘
10.920 (2,751,806)	120	530 (240)	1"	1"	1¼‘	1¼‘	1¼‘	1½ "	1½ "	1½ "

Table 7 *– NH_3 Liquid Line Sizing Chart (Minimum Pipe Size)*

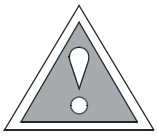
Capacity of Units	Distance from storage to vaporizer - feet (meters)*							
LBS (Kg)	**25 (8)**	**50 (15)**	**75 (23)**	**100 (31)**	**150 (36)**	**200 (61)**	**300 (92)**	**400 (122)**
19 (9)	½"	½"	½"	½"	½"	¾"	¾"	¾"
38 (17)	½"	½"	½"	¾"	¾"	1"	1"	1"
75 (34)	½"	¾"	¾"	¾"	1"	1"	1"	1¼‘
120 (54)	¾"	¾"	1"	1"	1"	1¼‘	1¼‘	1¼‘
180 (81)	1"	1"	1¼‘	1¼‘	1¼‘	1½ "	1½ "	1½ "
240 (109)	1"	1¼‘	1¼‘	1¼‘	1¼‘	1½ "	1½ "	1½ "

***Add equivalent length of all valves and fittings to the length of pipe. Use this value from the Tables shown above to determine minimum pipe length.**

Table 8 *– 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

Operation 4



WARNING

The equipment described in this manual is designed to operate with LP-gas, a flammable fuel under pressure. The nature of the application involves inherent hazards that could result in injury. ONLY a trained and fully qualified person should service this equipment.

General

The **POWER XP** Series 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. There are two different series of **POWER XP** vaporizers available. One series is for use with LPG and the other series is for use with NH_3.

Liquid LPG or NH_3, depending on the model, enters the vaporizer through an inlet safety solenoid valve at the base of the pressure vessel. The solenoid is a normally closed valve. It opens at a preset temperature after initial start-up, and remains open under normal operation. Violation of either the high temperature safety or the liquid level float switch causes the solenoid to de-energize (close).

During operation, an RTD temperature sensor and solid state control system maintain the core temperature at 160° F to 175° F (71° C to 79° 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 RTD provides a signal to the control system to energize the heater power contactor, applying power to the heater elements. The control board also provides the logic to shut off the vaporizer in the event of a safety circuit violation.

Operating Instructions

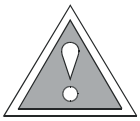
1. Complete the installation and leak test.
2. Check current and voltage to verify proper operation of the vaporizer. ***See procedure in the Troubleshooting Section of Chapter 6.***

NOTE

This vaporizer reaches operating temperature in less than 50 seconds after pressing the START switch.

3. Check operation of the inlet solenoid valve. ***See Step 5*** *of the Start Procedure*.
4. 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.
5. Normal operating temperature is160° F to 175° F (71° C to 79° C). Use caution when working around vaporizer.

Starting the Vaporizer

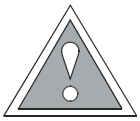


CAUTION

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 vaporizer outlet isolation valve.
2. Open all valves between the storage tank and the vaporizer to allow liquid flow to the vaporizer.
3. Push the START button on the vaporizer. The vaporizer heater elements will then be energized, heating the body. When the heater core temperature attains 130° F (54° C), the inlet solenoid valve will automatically be energized and the valve will open allowing liquid to enter the cast body. It will take less than 50 seconds for the vaporizer to reach operating temperature.
4. The unit is now ready to supply vapor. Slowly open the outlet isolation valve to pressurize the supply piping, and then fully open the valve to allow vapor flow to the load. The heaters will cycle automatically to match flow conditions.

CAUTION



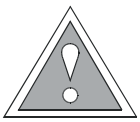
Make an operational check of the inlet solenoid valve once the vaporizer is started.

5. Press the **STOP** button. The valve should stop the flow of liquid as indicated by the loss of pressure at the outlet. Pressing the START button should immediately restore operation.

Stopping the Vaporizer

1. Push the **STOP** button on the vaporizer. This de-energizes and closes the inlet solenoid valve. Power is also disconnected from the heater elements.

NOTE



When shutting down the vaporizer, always shut off the vaporizer outlet isolation hand valve.

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Maintenance 5

General

The **POWER XP** 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.

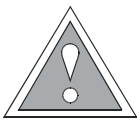
1. Clean the liquid inlet strainer after the first month of operation. Thereafter, check every 6 months.

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. Annually, change the inlet solenoid diaphragm.
   See the enclosed Maintenance & Operation sheet for ASCO 2-way valves: Appendix A Figure 21.

4. 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 Inspection Schedule.



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.

Contactor Inspection Schedule

The **POWER XP** 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 then 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:

- 2500 hours for vaporizers in service
- 15,000 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.

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

$$LF = \frac{X}{2500} + \frac{Y}{15000}$$

When

X = hours of vaporizer operation mode

Y = hours of vaporizer in standby mode

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

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.

Contactor Replacement Parts

Contactor Part Numbers 52603 and 52604 are now obsolete. Use replacement contactor Part Number 52745. The transformer power wires can be connected by slipping the fork connector under the line power wires. Or the fork connector can be cut off then strip the wire back to place wire in the box lug. Control boards shipped with the new contactor part number will have serial numbers of 527XX-8XXX.

Contactor Inspection Procedure

Inspect the **POWER XP** vaporizer contactor as follows:

NOTE

Disconnect and lock out power to the vaporizer.

1. Remove the explosion-proof cover. Slide the control board part way out.
2. Loosen the screws and remove the cover from the top of the contactor.

NOTE

You may have to disconnect the power wiring to get access to the cover.

3. Inspect the individual contacts for any discoloration, warping, melting or pitting. These are indicators of excessive heat or excessive wear. Do not operate the vaporizer if the above indicators exist. Replace the contactor before restarting the vaporizer.
4. Remove any dust, lint or foreign matter that may have accumulated inside the contactor.
5. Inspect the insulation on the wires and check the terminal screws for tightness. Check for any discoloration indicating excessive heat caused by bad connections.
6. Re-install cover on contactor and re-install any loose wiring.

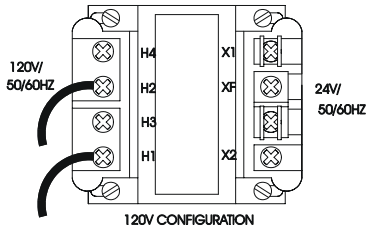
WARNING

Extreme caution must be taken due to the potential of flammable vapors being exposed to ignition sources, and the close proximity of high voltages in the vaporizer

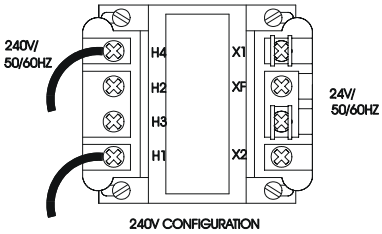
7. Re-apply power and press the START switch.
8. Listen to the contactor in operation. A noisy (humming) contactor indicates misalignment or foreign material in movable parts. This check may be performed with the vaporizer enclosure open. If it is noisy, replace it.
9. Re-install the explosion-proof cover. Torque cover bolts to 19.5 ft. lbs.

This instruction set is to be used for the Algas-SDI POWER XP Control Board - P/N – 52701, 52702, 52703, 52704, and 52705. This diagram applies to control boards with Serial Numbers below 5270X-6999. See New Transformer configuration diagram on the next page for boards with Serial numbers greater than 5270X-7000.

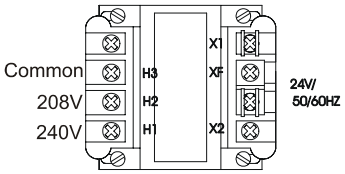
P/N 52701
120V configuration:
Install 2 jumpers
H1 to H3 and H2 to H4,
connect wires to
H1 and H2.



240V configuration:
Install 1 jumper
H3 to H2,
connect wires to
H1 and H4.

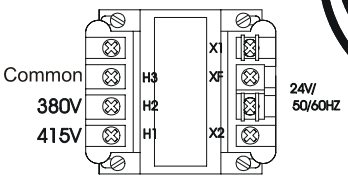


P/N 52702
Connect one wire
to common H3
the other to
H2 for 208V or
H1 for 220V or 240V.

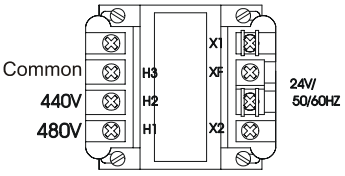


Connect
per voltage

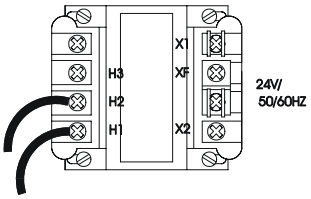
P/N 52703
Connect one wire
to common H3
the other to
H2 for 380V or
H1 for 415V.

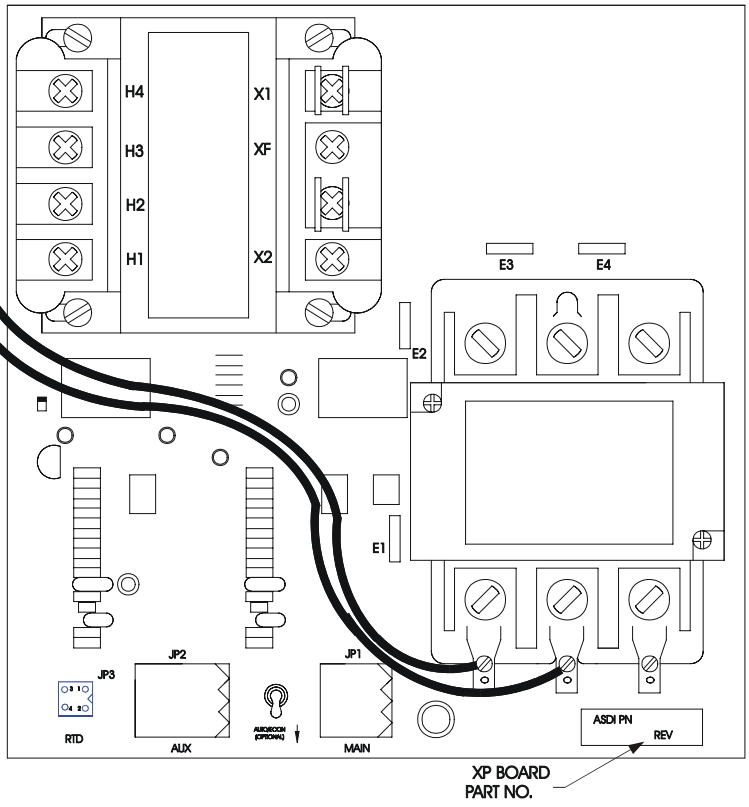


P/N 52704
Connect one wire
to common H3
the other to
H2 for 440V or
H1 for 480V.



P/N 52705
For 575V,
connect wires
to H1 and H2.





Board.wmf

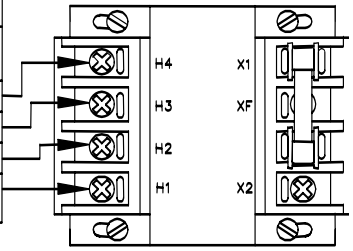
NOTE

Your new replacement control board will come wired for the highest voltage possible. If this is your voltage, do not change anything.

New Transformer Configuration

For the Algas-SDI POWER XP Control Board - P/N – 52701, 52702, 52703, 52704, and 52705. This diagram applies to control boards with Serial Numbers above 5270X-7000. For control boards with serial numbers below 5270X-6999, refer to previous page.

A.S.D.I. P/N 52701	A.S.D.I. P/N 52702	A.S.D.I. P/N 52703	A.S.D.I. P/N 52704	BOARD P/N
A.S.D.I. P/N 52605-01	A.S.D.I. P/N 52606-01	A.S.D.I. P/N 52607-01	A.S.D.I. P/N 52608-01	TRANSFORMER PRIMARY
240V	240V	415V	575V	H4
220V	220V	400V	480V	H3
120V	208V	380V	440V	H2
COMMON/ 0V	COMMON/ 0V	COMMON/ 0V	COMMON/ 0V	H1



Removing the Control Board

1. Disconnect electrical service.
2. Open the explosion-proof cover.
3. Disconnect the Molex connectors on JP1, and 3. If an Auto Restart Board is connected to JP2, disconnect it.
4. Pull the board out slightly and disconnect the incoming power wiring from the contactor.
5. Pull the board out further and disconnect the wiring on the backside of the contactor.
6. Pull the board out fully.

Installing the New Control Board

1. Check that the primary of the transformer is wired for the correct voltage.
2. Push the board in slightly and connect the wiring to the backside of the contactor.
3. Push the board in further and connect the power wiring to the front side of the contactor.
4. Re-connect the Molex connectors. Re-install the Auto Restart Board if required.
5. Check the wiring to the STOP/START switches to ensure they have not been pulled off.
6. Put the auto/economy switch in the proper position and test the vaporizer.
7. Re-install the cover.

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Troubleshooting 6

The troubleshooting guide for the **Algas-SDI POWER XP** Vaporizer is presented in five trees:

Tree #1 & #2 - System does not start

Tree #3 - System starts but will not stay on

Tree #4 - Liquid solenoid valve doesn't open

Tree #5 - Intermittent shutdown of system

Additional information on replacing and adjusting components can be found in the vendor information in the Appendix A.

WARNING

High voltage is present throughout the control enclosure even if the unit is turned off! You must shut off the power at the disconnect before you can safely reach into the enclosure to do anything!

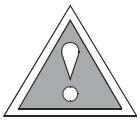
WARNING

The Contactor that powers the heaters produces sparks which may ignite any flammable vapor 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 or any indication of flammable vapors in the atmosphere.

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

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

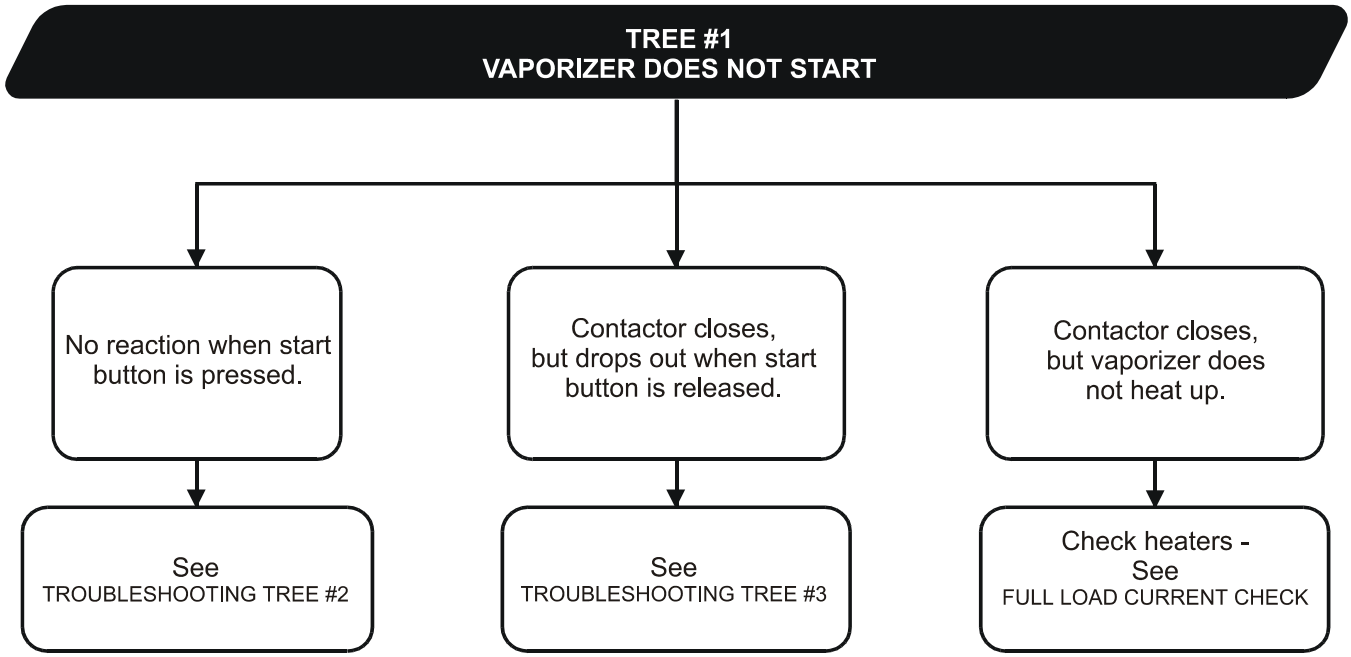
CAUTION

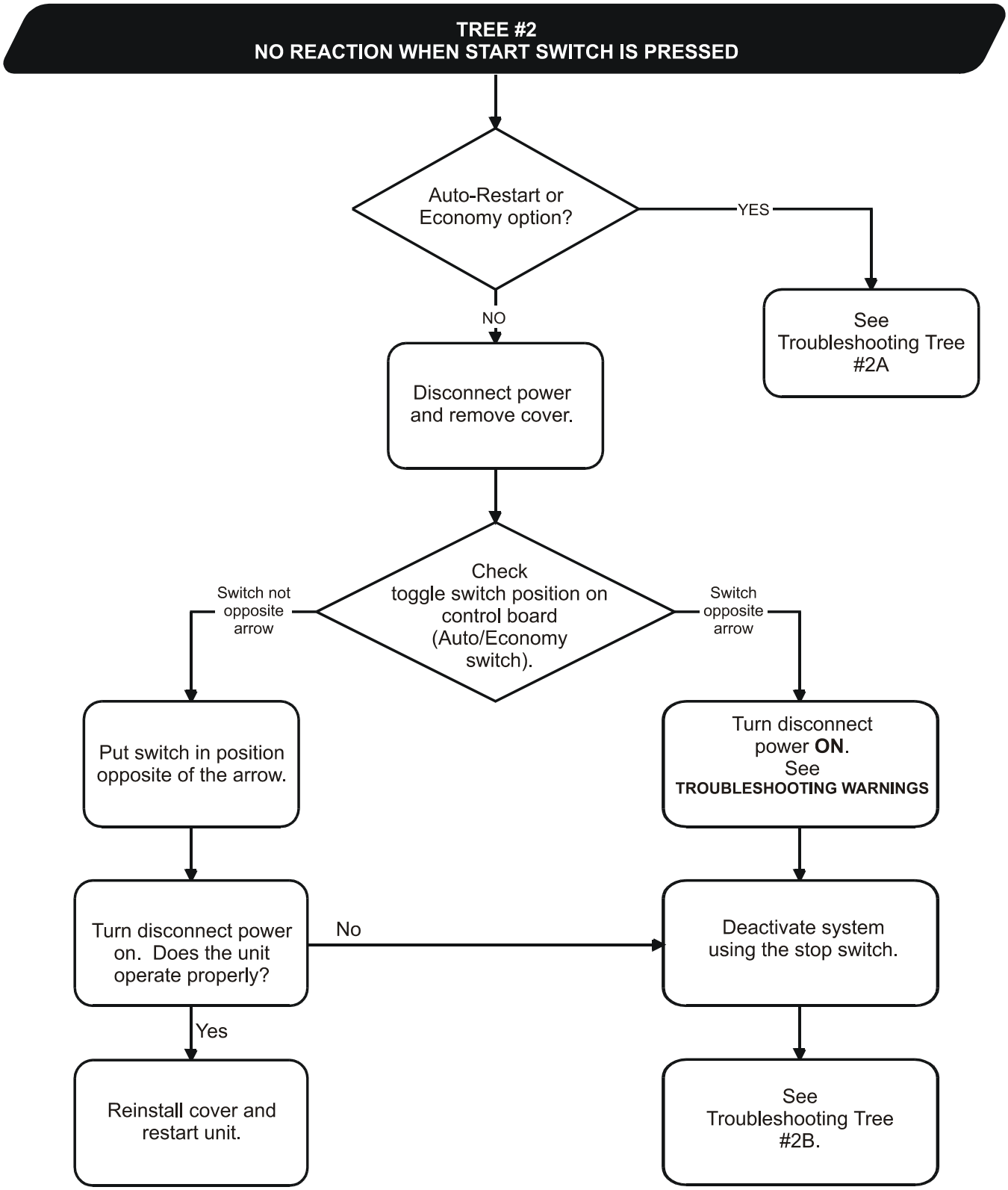


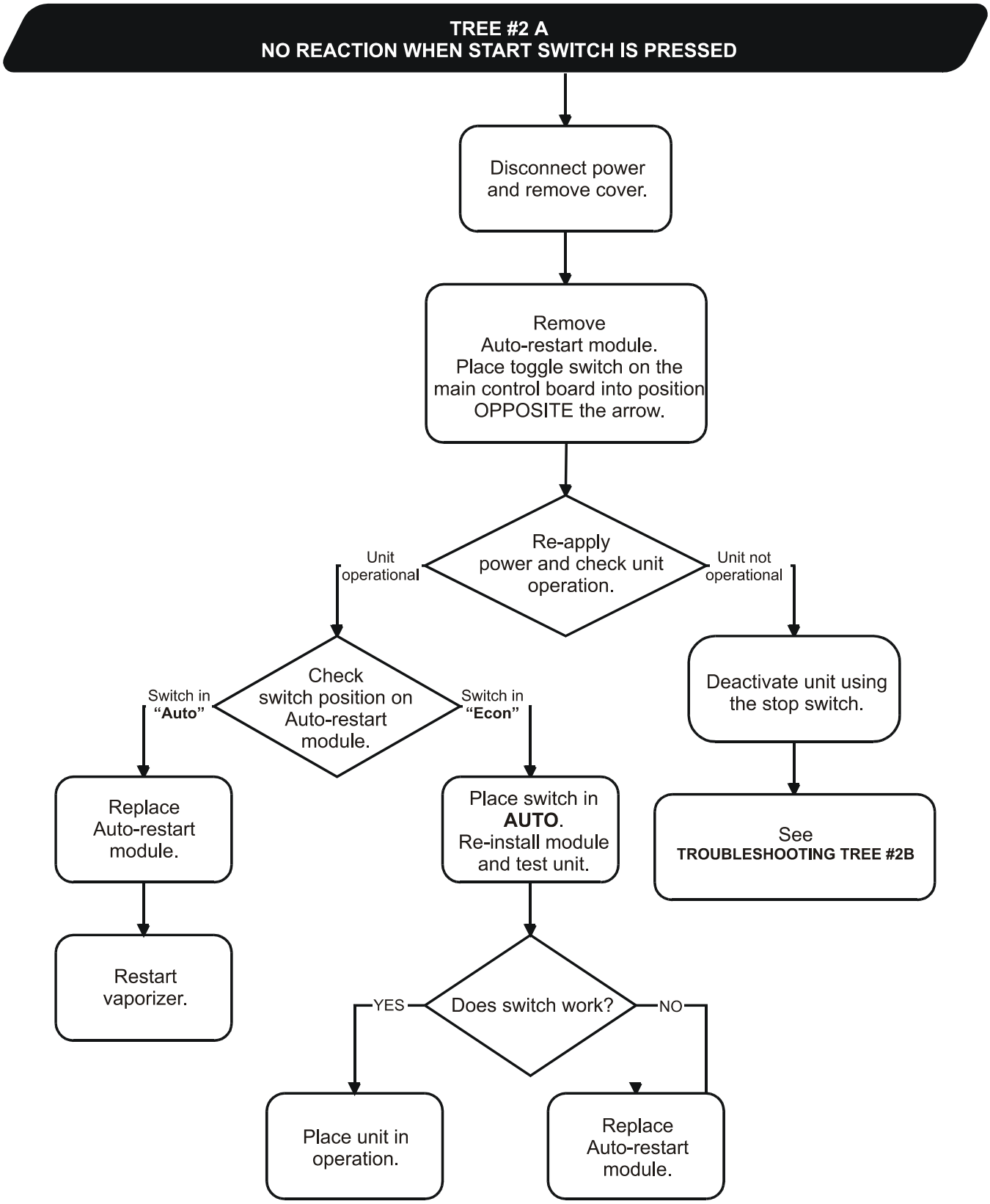
Do not test AC power by going from the ground to the power lead. This could produce an erroneous reading. Check from one power lead to another.

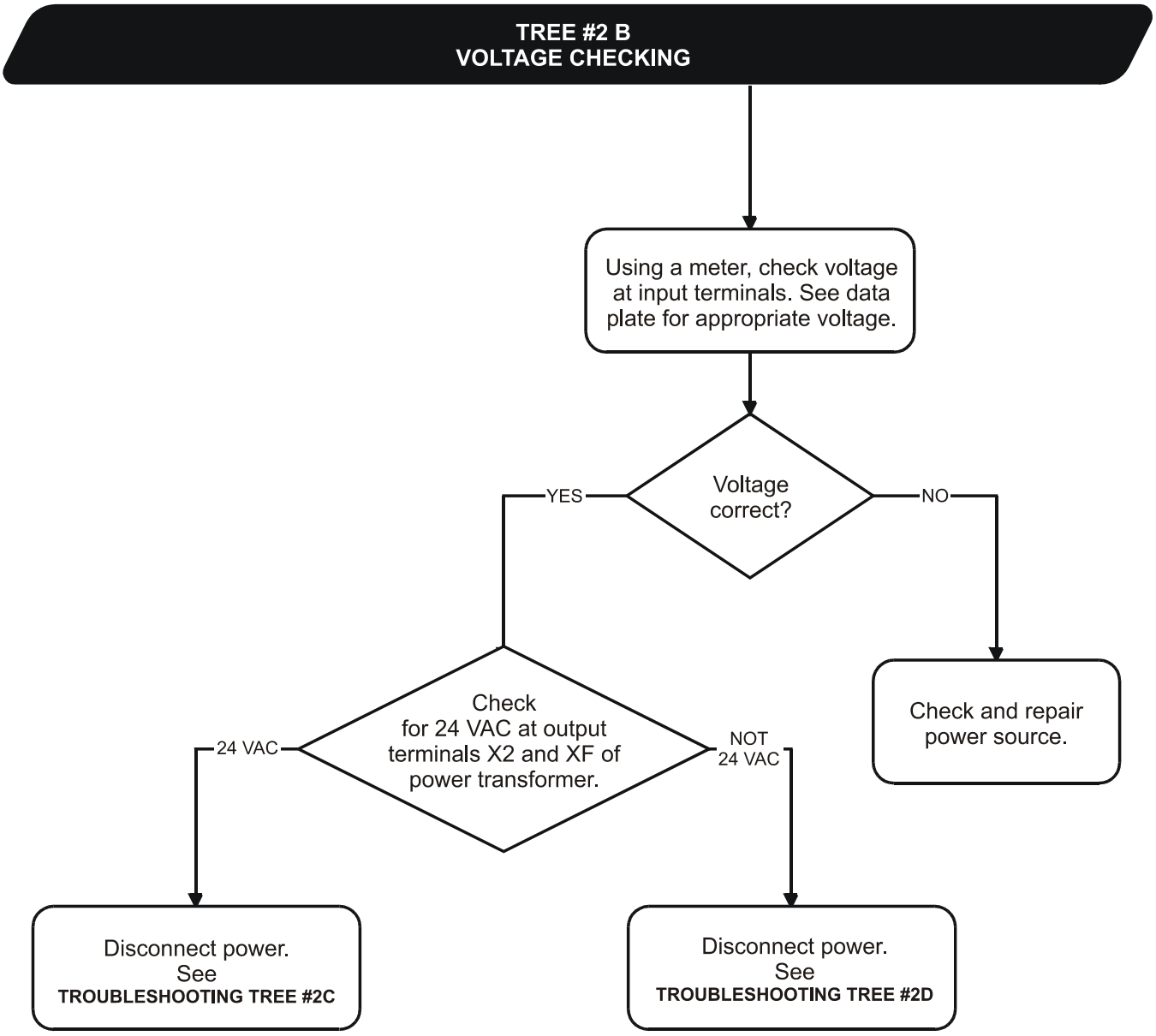
NOTE

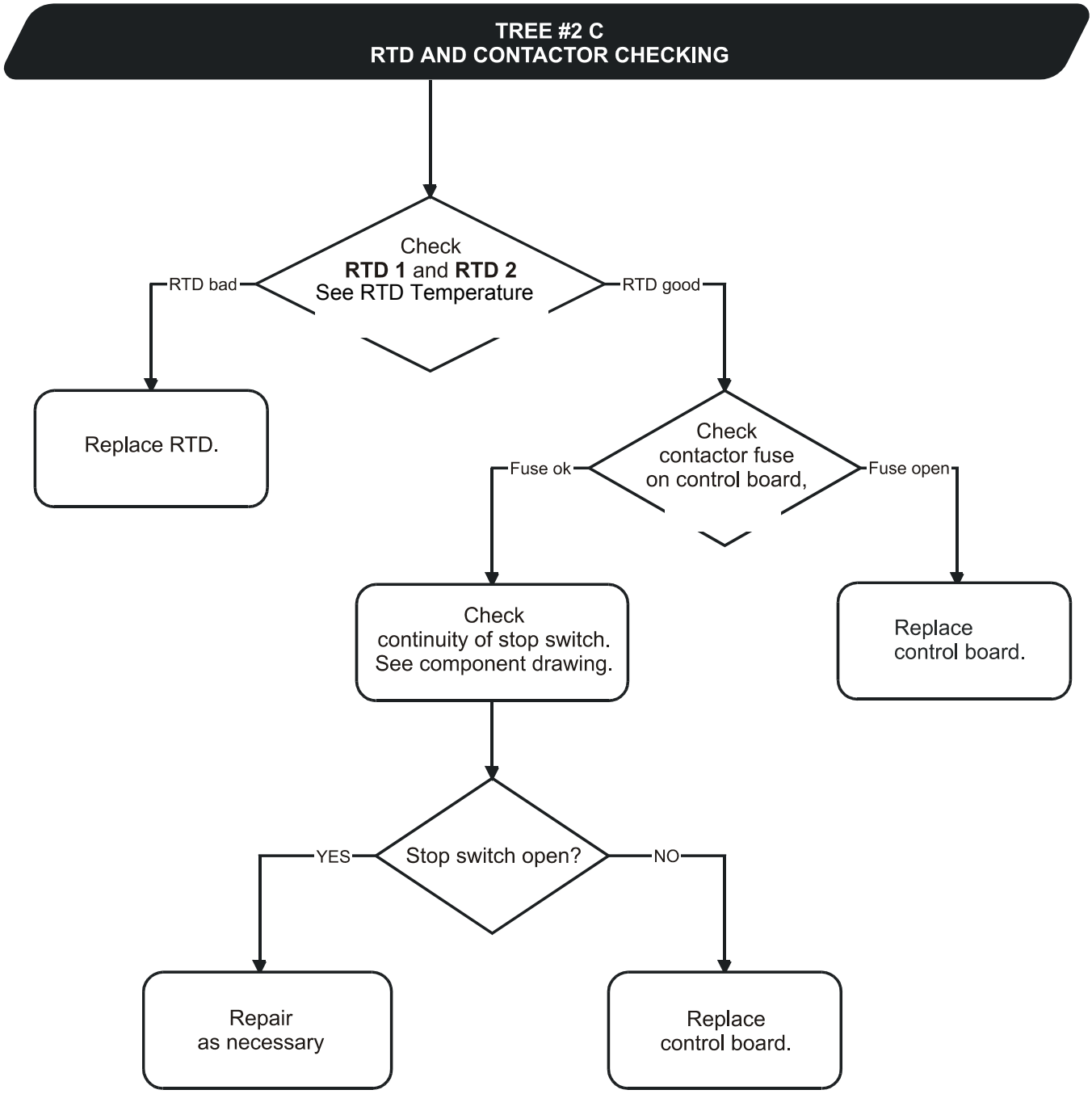
The toggle switch on the control board must be set opposite the direction of the arrow for all troubleshooting and all option connections must be removed from the auxiliary plug. Tests cannot be conducted with the switch set to "Auto/Econ option".

