MATHESON
The Gas Professionals

5000 SERIES PANELS

INSTALLATION AND OPERATION INSTRUCTIONS

READ AND COMPLY WITH THESE INSTRUCTIONS BEFORE INSTALLING, OPERATING, OR SERVICING

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LIMITED WARRANTY

This equipment is sold by MATHESON under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to the purchase of this equipment directly from MATHESON or MATHESON's Authorized Agent as new merchandise and are extended to the first Buyer thereof other for than the purpose of resale.

For a period of one year from date of original delivery (ninety days in corrosive service) to Buyer or to Buyer's order, this equipment, is warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in this manual and any accompanying labels and/or inserts, provided that this equipment is properly operated under the conditions of normal use and that regular and periodic maintenance and service is performed or replacements are made in accordance with the instructions provided. Expendable parts of this equipment are similarly warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in this manual and any accompanying labels and/or inserts. The foregoing warranties shall not apply if the equipment has been repaired other than by MATHESON or a service facility designated by MATHESON, or if this equipment has not been operated and maintained in accordance with written instructions provided by MATHESON, or has been altered by anyone other than MATHESON, or if the equipment has been subject to abuse, misuse, negligence or accident.

MATHESON's sole and exclusive obligation and the Buyer's sole and exclusive remedy under the above warranties is limited to repairing or replacing, free of charge, at MATHESON's sole discretion, the equipment or part which is telephonically reported to be a problem to the local MATHESON Branch Location, and which if so advised, is returned with a written statement of the observed deficiency, not later than seven days after the expiration of the applicable warranty, to the MATHESON Gas Equipment Technology Center during normal business hours, transportation charges prepaid, and which, upon examination, is found to comply with the above warranties. The Buyer shall pay for return trip transportation charges for the equipment or part.

MATHESON SHALL NOT BE OTHERWISE LIABLE FOR ANY DAMAGES INCLUDING BUT NOT LIMITED TO INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, OR SPECIAL DAMAGES, WHETHER SUCH DAMAGES RESULT FROM NEGLIGENCE, BREACH OF WARRANTY OR OTHERWISE.

THERE IS NO EXPRESS OR IMPLIED WARRANTIES THAT EXTEND BEYOND THE WARRANTIES HEREINABOVE SET FORTH. MATHESON MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE EQUIPMENT OR PARTS THEREOF.

USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically, with the frequency of such inspections depending upon the scope of use. Damaged, worn or contaminated equipment should not be used. Parts that are broken, missing, plainly worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, MATHESON recommends that a telephonic or written request for service advice be made to the MATHESON Equipment Engineering Group in Montgomeryville Pennsylvania or to the nearest MATHESON Branch location.

This equipment or any of its parts should not be altered without the prior written approval of MATHESON Equipment Engineering Group. The user of this equipment shall have the sole responsibility for any malfunction, which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than MATHESON a service facility designated by MATHESON. Further, the ultimate user of the equipment is responsible for the training and safe operation of the equipment by personnel in his/her employ.

SAFETY PRECAUTIONS

1. Many Specialty Gases are hazardous in nature. It is important that the user of the equipment carefully review the hazards associated with the gas to be used with the panel. **BEFORE INSTALLING THE PANEL WITH ANY CYLINDER OF COMPRESSED OR LIQUEFIED GAS, REFER TO THE MSDS THAT WAS SHIPPED WITH THE GAS, OR ON FILE IN YOUR FACILITY, AS TO THE SPECIFIC HAZARDS ASSOCIATED WITH THE GAS TO BE USED. ALSO, REFER TO ALL APPLICABLE INSERTS CONTAINED WITH THE EQUIPMENT FOR ADDITIONAL PRECAUTIONS AND OPERATING INSTRUCTIONS.**

2. Before using any panel on toxic, corrosive, pyrophoric, flammable or other type of hazardous gas, test the leak integrity of the panel using an inert gas.

3. Make certain that the panel purchased is suitable for the application intended. All equipment supplied by MATHESON has a model number, and a pressure limitation label and/or stamping. Carefully review this information to establish the panel fit for service in the desired application.

4. Make certain that the equipment purchased or delivered to the ultimate end user conforms to the specifications of the user. The user is responsible for selecting equipment compatible with gases that are to be used, physical parameters of operation and performance and normal material compatibilities. Selection information can be found in MATHESON Catalogs, MATHESON Tech Briefs and in the MATHESON Gas Data Book. In addition, any MATHESON representative would be pleased to aid in the selection of specific equipment.

5. Before installation of the panel onto the cylinder of compressed or liquefied gas, carefully inspect the panel for visible signs of damage or contamination. Close attention should involve visual inspection of all exposed and connecting threads for visible signs of wear and abuse. Also examine the panel for any loose parts outside of those that must swivel for connection to the gas cylinder or outlet lines. Also examine the panel for signs of contamination with dirt, grease or any other foreign material. Close attention should be given to the external appearance and the view of the panel from the inlet and the outlet. If any foreign materials are present and cannot be removed from the panel easily with a cloth, or if the threads on any components of the panel appear to be abused as indicated above, or any of the components appear to be loose, return the panel immediately for service.

6. Before installation of the panel onto the cylinder of compressed or liquefied gas, move the cylinder(s) to the work location and secure the cylinder before removing the cylinder valve cap. Check the cylinder valve as in step 5 for possible contamination and defective or loose parts. If for any reason the cylinder appears to be faulty as noted here, return the cylinder cap to the top of the cylinder, tighten down and remove the cylinder from the work area and call the supplier of the cylinder for immediate pick-up.

7. When using any hazardous gas, the cylinder of the gas should be placed under an exhaust hood or be placed in a suitable safety enclosure.

8. Before installation of the panel onto the cylinder of compressed or liquefied gas, make certain that the CGA connection on the cylinder matches the CGA connection attached to the panel. CGA connections are fitted to the panel to limit the services in which the panel can be used. **THE USE OF ADAPTORS OR ALTERATIONS TO THE PANEL TO CHANGE SERVICES CAN BE EXTREMELY DANGEROUS AND SHOULD NOT BE ATTEMPTED.** If a conversion of a product is required, consult MATHESON before attempting.