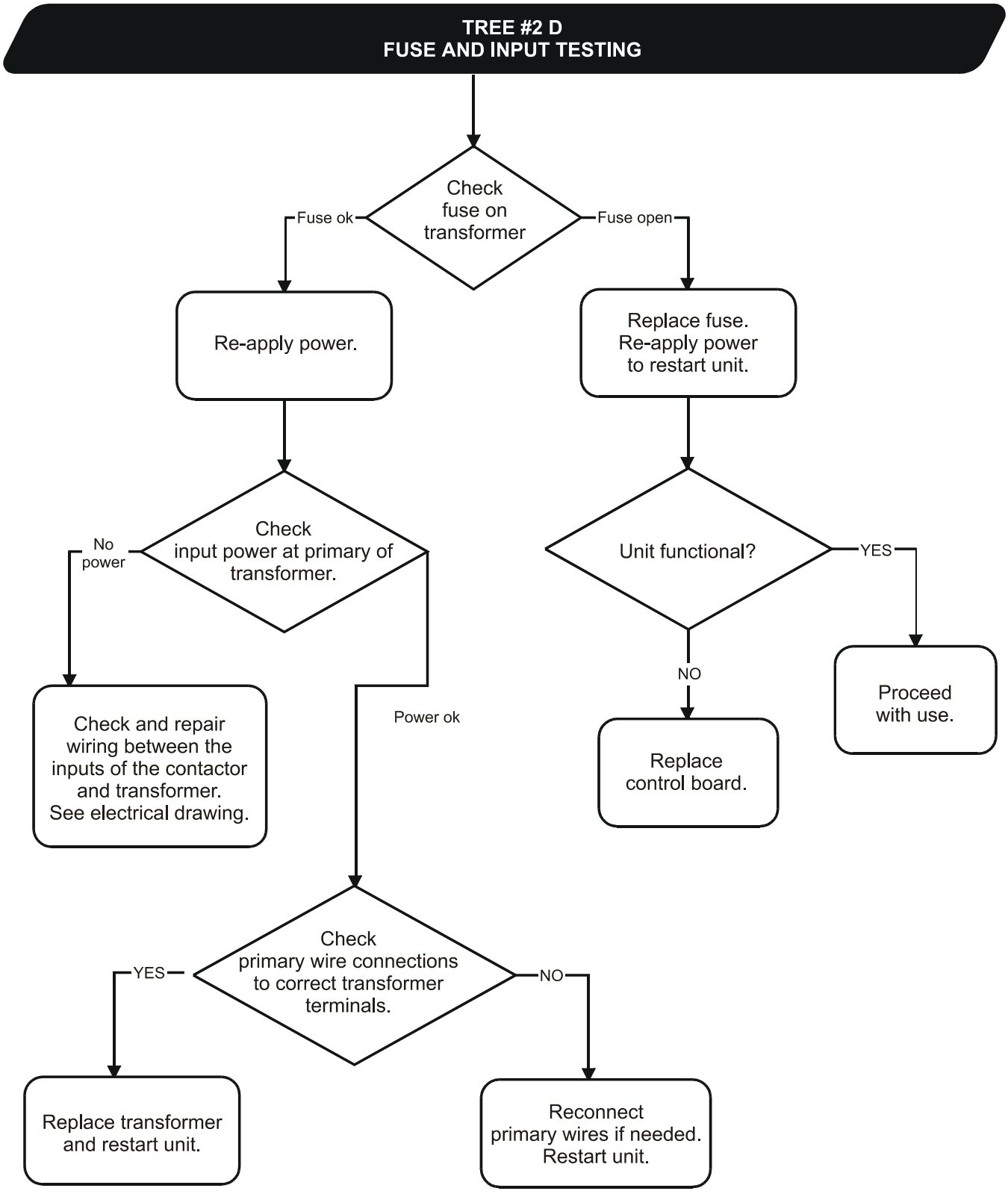

TREE #1
VAPORIZER DOES NOT START
No reaction when start button is pressed.
Contactor closes, but drops out when start button is released.
Contactor closes, but vaporizer does not heat up.
See TROUBLESHOOTING TREE #2
See TROUBLESHOOTING TREE #3
Check heaters - See FULL LOAD CURRENT CHECK

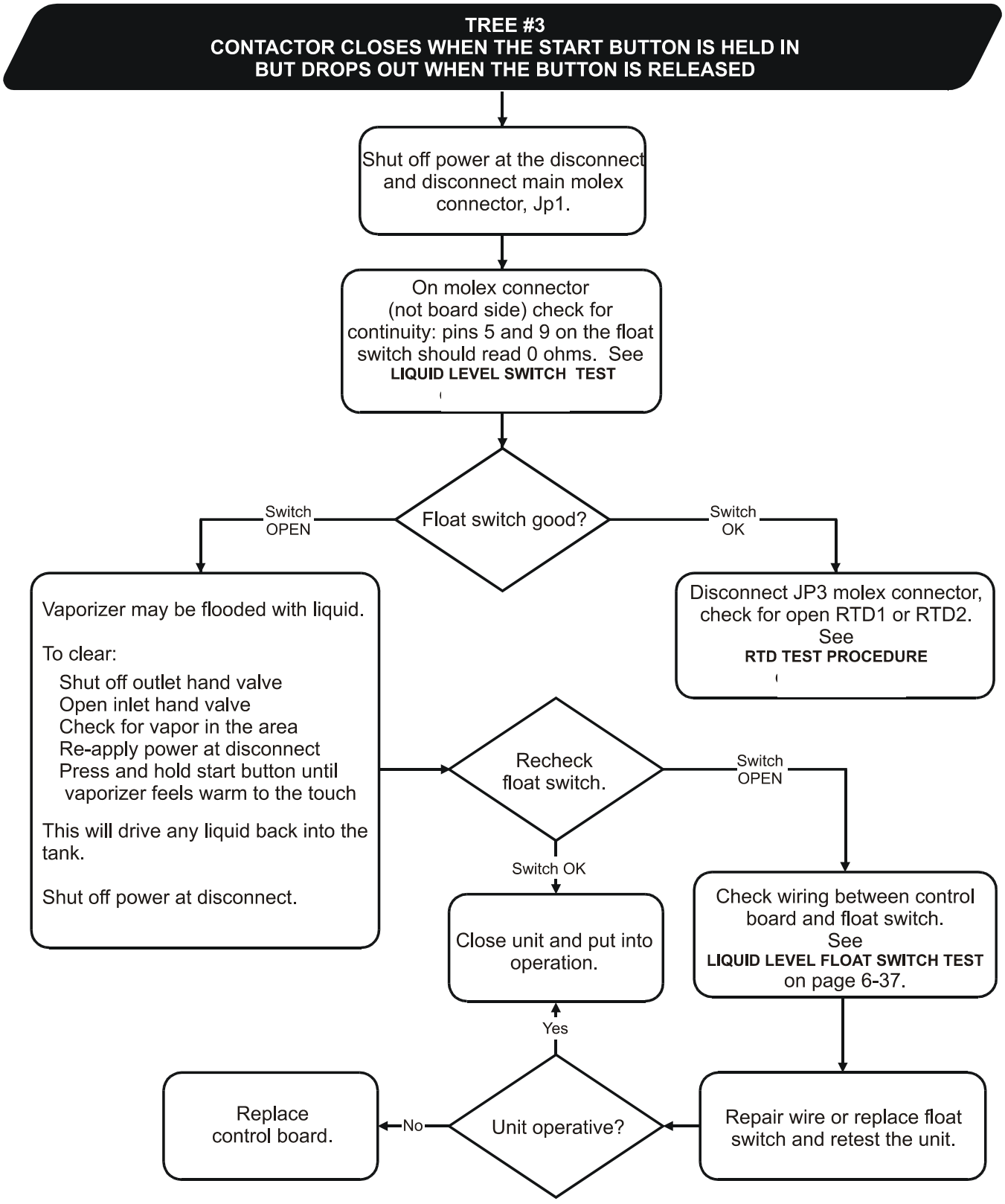

TREE #2
NO REACTION WHEN START SWITCH IS PRESSED
Auto-Restart or Economy option?
YES
See Troubleshooting Tree #2A
NO
Disconnect power and remove cover.
Check toggle switch position on control board (Auto/Economy switch).
Switch not opposite arrow
Switch opposite arrow
Put switch in position opposite of the arrow.
Turn disconnect power ON. See TROUBLESHOOTING WARNINGS
Turn disconnect power on. Does the unit operate properly?
No
Deactivate system using the stop switch.
Yes
Reinstall cover and restart unit.
See Troubleshooting Tree #2B.

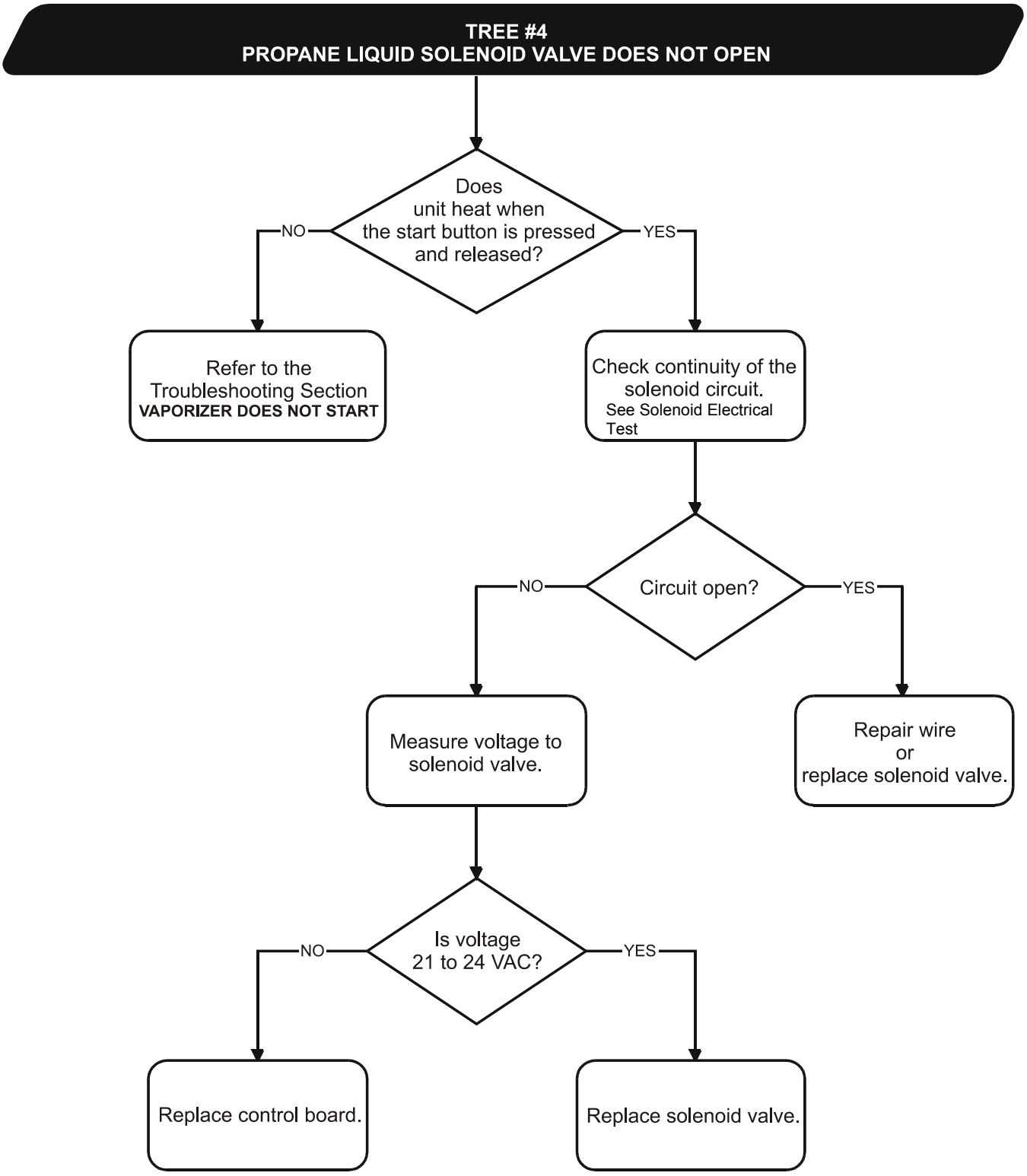

TREE #2 A
NO REACTION WHEN START SWITCH IS PRESSED
Disconnect power and remove cover.
Remove Auto-restart module. Place toggle switch on the main control board into position OPPOSITE the arrow.
Re-apply power and check unit operation.
Unit operational
Unit not operational
Check switch position on Auto-restart module.
Switch in "Auto"
Switch in "Econ"
Deactivate unit using the stop switch.
Replace Auto-restart module.
Place switch in AUTO. Re-install module and test unit.
See TROUBLESHOOTING TREE #2B
Restart vaporizer.
Does switch work?
YES
NO
Place unit in operation.
Replace Auto-restart module.

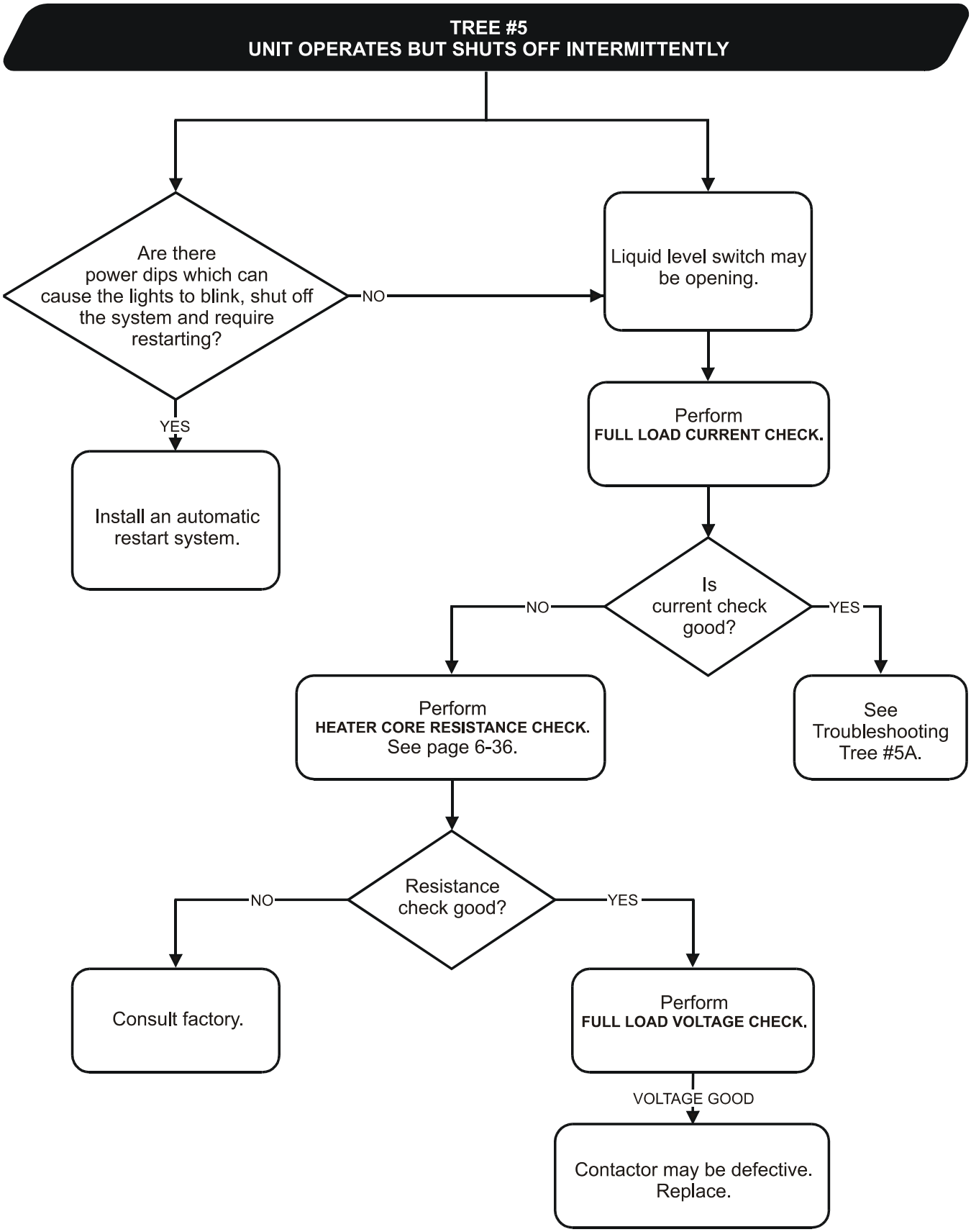

TREE #2 B
VOLTAGE CHECKING
Using a meter, check voltage at input terminals. See data plate for appropriate voltage.
Voltage correct?
YES
NO
Check and repair power source.
Check for 24 VAC at output terminals X2 and XF of power transformer.
24 VAC
NOT 24 VAC
Disconnect power. See TROUBLESHOOTING TREE #2C
Disconnect power. See TROUBLESHOOTING TREE #2D

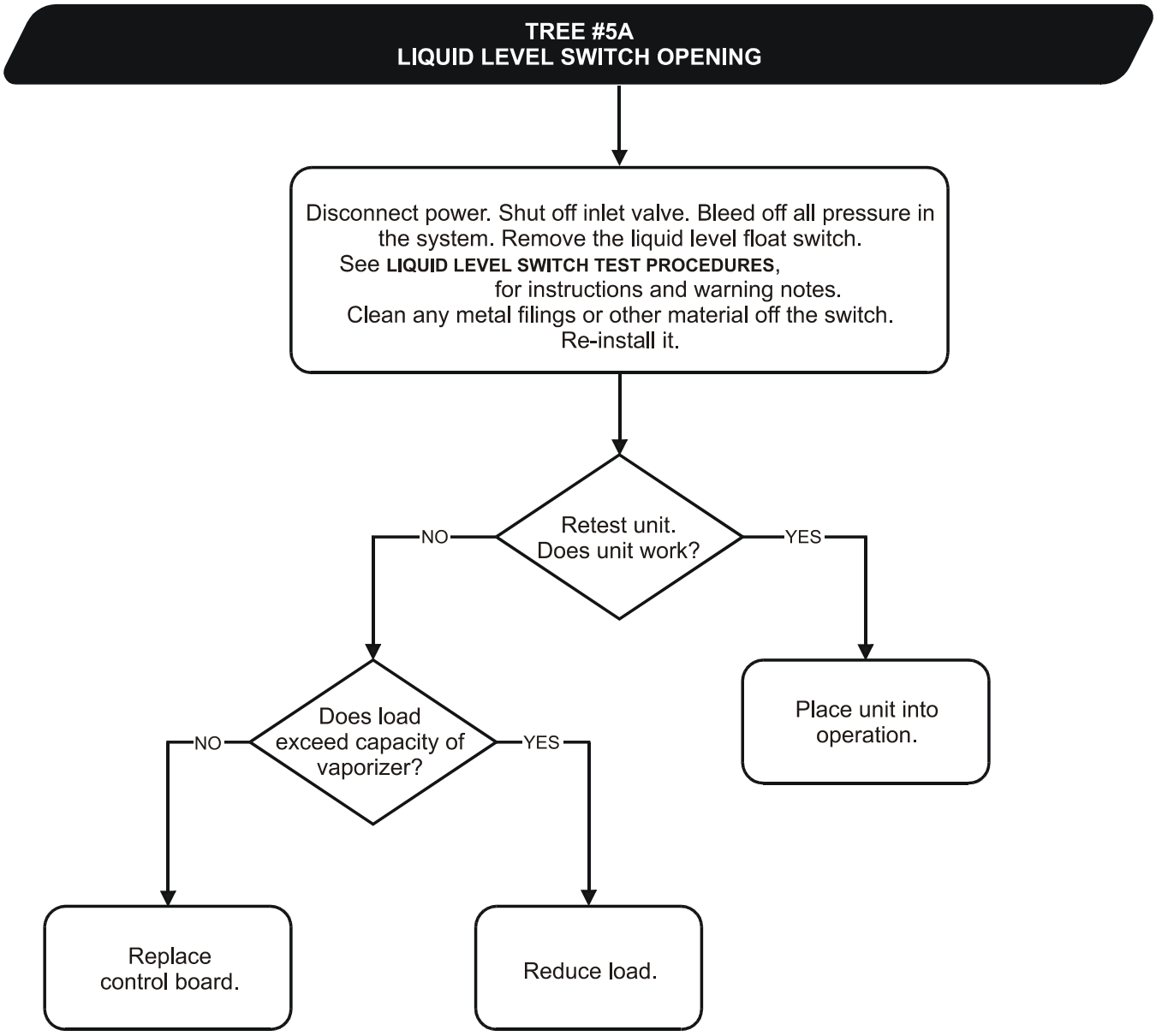

TREE #2 C
RTD AND CONTACTOR CHECKING
Check
RTD 1 and RTD 2
See RTD Temperature
RTD bad
RTD good
Replace RTD.
Check
contactor fuse
on control board,
Fuse ok
Fuse open
Check
continuity of stop switch.
See component drawing.
Replace
control board.
Stop switch open?
YES
NO
Repair
as necessary
Replace
control board.


TREE #2 D
FUSE AND INPUT TESTING
Check fuse on transformer
Fuse ok
Fuse open
Re-apply power.
Replace fuse. Re-apply power to restart unit.
Check input power at primary of transformer.
No power
Unit functional?
YES
NO
Check and repair wiring between the inputs of the contactor and transformer. See electrical drawing.
Power ok
Proceed with use.
Replace control board.
Check primary wire connections to correct transformer terminals.
YES
NO
Replace transformer and restart unit.
Reconnect primary wires if needed. Restart unit.


TREE #3
CONTACTOR CLOSES WHEN THE START BUTTON IS HELD IN
BUT DROPS OUT WHEN THE BUTTON IS RELEASED
Shut off power at the disconnect and disconnect main molex connector, Jp1.
On molex connector (not board side) check for continuity: pins 5 and 9 on the float switch should read 0 ohms. See LIQUID LEVEL SWITCH TEST
Float switch good?
Switch OPEN
Switch OK
Vaporizer may be flooded with liquid.
To clear:
Shut off outlet hand valve
Open inlet hand valve
Check for vapor in the area
Re-apply power at disconnect
Press and hold start button until vaporizer feels warm to the touch
This will drive any liquid back into the tank.
Shut off power at disconnect.
Disconnect JP3 molex connector, check for open RTD1 or RTD2. See RTD TEST PROCEDURE
Recheck float switch.
Switch OPEN
Switch OK
Close unit and put into operation.
Check wiring between control board and float switch. See LIQUID LEVEL FLOAT SWITCH TEST on page 6-37.
Yes
Unit operative?
No
Replace control board.
Repair wire or replace float switch and retest the unit.


TREE #4
PROPANE LIQUID SOLENOID VALVE DOES NOT OPEN
Does unit heat when the start button is pressed and released?
NO
YES
Refer to the Troubleshooting Section VAPORIZER DOES NOT START
Check continuity of the solenoid circuit. See Solenoid Electrical Test
Circuit open?
NO
YES
Measure voltage to solenoid valve.
Repair wire or replace solenoid valve.
Is voltage 21 to 24 VAC?
NO
YES
Replace control board.
Replace solenoid valve.


TREE #5
UNIT OPERATES BUT SHUTS OFF INTERMITTENTLY
Are there power dips which can cause the lights to blink, shut off the system and require restarting?
NO
YES
Install an automatic restart system.
Liquid level switch may be opening.
Perform FULL LOAD CURRENT CHECK.
Is current check good?
NO
YES
Perform HEATER CORE RESISTANCE CHECK. See page 6-36.
See Troubleshooting Tree #5A.
Resistance check good?
NO
YES
Consult factory.
Perform FULL LOAD VOLTAGE CHECK.
VOLTAGE GOOD
Contactor may be defective. Replace.


TREE #5A
LIQUID LEVEL SWITCH OPENING
Disconnect power. Shut off inlet valve. Bleed off all pressure in the system. Remove the liquid level float switch.
See LIQUID LEVEL SWITCH TEST PROCEDURES, for instructions and warning notes.
Clean any metal filings or other material off the switch.
Re-install it.
Retest unit. Does unit work?
NO
YES
Does load exceed capacity of vaporizer?
NO
YES
Place unit into operation.
Replace control board.
Reduce load.

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

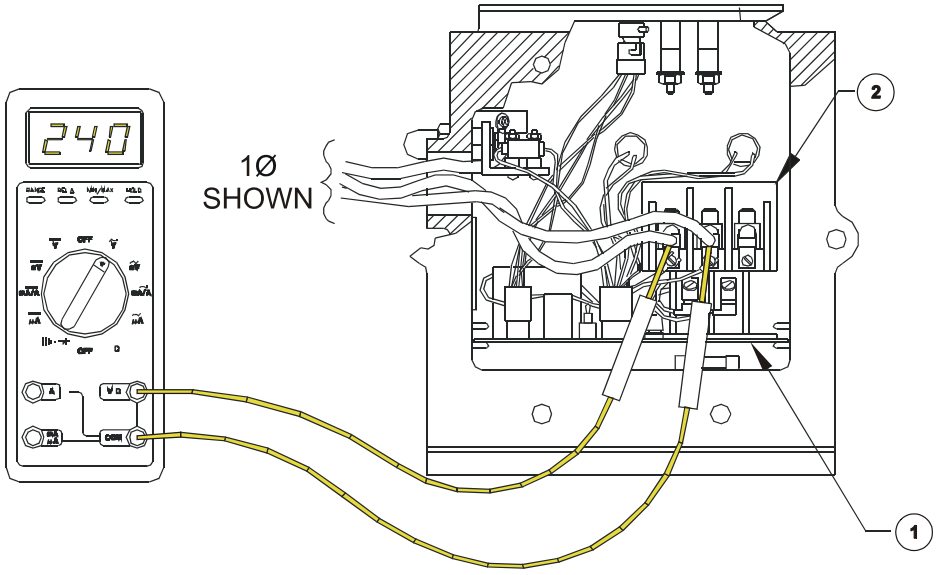
These tests include high voltage. Exercise great caution in making the following tests. Carelessness could result in severe injury or death. See additional warnings located at the beginning of this Chapter.

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 for your vaporizer. Measure the voltage between all connected poles of the contactor. The readings should be equal +/-3%.

NOTE

Low voltage reduces the vaporization capacity of your vaporizer.

Figure 5 – *Measuring Voltage at Contactor Terminals.*



Measuring Voltage at Contactor Terminals.wmf

1. **Control board**
2. **Heater Contactor**

Full Load Current Check

NOTE

See fusible link detail below for typical fusible link installation.

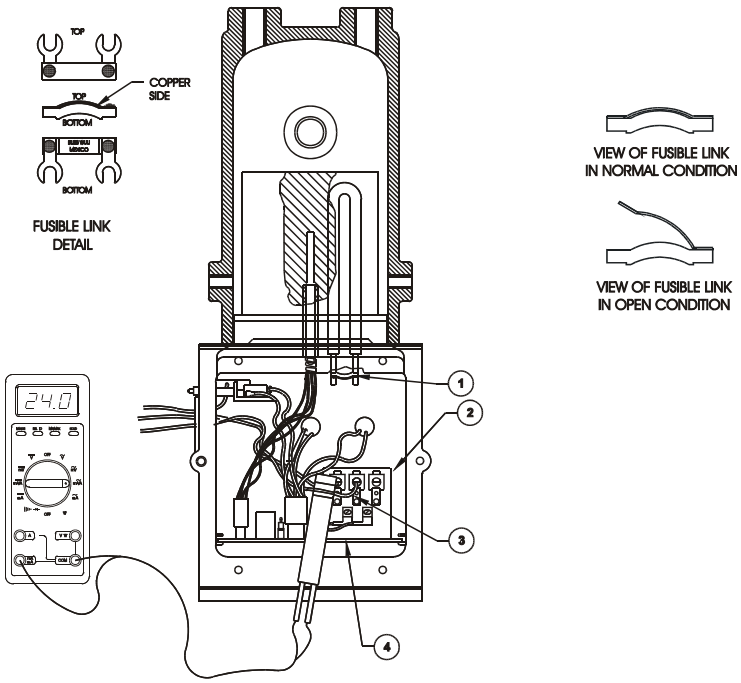
WARNING

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 6 – *Full Load Current Check.*



Full Load Current Check.wmf

1. **Fusible links**
2. **Contactor**
3. **Power input wiring**
4. **Control board**

Heater Core Resistance

NOTE

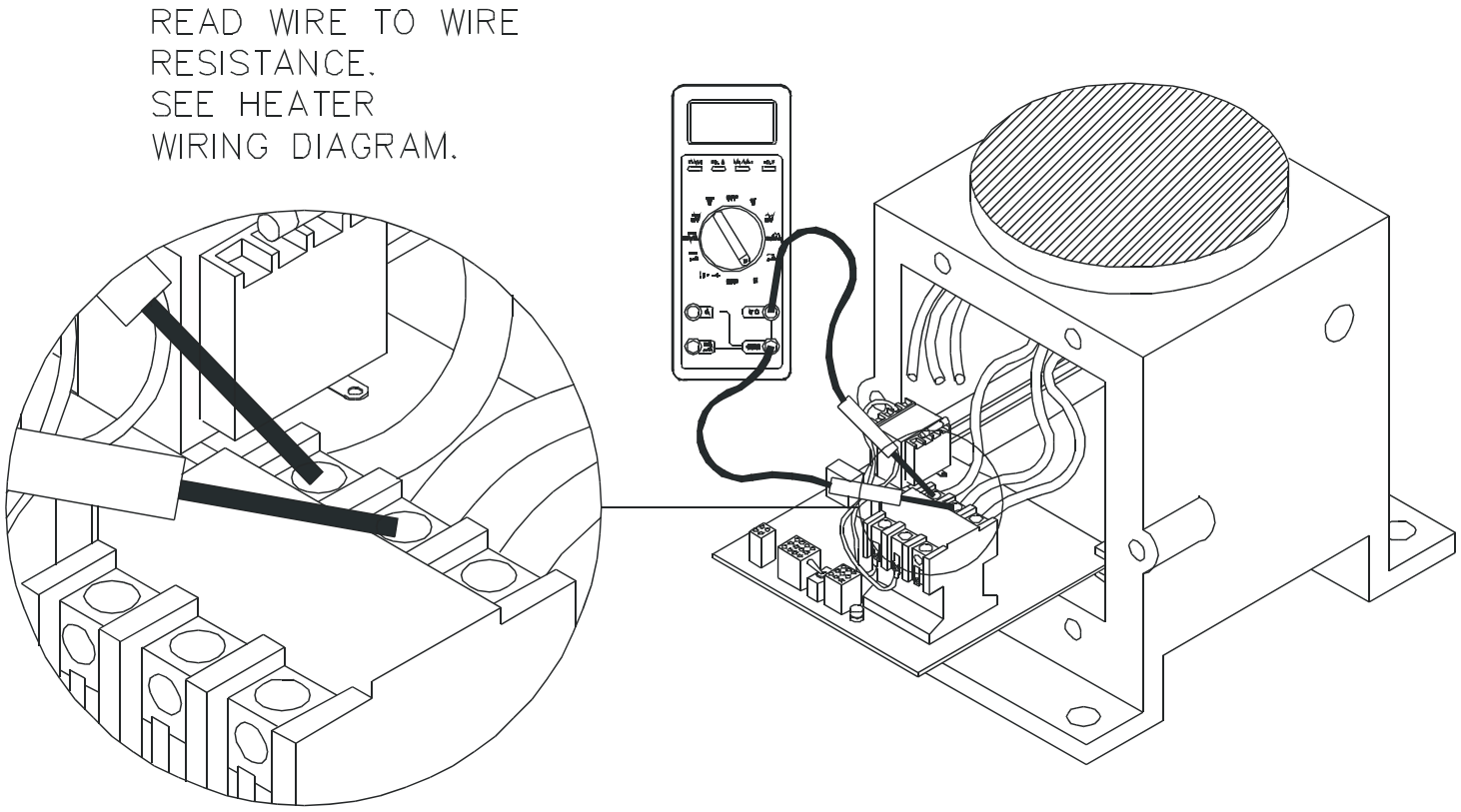
Refer to the Bussing diagram in Appendix A for wire to wire resistance for your vaporizer.

CAUTION

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

Remove the two Molex plugs **(MAIN and RTD)** from the control board. Slide out the control board to obtain 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 7 *– Heater Core Resistance Wiring Connections*



Heater Core Resistance Wiring Connections.wmf

Liquid Level Safety Switch

NOTE

A multimeter is required for the following test.

CAUTION

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

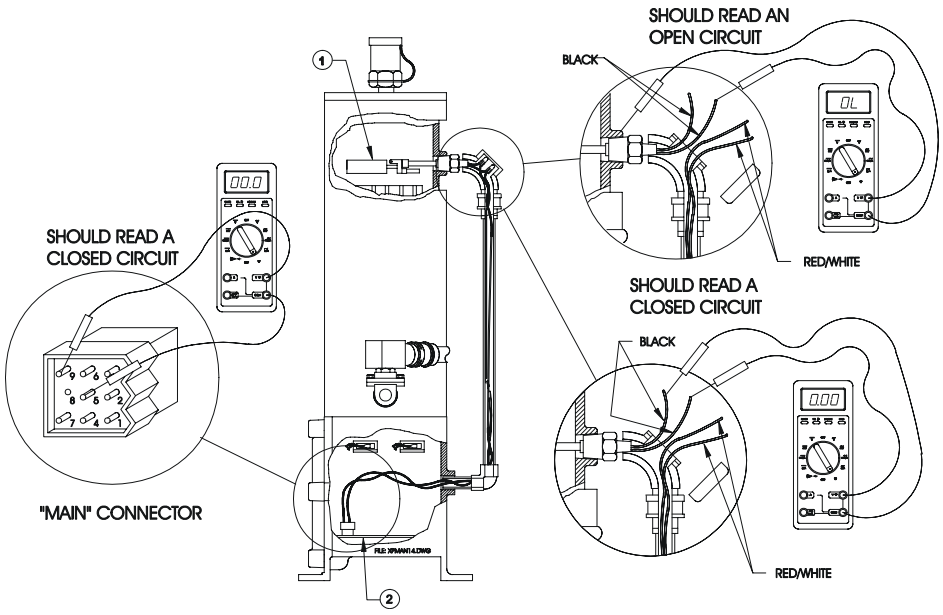
Open the control box housing and disconnect the **MAIN** (JP1) connector on the front of the control board. Check for continuity between pins 5 & 9 as shown below. If your meter reads 0 ohms, the float switch is good. Replace the connector in the proper position. Close the control box. Turn power on at the disconnect. Start vaporizer again.

If the switch reads open (OL on a digital meter) do the following tests: Remove the conduit elbow cover at the liquid level switch. Disconnect and separate the four wires and test as shown below. A reading other than what is indicated shows a bad liquid level switch. Replace it. If the liquid level switch is good, check, and if necessary, repair the wiring between the liquid level switch and the **MAIN** (JP1). Make sure that, when screwing conduit cover on, you do not pinch the wire.

Figure 8 *– Liquid Level Safety Switch Testing Sites.*

Liquid Level Safety Switch Testing Sites.wmf

1. **Liquid level switch**
2. **Control board**



Replacing the Liquid Level Switch

NOTE

Use a teflon base thread compound to seal for leaks when reinstalling the float switch.

CAUTION

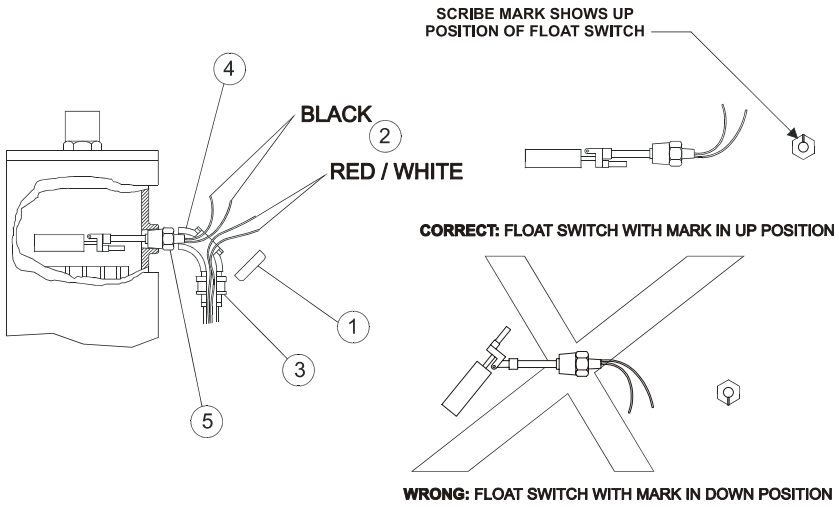
Turn power off at the electrical disconnect before performing this proceeding.

CAUTION

Close the liquid inlet isolation hand valve, release pressure in the vaporizer by opening the outlet valve before proceeding.

- **STEP 1:** Remove the conduit elbow cover (1)
- **STEP 2:** Pull out and separate the wires (2)
- **STEP 3:** Disconnect the conduit union (3)
- **STEP 4:** Unscrew the conduit elbow from the liquid level safety switch (4)
- **STEP 5:** Remove the liquid level safety switch (5). The scribe mark on the float switch must be up in order to pull the float back through the mounting hole. *See below.*

Figure 9 *– Replacing the Liquid Level Switch.*



Replacing Liquid Level Switch.wmf

1. **Conduit elbow cover**
2. **Wires**
3. **Conduit union**
4. **Conduit elbow**
5. **Liquid level safety switch**

Solenoid Valve Leak Test

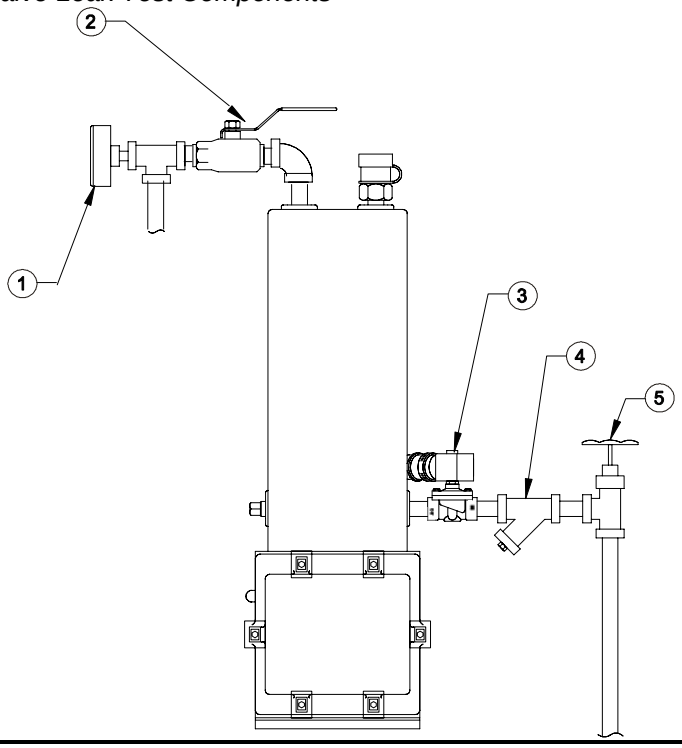
1. Shut off the outlet hand valve. The inlet hand valve should be open. Start the vaporizer and allow it to heat up until the heaters shutoff. This allows any accumulated liquid in the vaporizer to be forced back toward the supply tank.

2. Turn off the vaporizer. Shut off the power at the disconnect. Shut off the inlet hand valve. Close ball valve on 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. If it is not leaking in this condition, turn the power back on at the disconnect. Do not press the START switch.

4. Check again for a leaking solenoid valve. The pressure should remain at zero. If the pressure does not remain at zero, replace the control board.

Figure 10 – *Solenoid Valve Leak Test Components*



Solenoid Valve Leak Test Components.wmf

1. **Vapor pressure gauge**
2. **Vapor discharge outlet hand valve**
3. **Solenoid valve**
4. **Strainer**
5. **Liquid inlet hand valve**

Solenoid Valve Electrical Test

NOTE

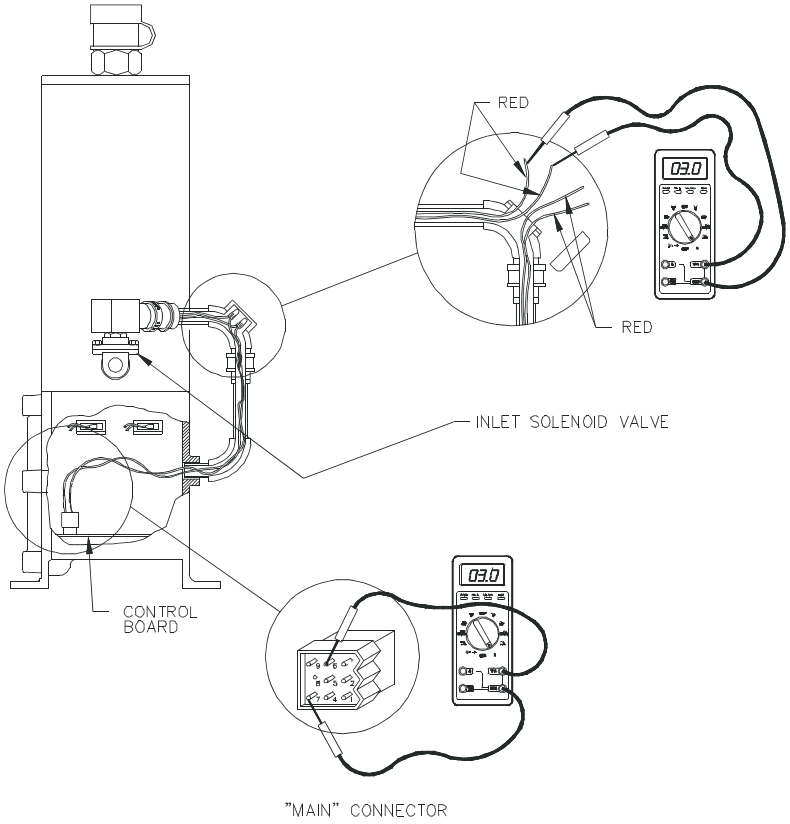
A multimeter is required for the following test.

CAUTION

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

Open the electrical housing at the vaporizer base. Disconnect the **MAIN** (JP1) connector and measure resistance between pins 6 & 7 on the Molex plug connector. You should measure approximately 3 ohms. If not, remove the cover at the conduit elbow, disconnect the wires and measure the solenoid leads again. If the measured resistance is still incorrect, change the solenoid coil. If it is good, check, and if necessary, repair the wiring between the elbow and the **MAIN** (JP1) connection.

Figure 11– *Solenoid Valve Electrical Test*



Solenoid Valve Electric Test.emf

1. **Inlet solenoid valve**
2. **Control board**

RTD Temperature Sensor

NOTE

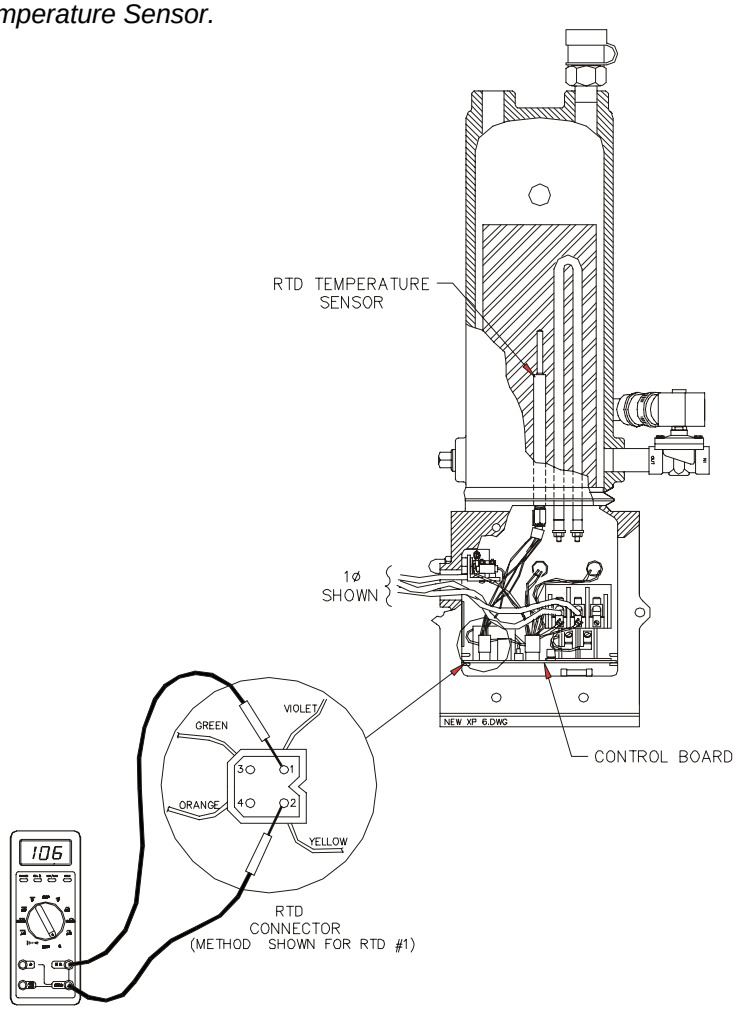
RTD #1 is pins 1 & 2 (Controls High Temp. Limit & Solenoid Circuit)
RTD #2 is pins 3 & 4 (Controls High Temp. Limit & Heater Contactor)

CAUTION

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

Remove the RTD Molex plug from the board. RTD resistance varies according to temperature. Consult the RTD temperature vs. resistance **Tables 9 and 10.**

Figure 12 *– RTD Temperature Sensor.*



RTD Temperature Sensor.wmf

Table 9 *- RTD Temperature vs. Resistance Table – Centigrade*

Platinum 100 Ω at 0°C 0.391 Ω/°C.							
T (°C)	**R(Ω)**	**T (°C)**	**R(Ω)**	**T (°C)**	**R(Ω)**	**T (°C)**	**R(Ω)**
0	100	50	119.395	100	138.5	150	157.315
1	100.391	51	119.78	101	138.879	151	157.688
2	100.781	52	120.165	102	139.258	152	158.061
3	101.172	53	120.54	103	139.637	153	158.434
4	101.562	54	120.934	104	140.016	154	158.807
5	101.953	55	121.318	105	140.394	155	159.19
6	102.343	56	121.703	106	141.773	156	159.553
7	102.733	57	122.087	107	141.151	157	159.925
8	103.123	58	122.471	108	141.53	158	160.298
9	103.513	59	122.855	109	141.908	159	160.67
10	103.902	60	123.239	110	142.289	160	161.043
11	104.292	61	123.623	111	142.664	161	161.415
12	104.681	62	124.007	112	143.042	162	161.787
13	105.071	63	124.39	113	143.42	163	162.159
14	105.46	64	124.774	114	143.797	164	162.521
15	105.849	65	125.157	115	144.175	165	162.902
16	106.238	66	103.513	116	144.552	166	163.274
17	106.627	67	103.513	117	144.929	167	163.646
18	107.016	68	103.513	118	145.307	168	164.017
19	107.404	69	103.513	119	145.684	169	164.388
20	107.793	70	127.072	120	146.061	170	164.759
21	108.181	71	127.454	121	146.437	171	165.13
22	108.57	72	127.837	122	146.814	172	165.501
23	108.958	73	128.219	123	147.191	173	165.872
24	109.346	74	128.601	124	147.567	174	166.243
25	109.734	75	128.984	125	147.943	175	166.613
26	110.122	76	129.366	126	148.32	176	166.984
27	110.509	77	129.748	127	148.696	177	167.354
28	110.897	78	130.129	128	149.072	178	167.724
29	111.284	79	130.511	129	149.448	179	168.064
30	111.672	80	130.893	130	149.823	180	168.464
31	112.059	81	131.274	131	150.199	181	168.834
32	112.446	82	131.655	132	150.575	182	169.204
33	112.833	83	132.037	133	150.95	183	169.573
34	113.22	84	132.418	134	151.325	184	169.943
35	113.607	85	132.799	135	151.701	185	170.312
36	113.994	86	133.18	136	152.076	186	170.683
37	114.38	87	133.56	137	152.451	187	171.051
38	114.767	88	133.941	138	152.825	188	171.42
39	114.153	89	134.322	139	153.2	189	171.789
40	115.539	90	134.702	140	153.575	190	172.158
41	115.925	91	135.082	141	153.949	191	172.526
42	116.311	92	135.463	142	154.324	192	172.895
43	116.697	93	135.843	143	154.698	193	173.312
44	117.083	94	136.223	144	155.072	194	173.632
45	117.469	95	136.602	145	155.446	195	174
46	117.854	96	136.982	146	155.82	196	174.368
47	118.239	97	137.362	147	156.194	197	174.736
48	118.625	98	137.982	148	156.568	198	175.104
49	119.01	99	138.121	149	156.941	199	175.472

Table 10 *- RTD Temperature vs. Resistance Table – Fahrenheit*

Platinum 100Ω at 32°F 0.271Ω/°F.							
T (°F)	**R(Ω)**	**T (°F)**	**R(Ω)**	**T (°F)**	**R(Ω)**	**T (°F)**	**R(Ω)**
0	93.034	50	103.902	100	114.681	150	125.37
1	93.252	51	104.119	101	114.895	151	125.583
2	93.47	52	104.335	102	115.11	152	125.795
3	93.689	53	104.551	103	115.325	153	126.008
4	93.907	54	104.768	104	115.539	154	126.221
5	94.125	55	104.984	105	115.754	155	126.434
6	94.343	56	105.2	106	115.968	156	126.656
7	94.561	57	105.417	107	116.183	157	126.859
8	94.779	58	105.633	108	116.397	158	127.072
9	94.997	59	105.849	109	116.611	159	127.284
10	95.215	60	106.065	110	116.826	160	127.497
11	95.433	61	106.281	111	117.04	161	127.709
12	95.651	62	106.497	112	117.254	162	127.922
13	95.868	63	106.713	113	117.469	163	128.134
14	96.086	64	106.929	114	117.683	164	128.347
15	96.304	65	107.145	115	117.897	165	128.559
16	96.522	66	107.361	116	118.111	166	128.771
17	96.739	67	107.577	117	118.325	167	128.984
18	96.957	68	107.793	118	118.539	168	129.196
19	97.175	69	108.009	119	118.753	169	129.408
20	97.392	70	108.224	120	118.967	170	129.62
21	97.61	71	108.44	121	119.181	171	129.832
22	97.827	72	108.656	122	119.395	172	130.045
23	98.045	73	108.871	123	119.609	173	130.257
24	98.262	74	109.087	124	119.823	174	130.469
25	98.479	75	109.303	125	120.036	175	130.681
26	98.697	76	109.518	126	120.25	176	130.893
27	98.914	77	109.734	127	120.464	177	131.105
28	99.131	78	109.949	128	120.678	178	131.317
29	99.349	79	110.165	129	120.891	179	131.528
30	99.566	80	110.38	130	121.105	180	131.74
31	99.783	81	110.595	131	121.318	181	131.952
32	100	82	110.811	132	121.532	182	132.164
33	100.217	83	111.026	133	121.746	183	132.375
34	100.434	84	111.241	134	121.959	184	132.587
35	100.651	85	111.457	135	122.172	185	132.799
36	100.868	86	111.672	136	122.386	186	133.01
37	101.085	87	111.887	137	122.599	187	133.222
38	101.302	88	112.102	138	122.813	188	133.434
39	101.519	89	112.317	139	123.026	189	133.645
40	101.736	90	112.532	140	123.239	190	133.857
41	101.953	91	112.747	141	123.452	191	134.068
42	102.169	92	112.962	142	123.666	192	134.279
43	102.386	93	113.177	143	123.879	193	134.491
44	102.603	94	113.392	144	124.092	194	134.702
45	102.819	95	113.607	145	124.305	195	134.913
46	103.036	96	113.822	146	124.518	196	135.125
47	103.253	97	114.037	147	124.731	197	135.336
48	103.469	98	114.251	148	124.944	198	135.547
49	103.686	99	114.466	149	125.157	199	135.758

RTD Temperature Sensor Replacement

NOTE

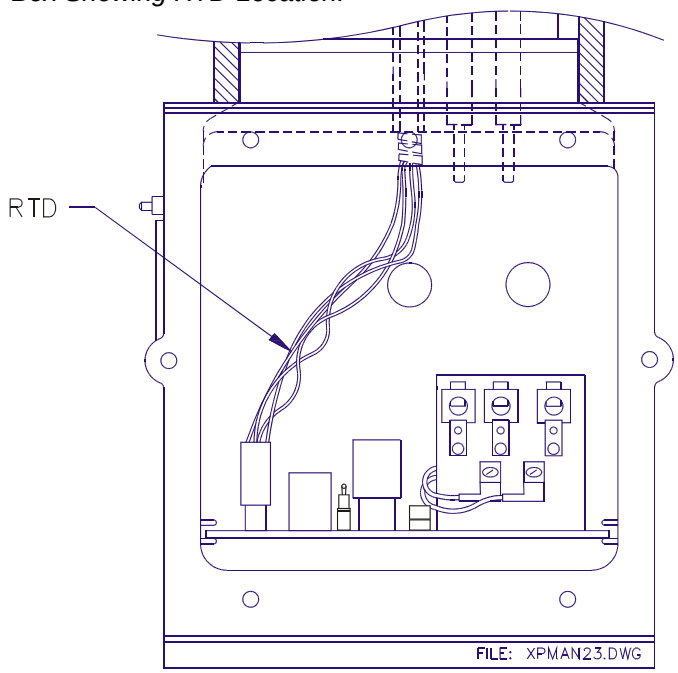
A flat bladed screwdriver and an open-end wrench (approx. ½") may be required depending on the type of locking collar on the sensor.

CAUTION

Always disconnect power to vaporizer before servicing.

1. Stop vaporizer and shut off power at the disconnect.
2. Remove the control box cover.
3. Disconnect the **MAIN** and RTD Molex connectors.
4. If equipped with **ECONOMY** disconnect the 2 wires from the terminal strip on the auto restart board.
5. Disconnect the main power wires attached to the contactor and the wires going to the heaters.
6. Slide the circuit board out of the control box.
7. The RTD temperature sensor can now be removed from the center of the vaporizer core (see below and ***Figure 14 and 15***).

Figure 13 *– POWER XP Box Showing RTD Location.*

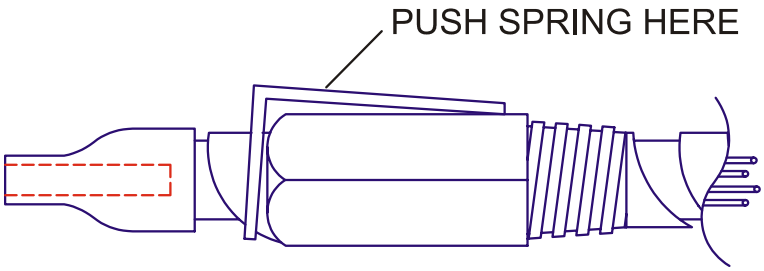


XP Box Showing RTD Location.wmf

Two types of locking collars have been used on the sensors.

SPRING TAB RETAINER (1 PIECE)

Figure 14 *- RTD Sensor with Spring Tab Retainer*

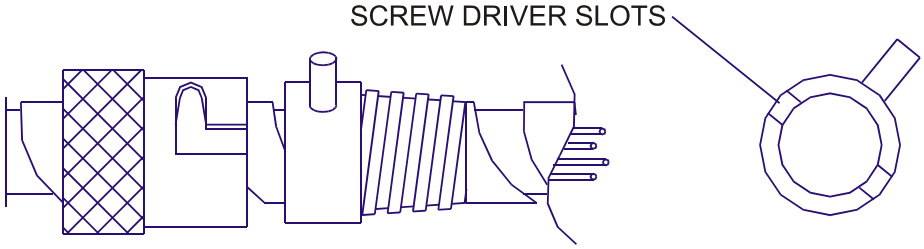


RTD Sensor with Spring Tab Retainer.wmf

To remove a sensor fitted with the spring tab style retainer, squeeze firmly on the tab and pull gently on the sensor. Remove and install the new retainer if required. Install the new sensor by applying a small amount of heat transfer grease to the sensor tube and reinserting in the unit. Squeeze the spring tab and insert the sensor. Push firmly until the sensor is fully engaged. There should be approximately ½" of sheath remaining.

BAYONET WITH ADAPTER (2 PIECE)

Figure 15 *- RTD Sensor with Bayonet Style Retainer*



RTD 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 (½" 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 ½" of sheath remaining.
5. Reinstall control board, connect all wires, and reinstall the enclosure cover. Torque cover bolts to 19.5 ft. lbs. Check vaporizer operation.

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Economy Operation (Optional)

The economy operation option minimizes the electric power required to meet your vapor demand by shutting off the vaporizer when the natural vaporization rate of the storage tank is able to supply enough vapor to meet the demand. When the vaporizer is shut off, vapor is supplied to the load via a vapor bypass line linking the storage tank and the vapor distribution line downstream of the vaporizer. When natural vaporization has decreased tank pressure, the economy system automatically energizes the vaporizer. The vaporizer supplies the demand until tank pressure increases to where it is again sufficient to supply the load.

Economy operation includes the automatic restart option. Consequently, you receive the additional benefit of automatic restart of the vaporizer in case of a power interruption. This convenience is extremely important in areas where facilities are subject to erratic power and interruptions of power. The vaporizer will automatically restart when power is restored. The vaporizer will NOT automatically restart if it shuts down due to a safety violation (high liquid or high temperature). Under such conditions, a manual restart is required.

The installation drawing **(See *Figure 16*)** shows the economy option. The installation includes a vapor bypass line to provide vapor when the vaporizer is off, the storage tank pressure switch on the inlet to the vaporizer, and the added auto/ economy circuit board. A vapor bypass line is necessary for proper operation of the economy option.

When pressure in the storage tank is higher than the storage tank pressure switch set point, (normally 50 psig (3.52 kg/cm^2)) the switch is open and the vaporizer is off. Vapor demand is met by natural vaporization from the storage tank through the vapor bypass line. When pressure in the storage tank is less than the pressure switch set point, the switch closes and the vaporizer comes on and supplies vapor to the load. The pressure regulator at the outlet of the vaporizer is set 2 to 4 psig (0.14 - 0.28 kg/cm^2) higher than the pressure out of the tank bypass line. When the vaporizer is on, the tank bypass regulator is shut off due to the higher pressure of the vaporizer regulator. This allows the tank to warm up and increase pressure until it reaches the upper set point of the tank pressure switch, (normally 70 psig (4.92 kg/cm^2)) then the switch will open and the vaporizer shuts off allowing natural vaporization of the tank to again supply the vapor through the bypass line.

Figure 16 *- Installation of Economy Operation*

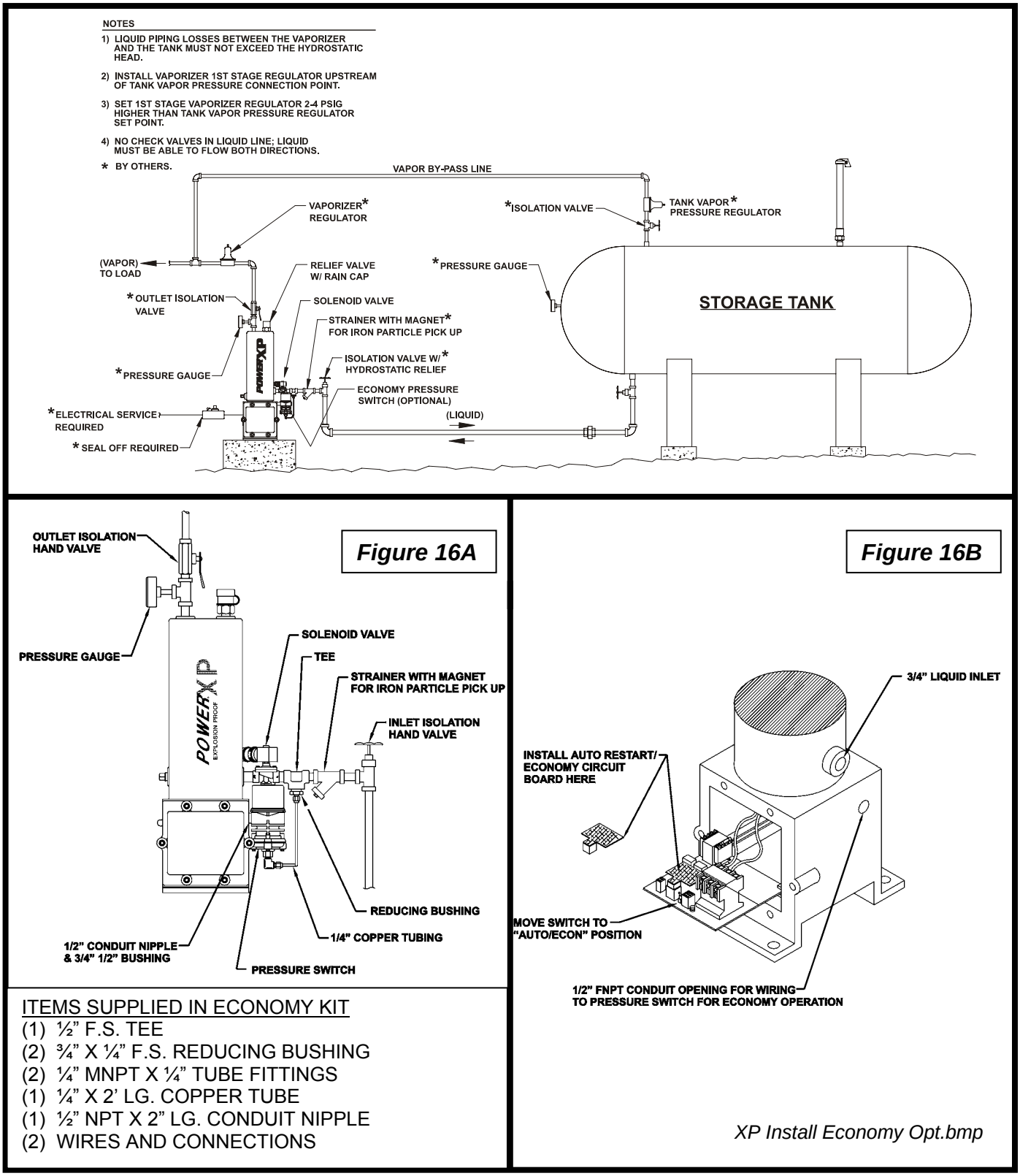


Figure 16A

ITEMS SUPPLIED IN ECONOMY KIT

(1) ½" F.S. TEE
(2) ¾" X ¼" F.S. REDUCING BUSHING
(2) ¼" MNPT X ¼" TUBE FITTINGS
(1) ¼" X 2' LG. COPPER TUBE
(1) ½" NPT X 2" LG. CONDUIT NIPPLE
(2) WIRES AND CONNECTIONS

Figure 16B

XP Install Economy Opt.bmp

Testing Your Economy Operation

Two switches on the control boards must be set properly to enable economy or standard operation. On the main control board, the switch marked **AUTO/ECONO** must be in the **AUTO/ECONO** position and the switch on the auto restart / economy control board must be in the **ECONOMY** position. ***See Figure 17.***

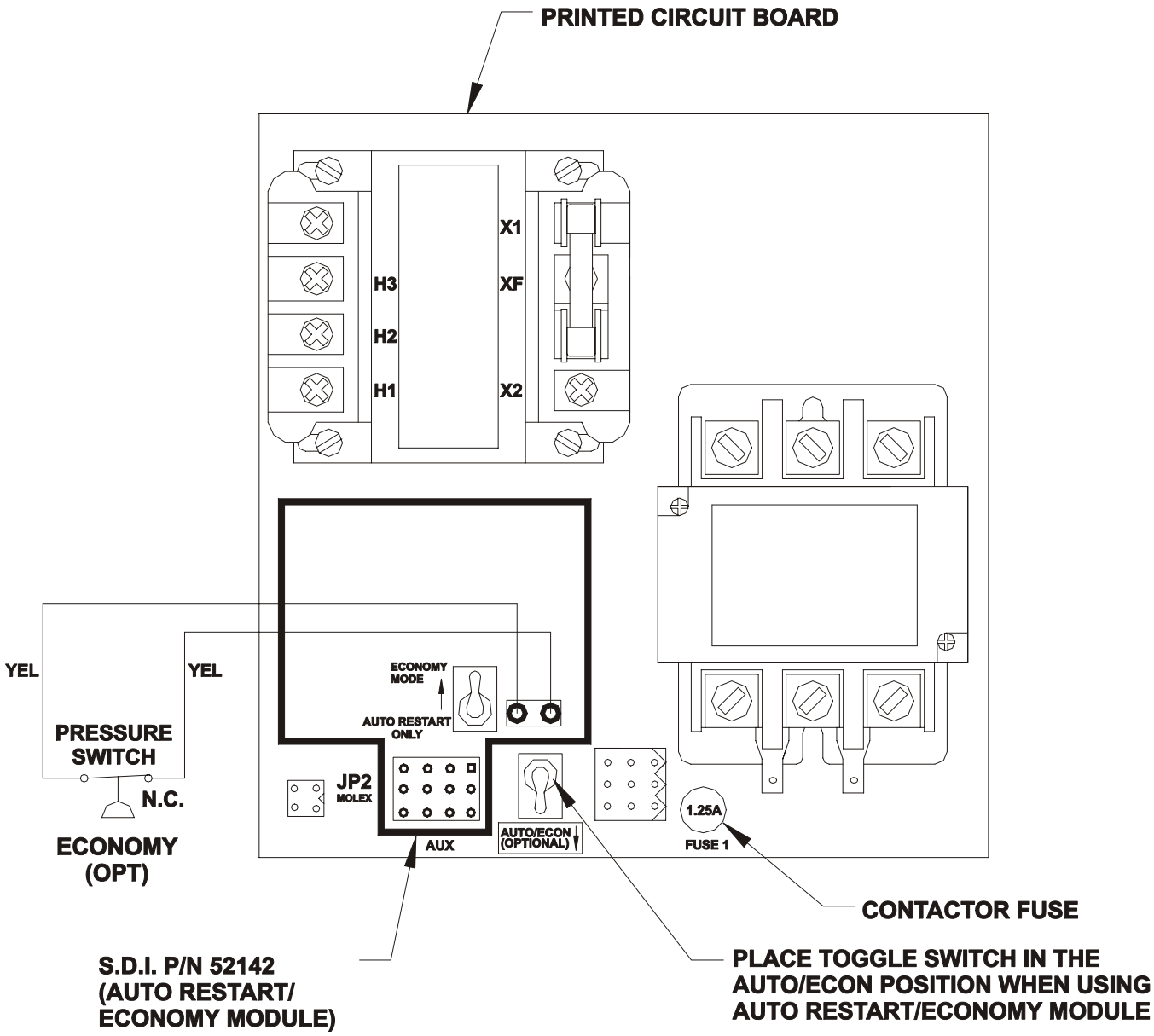
1. In order to activate your economy operation, you must apply power to the vaporizer and press the START switch. The vaporizer may not come on. ***See #2.***

2. The pressure switch is set from the factory to start the vaporizer when the tank pressure drops to 50 psig (3.52 kg/cm^2) and to shut off again when the tank pressure increases to 70 psig (4.92 kg/cm^2). If the tank pressure is above 50 psig (3.52 kg/cm^2), it will not start when you press the START switch. You will need to jumper the pressure switch to see if the vaporizer will start when the pressure drops to 50 psig (3.52 kg/cm^2). ***See #3.***

3. Disconnect power. Gain access to the switch by unscrewing the lid on the pressure switch. Connect a jumper between the two wires on the switch. Re-apply power and press the START switch. The vaporizer should operate. Press the STOP switch. Disconnect power. Remove the jumper. Re-install the cover. Reapply power. Press the START switch. The vaporizer is now ready to come on when the pressure drops to 50 psig (3.52 kg/cm^2).

4. If the tank pressure is below 50 psig (3.52 kg/cm^2), the vaporizer will start when the START switch is pressed. To test for shutoff at 70 psig (4.92 kg/cm^2), disconnect one wire on the pressure switch and the vaporizer should remain off when you press the START switch.

Figure 17 - Printed Circuit Board (Auto-Restart/Economy Module)



Printer Circuit Board.wmf

For AUTO RESTART Field Installation Kit use: **ASDI** PN: 52175

For ECONOMY Field Installation Kit use: **ASDI** PN: 80446

Installation of The Auto Restart/Economy Module

The following procedures are to be used for installing THE **AUTO RESTART/ ECONOMY MODULE (ASDI P/N 52142)** on an existing **POWER XP** series electric vaporizer. The Auto Restart/Economy Module is only compatible with models XP12.5 through XP80 and previously manufactured XP120 & XP160.

Module Installation for Auto Restart Operation Only

1. **SHUT OFF POWER AT THE DISCONNECT BEFORE REMOVING THE EXPLOSION PROOF COVER.**
2. Remove the explosion proof cover to access the control board.
3. On the existing circuit board, place the toggle switch in the **AUTO/ECON** position (towards you). It is located between the AUX and MAIN Molex wire connectors. ***See Figure 17*.**
4. Move the switch on the Auto Restart/Economy Module to **AUTO RESTART ONLY.** ***See Figure 17*.**
5. Plug the Auto Restart/Economy Module into the AUX Molex connector on the original circuit board.
6. Replace the explosion proof cover.
7. Turn on power at the disconnect.
8. Go to Operation of Auto-Restart.

Module Installation for Auto Restart and Economy Operation

1. SHUT OFF POWER AT THE DISCONNECT BEFORE DOING ANY WORK INSIDE THE VAPORIZER.

NOTE:

Before performing these operations, install the necessary items as shown in Figure 16A.

2. Connect one yellow wire to the common terminal (C) on the pressure switch, connect the other yellow wire to the normally closed (NC) terminal on the pressure switch. ***See Figure 17*.**

3. Remove the explosion proof cover to access the existing circuitry.

4. Install the pressure switch and copper tubing as shown in ***Figure 16A*.** A 1/4" NPT pressure tap must be provided by the installer upstream of the vaporizer.

5. On the existing circuit board, place the toggle switch in the **AUTO/ECON** position (towards you). It is located between the **AUX** and **MAIN** Molex wire connectors. ***See Figure 17.***

6. Connect the two yellow wires from the pressure switch to the two terminals on the Auto Restart/Economy module. ***See Figure 17.***

7. Move the switch on the Auto Restart/Economy Module to **ECONOMY MODE.**

8. Replace the explosion proof cover. Torque cover bolts to 19.5 ft. lbs.

9. Turn power on at the disconnect.

Auto Restart/ Economy Operation

1. Two position switch on the option module: **AUTO-RESTART/ECONOMY MODE** and **AUTO RESTART ONLY.**

AUTO-RESTART/ ECONOMY MODE	Enables **ECONOMY MODE;** operation of the vaporizer is regulated by the pressure switch. Vapor may be supplied by the tank or the vaporizer.
AUTO RESTART ONLY	Disables **ECONOMY MODE;** the vaporizer will operate regardless of the system pressure. The **AUTO RESTART** function will operate.

2. Operation of **AUTO RESTART**:

   A. When the power is first turned on, the vaporizer will not start automatically. To start the vaporizer and also initiate the **AUTO RESTART** function, the **START** button must be pushed at the vaporizer.

   B. Power may now be cycled on and off, and the vaporizer will resume operation due to the **AUTO RESTART** function.

   C. To discontinue the **AUTO RESTART** function and stop the vaporizer, push the **STOP** switch at the vaporizer when the power is on. Once this has been done, the vaporizer will not start automatically again until the **START** switch is pushed with the power on, as described above.

   D. The vaporizer will not restart automatically if the unit has shut down on a safety (i.e. high liquid level, high temperature, etc.). The unit must be manually restarted.

XP Remote Control Box

The **POWER XP REMOTE CONTROL BOX** provides a means of controlling the **POWER XP** vaporizer from a remote location. In addition, the box indicates the vaporizer operating status. The remote control box is intended for indoor use. With installer provided wire, the maximum wire length is 475 feet using 12 AWG wire, the maximum wire length is 250 feet using 14 AWG wire, the maximum wire length is 150 feet using 12 AWG wire.