1.0 PANEL INSTALLATION

BEFORE ATTACHMENT OF THE PANEL TO THE CYLINDER, READ CAREFULLY THE "USER RESPONSIBILITY" AND "SAFETY PRECAUTIONS" SECTIONS OF THIS MANUAL

1.1 Unpack the panel(s) and carefully check for damages, which might have occurred during transportation. If there is any evidence of damage, a claim must be filed with the shipper. If there is no damage, discard the wrapping.

1.2 Without cracking (opening) any of the seals of the panel, hang the panel at the desired height within the cabinet or in another secure place by attaching to suitable and compatible unistrut.

1.3 Close all manual valves on the panel by turning clockwise until resistance is encountered. NOTE: DO NOT OVER TORQUE. OVER TORQUING OF THE MANUAL VALVES ON THE PANEL (S) COULD RESULT IN PERMANENT DAMAGE TO THE SEAT WITHIN THE VALVE.

1.4 Close the regulator on the panel by turning the adjusting knob counterclockwise until the knob will turn no farther.

1.5 Remove the cap from the inlet of the panel. The inlet of the panel is the large male threaded connection.

1.6 Connect the pigtail or flex hose.

1.7 Connect the process line directly to the compression fitting on the Process Valve (V1). If the panel was ordered with either the excess flow valve or excess flow switch options then the process line should be connected to the respective compression fitting.

1.8 This step is to be performed only for those panels having a HP Vent Valve (V4) and/or LP Vent Valve (V3). Connect the vent line directly to the vent check valve. If the panel includes the venturi option then the vent line should be installed at the outlet of the venturi. The outlet of the venturi is located at the upper-left part of the panel

1.9 This step is to be performed only for those panels having a Purge Valve (V5). Make the proper connections of purge lines for the panel to the purge check valve either from the Buyer's purge gas source or another panel. The inert purge gas supply must be capable of supplying 50-90 psig working pressure, be filtered to 10 µm, and have moisture level < 1 ppm.

1.10 This step is to be performed only for those panels having a Venturi Valve (V6). Connect a source of 10 µm filtered nitrogen (moisture < 1ppm) at 70-80 psig pressure to the venturi check valve. The nitrogen source must be capable of delivering 70 slpm to the venturi.

2.0 PROCESS CYLINDER INSTALLATION INSTRUCTIONS

2.1 Before removing the cylinder cap, move the cylinder of process gas to the panel.

- 2.1.1 Secure the cylinder as to prevent accidental toppling.
- 2.1.2 Remove the cylinder cap.
- 2.1.3 Make certain that the cylinder valve is tightly closed.
- 2.1.4 Remove the cylinder plug, if present. If there is any sign of gas leaking through the closed cylinder valve, replace the plug and contact THE GAS SUPPLIER IMMEDIATELY to arrange for disposal.
- 2.1.5 Inspect the cylinder valve for contamination or abuse.

2.2 The user should then put on appropriate safety apparel such as, but not limited to, safety glasses and gloves.

2.3 Recheck the regulator on the panel. Close the regulator on the panel by rotating the adjusting knob in a counterclockwise direction. As the knob is turned, the movement of the assembly should become easier.

2.4 Ensure the status of the following:

ITEM	**STATUS**
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	CLOSED (Fully Counterclockwise)

2.5 Following the procedures outlined below, make the connection of the pigtail to the cylinder valve. Always use an open ended or adjustable wrench. Always use a DISS torque wrench for DISS connections. Always use a backup wrench on CGA connections

- 2.5.1 **DO NOT FORCE.** The connection should be made easily. If it cannot be made easily, most likely the user has the wrong panel for the gas service.
- 2.5.2 **LEFT HAND THREADS** are used on some CGA connections. Notches in the middle of the hex nut usually identify left hand threads.
- 2.5.3 **GASKETS** are used in conjunction with some CGA connections. If the connection requires a gasket, one has been supplied with the panel. Inspect the gasket for signs of contamination and abuse. Do not over-tighten a connection with a gasket, as this will force the gasket to extrude into the gas stream.
- 2.5.4 **NEVER USE LUBRICANTS OF ANY TYPE** on the panel or cylinder valve to aid in connection.
- 2.5.5 **NEVER USE TEFLON TAPE** to aid in the sealing of the CGA fitting to the cylinder valve.

2.6 Close the door to the cabinet and lock if desired.

3.0 LEAK CHECK

WARNING: THE USER SHOULD PUT ON APPROPRIATE SAFETY APPAREL SUCH AS, BUT NOT LIMITED TO, SAFETY GLASSES AND GLOVES.

3.1 Leak test the pigtail and high pressure side of the process panel as follows:

WARNING: IF INSTALLED INSIDE A GAS CABINET THE FOLLOWING STEPS MUST BE PERFORMED BY REACHING THROUGH THE ACCESS PORT ONLY. KEEP THE DOOR OF THE ENCLOSURE CLOSED AT ALL TIMES.

NOTE: IF THE PANEL BEING PURGED IS BEING USED WITH EITHER AN EXCESS FLOW VALVE OR AN ACTUATED EMERGENCY SHUTOFF VALVE ON THE HIGH PRESSURE SIDE, THEN THESE DEVICES MUST BE OPENED FULLY WHEN PERFORMING THESE TESTS.

3.1.1 Ensure the status of the following:

ITEM	**STATUS**
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	CLOSED (Fully Counterclockwise)

3.1.2 If using a panel with a Purge Valve (V5), supply a minimum of 50 psig to this valve.
3.1.3 Open the Purge Valve (V5) (if supplied).
3.1.4 If the panel does not have a Purge Valve (V5) and the process gas being used is inert, then the following step can be performed after slowly opening the cylinder valve allowing the high pressure gas to enter the pigtail assembly and panel.
3.1.5 Using an approved method, test the CGA connection to the cylinder for leak tightness.
- 3.1.5.1 An approved soap solution, if compatible with materials and applications in use, can be used to check connections for leaks.
- 3.1.5.2 An approved leak-detecting device can be used to check for leaks. Consult the manufacturer's instructions for applications and hazards associated with the gas to be used in the system.
- 3.1.5.3 If the Purge Valve (V5) is supplied with the panel then a pressure decay test can be used to determine leak tightness.
  - 3.1.5.3.1 Close the regulator of the purge gas supply system.
  - 3.1.5.3.2 Observe the low pressure gauge of the purge gas supply regulator for a drop in pressure over a thirty-minute period.
  - 3.1.5.3.3 The pressure reading of the low pressure gauge should not drop over this time period indicating a leak tight seal at the CGA connection.
- 3.1.5.4 If a leak is indicated, by any of the methods listed above, recheck the CGA connection to the cylinder and all other high pressure connections.
- 3.1.5.5 Repeat the test method used previously. If there is still indication of a leak contact the GAS SUPPLIER and notify him/her of potential problems with the

cylinder valve. Also contact MATHESON Equipment Customer Service at (800) 828-4313 to ascertain potential problems with the pigtail supplied.