Figure 18 *- Remote Control Box Dimensions – Stop / Start / Run Status*

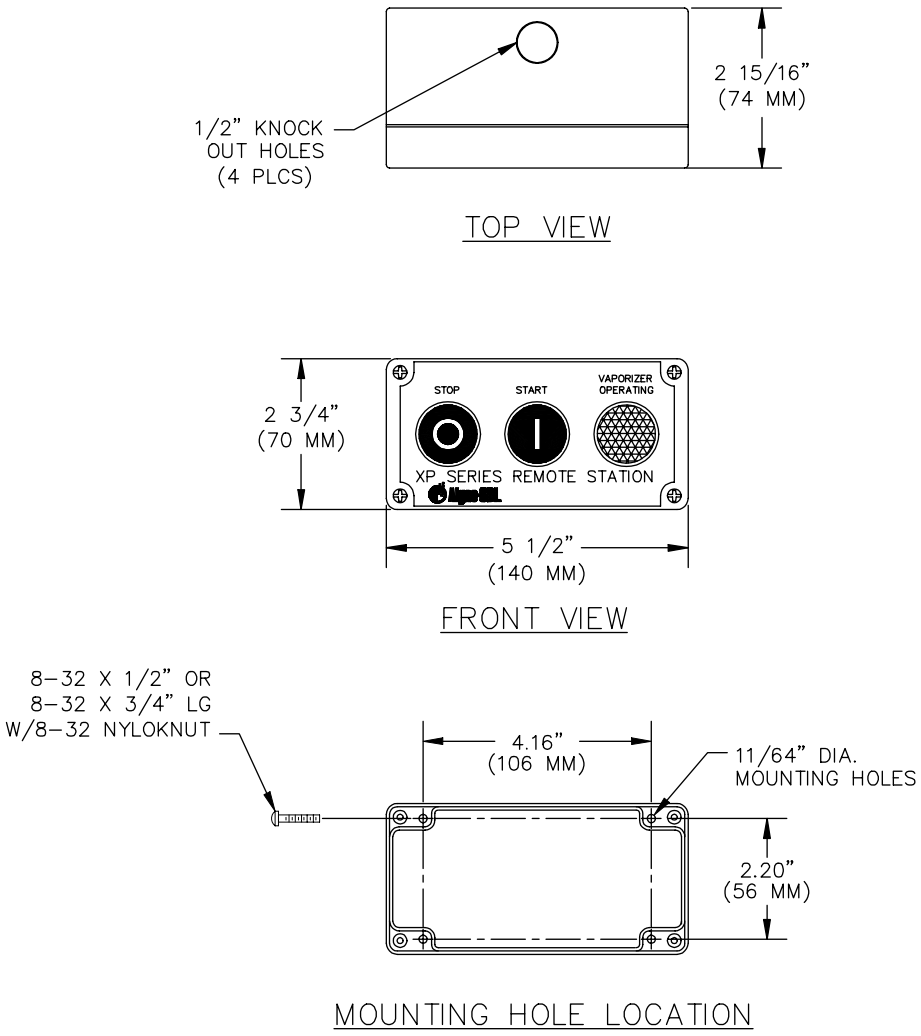
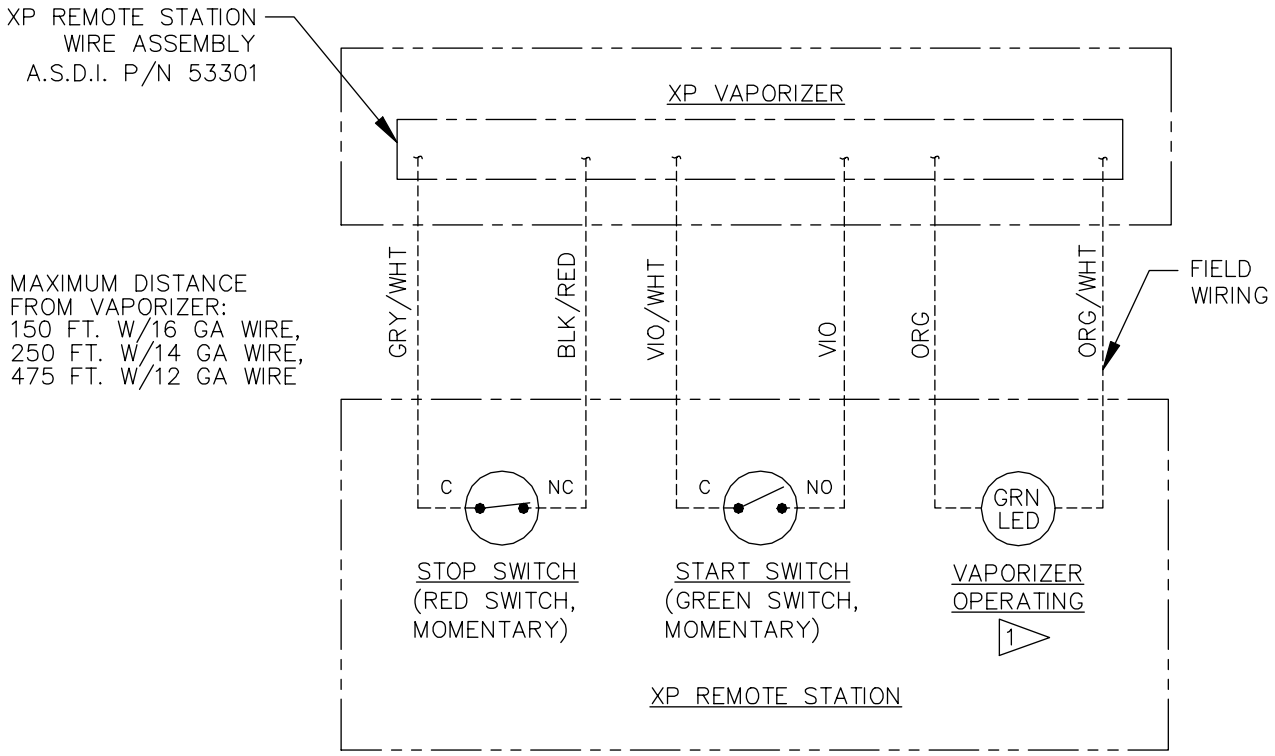


Figure 19 *- Remote Control Box Wiring – Stop / Start / Run Status*



1. VAPORIZER OPERATING LAMP WILL TURN ON AFTER 30–60 SECONDS AFTER THE START SWITCH IS PUSHED. HOWEVER IF THE VAPORIZER IS ALREADY WARM, THE LAMP WILL TURN ON IMMEDIATELY AFTER THE START SWITCH IS PUSHED.
2. FOR INDOOR/OUTDOOR INSTALLATION IN A GENERAL PURPOSE LOCATION ONLY.
3. ENCLOSURE RATING: IP65
4. ENCLOSURE MATERIAL: ABS THERMOPLASTIC

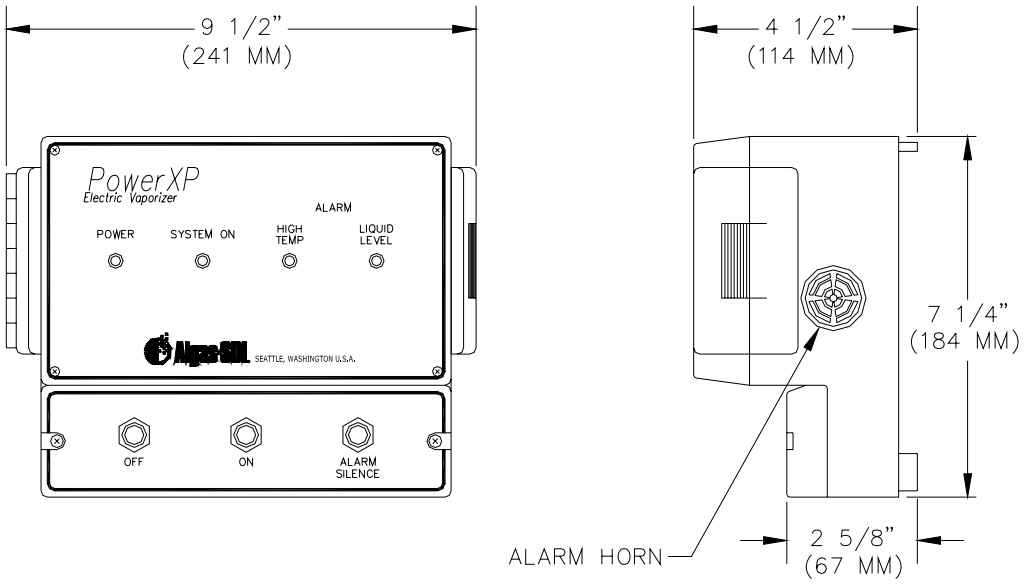
Indicating Lights

- VAPORIZER OPERATING: Illuminates when the vaporizer is operating (Solenoid Open).

Push Buttons

- **OFF:** Turns off the vaporizer.
- **ON:** Turns on the vaporizer.

Figure 20 *- Remote Control Box* ***(OBSOLETE – FOR REFERENCE ONLY, NOVEMBER 2003)***



Remote Control Box.wmf

Indicating Lights

(OBSOLETE – FOR REFERENCE ONLY, NOVEMBER 2003)

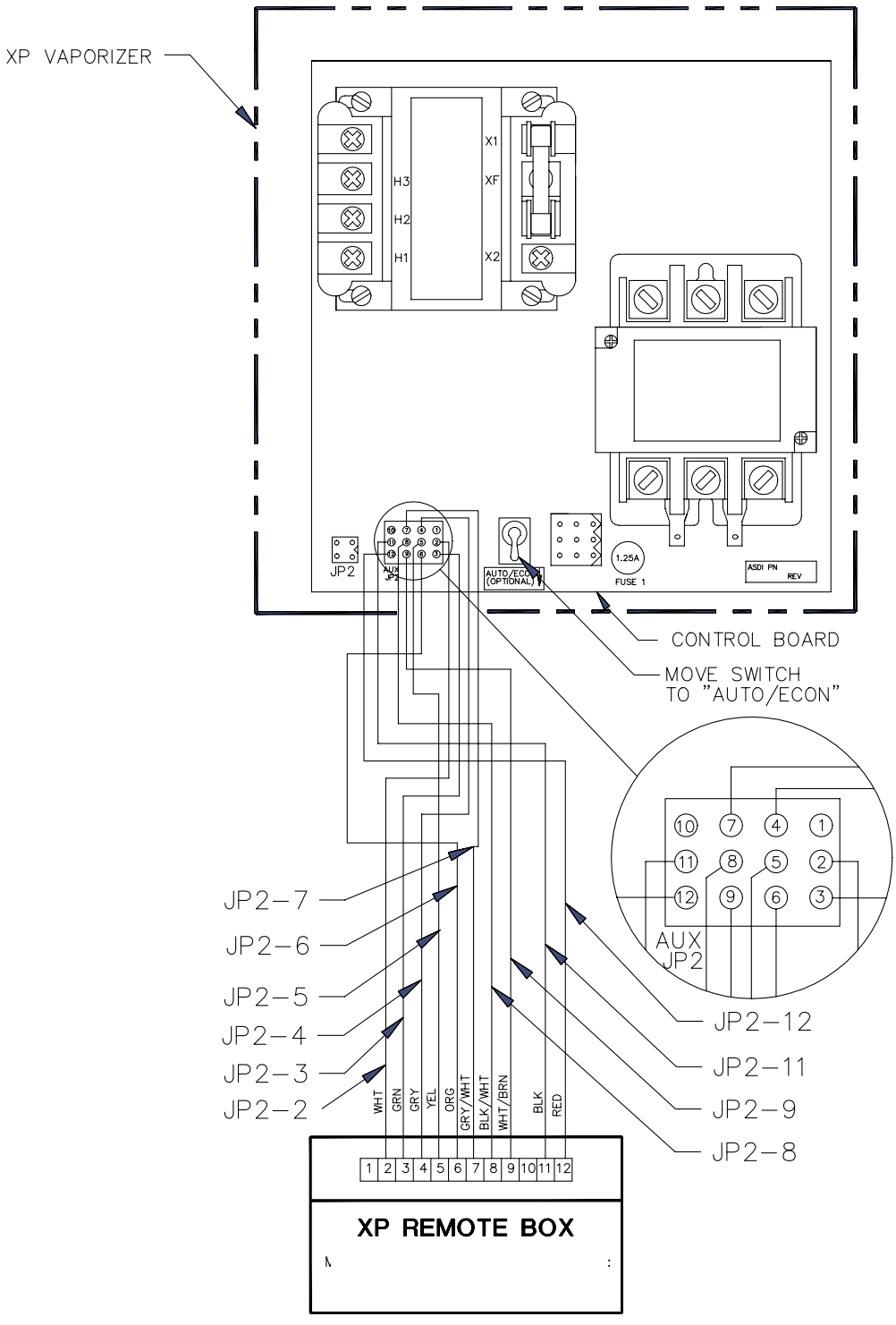
- **POWER:** Illuminates when power from the vaporizer is applied to the box.
- **SYSTEM ON:** Illuminates when the vaporizer has been started and is in operation.
- **HIGH TEMP:** Illuminates when the vaporizer exceeds its high temperature limit. The alarm horn will sound until it is silenced.
- **LIQUID LEVEL:** Illuminates when liquid in the vaporizer exceeds its high limit. The alarm horn will sound until it is silenced.

Push Buttons

(OBSOLETE – FOR REFERENCE ONLY, NOVEMBER 2003)

- **OFF:** Turns off the vaporizer.
- **ON:** Turns on the vaporizer.
- **ALARM SILENCE:** Silences the horn in the event of an alarm, however, the appropriate alarm light will remain illuminated until the alarm condition is cleared.

***Figure 21** - Interconnect Wiring Diagram (**POWER XP** Vaporizer with Remote Control Box)*
(OBSOLETE – FOR REFERENCE ONLY, NOVEMBER 2003)



Interconnect Wiring Diag.jpg

For REMOTE BOX Field Installation Kit use: **ASDI** PN: 50141P

Valve and Strainer Package

For a XP12.5 & XP80 use: **ASDI** PN: 36922 3/4"NPT inlet, 3/4"NPT outlet

For a XP120 & XP160 use: **ASDI** PN: 36922 3/4"NPT inlet, 1"NPT outlet

For a XP19AA & XP120AA use: **ASDI** PN: 36924 3/4"

For a XP180 & XP240 use: **ASDI** PN: 36925 1"

Contaminant Separator – Filtaire Optional

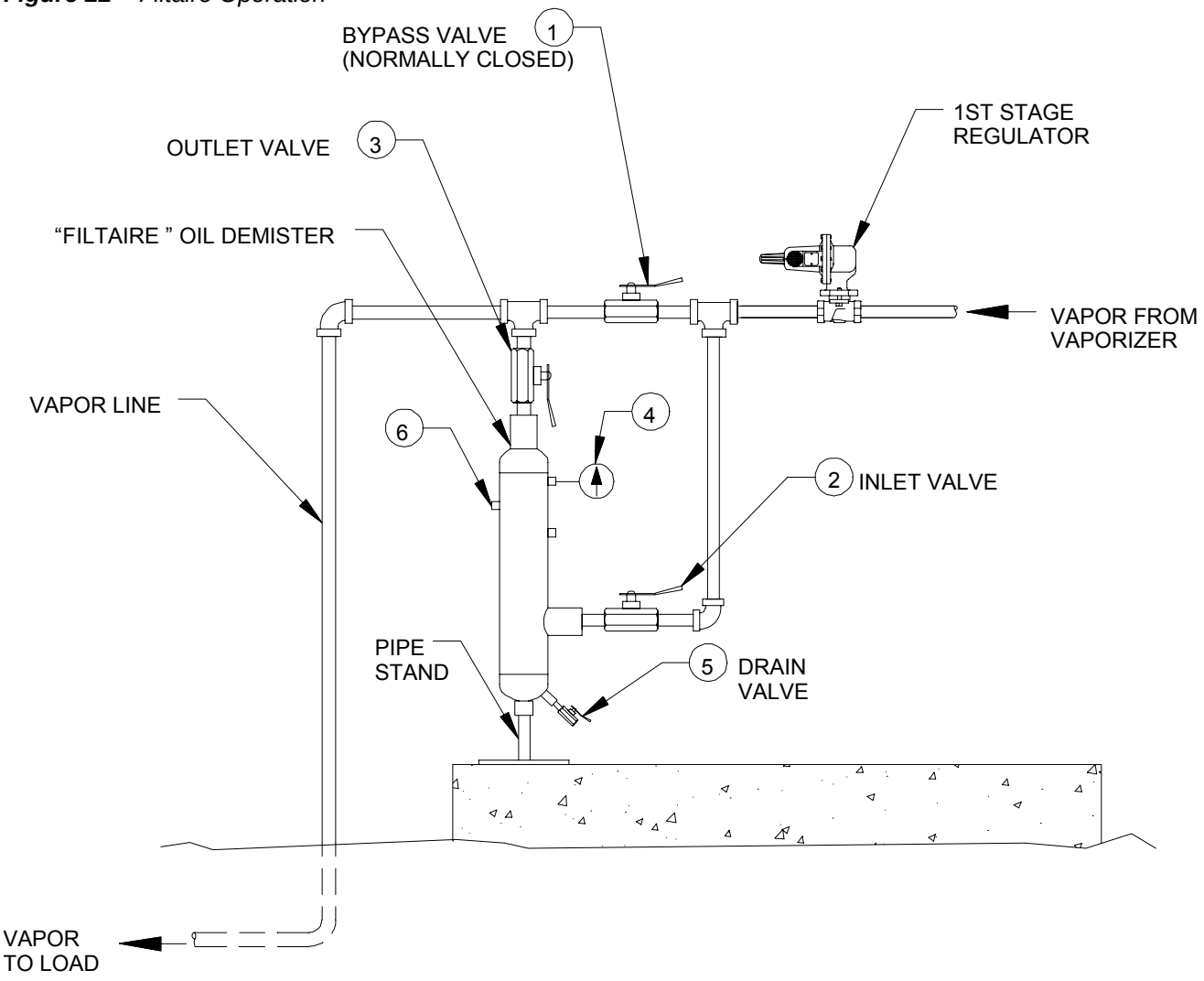
The **FILTAIRE** is a filtering device designed to trap heavy hydrocarbons commonly present in LPG gas vapor. It also traps other materials, which may be in the gas due to storage conditions and internal condition of the equipment.

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 **(*See Figure 32*).**

Note: Items 4, 5 and 6 are included with **FILTAIRE** assemblies.

Figure 22 *– Filtaire Operation*



Filtaire.wmf

Leak Test

CAUTION

The entire installation must be leak tested prior to operating the system.

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

APPENDIX A

TECHNICAL INFORMATION

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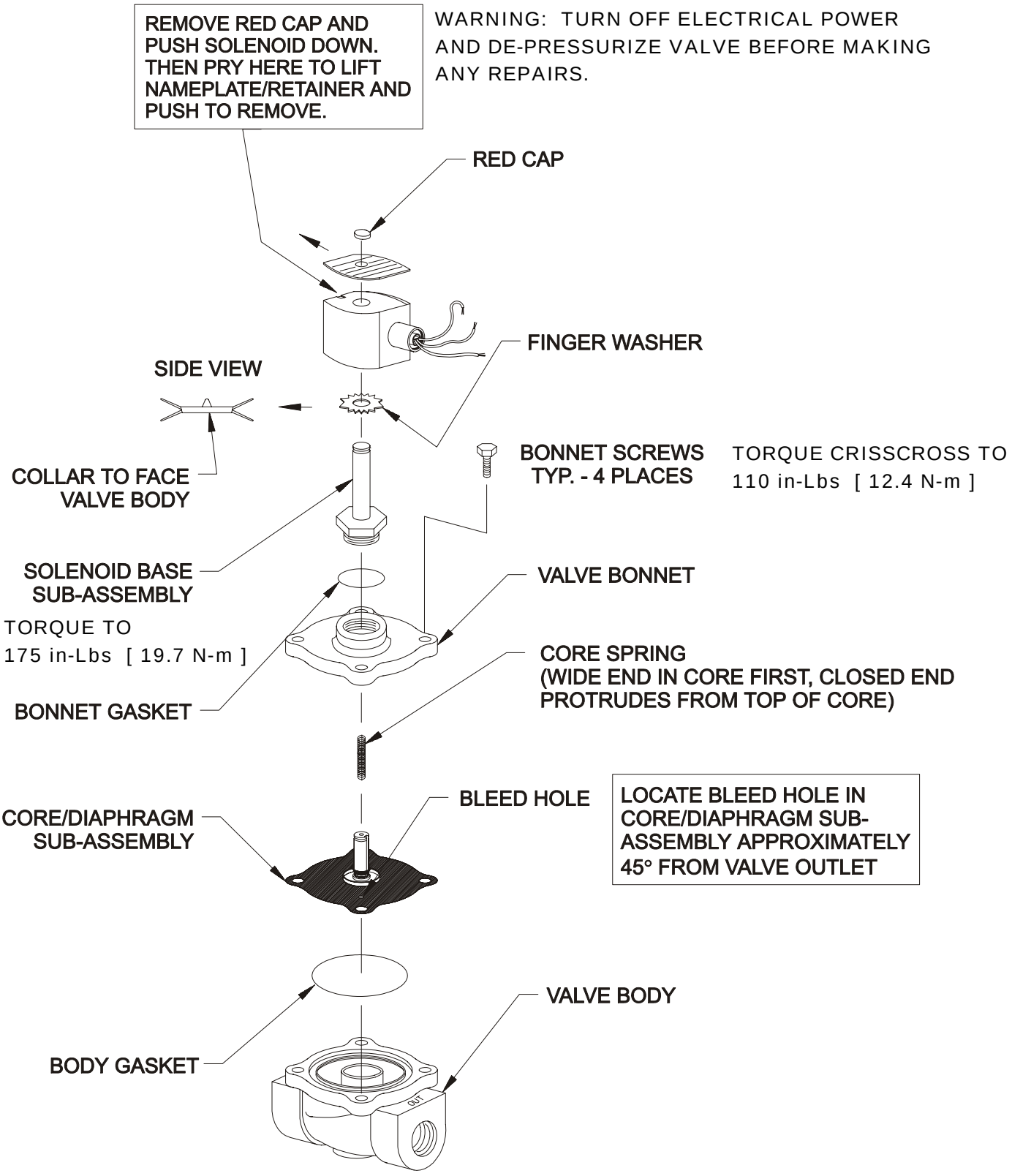
Figure 23 *- ASCO Valve used by Algas-SDI 2.9.98*



Algas-SDI ASCO Valve Draw.wmf

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.

Innovative Liquid Vaporizing and Gas Mixing Solutions

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POWER XP VERTICAL ELECTRIC VAPORIZER DATA SHEET
LPG MODELS

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	XP12, XP25, XP50, XP80
Operating Temperature:	93.3 - 100	Deg. C	200 - 212	Deg. F	XP160
High Temperature Limit:	174	Deg. C	345	Deg. F	
Connections:	3/4" NPT	Inlet - All,	3/4" NPT	Outlet - XP12, XP25, XP50, XP80	
			1" NPT	Outlet - XP160	
Conduit:	1" FNPT, Conduit Seal-Off by others				
Type of Service:	Propane Vaporization				
ASME Pressure Vessel:	250 PSIG MAWP				
Heat Exchange Area:	2.9 Ft^2 / 0.269 M^2	XP12, XP25, XP50,			
	4.3 Ft^2 / 0.399 M^2	XP80,			
	7.1 Ft^2 / 0.660 M^2	XP160			
Dry Weight:	110 LBS. / 49.9 Kg	XP12, XP25, XP50,			
	135 LBS. / 61.2 Kg	XP80,			
	166 LBS. / 75.3 Kg	XP160			

Wiring:	Meets NFPA Pamphlet 70 requirements for Class 1 Division 1 Group D
Other:	Meets NFPA Pamphlet 58 requirements for electric vaporizers and may be installed per indirect fired vaporizer limitations.

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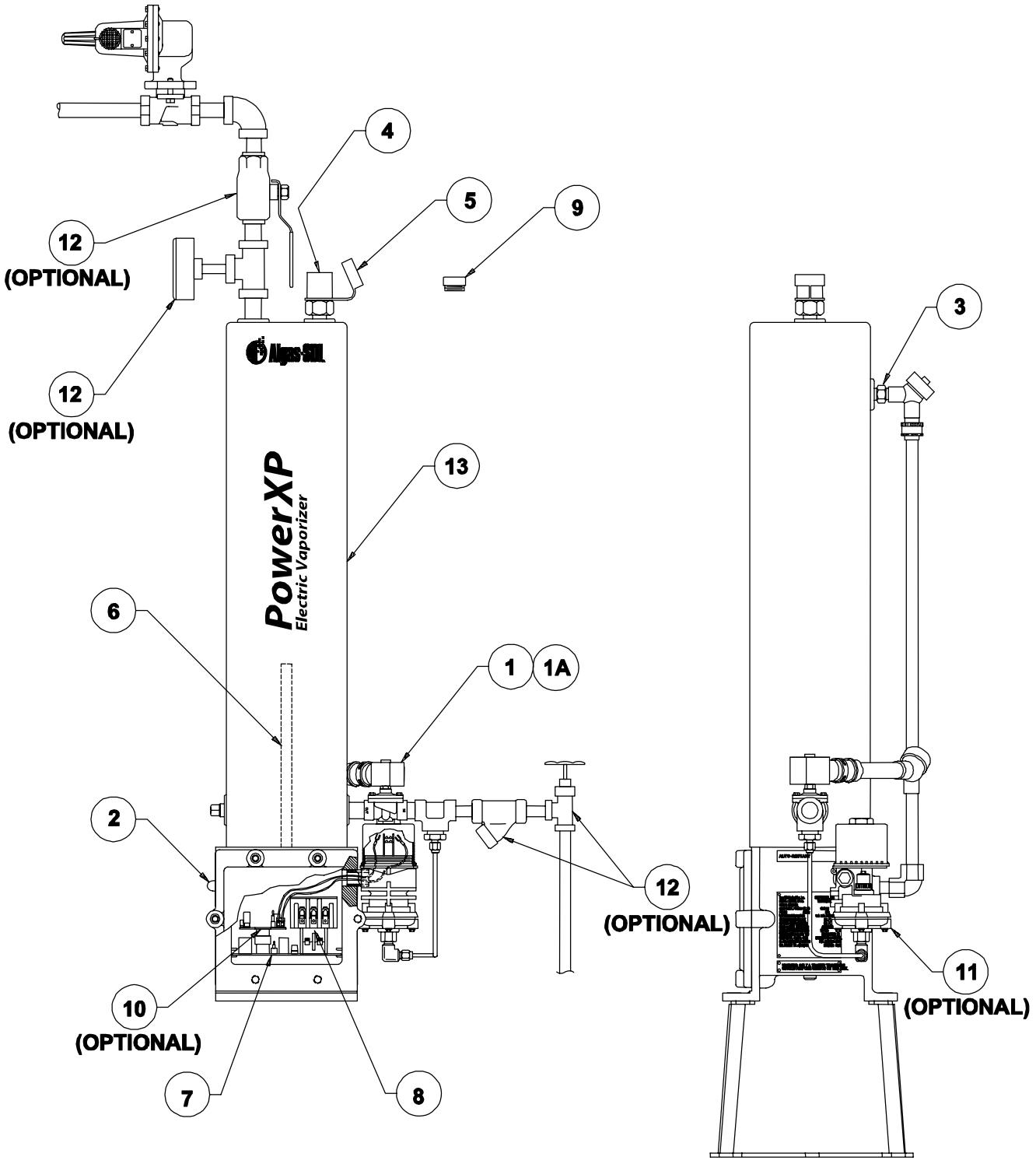
POWER XP VERTICAL ELECTRIC VAPORIZER DATA SHEET
LPG MODELS

Table: LPG VAPORIZER DATA TABLE

MODEL	PHASE	VOLTAGE	CURRENT - Amps.	POWER - Kw	EQUIPMENT DRAWING	ELECTRICAL DRAWING	BUSSING DIAGRAM
XP-12	1	120V	32.4	4	0620 - 6001	0620 - 7021	0620 - 7007
XP-12	1	208V	4.7	3	0620 - 6001	0620 - 7021	0620 - 7003
XP-12	1	220V	5.0	3	0620 - 6001	0620 - 7021	0620 - 7003
XP-12	1	240V	5.4	4	0620 - 6001	0620 - 7021	0620 - 7003
XP-25	1	208V	28.1	6	0620 - 6001	0620 - 7021	0620 - 7004
XP-25	1	220V	29.7	7	0620 - 6001	0620 - 7021	0620 - 7004
XP-25	1	240V	32.4	8	0620 - 6001	0620 - 7021	0620 - 7004
XP-50	1	208V	56.2	12	0620 - 6001	0620 - 7021	0620 - 7007
XP-50	1	220V	59.5	13	0620 - 6001	0620 - 7021	0620 - 7007
XP-50	1	240V	54.1	13	0620 - 6001	0620 - 7021	0620 - 7008
XP-25	3	208V	16.2	6	0620 - 6001	0620 - 7022	0620 - 7005
XP-25	3	220V	17.1	7	0620 - 6001	0620 - 7022	0620 - 7005
XP-25	3	240V	18.7	8	0620 - 6001	0620 - 7022	0620 - 7005
XP-25	3	380V	9.9	7	0620 - 6001	0620 - 7022	0620 - 7028
XP-25	3	415V	10.8	8	0620 - 6001	0620 - 7022	0620 - 7028
XP-50	3	208V	32.4	12	0620 - 6001	0620 - 7022	0620 - 7009
XP-50	3	220V	34.3	13	0620 - 6001	0620 - 7022	0620 - 7009
XP-50	3	240V	37.4	16	0620 - 6001	0620 - 7022	0620 - 7009
XP-50	3	380V	19.8	13	0620 - 6001	0620 - 7022	0620 - 7010
XP-50	3	415V	21.6	16	0620 - 6001	0620 - 7022	0620 - 7010
XP-50	3	440V	17.1	13	0620 - 6001	0620 - 7022	0620 - 7011
XP-50	3	480V	18.7	16	0620 - 6001	0620 - 7022	0620 - 7011
XP-80	3	208V	49.6	18	0620 - 6005	0620 - 7022	0620 - 7009
XP-80	3	220V	52.4	20	0620 - 6005	0620 - 7022	0620 - 7009
XP-80	3	240V	57.2	24	0620 - 6005	0620 - 7022	0620 - 7012
XP-80	3	380V	30.3	20	0620 - 6005	0620 - 7022	0620 - 7010
XP-80	3	415V	33.0	24	0620 - 6005	0620 - 7022	0620 - 7010
XP-80	3	440V	26.2	20	0620 - 6005	0620 - 7022	0620 - 7011
XP-80	3	480V	28.6	24	0620 - 6005	0620 - 7022	0620 - 7011
XP-80	3	575V	20.0	20	0620 - 6005	0620 - 7022	0620 - 7010
XP160	3	380V	50.2	33	0620 - 6005	0620 - 7022	0620 - 7010
XP160	3	415V	54.8	39	0620 - 6005	0620 - 7022	0620 - 7010
XP160	3	440V	50.2	33	0620 - 6005	0620 - 7022	0620 - 7011
XP160	3	480V	54.8	39	0620 - 6005	0620 - 7022	0620 - 7011

Figure 24 - POWER XP *Electric Vaporizer - LPG Models*



Drawing Reference Key	Spare Parts Description	Recommended Spares	Model/Voltage														
			XP12.5		XP25		XP50			XP80			XP120		XP160		
			120	208 220 240	208 220 240	380 415	208 220 240	380 415	440 480	208 220 240	380 415	440 480	380 415	440 480	380 415	440 480	575
7	Control Circuit Board	*	52701	52702	52702	52703	52702	52703	52704	52702	52703	52704	52703	52704	52703	52704	52705
7A	Control Transformer		52605-01	52606-01	52606-01	52607-01	52606-01	52607-01	52608-01	52606-01	52607-01	52608-01	52607-01	52608-01	52607-01	52608-01	52608-01
6	RTD Temperature Sensor		35681							35682			36020		36024		
1	Inlet Solenoid Valve		36111														
1A	Repair Kit, Inlet Solenoid Valve	*	40287														
7A	Fuse Cover, Control Xfmr		53097 Board Serial Number - 6999 DOWN / 53097-01 Board Serial Number - 7XXX UP														
	O-Ring, Cover		33410														
8	Contactor, Heater Control	*	52745 (Note #3) Board Serial Number - 8XXX UP														
3	Switch, Liquid Level	*	30897														
2	Switch, Start/Stop, Exp.		30887														
2A	Boot, Start/Stop	*	50302														
4	Valve, Pressure Relief		35009 / (30747 Old)														
5	Rain Cap for #4		35379														
	Fuse Kit - 2, 3A (Note #4)	*	52222														
	Fusible Link		33139														
Accessories																	
10	Auto Restart/Economy Module		52175														
11	Economy Operation Kit (#1)		80446														
9	Pipe Away Adapter for #5		30752														
13	Remote Control Panel		53300 (52141 OBSOLETE)														
12	Valve, Gauge, & Strainer Kit (#2)		36922														
	Stand		20437														
	Wire harness		52118														
	Corrosion Inhibiting Tape		60806														

#1 Kit includes pressure switch and all miscellaneous hardware. Requires 52175 (auto restart/economy module) to complete the economy operation.
#2 Kit includes strainer with magnetic plug, inlet valve with hydrostatic relief, outlet valve, gauge, and hardware.
#3 Part numbers 52603 & 52604 are obsolete, use Part Number 52745.
#4 One fuse kit included with each new vaporizer.

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POWER XP VERTICAL ELECTRIC VAPORIZER DATA SHEET
AMMONIA MODELS

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:	174	Deg. C	345	Deg. F
Connections:	3/4" NPT	300# Flanged SST Inlet - All,		
	3/4" NPT	300# Flanged Aluminum Outlet - XP12, XP25, XP50, XP80		
Conduit:	1" FNPT, Conduit Seal-Off by others			
Type of Service:	Ammonia Vaporization			
ASME Pressure Vessel:	250 PSIG MAWP			
Heat Exchange Area:	2.9 Ft^2 / 0.269 M^2	XP12, XP25, XP50,		
	4.3 Ft^2 / 0.399 M^2	XP80		
Dry Weight:	125 LBS. / 56.7 Kg	XP12, XP25, XP50,		
	150 LBS. / 68 Kg	XP80		

Wiring:	Meets NFPA Pamphlet 70 requirements for Class 1 Division 1 Group D
Other:	Meets NFPA Pamphlet 58 requirements for electric vaporizers and may be installed per indirect fired vaporizer limitations.

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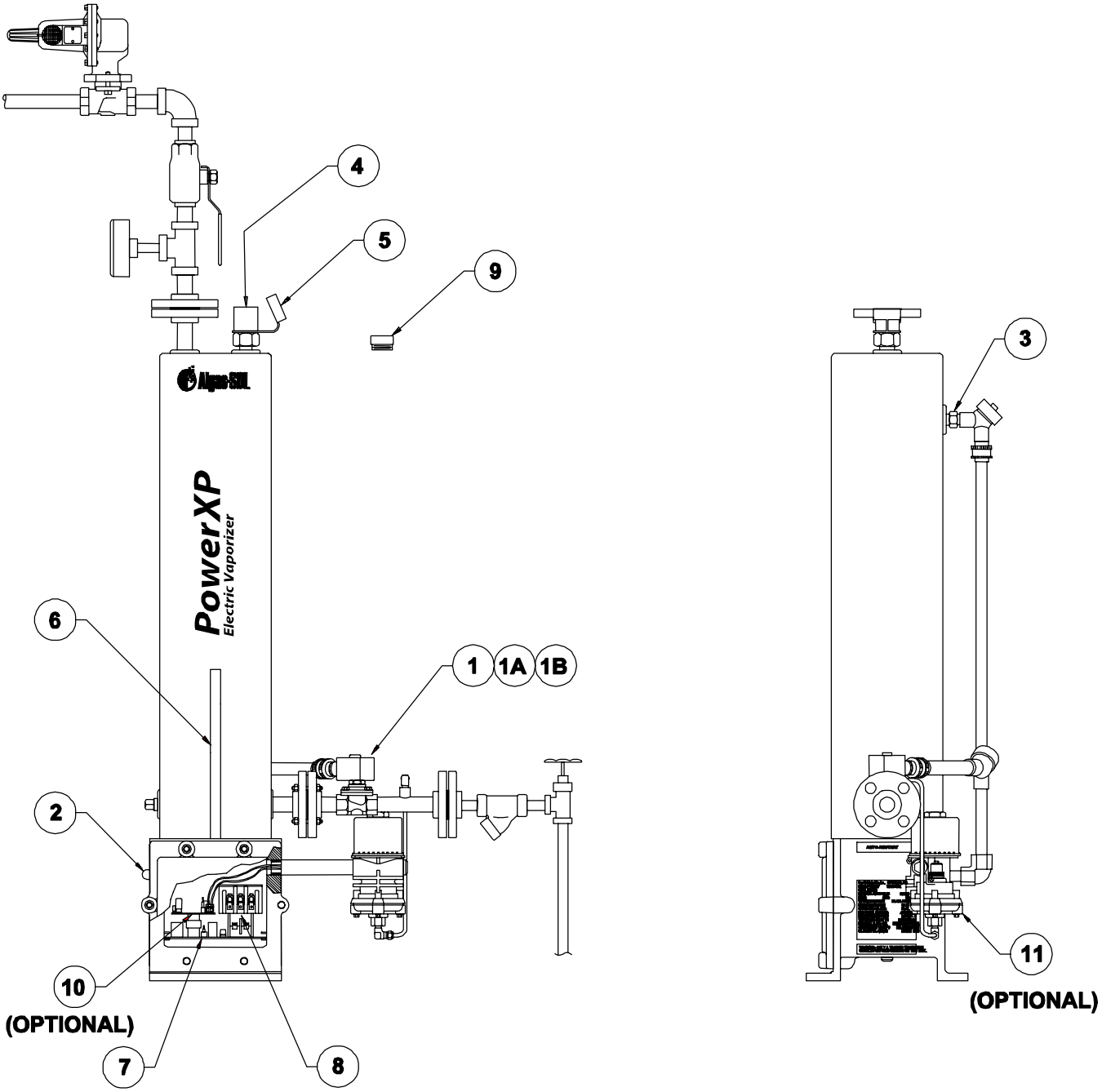
POWER XP VERTICAL ELECTRIC VAPORIZER DATA SHEET
AMMONIA MODELS

Table: AMMONIA VAPORIZER DATA TABLE

MODEL	PHASE	VOLTAGE	CURRENT - AMPS	POWER - KW	EQUIPMENT DRAWING	ELECTRICAL DRAWING	BUSSING DIAGRAM
XP-19AA	1	120V	32.4	4	0620 - 6003	0620 - 7021	0620 - 7007
XP-19AA	1	208V	4.7	3	0620 - 6003	0620 - 7021	0620 - 7003
XP-19AA	1	220V	5.0	3	0620 - 6003	0620 - 7021	0620 - 7003
XP-19AA	1	240V	5.4	4	0620 - 6003	0620 - 7021	0620 - 7003
XP-38AA	1	208V	28.1	6	0620 - 6003	0620 - 7021	0620 - 7004
XP-38AA	1	220V	29.7	7	0620 - 6003	0620 - 7021	0620 - 7004
XP-38AA	1	240V	32.4	8	0620 - 6003	0620 - 7021	0620 - 7004
XP-75AA	1	208V	56.2	12	0620 - 6003	0620 - 7021	0620 - 7007
XP-75AA	1	220V	59.5	13	0620 - 6003	0620 - 7021	0620 - 7007
XP-75AA	1	240V	54.1	13	0620 - 6003	0620 - 7021	0620 - 7008
XP-38AA	3	208V	16.2	6	0620 - 6003	0620 - 7022	0620 - 7005
XP-38AA	3	220V	17.1	7	0620 - 6003	0620 - 7022	0620 - 7005
XP-38AA	3	240V	18.7	8	0620 - 6003	0620 - 7022	0620 - 7005
XP-38AA	3	380V	9.9	7	0620 - 6003	0620 - 7022	0620 - 7028
XP-38AA	3	415V	10.8	8	0620 - 6003	0620 - 7022	0620 - 7028
XP-75AA	3	208V	32.4	12	0620 - 6003	0620 - 7022	0620 - 7009
XP-75AA	3	220V	34.3	13	0620 - 6003	0620 - 7022	0620 - 7009
XP-75AA	3	240V	37.4	16	0620 - 6003	0620 - 7022	0620 - 7009
XP-75AA	3	380V	19.8	13	0620 - 6003	0620 - 7022	0620 - 7010
XP-75AA	3	415V	21.6	16	0620 - 6003	0620 - 7022	0620 - 7010
XP-75AA	3	440V	17.1	13	0620 - 6003	0620 - 7022	0620 - 7011
XP-75AA	3	480V	18.7	16	0620 - 6003	0620 - 7022	0620 - 7011
XP-120AA	3	208V	49.6	18	0620 - 6007	0620 - 7022	0620 - 7009
XP-120AA	3	220V	52.4	20	0620 - 6007	0620 - 7022	0620 - 7009
XP-120AA	3	240V	57.2	24	0620 - 6007	0620 - 7022	0620 - 7012
XP-120AA	3	380V	30.3	20	0620 - 6007	0620 - 7022	0620 - 7010
XP-120AA	3	415V	33.0	24	0620 - 6007	0620 - 7022	0620 - 7010
XP-120AA	3	440V	26.2	20	0620 - 6007	0620 - 7022	0620 - 7011
XP-120AA	3	480V	28.6	24	0620 - 6007	0620 - 7022	0620 - 7011
XP-120AA	3	575V	20.0	20	0620 - 6007	0620 - 7022	0620 - 7010

Figure 25 - POWER XP *Electric Vaporizer - Ammonia Models*



Drawing Reference Key	Spare Parts Description	Recommended Spares	Model/Voltage														
			XP19AA		XP38AA		XP75AA			XP120AA			XP180AA		XP240AA		
			120	208 220 240	208 220 240	380 415	208 220 240	380 415	440 480	208 220 240	380 415	440 480	380 415	440 480	380 415	440 480	575
7	Control Circuit Board	*	52701	52702	52702	52703	52702	52703	52704	52702	52703	52704	52703	52704	52703	52704	52705
7A	Control Transformer		52605-01	52606-01	52606-01	52607-01	52606-01	52607-01	52608-01	52606-01	52607-01	52608-01	52607-01	52608-01	52607-01	52608-01	52608-01
6	RTD Temperature Sensor	*	35681							35682			36020		36024		
1	Inlet Solenoid Valve, Std.		32795														
1A	Inlet Solenoid Valve, Economy.		32797														
1B	Repair Kit, Inlet Solenoid Valve	*	40011														
1C	Gasket, 3/4" gylon		60133														
7A	Fuse Cover, Control Xfmr		53097 Board Serial Number - 6999 DOWN / 53097-01 Board Serial Number - 7XXX UP														
	O-Ring, Cover		33410														
8	Contactor, Heater Control	*	52745 (Note #2) Board Serial Number - 8XXX UP														
3	Switch, Liquid Level	*	30896														
2	Switch, Start/Stop, Exp.		30887														
2A	Boot, Start/Stop	*	50302														
4	Valve, Pressure Relief		30749														
5	Rain Cap for #4		35379														
	Fuse Kit - 2, 3A (Note #1)	*	52222														
	Fusible Link		33139														
Accessories																	
10	Auto Restart/Economy Module		52175														
9	Pipe Away Adapter		30967														
	Remote Control Panel		53300 (52141 OBSOLETE)														
11	Replacement Press. Switch, Economy		35945														
	Stand		20437														
	Valve, Gauge, & Strainer Kit		36924										36925				

#1 One fuse kit included with each new vaporizer.
#2 Part numbers 52603 & 52604 are obsolete, use Part Number 52745.

Innovative Liquid Vaporizing and Gas Mixing Solutions

POWER XP VERTICAL ELECTRIC VAPORIZER DATA SHEET
LPG NEMKO MODELS

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	XP12, XP25, XP50, XP80
Operating Temperature:	93.3 - 100	Deg. C	200 - 212	Deg. F	XP160
High Temperature Limit:	174	Deg. C	345	Deg. F	
Connections:	3/4" NPT	Inlet - All,	3/4" NPT	Outlet - XP12, XP25, XP50, XP80	
			1" NPT	Outlet - XP160	
Conduit:	1" FNPT, ATEX Approved gland style fitting by others				
Type of Service:	Propane Vaporization				
ASME Pressure Vessel:	250 PSIG MAWP				
Heat Exchange Area:	2.9 Ft^2 / 0.269 M^2	XP12, XP25, XP50,			
	4.3 Ft^2 / 0.399 M^2	XP80,			
	7.1 Ft^2 / 0.660 M^2	XP160			
Dry Weight:	110 LBS. / 49.9 Kg	XP12, XP25, XP50,			
	135 LBS. / 61.2 Kg	XP80,			
	166 LBS. / 75.3 Kg	XP160			
Approval:	Ex II 2 G	EEx d IIB T3	NEMKO 04ATEX1026		

Table: NEMKO VAPORIZER DATA TABLE

MODEL	PHASE	VOLTAGE	CURRENT - Amps.	POWER - Kw	EQUIPMENT DRAWING	ELECTRICAL DRAWING	BUSSING DIAGRAM
XP-12	1	220V	14.9	3.3	0620 - 6018	0602 - 7052	0620 - 7003
XP-12	1	240V	16.2	3.9	0620 - 6018	0602 - 7052	0620 - 7003
XP-25	1	240V	32.4	7.8	0620 - 6018	0602 - 7052	0620 - 7004
XP-25	3	240V	18.7	7.8	0620 - 6018	0602 - 7050	0620 - 7005
XP-25	3	380V	9.9	6.5	0620 - 6018	0602 - 7050	0620 - 7028
XP-25	3	400V	10.4	7.2	0620 - 6018	0602 - 7050	0620 - 7028
XP-50	3	240V	37.4	15.5	0620 - 6018	0602 - 7050	0620 - 7009
XP-50	3	380V	19.8	13.0	0620 - 6018	0602 - 7050	0620 - 7010
XP-50	3	400V	20.8	14.4	0620 - 6018	0602 - 7050	0620 - 7010
XP-80	3	240V	57.2	23.7	0620 - 6018	0602 - 7050	0620 - 7012
XP-80	3	380V	30.3	19.9	0620 - 6018	0602 - 7050	0620 - 7010
XP-80	3	400V	31.8	22.0	0620 - 6018	0602 - 7050	0620 - 7010
XP-80	3	415V	33.0	23.7	0620 - 6018	0602 - 7050	0620 - 7010
XP160	3	380V	50.2	33.0	0620 - 6018	0602 - 7050	0620 - 7010
XP160	3	400V	52.8	36.6	0620 - 6018	0602 - 7050	0620 - 7010
XP160	3	415V	54.8	39.3	0620 - 6018	0602 - 7050	0620 - 7010

Algas-SDI™ ...Innovative liquid vaporizing and gas mixing solutions

ISO 9001 Certified

CE Declaration of Conformity

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

Declare, solely under own responsibility, that the product

Model: XP 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 Ex II 2 G EEx d IIB T3	NEMKO 04ATEX1026
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-91
Technical Standards Applied: ASME B&PV Code, Section VIII, Div. 1		
Notified Body:	Det Norske Veritas AS Veritasveien 1 N-1322 Hovik, Norway	0575

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

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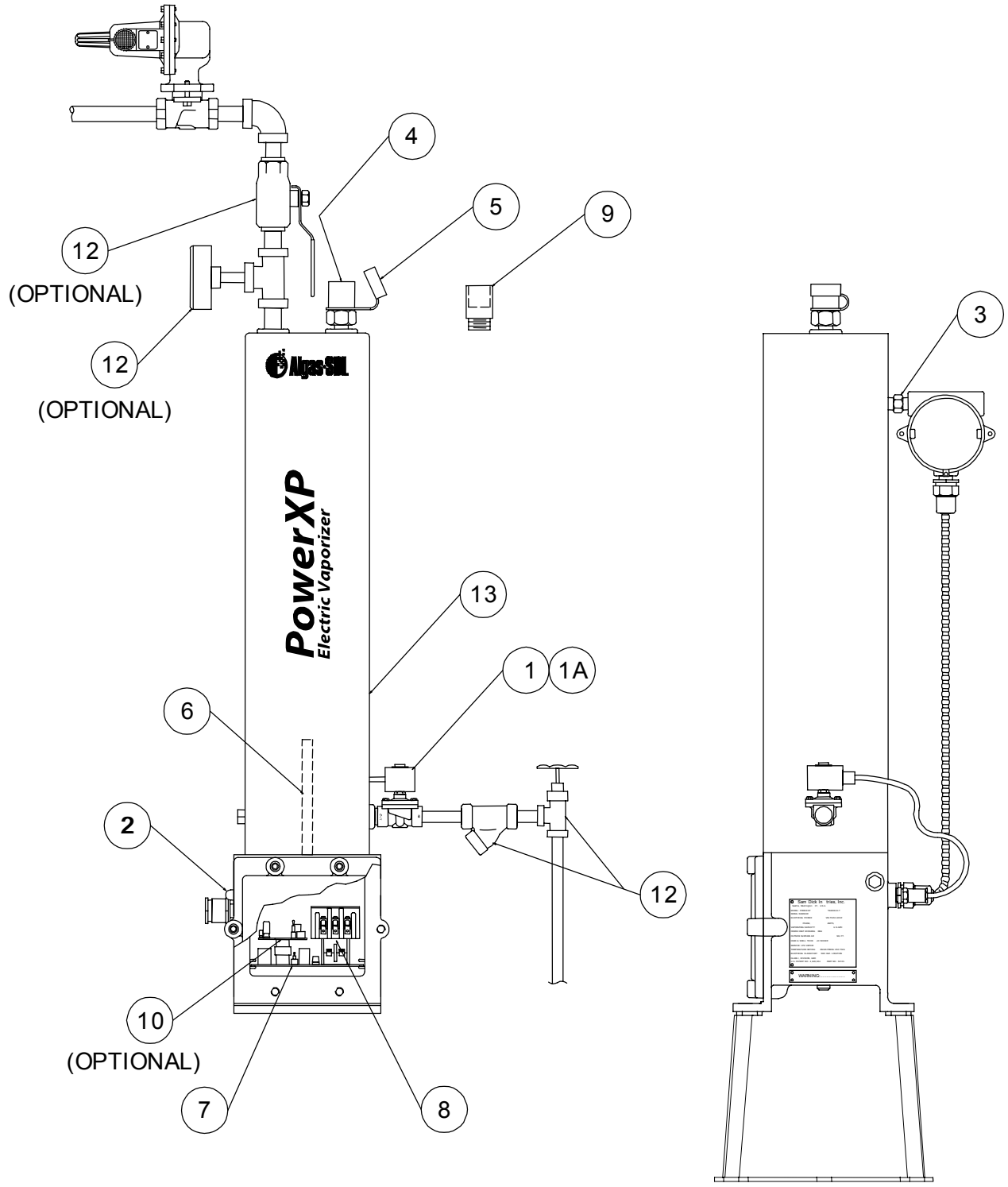
Mike Zimmer, PE
Engineering Manager
August 22, 2007

Figure 26 – POWER XP *Electric Vaporizer - NEMKO Models*



Drawing Reference Key	Spare Parts / Description	Recommended Spares	Model/Voltage														
			XP12.5		XP25		XP50			XP80			XP120		XP160		
			120	208 220 240	208 220 240	380 415	208 220 240	380 415	440 480	208 220 240	380 415	440 480	380 415	440 480	380 415	440 480	575
7	Control Circuit Board	*	52701	52702	52702	52703	52702	52703	52704	52702	52703	52704	52703	52704	52703	52704	52705
7A	Control Transformer		52605-01	52606-01	52606-01	52607-01	52606-01	52607-01	52608-01	52606-01	52607-01	52608-01	52607-01	52608-01	52607-01	52608-01	52608-01
6	RTD Temperature Sensor		35681							35682			36020		36024		
1	Inlet Solenoid Valve		33418														
1A	Repair Kit, Inlet Solenoid Valve	*	40249														
7A	Fuse Cover, Control Xfmr		53097 Board Serial Number - 6999 DOWN / 53097-01 Board Serial Number - 7XXX UP														
	O-Ring, Cover		33410														
8	Contactor, Heater Control	*	52745 (Note #3) Board Serial Number - 8XXX UP														
3	Switch, Liquid Level	*	30897														
2	Switch, Start/Stop, Exp.		30887														
2A	Boot, Start/Stop	*	50302														
4	Valve, Pressure Relief		35009 / (30747 Old)														
5	Rain Cap for 4		35379														
	Fuse Kit – 2, 3A (Note #4)	*	52222														
	Fusible Link		33139														
Accessories																	
10	Auto Restart/Economy Module		52175														
11	Economy Operation Kit (#1)		80446														
9	Pipe Away Adapter for #5		30752														
13	Remote Control Panel		53300 (52141 OBSOLETE)														
12	Valve, Gauge, & Strainer Kit (#2)		36922														
	Stand		20437														
	Wire harness		52118														
	Corrosion Inhibiting Tape		60806														

#1 Kit includes pressure switch and all miscellaneous hardware. Requires 52175 (auto restart/economy module) to complete the economy operation.
#2 Kit includes strainer with magnetic plug, inlet valve with hydrostatic relief, outlet valve, gauge, and hardware.
#3 Part numbers 52603 & 52604 are obsolete, use Part Number 52745.
#4 One fuse kit included with each new vaporizer.

Innovative Liquid Vaporizing and Gas Mixing Solutions

151 South Michigan Street
Seattle, WA 98108 USA
Phone: 206-789-5410
Fax: 206-789-5414
Web: www.algas-sdi.com

POWER XP VERTICAL ELECTRIC VAPORIZER DATA SHEET
LPG FEEDBACK MODELS

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			
Operating Temperature:	71 - 79	Deg. C	160 - 175	Deg. F
High Temperature Limit:	174	Deg. C	345	Deg. F
Operating Pressure Control:		psig - Closes		psig - Opens
High LPG Pressure Switch:	200	psig - Opens		
Connections:	3/4" NPT	Inlet - All,	3/4" NPT	Outlet - XP12 / XP25 / XP50 / XP80
Conduit:	1" FNPT, Conduit Seal-Off by others			
Type of Service:	Propane Vaporization			
ASME Pressure Vessel:	250 PSIG MAWP			
Heat Exchange Area:	2.9 Ft^2 / 0.269 M^2	XP12 / XP25 / XP50,		
	4.3 Ft^2 / 0.399 M^2	XP80		
Dry Weight:	110 LBS. / 49.9 Kg	XP12 / XP25 / XP50,		
	135 LBS. / 61.2 Kg	XP80		
Approval:	None			

Wiring:	Meets NFPA Pamphlet 70 requirements for Class 1 Division 1 Group D
Other:	Meets NFPA Pamphlet 58 requirements for electric vaporizers and may be installed per indirect fired vaporizer limitations.

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POWER XP VERTICAL ELECTRIC VAPORIZER DATA SHEET
LPG FEEDBACK MODELS

Table: FEEDBACK SYSTEMS DATA TABLE

MODEL	PHASE	VOLTAGE	CURRENT - Amps.	POWER - Kw	EQUIPMENT DRAWING	ELECTRICAL DRAWING	BUSSING DIAGRAM
XP-12	1	120V	32.4	4	0620 - 6012		0620 - 7007
XP-12	1	208V	4.7	3	0620 - 6012		0620 - 7003
XP-12	1	220V	5.0	3	0620 - 6012		0620 - 7003
XP-12	1	240V	5.4	4	0620 - 6012		0620 - 7003
XP-25	1	208V	28.1	6	0620 - 6012		0620 - 7004
XP-25	1	220V	29.7	7	0620 - 6012		0620 - 7004
XP-25	1	240V	32.4	8	0620 - 6012		0620 - 7004
XP-50	1	208V	56.2	12	0620 - 6012		0620 - 7007
XP-50	1	220V	59.5	13	0620 - 6012		0620 - 7007
XP-50	1	240V	54.1	13	0620 - 6012		0620 - 7008
XP-25	3	208V	16.2	6	0620 - 6012	0620 - 7031	0620 - 7005
XP-25	3	220V	17.1	7	0620 - 6012	0620 - 7031	0620 - 7005
XP-25	3	240V	18.7	8	0620 - 6012	0620 - 7031	0620 - 7005
XP-25	3	380V	9.9	7	0620 - 6012	0620 - 7031	0620 - 7028
XP-25	3	415V	10.8	8	0620 - 6012	0620 - 7031	0620 - 7028
XP-50	3	208V	32.4	12	0620 - 6012	0620 - 7031	0620 - 7009
XP-50	3	220V	34.3	13	0620 - 6012	0620 - 7031	0620 - 7009
XP-50	3	240V	37.4	16	0620 - 6012	0620 - 7031	0620 - 7009
XP-50	3	380V	19.8	13	0620 - 6012	0620 - 7031	0620 - 7010
XP-50	3	415V	21.6	16	0620 - 6012	0620 - 7031	0620 - 7010
XP-50	3	440V	17.1	13	0620 - 6012	0620 - 7031	0620 - 7011
XP-50	3	480V	18.7	16	0620 - 6012	0620 - 7031	0620 - 7011
XP-80	3	208V	49.6	18	0620 - 6012	0620 - 7031	0620 - 7009
XP-80	3	220V	52.4	20	0620 - 6012	0620 - 7031	0620 - 7009
XP-80	3	240V	57.2	24	0620 - 6012	0620 - 7031	0620 - 7012
XP-80	3	380V	30.3	20	0620 - 6012	0620 - 7031	0620 - 7010
XP-80	3	415V	33.0	24	0620 - 6012	0620 - 7031	0620 - 7010
XP-80	3	440V	26.2	20	0620 - 6012	0620 - 7031	0620 - 7011
XP-80	3	480V	28.6	24	0620 - 6012	0620 - 7031	0620 - 7011
XP-80	3	575V	20.0	20	0620 - 6012	0620 - 7031	0620 - 7010

XP SERIES FEEDBACK VAPORIZER

OVERVIEW

The feed back option is used to maintain a desired pressure in the storage tank when ambient temperatures or natural vaporization are inadequate. The LPG storage tank and vaporizer are installed in a loop arrangement with the vaporizer supplying heat to the tank via superheated vapor. Vaporizer pressure controls are added to cycle unit to obtain desired set pressure range and afford a high tank safety pressure below the tank pressure relief valve.

INSTALLATION AND OPERATION

The installation drawing (See Figure 25) shows the feedback option. This option consists of a liquid inlet line and a vapor outlet line routed directly back to the top of the tank vapor space. Inlet pressure to the vaporizer is from the liquid column in the storage tank. Therefore the vaporizer inlet must be below the bottom of the tank. Two feet minimum is recommended for proper operation. Installation of the vaporizer should be as close as possible to the storage tank to reduce any line pressure losses. Liquid inlet line should be minimum ¾" and outlet vapor line should be 1" minimum.

The vaporizer has the float switch and inlet solenoid valve removed. Two pressure switches are added, one an operational switch to start/ stop the vaporizer based on required tank pressure and one as a high tank safety pressure switch to prevent over pressurization of the storage tank. The operational switch is the economy switch option for this unit. The vaporizer cycles within a pressure range controlled by this switch to maintain tank pressure. The high tank pressure safety switch is wired to the float switch terminals on the control board and will cause a safety shutdown when over pressure is reached.

The Data Sheet will identify the pressures that the operational switch will cycle the vaporizer between. It will also list the high tank safety pressure setting. These pressures should be checked when installing the unit and adjusted if necessary.

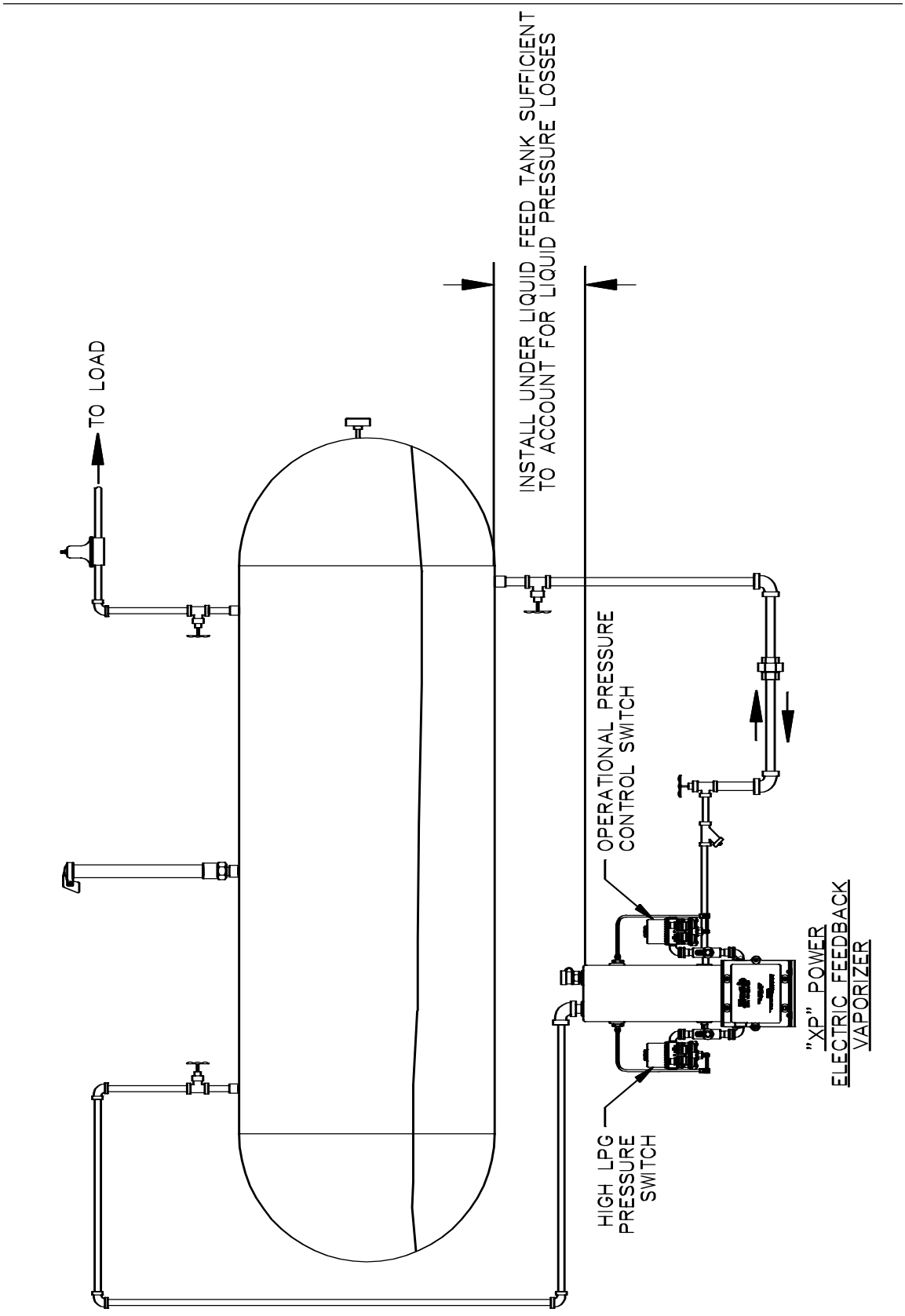
MAINTENANCE

Annually check and reset operation and high tank safety pressure switch settings to those listed on the Data Sheet.

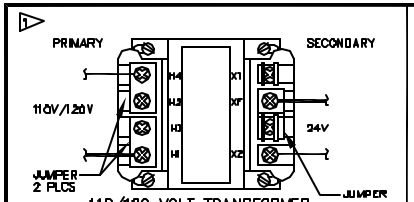
TROUBLESHOOTING

Treat the operational pressure switch as an economy pressure switch for troubleshooting. The high pressure tank safety switch replaces the float switch for troubleshooting.

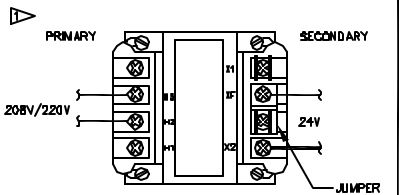
Figure 27 *- XP Feedback.wmf, Typical installation diagram*



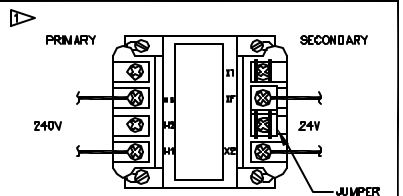
REVISIONS		
Rev	Description	Rev. by
A	UPDATED AND RENUMBERED PER NEW "XP" CONFIGURATIONS	J.M.B. 5-30-97
B	1) ADDED 110V/120V TRANSFORMER CONFIGURATION 2) ADDED NOTES REFERING TO BUSSING DIAGRAMS & ▷	G.L.R. 9-6-00
C	1) ADDED NEW TRANSFORMER DETAIL & ▷2 ▷3 4	G.L.R. 1-22-04



110/120 VOLT TRANSFORMER
CONFIGURATION 50/60HZ
(MODEL XP12.5 ONLY)

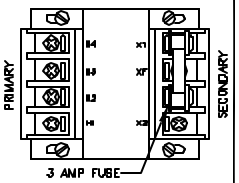


LOW VOLTAGE TRANSFORMER
CONFIGURATION 50/60HZ

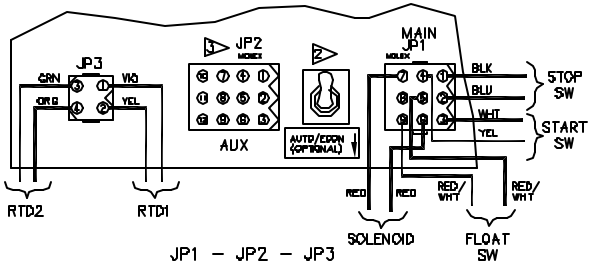


HIGH VOLTAGE TRANSFORMER
CONFIGURATION 50/60HZ

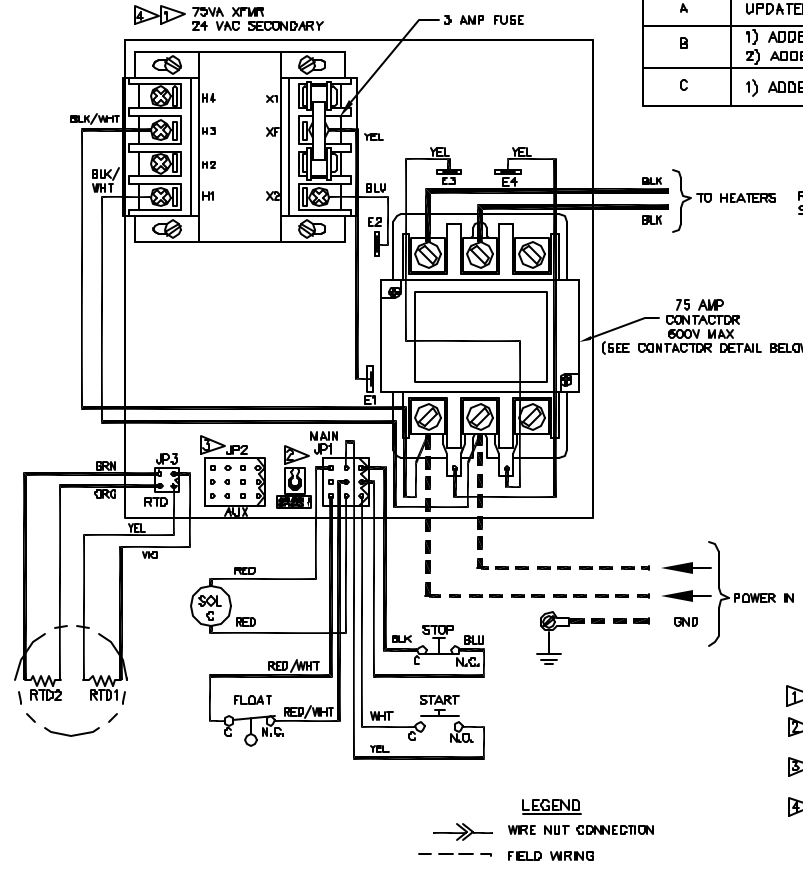
A.S.D.I. P/N 52606-01	A.S.D.I. P/N 52607-01	A.S.D.I. P/N 52608-01	PRIMARY
240V	415V	575V	H4
220V	400V	480V	H3
208V	380V	440V	H2
COMMON/ 0V	COMMON/ 0V	COMMON/ 0V	H1

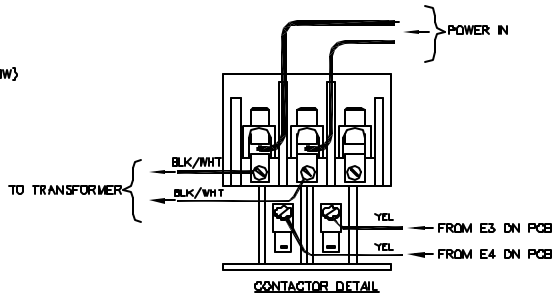


208 THRU 575 VOLT CONFIGURATION



JP1 - JP2 - JP3
MOLEX CONNECTOR DETAILS





NOTES

1. SEE TRANSFORMER CONFIGURATIONS FOR OTHER VOLTAGE CONFIGURATIONS.
2. TOGGLE SWITCH SHOWN SET TO NO OPTIONS. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
3. USED FOR REMOTE BOX, AUTO RESTART OPTION AND ECONOMY OPTION. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
4. NEW TRANSFORMER USED ON XP BOARD WITH SERIAL NUMBERS STARTING AT 7000, 527XX-7XXX.

LEGEND

WIRE NUT CONNECTION

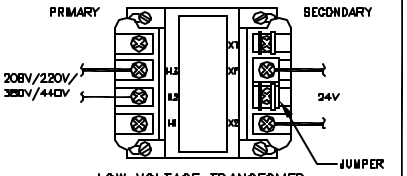
FIELD WIRING

Algas-SDI
1140 N.W. 46th St., Seattle, Washington, USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

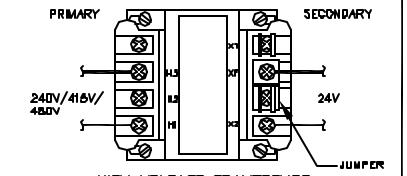
Title: PRINTED CIRCUIT BOARD WIRING DIAGRAM FOR 110V THRU 240V / 1PH ELECTRIC VERTICAL VAPORIZER MODELS XP12.5 THRU XP50 AND MODELS XP15.5AA THRU XP62AA

Drawn By: BRISSON	Date: 5-30-97	Dwg. No.: 0620-7021	
Checked By:	Scale: NONE		
Approved By:	Job No.: A.S.D.I. STD.		
	Part Number:	Size: B	Sht. No.: 1 of 1 / Rev: C

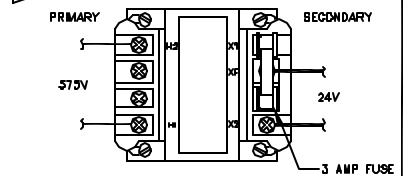
REVISIONS		
Rev	Description	Rev. by
A	UPDATED AND RENUMBERED PER NEW "XP" CONFIGURATIONS	J.M.B. 5-30-97
B	1) ADDED 575V TRANSFORMER CONFIGURATION 2) ADDED NOTES REFERING TO BUSSING DIAGRAMS & 1	G.L.R. 9-6-00
C	1) ADDED NEW TRANSFORMER DETAIL & 2 3 4	G.L.R. 1-22-04



LOW VOLTAGE TRANSFOMER
CONFIGURATION 50/60HZ

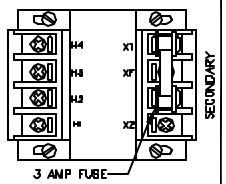


HIGH VOLTAGE TRANSFOMER
CONFIGURATION 50/60HZ

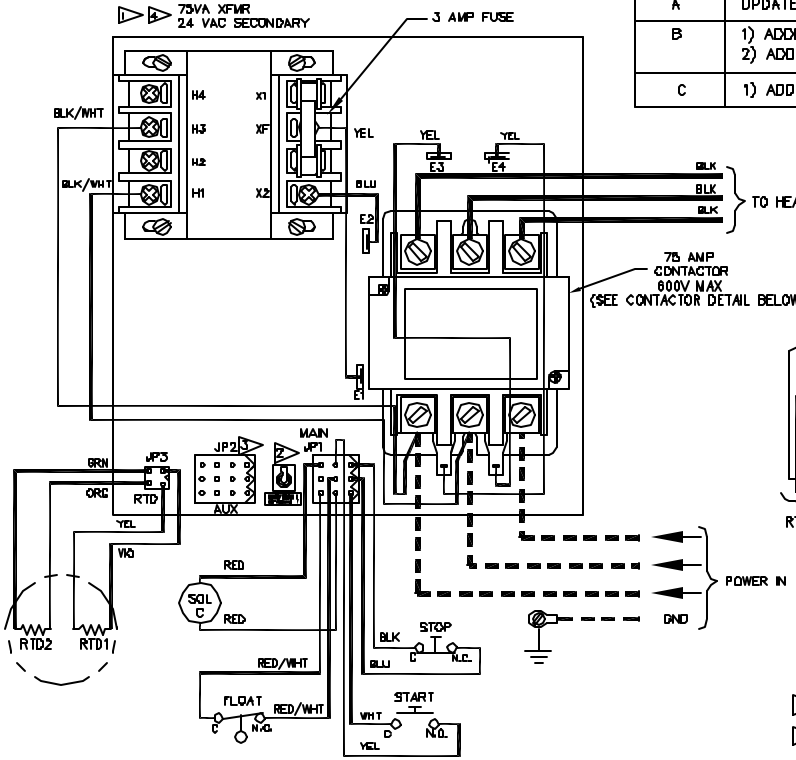


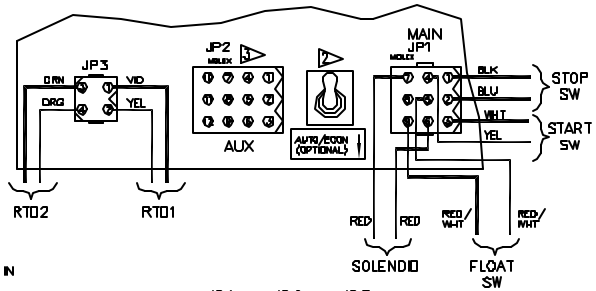
575 VOLT TRANSFOMER
CONFIGURATION 50/60HZ

A.S.D.I. P/N 52606-01	A.S.D.I. P/N 52607-01	A.S.D.I. P/N 52608-01	PRIMARY
240V	415V	575V	H4
220V	400V	480V	H3
208V	380V	440V	H2
COMMON/ 0V	COMMON/ 0V	COMMON/ 0V	H1



208 THRU 575 VOLT CONFIGURATION



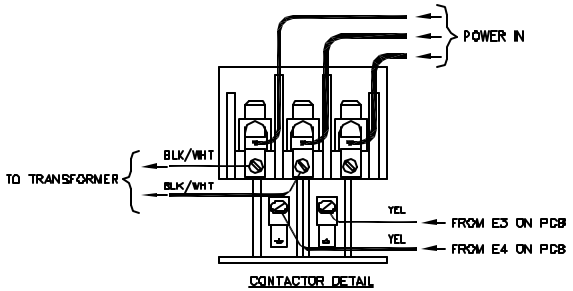


JP1 – JP2 – JP3
MOLEX CONNECTOR DETAILS

LEGEND
WIRE NUT CONNECTION
FIELD WIRING

NOTES

1. SEE TRANSFORMER CONFIGURATIONS FOR OTHER VOLTAGE CONFIGURATIONS.
2. TOGGLE SWITCH SHOWN SET TO NO OPTIONS. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
3. USED FOR REMOTE BOX, AUTO RESTART OPTION AND ECONOMY OPTION. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
4. NEW TRANSFORMER USED ON XP BOARD WITH SERIAL NUMBERS STARTING AT 7000, 627XX-7XXX.