3.1.6 Close the Purge Valve (V5) (if supplied).

3.1.7 Close the cylinder valve of the process gas if opened in step 3.1.4.

3.2 Leak test the low pressure side of the process panel as follows:

3.2.1 Ensure the status of the following:

ITEM	**STATUS**
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	CLOSED (Fully Counterclockwise)

3.2.2 If using a panel with a Purge Valve (V5), supply a minimum of 50 psig to this valve.

3.2.3 Open the Purge Valve (V5) (if supplied).

3.2.4 If the panel does not have a Purge Valve (V5) and the process gas being used is inert, then the following step can be performed after slowly opening the cylinder valve allowing the high pressure gas to enter the pigtail assembly and panel

3.2.5 Opening the Isolation Valve (V2) (if supplied).

3.2.6 While observing the low pressure gauge, set the delivery pressure of the regulator by turning the knob in a clockwise manner to approximately 5-10 psig above the normal working pressure.

3.2.7 Utilizing one of the methods described in step 3.1.5, check the valves and compression tube connections.

3.2.7.1 If a leak is verified at any of the connections, use open-ended wrenches to re-tighten this connection. If this procedure does not stop the leak, the connection may have to be disassembled and replaced.

3.2.7.2 If a leak is verified from any of the other components in the panel, shutdown the entire panel as described in Section 12.0, 13.0 or 14.0 “SHUT DOWN AND DISASSEMBLY” and contact MATHESON Equipment Customer Service at (800) 828-4313 for advice on repair or replacement.

3.2.8 Close the Purge Valve (V5) (if supplied).

3.2.9 Close the Isolation Valve (V2) (if supplied).

3.2.10 Close the cylinder valve of the process gas if opened in step 3.2.4.

3.3 To check the process and vent piping for leaks, these same methods can be employed after closing off the lines at their end and opening the Process Valve (V1) and LP Vent Valve (V3) allowing pressurized gas to fill these lines.

3.4 Ensure that that all purge gas has been exhausted through the vent line by opening the HP Vent Valve (V4) and the LP Vent Valve (V3).

3.5 Close the HP Vent Valve (V4) and the LP Vent Valve (V3).

4.0 HIGH PRESSURE INERT GAS PURGING (For 5-Valve Panels only)

NOTE: IF THE PANEL BEING PURGED IS BEING USED WITH EITHER AN EXCESS FLOW VALVE OR AN ACTUATED EMERGENCY SHUTOFF VALVE ON THE HIGH PRESSURE SIDE, THEN THESE DEVICES MUST BE OPENED FULLY WHEN PERFORMING THESE PURGES.

4.1 Ensure the status of the following:

ITEM	**STATUS**
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	CLOSED (Fully Counterclockwise)

4.2 Open the HP Vent Valve (V4) to relieve any contained pressure in the pigtail and intervening assemblies.

4.3 Close the HP Vent Valve (V4).

4.4 Recheck the pressure of the gas being supplied to the Purge Valve (V5). This pressure should be a minimum of 50 PSIG and a maximum of 90 PSIG. Confirm this pressure before proceeding.

4.5 Open the Venturi Valve (V6) (if supplied).

4.6 Open the Purge Valve (V5) and allow the pressure to build in the high pressure section of the panel including the pigtail. This should be accomplished in about five seconds.

4.7 Close the Purge Valve (V5).

4.8 Open the HP Vent Valve (V4) for a minimum of five seconds.

4.9 Close the HP Vent Valve (V4).

4.10 Repeat steps 4.6 to 4.9 a minimum of ten and a maximum of 25 times dependent upon the Buyer's experience with purging techniques and recommendations.

4.11 Ensure that the Purge Valve (V5) is closed, and that all purge gas has been exhausted through the vent line by opening the HP Vent Valve (V4).

4.12 Close the HP Vent Valve (V4).

4.13 Close the Venturi Valve (V6) (if supplied).

5.0 LOW PRESSURE INERT GAS PURGING (For 5- Valve Panels only)

NOTE: IF THE PANEL BEING PURGED IS BEING USED WITH EITHER AN EXCESS FLOW VALVE OR AN ACTUATED EMERGENCY SHUTOFF VALVE ON THE HIGH PRESSURE SIDE, THEN THESE DEVICES MUST BE OPENED FULLY WHEN PERFORMING THESE PURGES.

5.1 Ensure the status of the following:

ITEM	**STATUS**
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	CLOSED (Fully Counterclockwise)

5.2 Open the Purge Valve (V5).

5.3 Open the Isolation Valve (V2).

5.4 While observing the low pressure gauge, set the delivery pressure of the regulator by turning the knob in a clockwise manner to approximately 5-10 psig above the normal working pressure.

5.5 Close the Purge Valve (V5).

5.6 Monitor the low pressure gauge on the regulator for a change in pressure over a minimum period of 5 minutes.

5.7 If the low pressure gauge on the regulator indicates a loss in pressure, check all of the components and connections in the gas stream for a leak as described in Section 3.0 “LEAK CHECK.” If a leak is indicated, re-tighten all connections or identify the component where the leak persists.

5.8 If the low pressure gauge on the regulator indicates a rise in pressure, this is indicative of an imminent seat failure. If this condition is observed contact MATHESON Equipment Customer Service at (800) 828-4313.

5.9 Open the LP Vent Valve (V3) allowing the purge gas to be evacuated through the vent line. The low pressure gauge will indicate zero on the face.

5.10 After the gauge reads zero psig, close the LP Vent Valve (V3) and observe the low pressure gauge for any indication of change.