CONTACTOR DETAIL

Algas-SDI
1140 N.W. 46th St., Seattle, Washington, USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

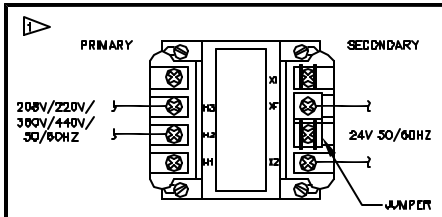
Drawn By BRISSON	Date 5-30-97
Checked By	Scale NONE
Approved By	Job No. A.S.D.I. STD.
	Part Number

Title: PRINTED CIRCUIT BOARD WIRING DIAGRAM FOR 208V THRU 575V / 3PH ELECTRIC VERTICAL VAPORIZER MODELS XP25 THRU XP160 AND MODELS XP38AA THRU XP240AA

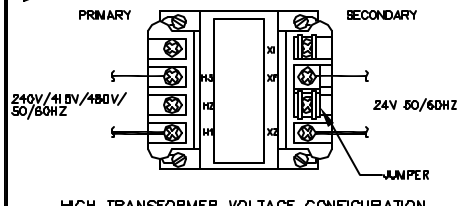
Dwg. No. 0620-7022

Size	Sht. No.	Rev
B	1 of 1	C

REVISIONS		
REV	DESCRIPTION	REV. BY
E	1) ADDED TRANSFORMER VOLTAGE CONFIGURATIONS, CONTACTOR DETAIL, WIRE NUT CONNECTIONS, AND ADDED 208V – 480 TO TITLE BLOCK 2) SEE REVISION D FOR PREVIOUS REVISIONS	G.L.R. 11-10-99
F	1) ADDED NEW TRANSFORMER DETAIL & 2 3 4	G.L.R. 1-22-04



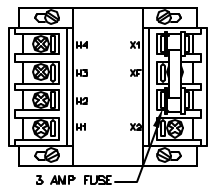
LOW TRANSFORMER VOLTAGE CONFIGURATION



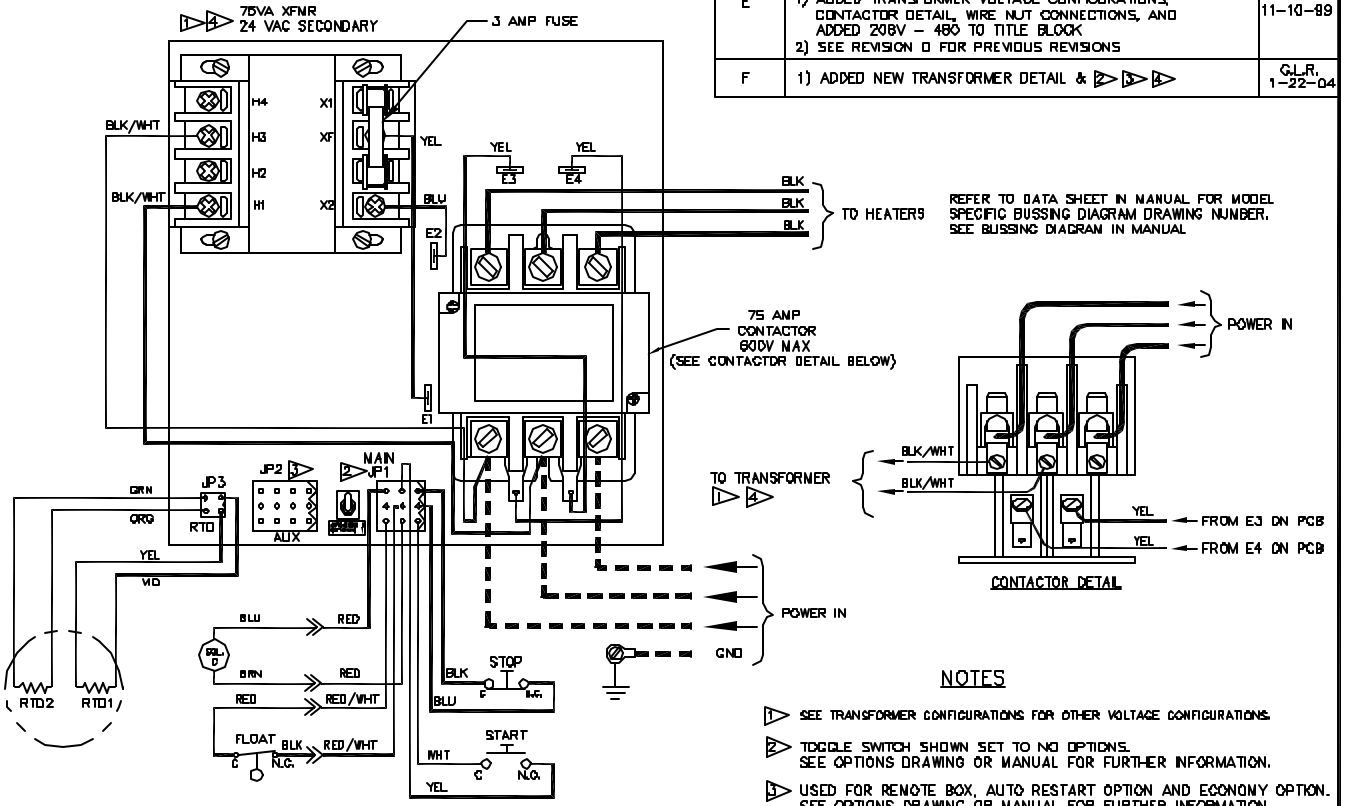
HIGH TRANSFORMER VOLTAGE CONFIGURATION

4

A.S.D.I. P/N 52606-01	A.S.D.I. P/N 52607-01	A.S.D.I. P/N 52608-01	PRIMARY
240V	415V	575V	H4
220V	400V	480V	H3
208V	380V	440V	H2
COMMON/ 0V	COMMON/ 0V	COMMON/ 0V	H1



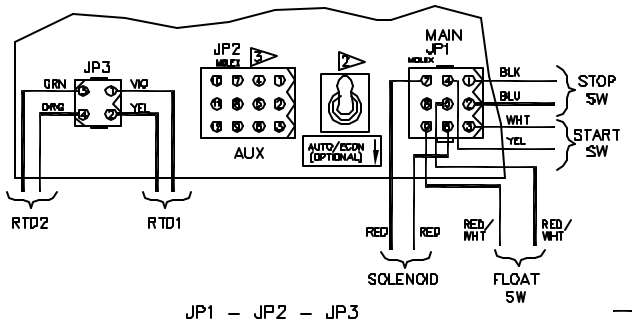
208 THRU 575 VOLT CONFIGURATION



REFER TO DATA SHEET IN MANUAL FOR MODEL SPECIFIC BUSSING DIAGRAM DRAWING NUMBER. SEE BUSSING DIAGRAN IN MANUAL

NOTES

1. SEE TRANSFORMER CONFIGURATIONS FOR OTHER VOLTAGE CONFIGURATIONS.
2. TOGGLE SWITCH SHOWN SET TO NO OPTIONS. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
3. USED FOR REMOTE BOX, AUTO RESTART OPTION AND ECONOMY OPTION. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
4. NEW TRANSFORMER USED ON XP BOARD WITH SERIAL NUMBERS STARTING AT 7000, 527XX-7XXX.



JP1 – JP2 – JP3
MOLEX CONNECTOR DETAILS

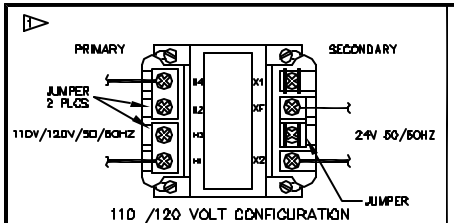
LEGEND
WIRE NUT CONNECTION
FIELD WIRING

Algas-SDI
1140 N.W. 46th St., Seattle, Washington, USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

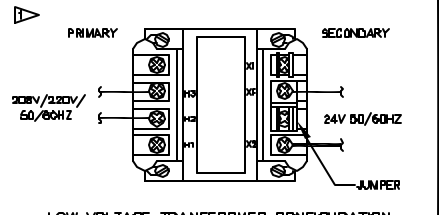
Title: PRINTED CIRCUIT BOARD WIRING DIAGRAM FOR 208V THRU 480V / 3Ø POWER VERTICAL MODELS XP25 THRU XP160 NEMKO VERSION

Drawn By: G. ROPPE	Date: 10-31-96	Dwg. No.: 0602-7050
Checked By:	Scale: NONE	
Approved By:	Job No.: A.S.D.I. STD.	
	Part Number:	Size: B / Sht. No.: 1 of 1 / Rev: F

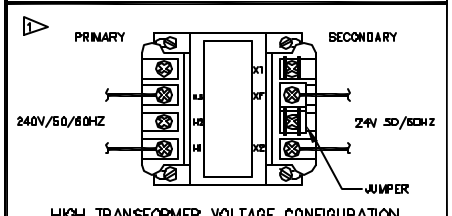
REVISIONS		
REV	DESCRIPTION	REV. BY
A	1) INITIAL RELEASE	G.L.R. 9-25-98
B	1) ADDED TRANSFORMER VOLTAGE CONFIGURATIONS AND CONTACTOR DETAIL	G.L.R. 11-12-99
C	1) ADDED NEW TRANSFORMER DETAIL & 2 3 4	G.L.R. 1-22-04



110 /120 VOLT CONFIGURATION
MODEL XP12.5 ONLY

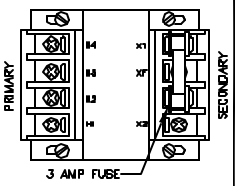


LOW VOLTAGE TRANSFORMER CONFIGURATION

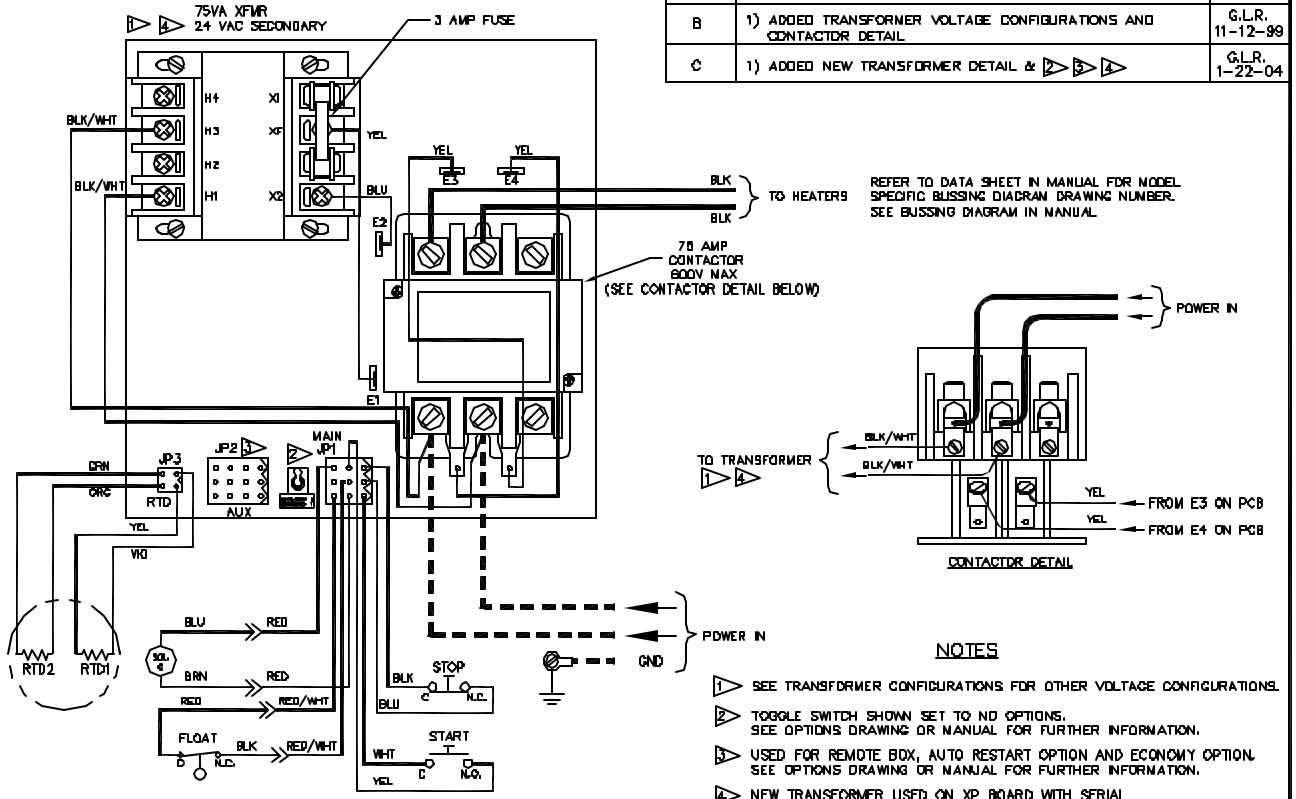


HIGH TRANSFORMER VOLTAGE CONFIGURATION

A.S.D.I. P/N 52606-01	A.S.D.I. P/N 52607-01	A.S.D.I. P/N 52608-01	PRIMARY
240V	415V	575V	H4
220V	400V	480V	H3
208V	380V	440V	H2
COMMON/ 0V	COMMON/ 0V	COMMON/ 0V	H1

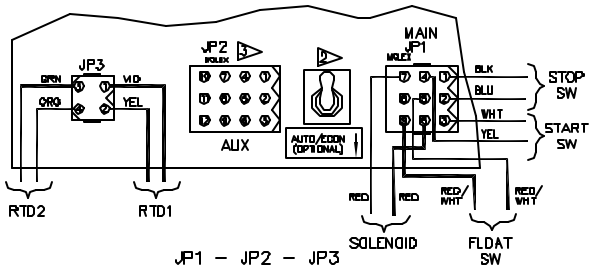


208 THRU 575 VOLT CONFIGURATION



NOTES

1. SEE TRANSFORMER CONFIGURATIONS FOR OTHER VOLTAGE CONFIGURATIONS.
2. TOGGLE SWITCH SHOWN SET TO NO OPTIONS. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
3. USED FOR REMOTE BOX, AUTO RESTART OPTION AND ECONOMY OPTION. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
4. NEW TRANSFORMER USED ON XP BOARD WITH SERIAL NUMBERS STARTING AT 7000, 527XX-7XXX.



JP1 - JP2 - JP3
MOLEX CONNECTOR DETAILS

LEGEND
WIRE NUT CONNECTION
FIELD WIRING

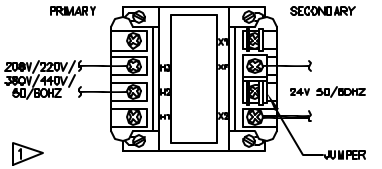
Algas-SDI
1140 N.W. 46th St., Seattle, Washington. USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

Drawn By G. ROPPE	Date 10-31-96
Checked By	Scale NONE
Approved By	Job No. A.S.D.I. STD.
	Part Number

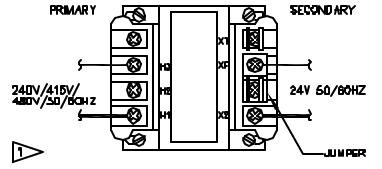
Title: PRINTED CIRCUIT BOARD WIRING DIAGRAM FOR 110V THRU 240V / 1 PH POWER VERTICAL MODELS XP12.5 THRU XP80 NEMKO VERSION

Dwg. No. 0602-7052

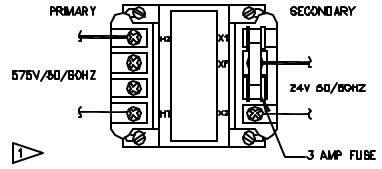
Size B | Sht. No. 1 of 1 | Rev C



LOW TRANSFORMER VOLTAGE CONFIGURATION

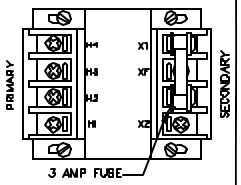


HIGH TRANSFORMER VOLTAGE CONFIGURATION

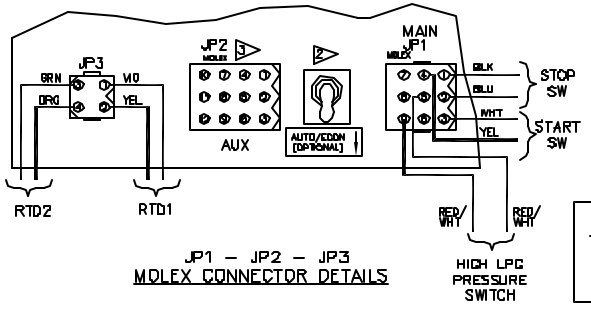


575 VOLT CONFIGURATION

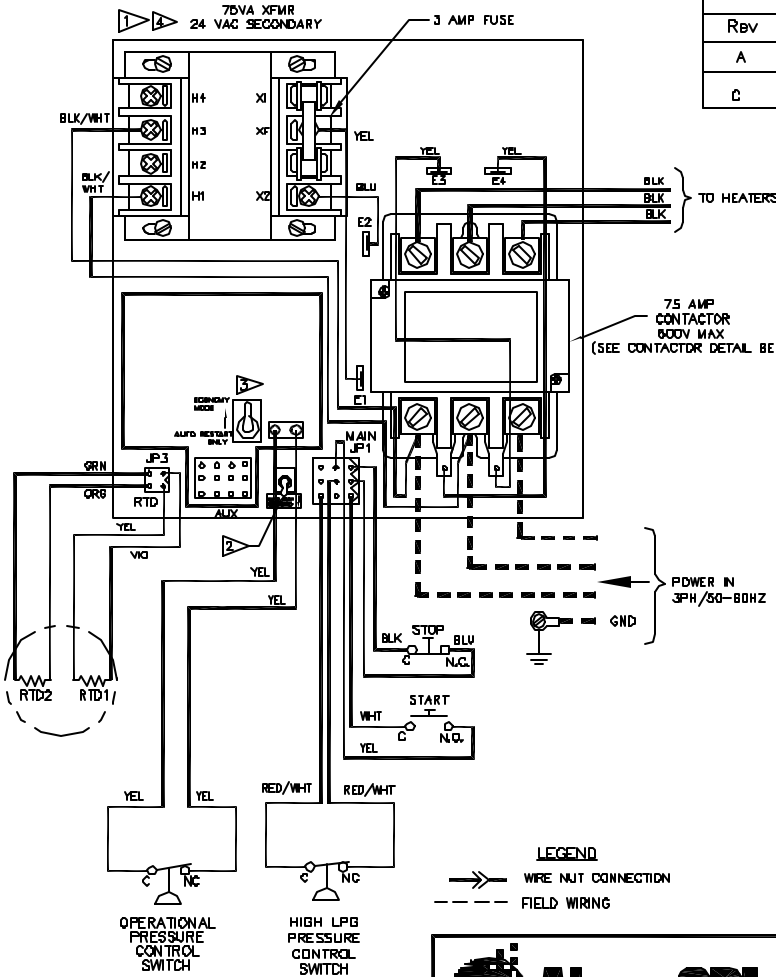
A.S.D.I. P/N 52605-01	A.S.D.I. P/N 52607-01	A.S.D.I. P/N 52608-01	PRIMARY
240V	415V	575V	H4
220V	400V	480V	H3
208V	380V	440V	H2
COMMON/ 0V	COMMON/ 0V	COMMON/ 0V	H1

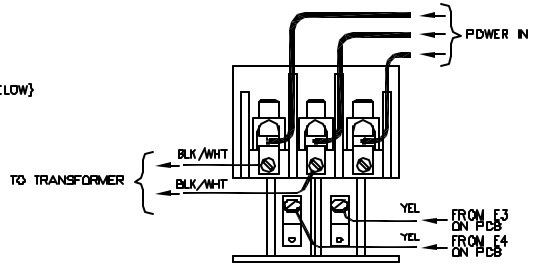


208 THRU 575 VOLT CONFIGURATION



JP1 - JP2 - JP3
MOLEX CONNECTOR DETAILS





CONTACTOR DETAIL

LEGEND

WIRE NUT CONNECTION

FIELD WIRING

REFER TO DATA SHEET IN MANUAL FOR MODEL SPECIFIC BUSSING DIAGRAM DRAWING NUMBER. SEE BUSSING DIAGRAM IN MANUAL

NOTES

1. SEE TRANSFORMER CONFIGURATIONS FOR OTHER VOLTAGE CONFIGURATIONS.
2. TOGGLE SWITCH SHOWN IS SET TO AUTO/ECONOMY POSITION. SEE OPTIONS DRAWING OR MANUAL FOR FURTHER INFORMATION.
3. TOGGLE SWITCH SHOWN IS SET FOR ECONOMY MODE. ECONOMY MODE IS BEING USED TO CONTROL OPERATING PRESSURE.
4. NEW TRANSFORMER USED ON XP BOARD WITH SERIAL NUMBERS STARTING AT 7000, 527XX-7XXX.

CAUTION

THIS VAPORIZER IS EQUIPPED WITH AUTO RESTART. YOU MUST SHUT OFF POWER AT THE DISCONNECT OR CIRCUIT BREAKER TO INSURE IT REMAINS OFF. WHEN POWER IS REAPPLIED THIS UNIT WILL START AUTOMATICALLY.

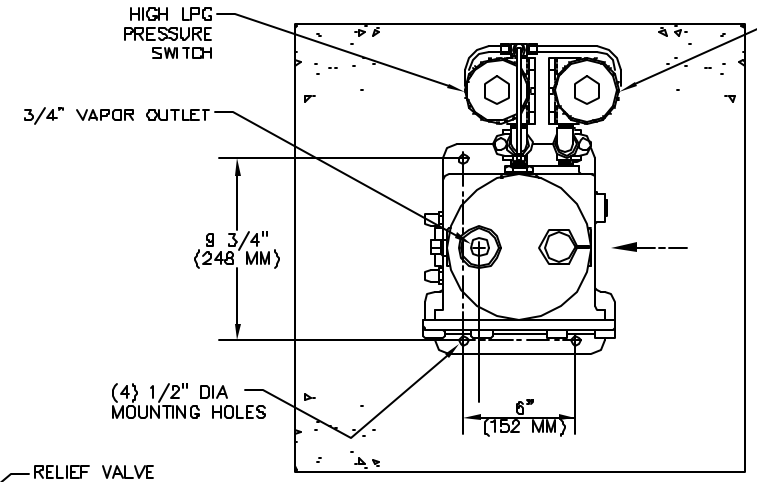
REVISIONS

Rev	Description	Rev. by
A	1) INITIAL RELEASE	G.L.R. 10-29-01
C	1) ADDED NEW TRANSFORMER DETAIL & 2 3 4	G.L.R. 1-22-04

Algas-SDI
1140 N.W. 46th St., Seattle, Washington, USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

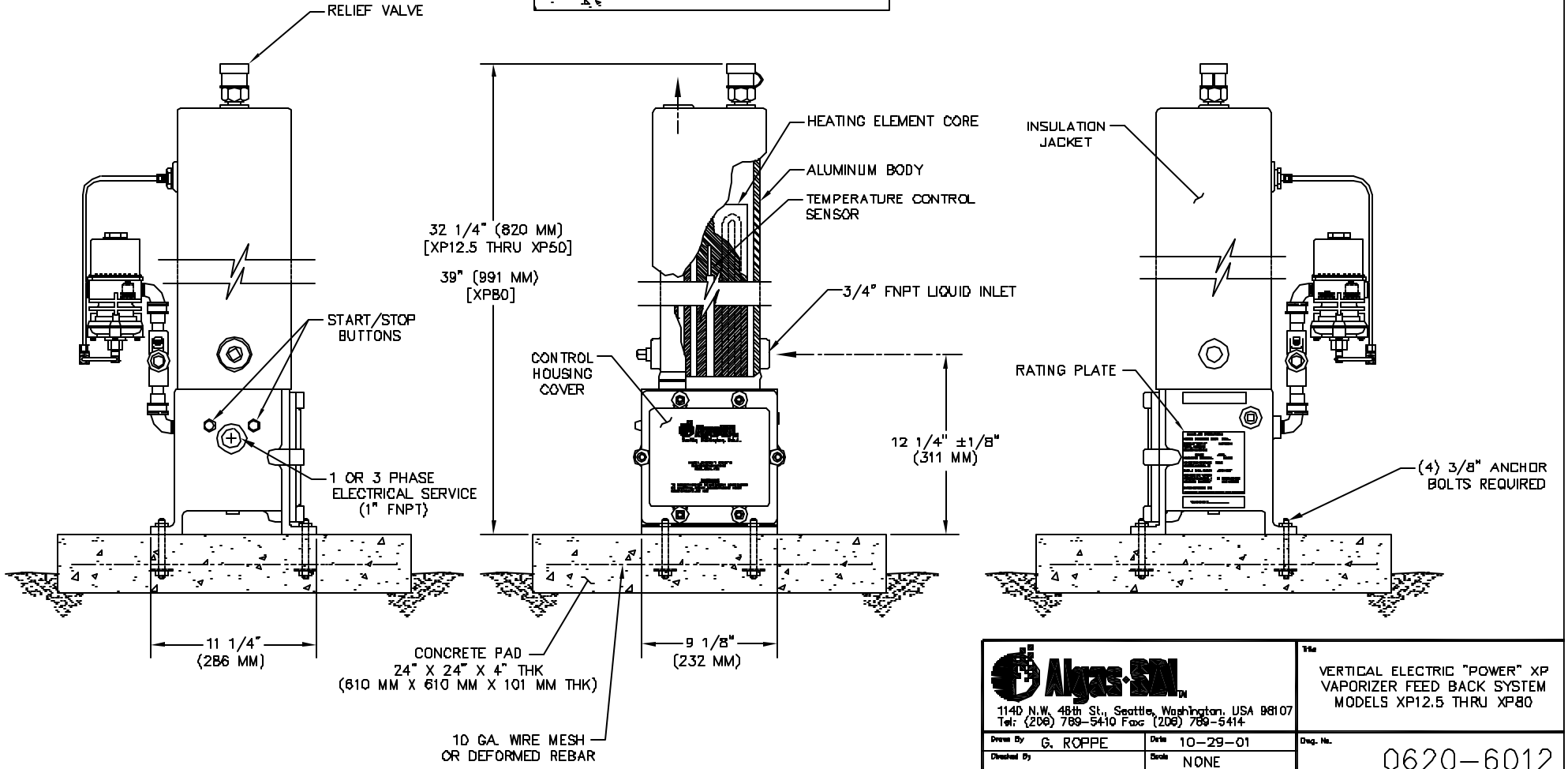
Title: VERTICAL ELECTRIC POWER XP VAPORIZER FEEDBACK SYSTEM WIRING DIAGRAM MODELS XP25 THRU XP80 3PH/50-60HZ

Drawn By: G. ROPPE	Date: 10-29-01	Dwg. No.: 0620-7031	
Checked By:	Scale: NONE		
Approved By:	Job No.: A.S.D.I. STD.		
		Size: B	Sht. No.: 1 of 1
Part Number:			Rev: B



NOTES

1. ENCLOSURE NEMA 4.
2. CONFORMS TO CLASS I DIV 1 GROUP D LOCATIONS.
3. PRESSURE VESSEL RATED @ 250 PSIG.
4. SUITABLE FOR INDOOR/OUTDOOR INSTALLATION.
5. INSTALL UNDER LIQUID FEED TANK SUFFICIENT TO ACCOUNT FOR LIQUID PRESSURE LOSSES.



Algas-SDI
1140 N.W. 48th St., Seattle, Washington, USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

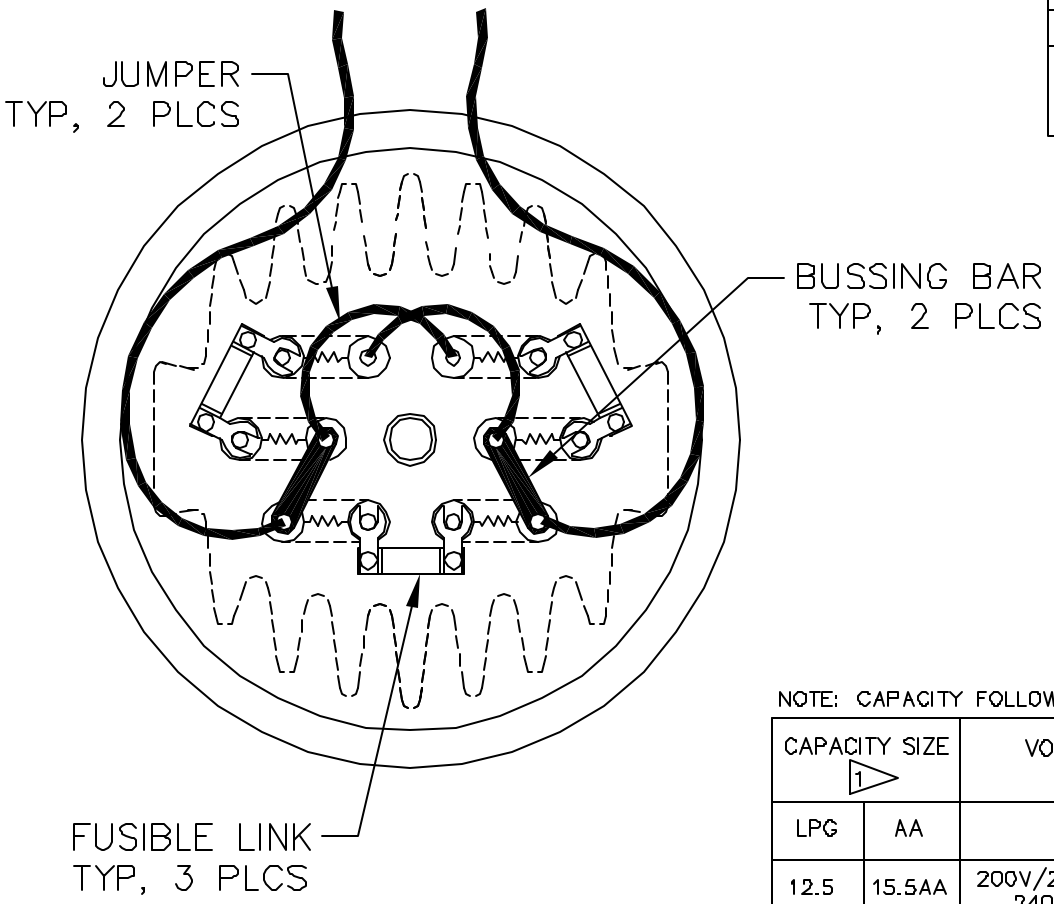
Drawn By: G. ROPPE	Date: 10-29-01
Checked By:	Scale: NONE
Approved By:	Job No.: A.S.D.I. STD.
	Part Number:

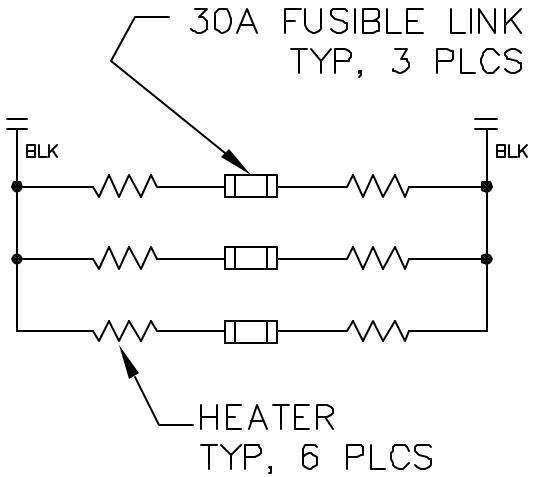
Title: VERTICAL ELECTRIC "POWER" XP VAPORIZER FEED BACK SYSTEM MODELS XP12.5 THRU XP80

Dwg. No.: 0620-6012

Size: C | Sht. No.: 1 of 1 | Rev: A

REVISIONS		
Rev	Description	Rev. by
D	1) UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS 2) ADDED NEW INFORMATION GRID	G.L.R. 7-18-00





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

CAPACITY SIZE [1]		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
12.5	15.5AA	200V/208V/220V/240V, 1PH	2595 WATTS @ 240VAC	22.2 OHMS	14.8 OHMS

[1] CAPACITY SIZES SHOWN ARE FOR LPG EX, & XP SERIES POWER VERTICAL VAPORIZERS

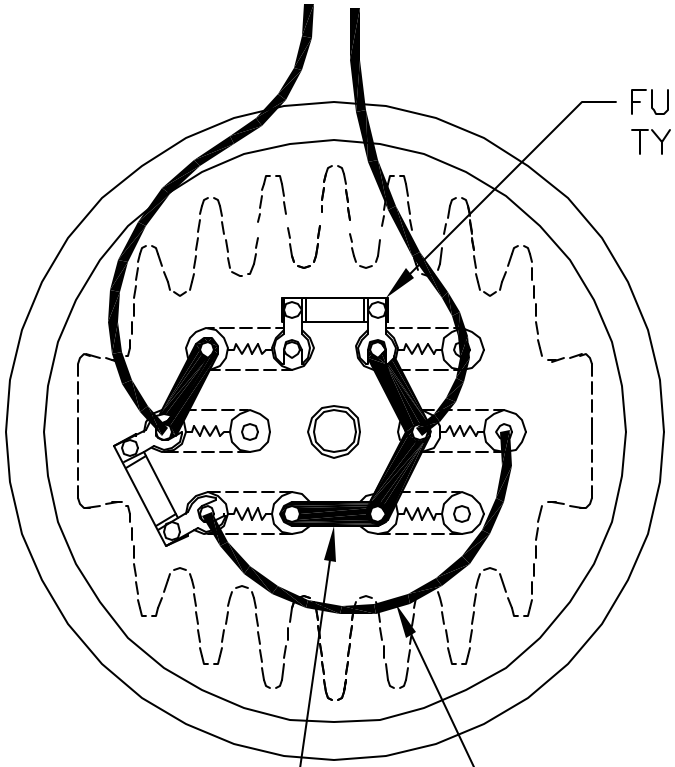
Algas-SDI™
1140 N.W. 46th St., Seattle, Washington, USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

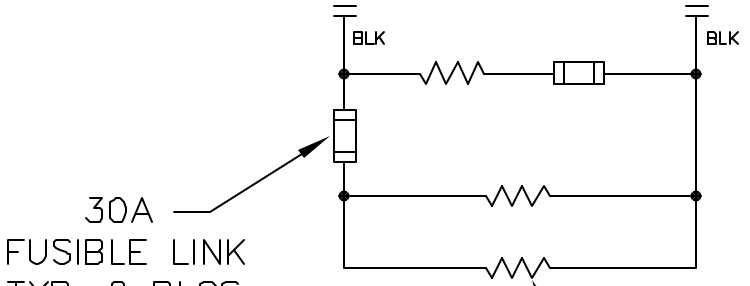
Title

BUSSING DIAGRAM
CAPACITY SIZE 12.5 & 15.5AA
200V/208V/220V/240V, 1 PH
POWER ELECTRIC VAPORIZER

Drawn By: BRISSON	Date: 5-16-97	Dwg. No.: 0620-7003	
Checked By:	Scale: N/A		
Approved By:	Job No.: A.S.D.I. STD.		
	Part Number: 82900	Size: A	Sht. No.: 1 of 1 / Rev: D

REVISIONS		
Rev	Description	Rev. by
C	1) REDRAWN & UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS 2) ADDED NEW INFORMATION GRID	G.L.R. 7-18-00





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

CAPACITY SIZE [1]		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
25	31AA	200V/208V/220V/240V, 1PH	2595 WATTS @ 240VAC	22.2 OHMS	7.4 OHMS

[1] CAPACITY SIZES SHOWN ARE FOR LPG EX, & XP SERIES POWER VERTICAL VAPORIZERS

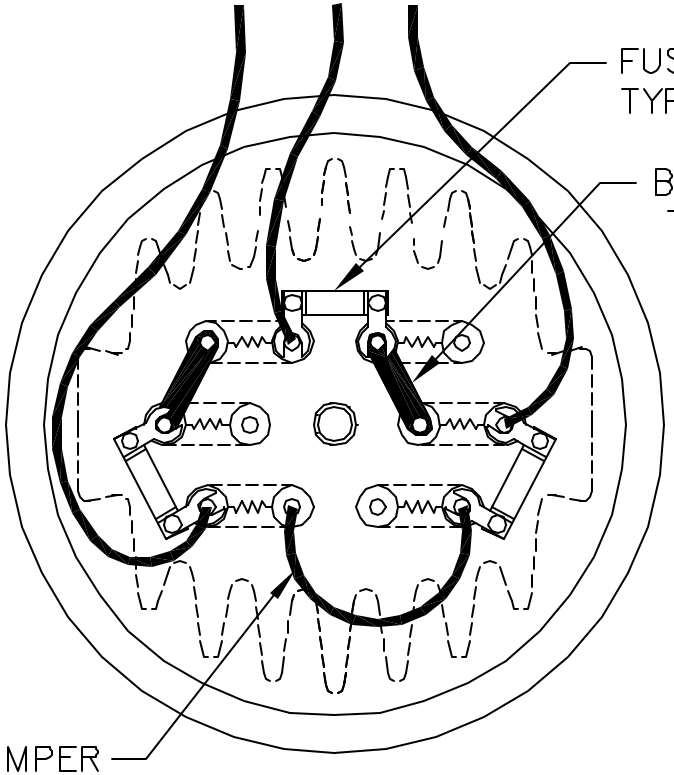
Algas-SDI™
1140 N.W. 46th St., Seattle, Washington. USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

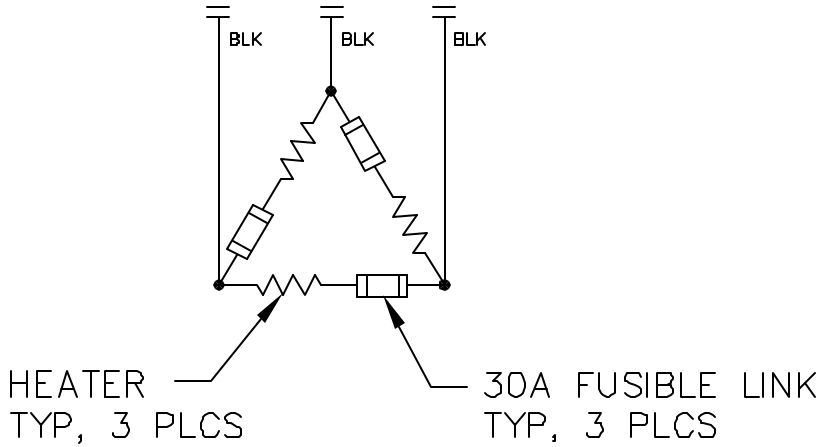
Title

BUSSING DIAGRAM CAPACITY SIZE 25 & 31AA 200V/208V/220V/240V 1PH POWER ELECTRIC VAPORIZER

Drawn By: BRISSON	Date: 5-16-97	Dwg. No.: 0620-7004	
Checked By:	Scale: N/A		
Approved By:	Job No.: A.S.D.I. STD.		
	Part Number: 82901	Size: A	Sht. No.: 1 of 1 / Rev: C

REVISIONS		
Rev	Description	Rev. by
C	1) REDRAWN & UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS 2) ADDED NEW INFORMATION GRID	G.L.R. 7-18-00





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

CAPACITY SIZE ▷1		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
25	31AA	200V/208V/220V/ 240V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS	14.8 OHMS

▷1 CAPACITY SIZES SHOWN ARE FOR LPG EX, & XP SERIES POWER VERTICAL VAPORIZERS

Algas-SDI™
1140 N.W. 46th St., Seattle, Washington, USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

Title

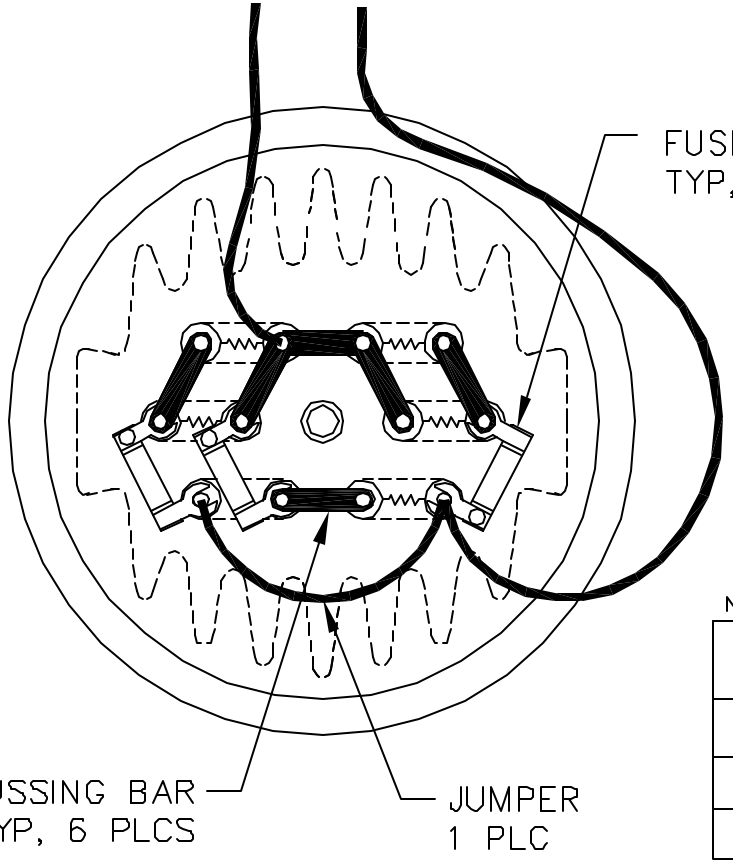
BUSSING DIAGRAM CAPACITY SIZE 25 & 31AA 200V/208V/220V/240V, 3 PH POWER ELECTRIC VAPORIZER

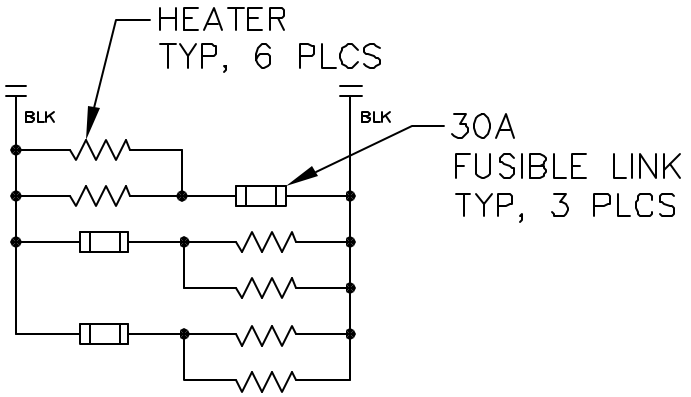
Drawn By	BRISSON	Date	5-16-97
Checked By		Scale	N/A
Approved By		Job No.	A.S.D.I. STD.
		Part Number	82902

Dwg. No. 0620-7005

Size	Sht. No.	Rev
A	1 of 1	C

REVISIONS		
Rev	Description	Rev. by
D	1) UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS & ADDED 12.5 & 15.5AA 2) ADDED NEW INFORMATION GRID	G.L.R. 7-18-00





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

CAPACITY SIZE [1]		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
12.5	15.5AA	110V/120V, 1PH	2595 WATTS @ 240VAC	22.2 OHMS	3.7 OHMS
50	62AA	200V/208V/220V, 1PH	2595 WATTS @ 240VAC	22.2 OHMS	3.7 OHMS

[1] CAPACITY SIZES SHOWN ARE FOR LPG EX, & XP SERIES POWER VERTICAL VAPORIZERS

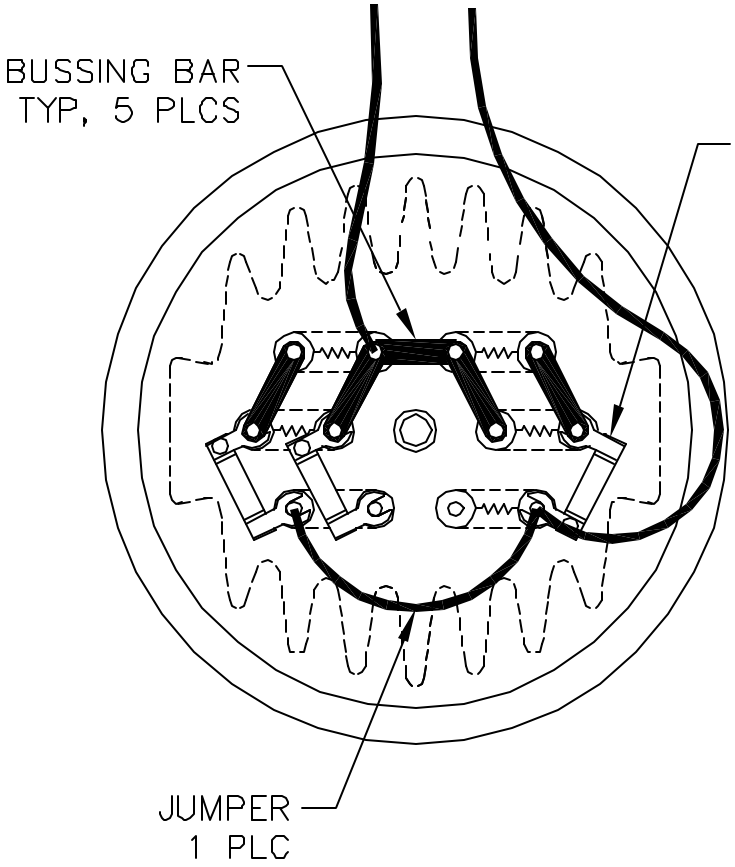
Algas-SDI™
1140 N.W. 46th St., Seattle, Washington. USA 98107
Tel: (206) 789-5410 Fax: (206) 789-5414

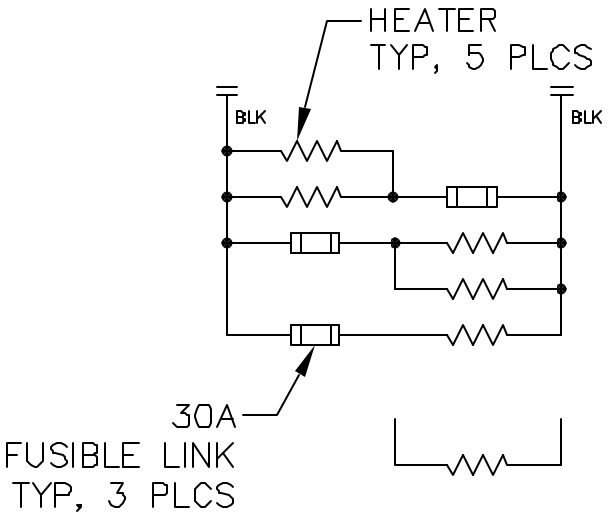
Title

BUSSING DIAGRAM
CAPACITY SIZE 12.5, 15.5AA, 50, & 62AA
110V/120V/200V/208V/220V, 1PH
POWER ELECTRIC VAPORIZER

Drawn By: BRISSON	Date: 5-20-97	Dwg. No.: 0620-7007	
Checked By:	Scale: N/A		
Approved By:	Job No.: A.S.D.I. STD.		
	Part Number: 82904	Size: A	Sht. No.: 1 of 1 / Rev: D

REVISIONS		
Rev	Description	Rev. by
C	1) REDRAWN & UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS 2) ADDED NEW INFORMATION GRID	G.L.R. 7-18-00





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

CAPACITY SIZE [1]		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
50	62AA	240V, 1PH	2595 WATTS @ 240VAC	22.2 OHMS	4.4 OHMS

[1] CAPACITY SIZES SHOWN ARE FOR LPG EX, & XP SERIES POWER VERTICAL VAPORIZERS

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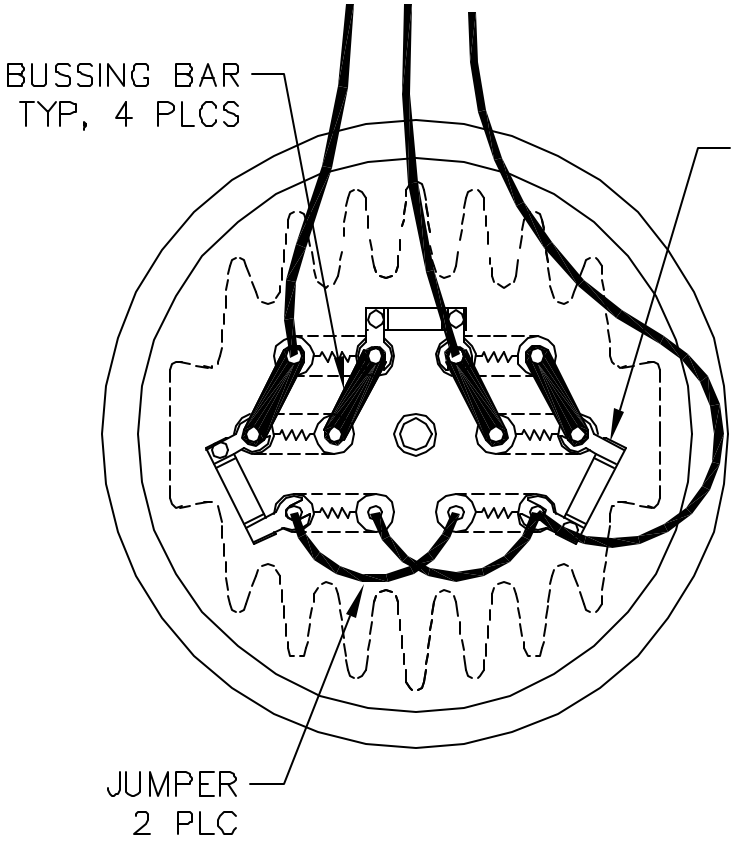
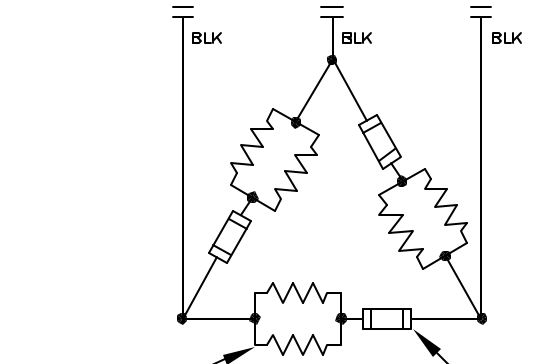
Title

BUSSING DIAGRAM
CAPACITY SIZE 50 & 62AA
240V 1 PH
POWER ELECTRIC VAPORIZER

Drawn By: BRISSON	Date: 5-20-97	Dwg. No.: 0620-7008	
Checked By:	Scale: N/A		
Approved By:	Job No.: A.S.D.I. STD.		
	Part Number: 82905	Size: A	Sht. No.: 1 of 1 / Rev: C

REVISIONS		
Rev	Description	Rev. by
C	1) REDRAWN & UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS 2) ADDED NEW INFORMATION GRID	G.L.R. 7-18-00





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

CAPACITY SIZE 1		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
50	62AA	200V/208V/220V/240V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS	7.4 OHMS
80	100AA	200V/208V/220V/3PH	3333 WATTS @ 220VAC	14.5 OHMS	4.8 OHMS

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

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

Title

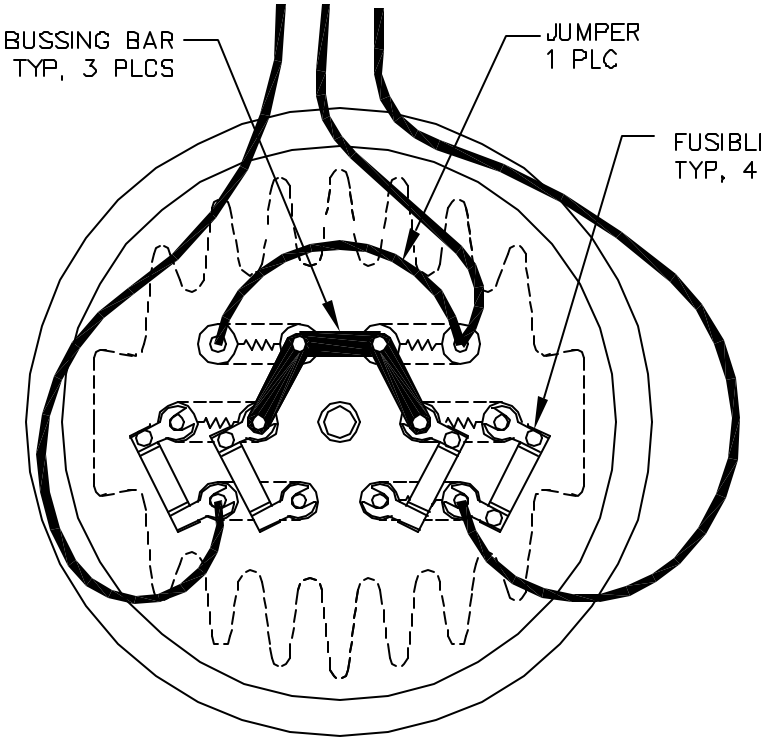
BUSSING DIAGRAM
CAPACITY SIZE 50, 62AA, 80, & 100AA
200V/208V/220V/240V, 3PH
POWER ELECTRIC VAPORIZER

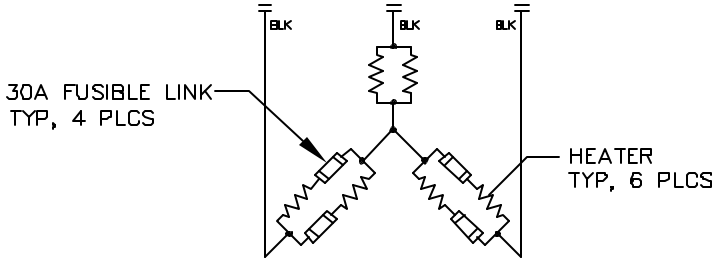
Drawn By: BRISSON	Date: 5-20-97
Checked By:	Scale: N/A
Approved By:	Job No.: A.S.D.I. STD.
	Part Number: 82906

Dwg. No.: 0620-7009

Size	Sht. No.	Rev
A	1 of 1	C

REVISIONS		
Rev	Description	Rev. by
D	1) ADDED XP160 ONLY INFO. 2) SEE REV. C FOR PREVIOUS REVISIONS	G.L.R. 8-22-02





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

CAPACITY SIZE ▷1		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
50	62AA	380V/415V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS	22.2 OHMS
80	100AA	380V/415V, 3PH	3333 WATTS @ 220VAC	14.5 OHMS	14.5 OHMS
120	150AA	380V/415V, 3PH	5000 WATTS @ 220VAC	9.7 OHMS	9.7 OHMS
160	200AA	380V 3PH	6580 WATTS @ 220VAC	7.4 OHMS	7.4 OHMS
160	200AA	415V 3PH	6580 WATTS @ 240VAC	8.8 OHMS	8.8 OHMS
XP160 ONLY		380V/415V, 3PH	6580 WATTS @ 240VAC	8.8 OHMS	8.8 OHMS
50	62AA	575V 3PH	2595 WATTS @ 333VAC	42.7 OHMS	42.7 OHMS
80	100AA	575V 3PH	3333 WATTS @ 333VAC	33.3 OHMS	33.3 OHMS
120	150AA	575V 3PH	5000 WATTS @ 333VAC	22.2 OHMS	22.2 OHMS
160	200AA	575V 3PH	6580 WATTS @ 333VAC	16.9 OHMS	16.9 OHMS

▷1 CAPACITY SIZES SHOWN ARE FOR LPG XP, P, XPV & XPM SERIES POWER VERTICAL VAPORIZERS

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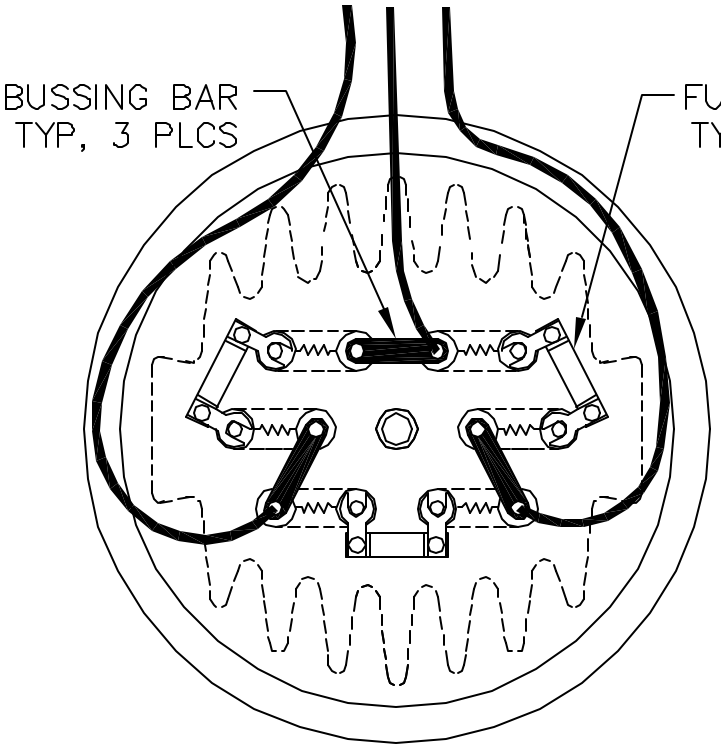
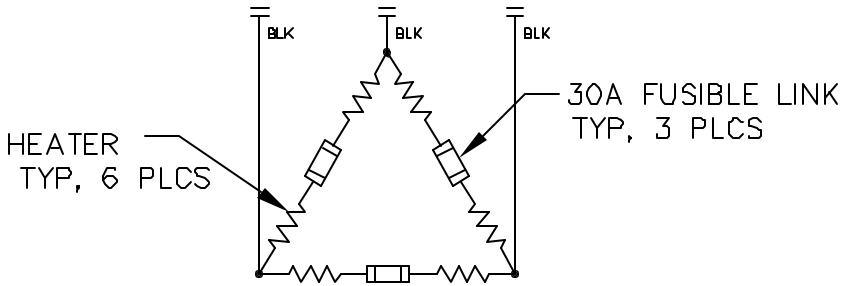
Title

BUSSING DIAGRAM
CAPACITY SIZE
50 THRU 160 & 62AA THRU 200AA
380V/415V/575V, 3 PH
POWER ELECTRIC VAPORIZER

Drawn By: BRISSON	Date: 5-20-97	Dwg. No.: 0620-7010	
Checked By:	Scale: N/A		
Approved By:	Job No.: A.S.D.I. STD.		
	Part Number: 82907	Size: A	Sht. No.: 1 of 1 / Rev: D

REVISIONS		
Rev	Description	Rev. by
C	1) REDRAWN & UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS 2) ADDED NEW INFORMATION GRID	G.L.R. 7-18-00





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

CAPACITY SIZE ▷1		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
50	62AA	440V/480V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS	29.6 OHMS
80	100AA	440V/480V, 3PH	3333 WATTS @ 220VAC	14.5 OHMS	19.4 OHMS
120	150AA	440V/480V, 3PH	5000 WATTS @ 220VAC	9.7 OHMS	12.9 OHMS
160	200AA	440V 3PH	6580 WATTS @ 220VAC	7.4 OHMS	9.8 OHMS
160	200AA	480V 3PH	6580 WATTS @ 240VAC	8.8 OHMS	11.7 OHMS

▷1 CAPACITY SIZES SHOWN ARE FOR LPG EX, XP, P, XPV, & XPM SERIES POWER VERTICAL VAPORIZERS

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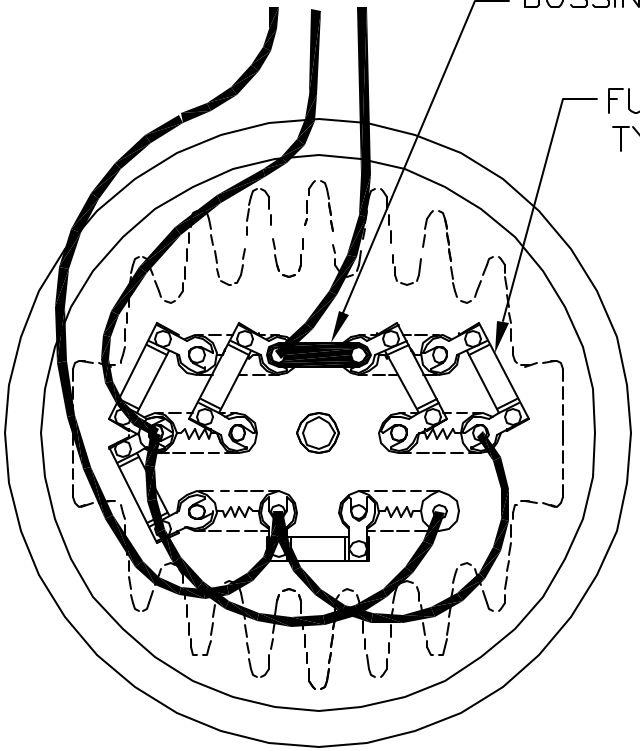
Title
BUSSING DIAGRAM
CAPACITY SIZE 50 THRU 160 &
62AA THRU 200AA
440V, 480V, 3 PH
POWER ELECTRIC VAPORIZER

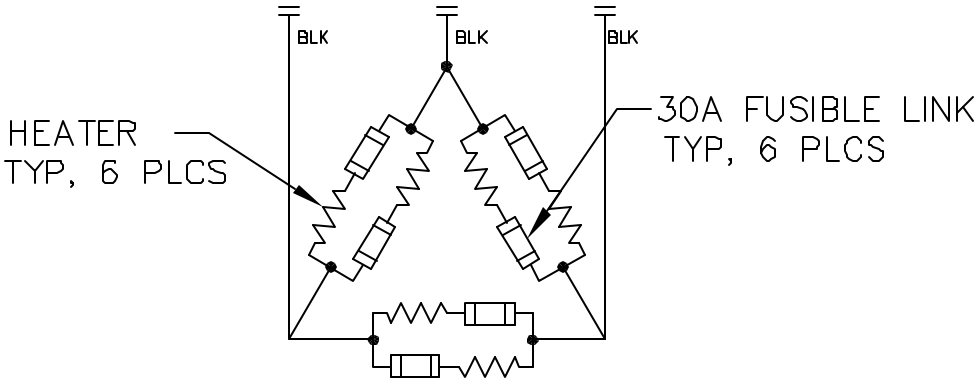
Drawn By: BRISSON	Date: 5-20-97
Checked By:	Scale: N/A
Approved By:	Job No.: A.S.D.I. STD.
	Part Number: 82908

Dwg. No. 0620-7011

Size	Sht. No.	Rev
A	1 of 1	C

REVISIONS		
Rev	Description	Rev. by
D	1) UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS 2) ADDED NEW INFORMATION GRID	G.L.R. 7-18-00





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

CAPACITY SIZE [1]		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
80	100AA	240V, 3PH	3333 WATTS @ 220VAC	14.5 OHMS	4.8 OHMS
120	150AA	200V/208V/ 220V/240V, 3PH	5000 WATTS @ 220VAC	9.7 OHMS	3.2 OHMS

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

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

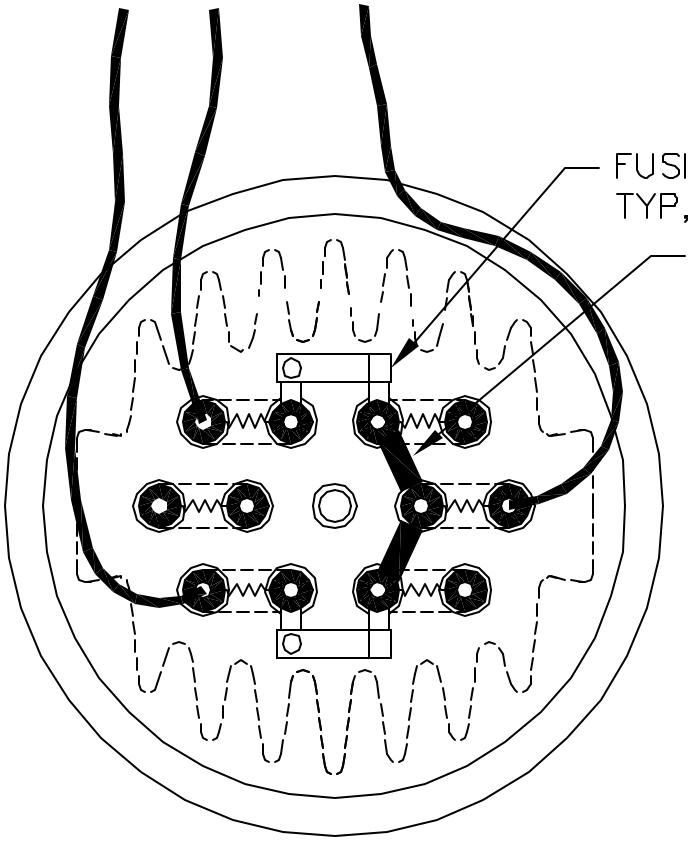
Title
BUSSING DIAGRAM
CAPACITY SIZE 80, 100AA, 120 & 150AA
200V/208V/220V/240V, 3PH
POWER ELECTRICAL VAPORIZER

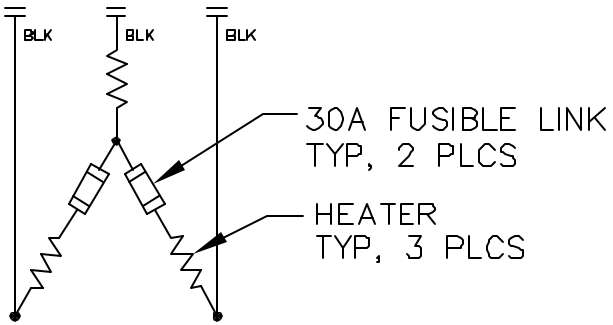
Drawn By: BRISSON	Date: 5-22-97
Checked By:	Scale: N/A
Approved By:	Job No.: A.S.D.I. STD.
	Part Number: 82909

Dwg. No. 0620-7012

Size	Sht. No.	Rev
A	1 of 1	D

REVISIONS		
Rev	Description	Rev. by
B	1) UP-DATED TO INCLUDE ALL VERSIONS OF "POWER" VAPORIZERS	G.L.R. 7-18-00





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

CAPACITY SIZE [1]		VOLTAGE	HEATER	INDIVIDUAL HEATER OHMS	WIRE TO WIRE RESISTANCE
LPG	AA				
25	31AA	380V/415V, 3PH	2595 WATTS @ 240VAC	22.2 OHMS	44.4 OHMS
*60	75AA	380V/415V, 3PH	5000 WATTS @ 220VAC	9.68 OHMS	4.84 OHMS
**80	100AA	380V, 3PH	6580 WATTS @ 220VAC	7.36 OHMS	3.68 OHMS
**80	100AA	415V, 3PH	6580 WATTS @ 240VAC	8.75 OHMS	4.38 OHMS

* USES 120 SIZE CORE
**USES 160 SIZE CORE

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

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

Title
BUSSING DIAGRAM
CAPACITY SIZE 25, 31AA, 60, 75AA
80 & 100AA
380V/415V 3PH
POWER ELECTRIC VAPORIZER

Drawn By: G. ROPPE	Date: 5-22-00
Checked By:	Scale: N/A
Approved By:	Job No.: A.S.D.I. STD.
	Part Number: 82903

Dwg. No. 0620-7028

Size	Sht. No.	Rev
A	1 of 1	B

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.

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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.