5.11 Ensure the status of the following:

ITEM	STATUS
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	OPEN
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	OPEN (Fully Clockwise)

NOTE: IF THE PANEL BEING PURGED IS BEING USED WITH EITHER AN EXCESS FLOW VALVE OR AN ACTUATED EMERGENCY SHUTOFF VALVE ON THE HIGH PRESSURE SIDE, THEN THESE DEVICES MUST BE OPENED FULLY WHEN PERFORMING THESE PURGES.

5.12 Open the Venturi Valve (V6) (if supplied).

5.13 Open the Purge Valve (V5) and allow pressure to build in the low pressure section of the panel including the pigtail. This should be accomplished in about five seconds.

5.14 Close the Purge Valve (V5).

5.15 Open the LP Vent Valve (V3) to exhaust the gas into the vent line. This should be accomplished in about 15 seconds.

5.16 Close the LP Vent Valve (V3).

5.17 Repeat steps 5.13 to 5.16 a minimum of ten and a maximum of 25 times dependent upon the Buyer's experience with purging techniques and recommendations.

5.18 Ensure that Purge Valve (V5) is closed, and that all purge gas has been exhausted through the vent line by opening the LP Vent Valve (V3).

5.19 Close the LP Vent Valve (V3).

5.20 Close the Isolation Valve (V2).

5.21 Close the Venturi Valve (V6) (if supplied).

5.22 Close the regulator by turning the adjusting knob counterclockwise until the knob will turn no further.

6.0 HIGH PRESSURE PROCESS GAS PURGING (For 3-Valve and 5-Valve Panels only)

WARNING: IF THE PANEL IS INSTALLED IN A GAS CABINET THEN THE FOLLOWING STEPS MUST BE PERFORMED BY REACHING THROUGH THE ACCESS PORT ONLY. KEEP THE DOOR OF THE ENCLOSURE CLOSED AT ALL TIMES.

CAUTION: IT IS RECOMMENDED THAT DURING THE FOLLOWING PROCEDURES, PERSONNEL WORK IN PAIRS IN CASE OF ACCIDENT.

CAUTION: WHEN PURGING A HAZARDOUS GAS INTO THE VENT, BE SURE THAT THE SYSTEM INTO WHICH THE GAS IS BEING VENTED IS DESIGNED TO HANDLE THE GAS SAFELY.

NOTE: IF THE PANEL BEING PURGED IS BEING USED WITH EITHER AN EXCESS FLOW VALVE OR AN ACTUATED EMERGENCY SHUTOFF VALVE ON THE HIGH PRESSURE SIDE, THEN THESE DEVICES MUST BE OPENED FULLY WHEN PERFORMING THESE PURGES.

6.1 Ensure the status of the following:

ITEM	**STATUS**
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	CLOSED (Fully Counterclockwise)

6.2 Open the Venturi Valve (V6) (if supplied).

6.3 To avoid damage to the panel components, open the cylinder valve SLOWLY.

6.4 Observe all high pressure connections in the pressurized system for leaks. If any leaks are noted at the CGA connection to the cylinder or any valve, CLOSE THE CYLINDER VALVE IMMEDIATELY, and follow the instruction in the Appendix for EMERGENCY GAS EVACUATION.

6.5 Close the process gas cylinder valve.

6.6 Open the HP Vent Valve (V4) for at least ten seconds to allow all of the gas in the system to be evacuated through the vent line.

6.7 Close the HP Vent Valve (V4).

6.8 Open the process gas cylinder valve.

6.9 Repeat steps 6.5 to 6.8 a minimum of ten and a maximum of 25 times dependent upon the Buyer's experience with purging techniques and recommendations.

6.10 Close the Venturi Valve (V6) (if supplied).

6.11 Open the process gas cylinder valve completely in order to form a good seal within the cylinder valve. Keep the hand wheel or wrench (if required for this particular cylinder valve type) available at all times to allow for shut-off.

6.12 If not proceeding immediately to Section 7.0 “LOW PRESSURE PROCESS GAS PURGE” then ensure that the process gas cylinder valve is closed.

7.0 LOW PRESSURE PROCESS GAS PURGING (For 5-Valve Panels only)

WARNING: IF THE PANEL WAS SUPPLIED IN A GAS CABINET THEN THE FOLLOWING STEPS MUST BE PERFORMED BY REACHING THROUGH THE ACCESS PORT ONLY. KEEP THE DOOR OF THE ENCLOSURE CLOSED AT ALL TIMES.

CAUTION: IT IS RECOMMENDED THAT DURING THE FOLLOWING PROCEDURES, PERSONNEL WORK IN PAIRS IN CASE OF ACCIDENT.

CAUTION: WHEN PURGING A HAZARDOUS GAS INTO THE VENT, BE SURE THAT THE SYSTEM INTO WHICH THE GAS IS BEING VENTED IS DESIGNED TO HANDLE THE GAS SAFELY.

NOTE: IF THE PANEL BEING PURGED IS BEING USED WITH EITHER AN EXCESS FLOW VALVE OR AN ACTUATED EMERGENCY SHUTOFF VALVE ON THE HIGH PRESSURE SIDE, THEN THESE DEVICES MUST BE OPENED FULLY WHEN PERFORMING THESE PURGES.

7.1 Ensure the status of the following:

ITEM	**STATUS**
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	CLOSED (Fully Counterclockwise)

7.2 Open the process gas cylinder valve. Keep the hand wheel or wrench (if required for this particular cylinder valve type) available at all times to allow for shut-off.

7.3 Open the Isolation Valve (V2).

7.4 While observing the low pressure gauge, set the delivery pressure of the regulator by turning the knob in a clockwise manner to approximately 5-10 psig above the normal working pressure.

7.5 Close the Isolation Valve (V2).

7.6 Monitor the low pressure gauge on the regulator for a change in pressure over a minimum period of 30 minutes.

7.6.1 If the low pressure gauge on the regulator indicates a loss in pressure, immediately refer to the Section 3.0 “LEAK CHECK.” Perform the leak check procedures. Contact MATHESON Equipment Customer Service at (800) 828-4313 for further instructions.

7.6.2 If the low pressure gauge on the regulator indicates a rise in pressure, this is indicative of an imminent seat failure. If this condition is observed contact the MATHESON Equipment Customer Service at (800) 828-4313.

7.7 Open the LP Vent Valve (V3) allowing the process gas to be evacuated through the vent line. The low pressure gauge will indicate zero psig on the face.

7.8 After observing the gauge reading zero, close the LP Vent Valve (V3).

7.9 Ensure the status of the following:

ITEM	STATUS
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	OPEN (Fully Clockwise)

7.10 Open the Venturi Valve (V6) (if supplied).

7.11 Open the Isolation Valve (V2) and allow the pressure to build in the low pressure section of the panel. This should be accomplished in about five seconds.

7.12 Close the Isolation Valve (V2).

7.13 Open the LP Vent Valve (V3) to exhaust the gas into the vent line. This should be accomplished in about 15 seconds.

7.14 Close the LP Vent Valve (V3).

7.15 Repeat steps 7.11 to 7.14 a minimum of ten and a maximum of 25 times dependent upon the Buyer's experience with purging techniques and recommendations.

7.16 Ensure that the Isolation Valve (V2) is closed, and that all process gas has been exhausted through the vent line by opening the LP Vent Valve (V3) leaving zero psig on the low pressure side of the panel.

7.17 Close the LP Vent Valve (V3).

7.18 Close the Venturi Valve (V6) (if supplied).

7.19 Close the regulator by turning the adjusting knob counterclockwise until the knob will turn no further.

7.20 If not proceeding immediately to Section 8.0 “PROCESS PANEL OPERATION” then ensure that the process gas cylinder valve is closed.

8.0 PROCESS PANEL OPERATION

WARNING: IF THE PANEL IS INSTALLED INSIDE A GAS CABINET THEN THE FOLLOWING STEPS MUST BE PERFORMED BY REACHING THROUGH THE ACCESS PORT ONLY. KEEP THE DOOR OF THE ENCLOSURE CLOSED AT ALL TIMES.

WARNING: BEFORE USING THIS PANEL TO SUPPLY GAS TO THE PROCESS, MAKE CERTAIN THAT THE PROCEDURES IN THE PREVIOUS SECTIONS HAVE BEEN PERFORMED IN THE DESCRIBED MANNER. FURTHER, IT IS STRONGLY ADVISED THAT THE BUYER HAS PERFORMED OR MADE PROVISIONS TO PURGE AND PREP THE DISTRIBUTION LINE FROM THE LOW PRESSURE PROCESS VALVE TO THE POINT OF USE. FAILURE TO ADDRESS THIS SITUATION COULD LEAD TO ADVERSE RESULTS AT THE POINT OF USE OR IN THE PROCESS LINE.

NOTE: IF THE PANEL BEING OPERATED IS BEING USED WITH EITHER AN EXCESS FLOW VALVE OR AN ACTUATED EMERGENCY SHUTOFF VALVE ON THE HIGH PRESSURE SIDE, THEN THESE DEVICES MUST BE OPENED FULLY WHEN INITIALLY SUPPLYING GAS TO THE PROCESS LINE. SET THE EXCESS FLOW VALVE TO THE RUN POSITION ONCE THE PROCESS GAS IS BEING SUPPLIED STEADILY.

8.1 Ensure the status of the following:

ITEM	**STATUS**
PROCESS VALVE (V1)	CLOSED
ISOLATION VALVE (V2)	CLOSED
LP VENT VALVE (V3)	CLOSED
HP VENT VALVE (V4)	CLOSED
PURGE VALVE (V5)	CLOSED
VENTURI VALVE (V6)	CLOSED
PRESSURE REGULATOR	CLOSED (Fully Counterclockwise)

8.2 If proceeding immediately from Section 7.0 “LOW PRESSURE PROCESS GAS PURGE.”
- 8.2.1 Open the Isolation Valve (V2).
- 8.2.2 While observing the low pressure gauge, set the delivery pressure of the regulator by turning the knob in a clockwise manner.
- 8.2.3 PROCEED TO STEP 8.4 BELOW.

8.3 If NOT proceeding immediately from Section 7.0 “LOW PRESSURE PROCESS GAS PURGE.”
- 8.3.1 If there is zero psig as indicated by the low pressure gauge on the regulator, proceed immediately to the step 8.3.3.
- 8.3.2 If there is pressure as indicated by the low pressure gauge on the regulator:
  - 8.3.2.1 Open the LP Vent Valve (V3) to exhaust any gas into the vent line. This should be accomplished in about 15 seconds.
  - 8.3.2.2 Close the LP Vent Valve (V3).
- 8.3.3 Open the process cylinder valve.
- 8.3.4 Open the Isolation Valve (V2).
- 8.3.5 While observing the low pressure gauge, set the delivery pressure of the regulator by turning the knob in a clockwise manner.

8.4 Open the Process Valve (V1).

8.5 Activate the process equipment using the process gas supplied by the panel.

8.6 Make any necessary fine pressure adjustments to the regulator needed to control the pressure to the process equipment.

8.7 Periodically monitor the delivery pressure gauge to ensure proper delivery pressure as the cylinder pressure of the process gas diminishes.

9.0 CYLINDER CHANGE PROCEDURE (5-Valve Panels)

9.1 Close the cylinder valve.

9.2 Close Process Valve (V1) downstream of regulator.

9.3 Open LP Vent Valve (V3) for 15 seconds, then close. Verify cylinder and delivery pressure indication is zero (0) psig.

9.4 Fully decrease regulator (counter-clockwise).

9.5 Close Isolation Valve (V2).

9.6 Open HP Vent Valve (V4) for 10 seconds, then close. Verify cylinder pressure indication is zero (0) psig.

9.7 Wait 3 minutes minimum, then again verify cylinder pressure indication is zero (0) psig or less. If pressure has increased, then cylinder valve is leaking past the seat. If cylinder valve is leaking, open the cylinder valve and close again tightly; then return to step 9.6. Do not proceed if cylinder valve continues to leak; contact gas supplier for assistance.

9.8 Open Venturi Valve (V6) if included on the panel

9.9 Open HP Vent Valve (V4) for 15 seconds, then close. Verify cylinder pressure indication is zero (0) psig or less.

9.10. Open Purge Valve (V5) for 6 seconds, then close. Verify cylinder pressure indication is approximately equal to the purge gas inlet pressure.

9.11 Repeat steps 9.9 and 9.10 for a minimum of five times. For hazardous process gases, repeat steps 9.9 and 9.10 for up to 60 times depending upon the hazard level of the gas.