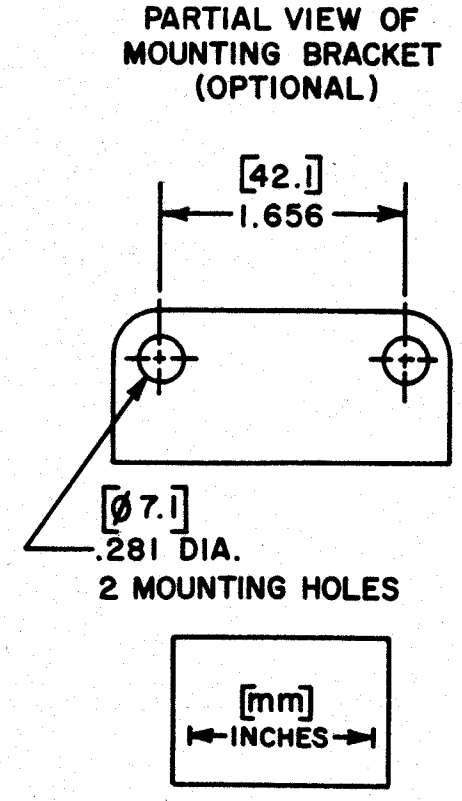

Figure 1. Dimensions For Mounting Bracket (Optional Feature)

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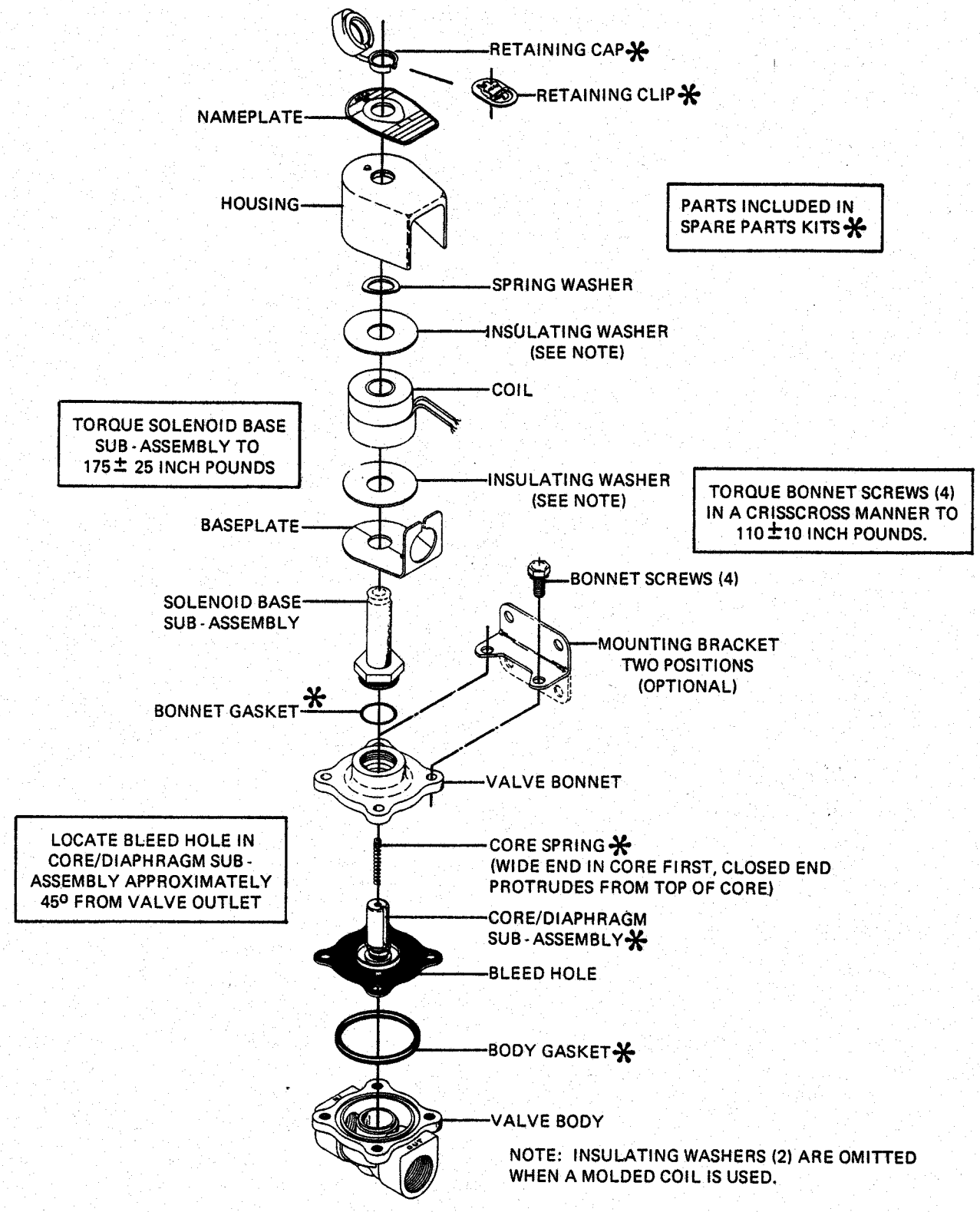

Bulletin 8210 — 3/8, 1/2 & 3/4 N.P.T. — A-C Construction
General purpose solenoid enclosure shown.

Figure 2. **For explosion-proof/watertight solenoid enclosure used on Bulletin 8211, see Form No. V-5380.**

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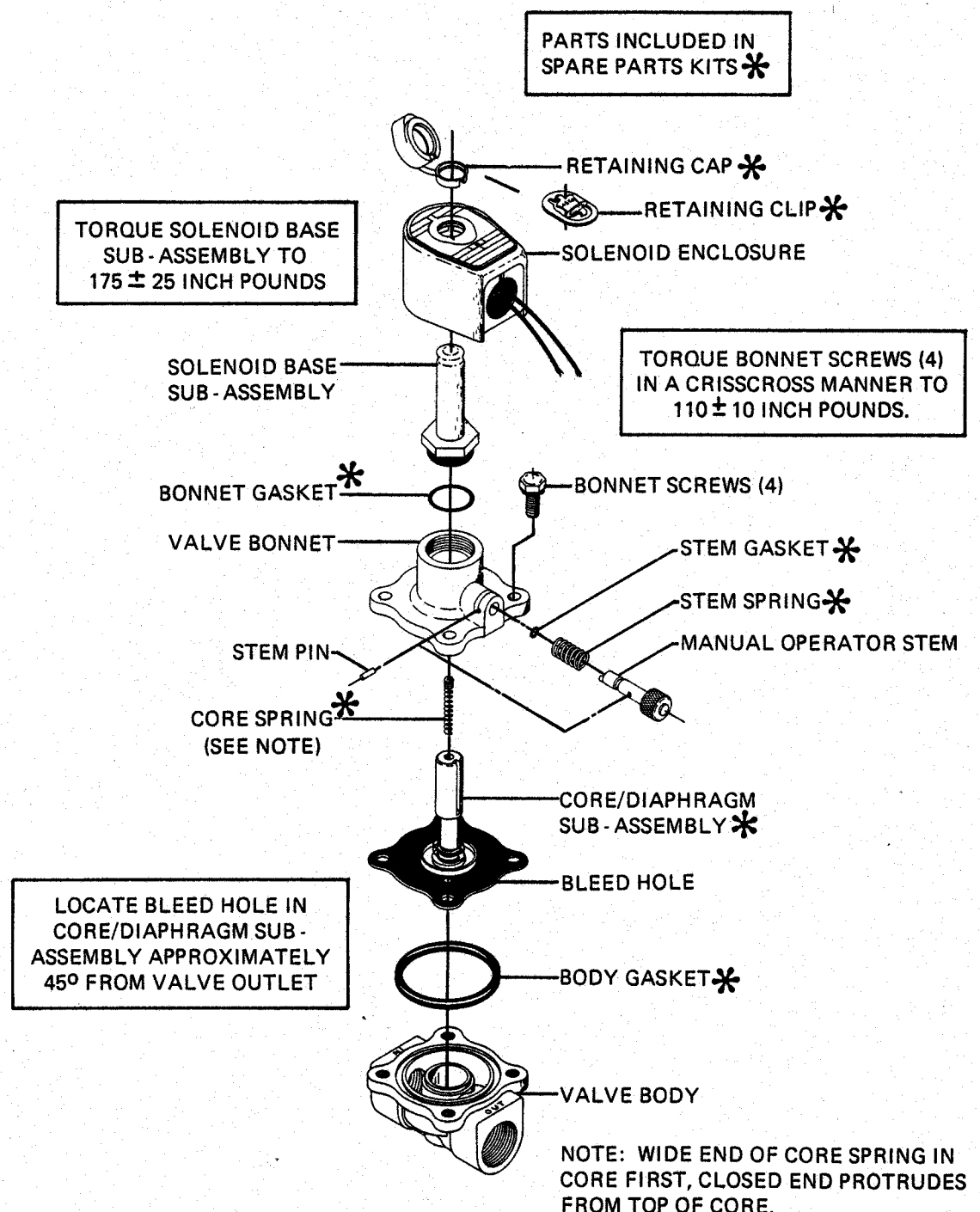

Bulletin 8210 — Manual Operator
General purpose solenoid enclosure shown.
For explosion-proof/watertight solenoid enclosure used on Bulletin 8211, see Form No. V-5380.

Figure 3.

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Installation & Maintenance Instructions

ASCO Red-Hat II®

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–resetable 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

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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 to be approximately 1/4″. Tinning of the ends of the lead wires 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, grounding wire, 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.

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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

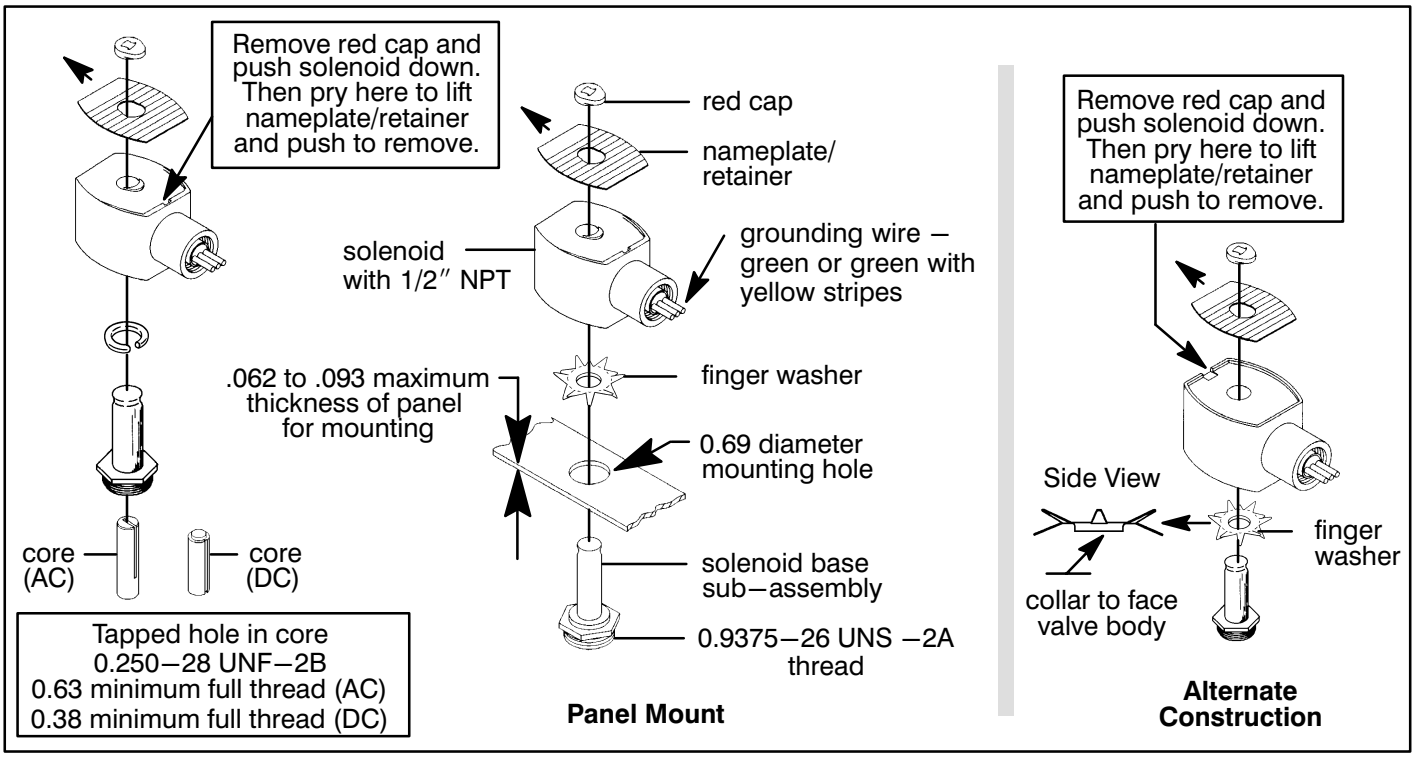

Figure 1. Series 8003G solenoids

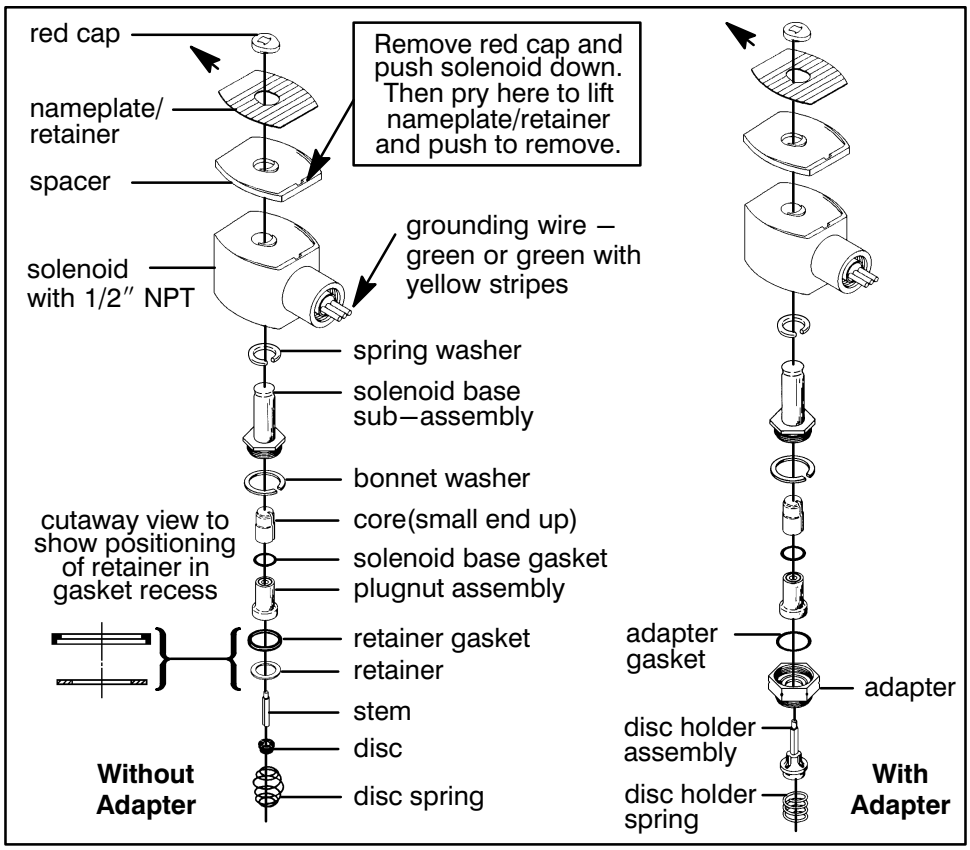

Figure 2. Series 8202G solenoids

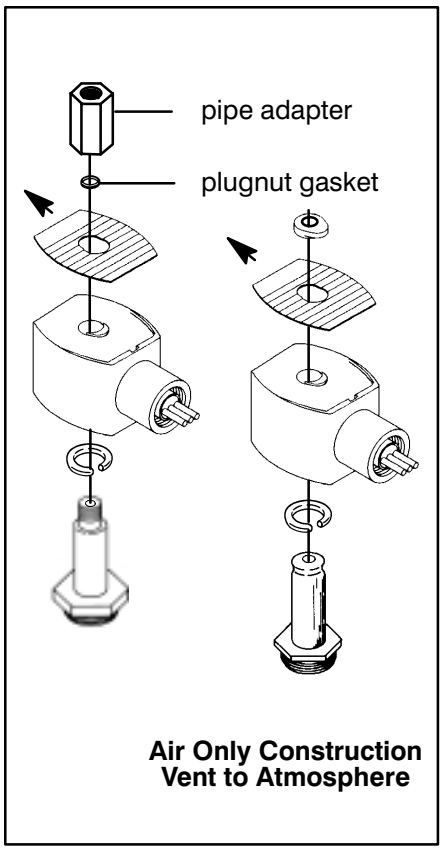

Figure 3. 3—Way Construction

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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

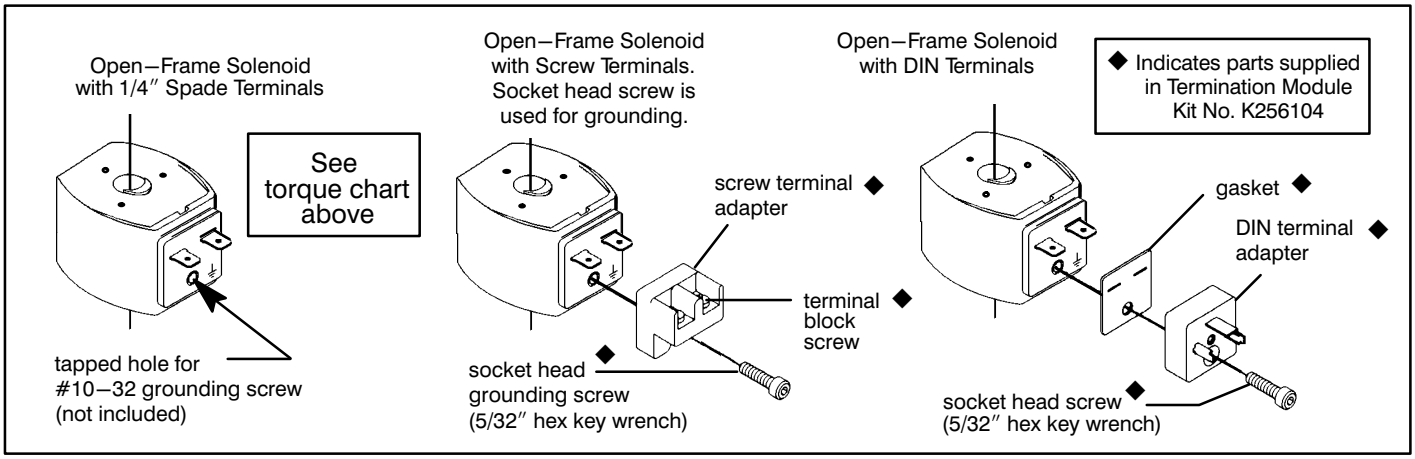

Figure 4. Open—frame solenoids

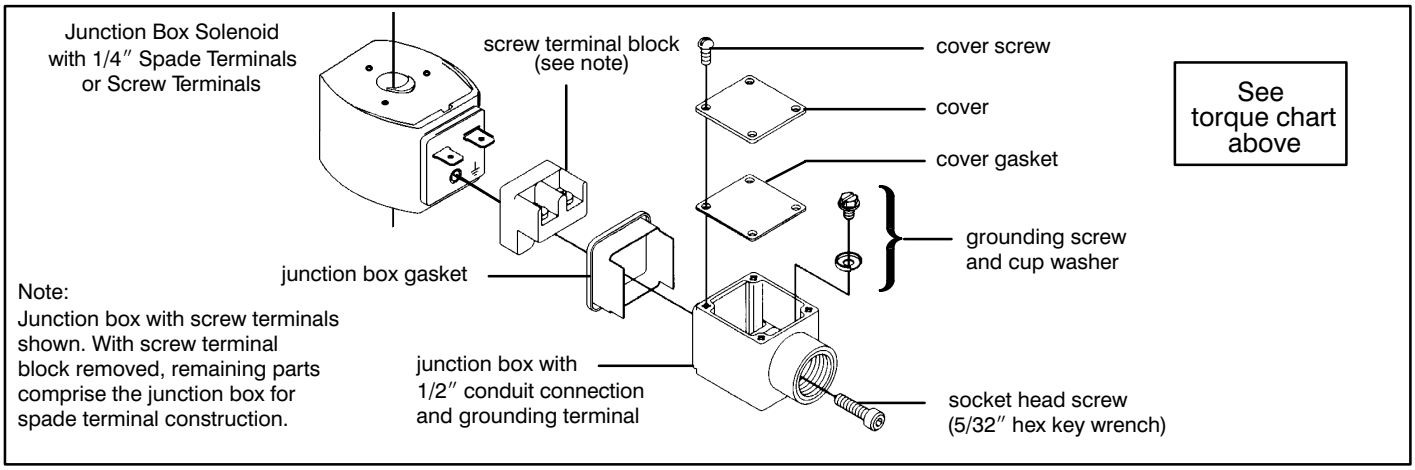

Figure 5. Junction box (optional feature)

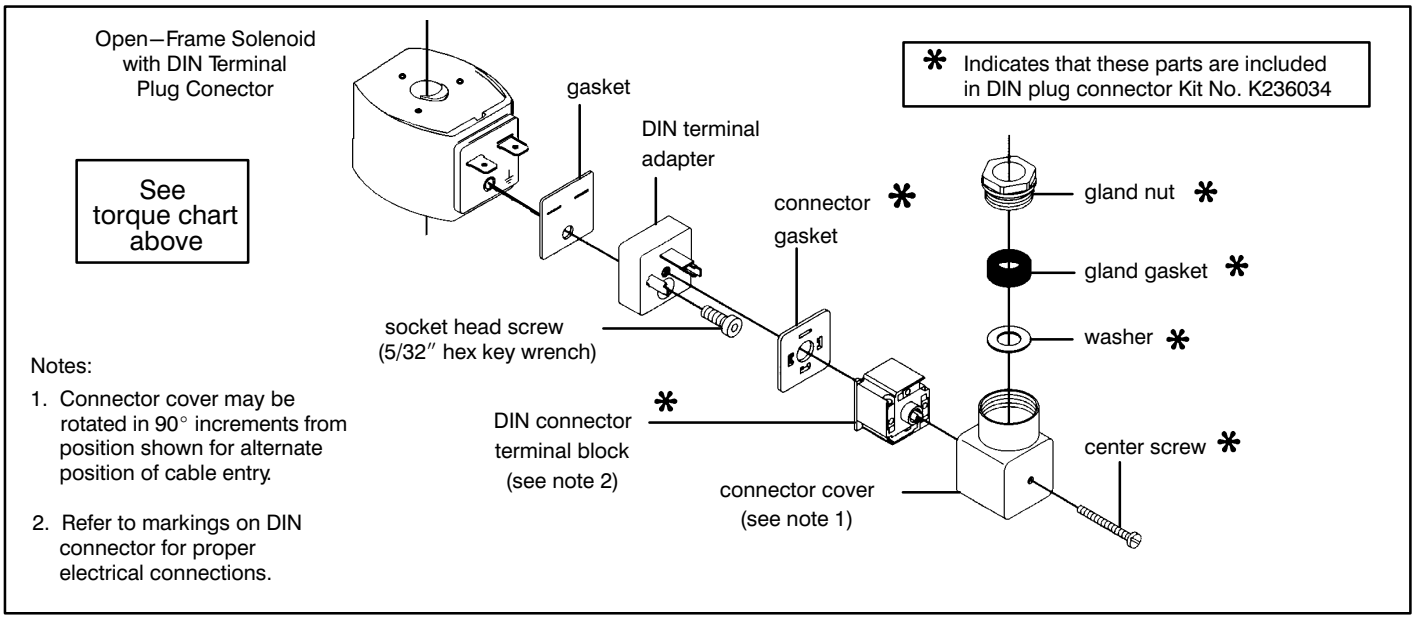

Figure 6. DIN plug connector kit No. K236034 (optional feature)

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GB CE

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 authorised 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 89/336/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.

FR CE

INSTRUCTIONS GÉNÉRALES D'INSTALLATION ET D'ENTRETIEN

Nota : 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 "clic" 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 réfection. 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 89/336/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.

DE CE

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 Einbaulage 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 Ventileingang 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 Anschlußklemmen 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 Gerätesteckdose nach DIN 43650 Form A/ISO 4400 oder 3x DIN 46244 (durch ordnungsgemäße Montage der Gerätesteckdose wird Schutzklasse IP 65 erreicht).
- Anschlüsse innerhalb eines Blechgehäuses mittels Schraubklemmen. Kabeleinführung ins Gehäuse mit PG-Verschraubung.
- Offene Spulen mit Flachsteckern (AMP-Fahnen) 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 IIB 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 89/336/EWG, einschl. Nachtrage, sowie den Niederspannungsrichtlinien 73/23/EWG u. 93/68/EWG. Bitte geben Sie die Auftragsbestätigungsnummer und die Seriennummern der betreffenden Produkte an.

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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/JOUCOMATIC 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, par 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 teminales 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 segun 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 sólamente se puede llevar a cabo por el usuario que disponga la válvula instalada en su sistema.

MANTENIMIENTO

El mantenimiento de los productos ASCO/JOUCOMATIC 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/JOUCOMATIC 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 acepta-ción 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 tension 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.

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 possinili solo dopo aver consultato il costruttore o i suoi rappresentanti. Prima dell'installazione depressurizzare i tubi e pulire internamente.
Le elettrovalvole possone essere montate in tutte le posizioni. Diversamente, una freccia posta sulla valvola indica che deve essere montata in posizione verticale e diritta.
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 puo' causare operazioni sbalgliate 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 appropriate 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 effetuato esclusivamente dal personale specializzato e deve essere conforme alle Norme locali.
Attensione:

- Prima di mettere in funzione togliere l'alimentazione elettrica, diseccitare 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 devone essere provviste di morsetti di terra a seconda della tensione e delle Norme di sicurezza locali.

I piloti possono avere una delle seguenti caratteristiche elettrice:

- 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 valvoa, 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 possibilita' di danneggiare cose o persone, non toccare il pilota.
La custodia della bobina o del pilota puo' scaldarsi anche in normali condizioni di funzionamento.

EMISSIONE SUONI

L'emissione di suoni dipende dall'applicazione e dal tipo di elettrovalvola. L'utente puo' 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 per la revisione.
Se si incontrano problemi durante l'installazione e la manutenzione o se si hanno dei dubbi, consultare ASCO/JOUCOMATIC o i suoi rappresentanti.

L'utente puo'richiedere al costruttore una dichiarazione separate 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 nonche' gli emendamenti e le directtive sulla bassa tensione 73/23/CEE e 93/68/CEE. Una Dichiarazione di Conformitá 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 instruktties t.a.v. installatie en onderhoud moeten in acht worden genomen tezamen met de specifieke voorschriften van het produkt.

INSTALLATIE

ASCO/JOUCOMATIC produkten 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 inbouwen dient het leidingssysteem 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 pijpaansluiting moet overeenkomstig de naamplaatgegevens plaatsvinden.
Hierbij moet men letten op:

- Een reductie van de aansluitingen kan tot prestatie- en funktie-stoornis leiden.
- Ter bescherming van de interne delen wordt een filter in het leidingnet aanbevolen.
- Bij het gebruik van draadafdichtingspasta of tape mogen er geen deeltjes in het leidingwerk geraken.
- Men dient uitsluitend geschikt gereedschap voor de montage te gebruiken.
- Bij konische/tapse koppelingen moet met een zodanig koppel worden gewerkt dat het produkt niet wordt beschadigd.
- Het produkt, de behuizing of de spoel mag niet als hefboom worden gebruikt.
- De pijpaansluitingen mogen geen krachten of momenten op het produkt 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 spannings-voerende 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 produkt volgens de geldende normen van een aarding worden voorzien.

Het produkt kan de volgende aansluitingen hebben:

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

IN GEBRUIK STELLEN

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

GEBRUIK

De meeste magneetafsluiters 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 bedrijfs-omstandigheden.
In bepaalde gevallen moet men bedacht zijn op media welke sterke vervuiling binnen in het produkt 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 onderdelensets 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 essentiele 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 produkten.

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

UNDERWRITERS LABORATORIES, INC. LISTED

ASCO® TRIVPOINT® 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

Automatic Switch Co. 50–60 Hanover Road, Florham Park, New Jersey 07932

Installation & Maintenance Instructions

ASCO® TRIPOINT® 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 reactuation (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 and torque 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.

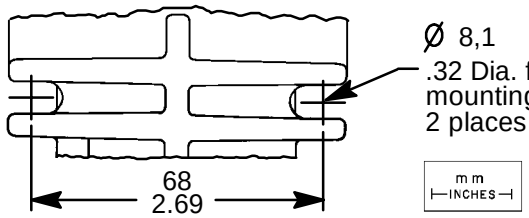


Figure 1. Mounting locations

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

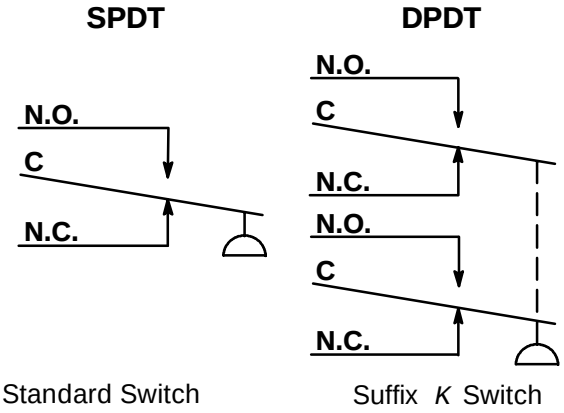
Wiring must comply with local codes and the National Electrical Code. All switch enclosures are provided with two 3/4I NPT conduit hubs with one plugged when not in use. It is recommended that a flexible conduit connection be used. If rigid conduit is used, do not consider it or use it as a means of 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



Standard Switch Suffix *K* Switch

INSTALLATION OF TEMPERATURE TRANSDUCERS

Direct Probe

The direct probe (local) temperature transducer is provided with 1/2I 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 3/8I 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 3/8I 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 7/16I 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 7/16I 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 reactuation signal. Then advance low signal adjusting nut until switch reactuates.	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 7/16I 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 reactuation signal. Then back off high signal adjusting nut until switch reactuates.	NC	Off (Open Circuit)	NO	On (Closed Circuit)

5. Cycle between actuation and reactuation 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 reactuates 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 gage. 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 Reactuate:** 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.

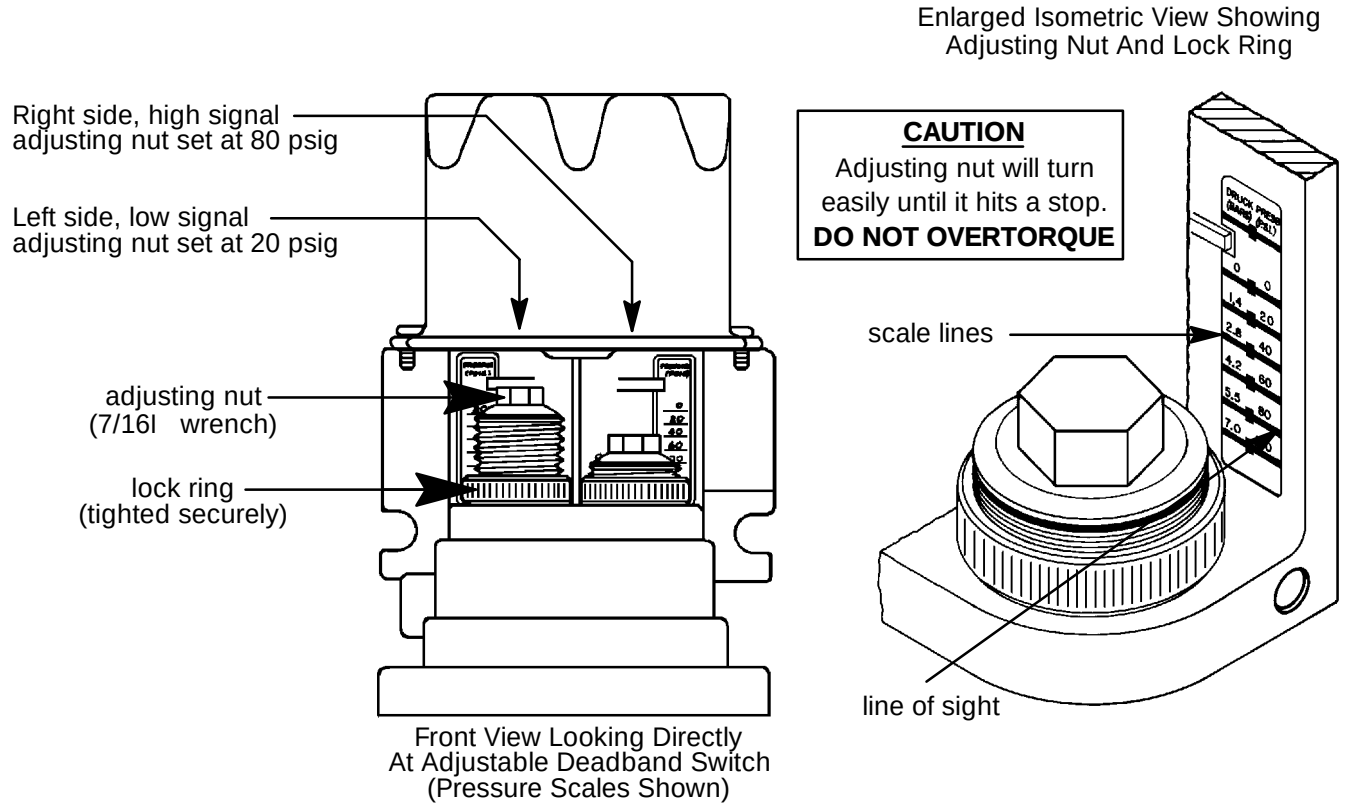


Figure 2. Adjustment (Signal Setting) of Adjustable Deadband Switch

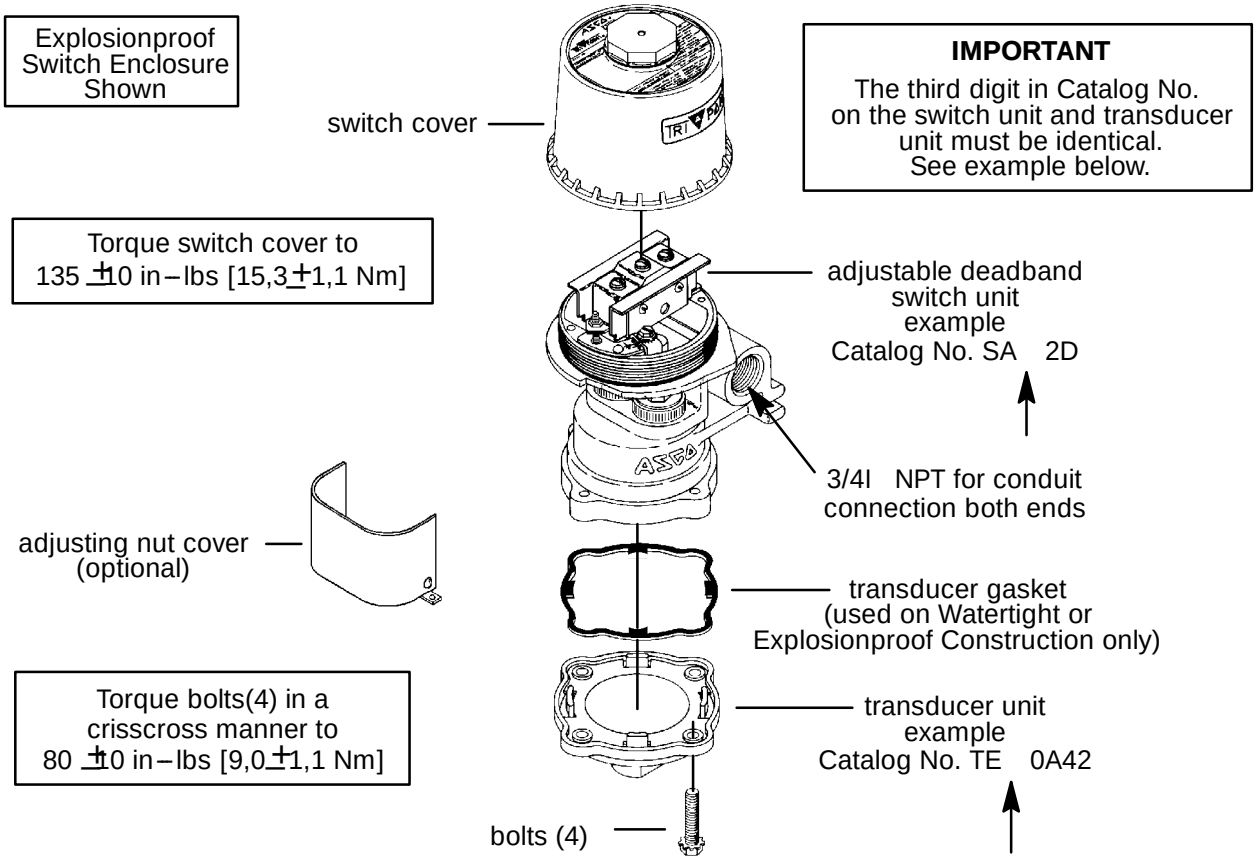


Figure 3. Switch Unit and Pressure Transducer Unit to be Assembled.

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ASCO® TRIVPOINT® 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.

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Printed in U.S.A.

Automatic Switch Co. 50–60 Hanover Road, Florham Park, New Jersey 07932

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	Watertight 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.	Catalog No.	Catalog No.	Catalog No.	Catalog No.
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. *ECII*® Catalog L-500.
3. *ECII*® 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.

Algas-SDI™

ISO 9001 Certified

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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