9.12. Close Venturi Valve (V6) valve if included on the panel.

9.13 Open Purge Valve (V5). If the panel does not include a Purge Gas Orifice (PGO) then just slightly open the Purge Valve (V5).

WARNING!

PIGTAIL BLEED FEATURE PRESSURIZES MANIFOLD

Because the manifold has a purge gas bleed feature, the process gas cylinder connection line is pressurized with purge gas. Once the connection is loosed, the purge gas will vent and a low flow of purge gas will continue to flow out of the manifold side of the connection.

9.14. Separate the process gas cylinder connection. Discard the gasket, if applicable.

9.15. Install the cylinder cap protective cover; remove the cylinder and place the cylinder on a gas cylinder cart or in a designated storage facility; install the safety chain to prevent accidental damage by falling.

9.16 Inspect the cylinder connection sealing surface on the pigtail for dirt, scratches, dents, pits, or corrosion. Clean or replace parts as indicated.

9.17 Install the new cylinder and fasten the safety strap and/or chain. Remove the protective cap from the cylinder valve.

9.18 Inspect the cylinder valve connection sealing surface for dirt, scratches, dents, pits, or corrosion. Clean as indicated. Do not attempt to connect a cylinder that is in any way defective.

9.19 Wearing new latex gloves to avoid fingerprints, install a new cylinder connection gasket, if required between the connectors, then loosely make up the connection.

9.20 Wait 30 seconds to allow the pigtail bleed to purge through the pigtail and out the loose connection, then finger tighten the connection.

9.21. With a suitable wrench, tighten the cylinder connection. (Always use a DISS torque wrench for DISS connections. Always use a backup wrench on CGA connections.)

9.22 Carefully inspect all work.

9.23 Close Purge Valve (V5).

9.24 Open HP Vent Valve (V4) for 15 seconds, then close. Verify cylinder pressure display indication is zero (0) psig.

9.25 Open Purge Valve (V5) for 5 seconds, then close. Verify cylinder pressure display indication is approximately equal to the purge gas inlet pressure.

9.26 Wait for 2 minutes minimum and monitor cylinder pressure display. A drop in pressure indicates a potential leak most probably at the cylinder connection. If leakage is discovered, repair leaks and return to step 9.18.

9.27 Open Venturi Valve (V6).

9.28 Open HP Vent Valve (V4) for 15 seconds, then close. Verify cylinder pressure display indication is zero (0) psig or less.

9.29 Open Purge Valve (V5) for 5 seconds, then close. Verify cylinder pressure display indication is approximately equal to the purge gas inlet pressure.

9.30 Repeat steps 9.28 and 9.29 for a minimum of five times. For hazardous process gases or high purity applications, cycle purging of up to 60 times may be necessary depending upon the hazard level of the gas or the atmospheric contamination introduced.

9.31 Open HP Vent Valve (V4) for 15 seconds, then close. Verify cylinder pressure display indication is zero (0) psig or less.

9.32 Close Venturi Valve (V6).

9.33 To avoid damage to the panel components, open the cylinder valve SLOWLY. Wait 5 seconds minimum or until cylinder pressure indication stabilizes. Verify full cylinder pressure indication, then close cylinder valve.

9.34 Wait for 2 minutes minimum and monitor cylinder pressure display. A drop in pressure indicates a potential leak most probably at the cylinder connection. If leakage is discovered, close cylinder valve and repeat this entire procedure except repair leaks instead of replacing cylinders.

9.35 Open the process gas cylinder valve completely in order to form a good seal within the cylinder valve. Keep the hand wheel or wrench (if required for this particular cylinder valve type) available at all times to allow for shut-off.

9.36 If the process gas uses a scale to determine when the cylinder contents' are nearly depleted, then adjust the cylinder scale indication as required by the equipment. Refer to the applicable controller operations manual for instructions.

9.37 Open Isolation Valve (V2).

9.38 Increase regulator (clockwise) to desired delivery pressure.

9.39 Manifold is now ready to be place in SERVICE and supply process gas.

9.40 Open Process Valve (V1) downstream of regulator.

10.0 CYLINDER CHANGE PROCEDURE (3-Valve Panels)

10.1 Close the cylinder valve.

10.2 Close Process Valve (V1) downstream of regulator.

10.3 Open HP Vent Valve (V4) for 10 seconds, then close. Verify cylinder pressure indication is zero (0) psig.

10.4 Close Isolation Valve (V2).

10.5 Wait 3 minutes minimum, then again verify cylinder pressure indication is zero (0) psig or less. If pressure has increased, then cylinder valve is leaking past the seat. If cylinder valve is leaking, open the cylinder valve and close again tightly; then return to step 10.3. Do not proceed if cylinder valve continues to leak; contact gas supplier for assistance.

10.6 Open HP Vent Valve (V4) for 10 seconds, then close. Verify cylinder pressure indication is zero (0) psig or less.

10.7 Separate the process gas cylinder connection. Discard the gasket, if applicable.

10.8 Install the cylinder cap protective cover; remove the cylinder and place the cylinder on a gas cylinder cart or in a designated storage facility; install the safety chain to prevent accidental damage by falling.

10.9 Inspect the cylinder connection sealing surface on the pigtail for dirt, scratches, dents, pits, or corrosion. Clean or replace parts as indicated.

10.10 Install the new cylinder and fasten the safety strap and/or chain. Remove the protective cap from the cylinder valve.

10.11 Inspect the cylinder valve connection sealing surface for dirt, scratches, dents, pits, or corrosion. Clean as indicated. Do not attempt to connect a cylinder that is in any way defective.

10.12 Wearing new latex gloves to avoid fingerprints, install a new cylinder connection gasket, if required, between the connectors, then with a suitable wrench, tighten the cylinder connection. (Always use a DISS torque wrench for DISS connections. Always use a backup wrench on CGA connections.)

10.13 Carefully inspect all work.

10.14 To avoid damage to the panel components, open the cylinder valve SLOWLY. Wait 5 seconds minimum or until cylinder pressure indication stabilizes. Verify full cylinder pressure indication, then close cylinder valve.

10.15 Wait for 2 minutes minimum and monitor cylinder pressure display. A drop in pressure indicates a potential leak most probably at the cylinder connection. If leakage is discovered, close cylinder valve and repeat this entire procedure except repair leaks instead of replacing cylinders.

10.16 Close the process gas cylinder valve.

10.17 Open the HP Vent Valve (V4) for at least 10 seconds to allow all of the gas in the system to be evacuated through the vent line.

10.18 Close the HP Vent Valve (V4).

10.19 Open the process gas cylinder valve SLOWLY.

10.20 Repeat steps 10.16 to 10.19 a minimum of five and a maximum of 25 times dependent upon the Buyer's experience with purging techniques and recommendations.

10.21 Open the process gas cylinder valve completely in order to form a good seal within the cylinder valve. Keep the hand wheel or wrench (if required for this particular cylinder valve type) available at all times to allow for shut-off.

10.22 If the process gas uses a scale to determine when the cylinder contents' are nearly depleted, then adjust the cylinder scale indication as required by the equipment. Refer to the applicable controller operations manual for instructions.

10.23 Open Isolation Valve (V2).

10.24 Adjust regulator to desired delivery pressure.

10.25 Manifold is now ready to be place in SERVICE and supply process gas.

10.26 Open Process Valve (V1) downstream of regulator.

11.0 CYLINDER CHANGE PROCEDURE (1-Valve Panels)

11.1 Close the cylinder valve.

11.2 Close Process Valve (V1) downstream of regulator.

11.3 Separate the process gas cylinder connection. Discard the gasket, if applicable.

11.4 Install the cylinder cap protective cover; remove the cylinder and place the cylinder on a gas cylinder cart or in a designated storage facility; install the safety chain to prevent accidental damage by falling.

11.5 Inspect the cylinder connection sealing surface on the pigtail for dirt, scratches, dents, pits, or corrosion. Clean or replace parts as indicated.

11.6 Install the new cylinder and fasten the safety strap and/or chain. Remove the protective cap from the cylinder valve.

11.7 Inspect the cylinder valve connection sealing surface for dirt, scratches, dents, pits, or corrosion. Clean as indicated. Do not attempt to connect a cylinder that is in any way defective.

11.8 Wearing new latex gloves to avoid fingerprints, install a new cylinder connection gasket, if required, between the connectors, then with a suitable wrench, tighten the cylinder connection. (Always use a DISS torque wrench for DISS connections. Always use a backup wrench on CGA connections.)

11.9 Carefully inspect all work.

11.10 To avoid damage to the panel components, open the cylinder valve SLOWLY. Wait 5 seconds minimum or until cylinder pressure indication stabilizes. Verify full cylinder pressure indication, then close cylinder valve.

11.11 Wait for 2 minutes minimum and monitor cylinder pressure display. A drop in pressure indicates a potential leak most probably at the cylinder connection. If leakage is discovered, close cylinder valve and repeat this entire procedure except repair leaks instead of replacing cylinders.

11.12 Open the process gas cylinder valve completely in order to form a good seal within the cylinder valve. Keep the hand wheel or wrench (if required for this particular cylinder valve type) available at all times to allow for shut-off.

11.13 If the process gas uses a scale to determine when the cylinder contents' are nearly depleted, then adjust the cylinder scale indication as required by the equipment. Refer to the applicable controller operations manual for instructions.

11.14 Adjust regulator to desired delivery pressure.

11.15 Manifold is now ready to be place in SERVICE and supply process gas.

11.16 Open Process Valve (V1) downstream of regulator.

12.0 SHUT DOWN AND DISASSEMBLY (For Repair or Replacement of 5-Valve Panels)

CAUTION: THIS PROCEDURE SHOULD ONLY BE USED FOR THE REPLACEMENT OF THE PANEL, REPLACEMENT OF ANY MODULE IN THE PANEL OR THE REPLACEMENT OF ANY EXPENDABLE PART (S) IN THE PANEL.

12.1 Make sure that the final user of the gas from the panel is informed that the panel will be taken off line.

12.2 In a method consistent with the Buyer's internal procedures, vent the process line of the system using gas from the panel.

12.3 The user should put on appropriate safety apparel such as, but not limited to, safety glasses and gloves.

WARNING: THE BUYER SHOULD FULLY UNDERSTAND THE HAZARDS AND PROPERTIES OF THE GASES THAT ARE BEING USED.

WARNING: IF THE PANEL IS INSTALLED INSIDE A CABINET, THE FOLLOWING STEPS MUST BE PERFORMED BY REACHING THROUGH THE ACCESS PORT ONLY. KEEP THE DOOR OF THE ENCLOSURE CLOSED AT ALL TIMES.

12.4 Close the cylinder valve.

12.5 Close Process Valve (V1) downstream of regulator.

12.6 Open LP Vent Valve (V3) for 15 seconds, then close. Verify cylinder and delivery pressure indication is zero (0) psig.

12.7 Close Isolation Valve (V2).

12.8 Open HP Vent Valve (V4) for 10 seconds, then close. Verify cylinder pressure indication is zero (0) psig.

12.9 Wait 3 minutes minimum, then again verify cylinder pressure indication is zero (0) psig or less. If pressure has increased, then cylinder valve is leaking past the seat. If cylinder valve is leaking, open the cylinder valve and close again tightly; then return to step 12.8. Do not proceed if cylinder valve continues to leak; contact gas supplier for assistance.

12.10 Open Venturi Valve (V6) if included on the panel

12.11 Open HP Vent Valve (V4) for 15 seconds, then close. Verify cylinder pressure indication is zero (0) psig or less.

12.12 Open Purge Valve (V5) for 6 seconds, then close. Verify cylinder pressure indication is approximately equal to the purge gas inlet pressure.

12.13 Repeat steps 12.11 and 12.12 for a minimum of five times. For hazardous process gases, repeat steps 12.11 and 12.12 for up to 60 times depending upon the hazard level of the gas.

12.14 Open Purge Valve (V5).

12.15 Open Isolation Valve (V2)

12.16 Fully open the regulator (clockwise).

12.17 Close the Purge Valve (V5).

12.18 Open Isolation Valve (V2).

12.19 Open LP Vent Valve (V3) for 15 seconds, then close.

12.20 Open Purge Valve (V5) for 6 seconds, then close.

12.21 Repeat steps 12.19 and 12.20 for a minimum of five times. For hazardous process gases, repeat steps 12.19 and 12.20 for up to 60 times depending upon the hazard level of the gas.

12.22 Close Venturi Valve (V6) valve if included on the panel.

12.23 Fully decrease regulator (counter-clockwise).

12.24 Remove the component modules or the entire panel to be repaired or replaced.

13.0 SHUT DOWN AND DISASSEMBLY (For Repair or Replacement of 3-Valve Panels)

CAUTION: THIS PROCEDURE SHOULD ONLY BE USED FOR THE REPLACEMENT OF THE PANEL, REPLACEMENT OF ANY MODULE IN THE PANEL OR THE REPLACEMENT OF ANY EXPENDABLE PART (S) IN THE PANEL.

13.1 Make sure that the final user of the gas from the panel is informed that the panel will be taken off line.

13.2 In a method consistent with the Buyer's internal procedures, vent the process line of the system using the gas from the panel.

13.3 The user should put on appropriate safety apparel such as, but not limited to, safety glasses and gloves.

WARNING: THE BUYER SHOULD FULLY UNDERSTAND THE HAZARDS AND PROPERTIES OF THE GASES THAT ARE BEING USED.

WARNING: IF THE PANEL IS INSTALLED INSIDE A CABINET, THE FOLLOWING STEPS MUST BE PERFORMED BY REACHING THROUGH THE ACCESS PORT ONLY. KEEP THE DOOR OF THE ENCLOSURE CLOSED AT ALL TIMES.

13.4 Close the cylinder valve.

13.5 Close Process Valve (V1) downstream of regulator.

13.6 Open HP Vent Valve (V4) for 10 seconds, then close. Verify cylinder pressure indication is zero (0) psig.

13.7 Close Isolation Valve (V2).

13.8 Wait 3 minutes minimum, then again verify cylinder pressure indication is zero (0) psig or less. If pressure has increased, then cylinder valve is leaking past the seat. If cylinder valve is leaking, open the cylinder valve and close again tightly; then return to step 13.6. Do not proceed if cylinder valve continues to leak; contact gas supplier for assistance.

13.9 Open HP Vent Valve (V4) for 10 seconds, then close. Verify cylinder pressure indication is zero (0) psig or less.

13.10 In a method consistent with the Buyer's internal procedures, vent the low pressure side of the panel through the process line of the system using gas from the panel.

13.11 Remove the component modules or the entire panel to be repaired or replaced.

14.0 SHUT DOWN AND DISASSEMBLY (For Repair or Replacement of 1-Valve Panels)

CAUTION: THIS PROCEDURE SHOULD ONLY BE USED FOR THE REPLACEMENT OF THE PANEL, REPLACEMENT OF ANY MODULE IN THE PANEL OR THE REPLACEMENT OF ANY EXPENDABLE PART (S) IN THE PANEL.

14.1 Make sure that the final user of the gas from the panel is informed that the panel will be taken off line.

14.2 In a method consistent with the Buyer's internal procedures, vent the process line of the system using the gas from the panel.

14.3 The user should put on appropriate safety apparel such as, but not limited to, safety glasses and gloves.

WARNING: THE BUYER SHOULD FULLY UNDERSTAND THE HAZARDS AND PROPERTIES OF THE GASES THAT ARE BEING USED.

WARNING: IF THE PANEL IS INSTALLED INSIDE A CABINET, THE FOLLOWING STEPS MUST BE PERFORMED BY REACHING THROUGH THE ACCESS PORT ONLY. KEEP THE DOOR OF THE ENCLOSURE CLOSED AT ALL TIMES.

14.4 Close the cylinder valve.

14.5 In a method consistent with the Buyer's internal procedures, vent the gas in the panel through the process line of the system using the gas from the panel.

14.5 Close Process Valve (V1) downstream of regulator.

14.6 Remove the component modules or the entire panel to be repaired or replaced.

APPENDIX I

FITTINGS

1. **COMPRESSION TUBE FITTINGS** are supplied as connections on some MATHESON Panels. These connections are for use with 1/4" OD rigid metal tubing. Dependent upon the application, the tubing material will either be Brass, Copper, Stainless Steel or Monel. Connect the rigid tubing to the outlet of the Panel and then to the equipment utilizing the manufacturer's instructions for making compression tube connections. **WARNING: MOST APPROVED AND RELIABLE COMPRESSION TUBE CONNECTIONS UTILIZE FERRULES FOR COMPRESSION OF THE FITTING ONTO THE TUBE. THESE FERRULES ARE TO BE USED FOR ONE (1) CONNECTION ONLY AND MUST NOT BE USED ON ANOTHER PIECE OF TUBING. NEVER USE TEFLON TAPE IN MAKING A COMPRESSION TUBE CONNECTION.**

2. FACE SEAL CONNECTIONS are supplied as inlet and/or outlet connections on some MATHESON Panels. Standard connections provided are either 1/4" or 3/8" male or female dependent upon customer order. Connections are to be made only to compatible connections within the User's system. Face seal connections utilize an expendable gasket for sealing which may or may not be supplied. WARNING: FACE SEAL CONNECTIONS USE EXPENDABLE GASKETS. THESE GASKETS ARE TO BE UTILIZED ONLY FOR ONE ATTEMPT AT SEALING AND SHOULD NEVER BE REUSED. MAKE CERTAIN THAT THE GASKETS TO BE EMPLOYED ARE COMPATIBLE WITH THE GAS SERVICE INTENDED.

3. CGA connections are supplied on pigtails for the connection of the process gas cylinder to the panel.

    a. **DO NOT FORCE.** The connection should be made easily. If it cannot be made easily, most likely the user has the wrong panel for the gas service.
    b. **LEFT HAND THREADS** are used on some CGA connections. Notches in the middle of the hex nut usually identify left hand threads.
    c. **GASKETS** are used in conjunction with some CGA connections. If the connection requires a gasket, one has been supplied with the panel. Inspect the gasket for signs of contamination and abuse. Do not over-tighten a connection with a gasket, as this will force the gasket to extrude into the gas stream.
    d. **NEVER USE LUBRICANTS OF ANY TYPE** on the panel or cylinder valve to aid in connection.
    e. **NEVER USE TEFLON TAPE** to aid in the sealing of the CGA fitting to the cylinder valve.

APPENDIX II

EMERGENCY SHUT DOWN

WARNING: THIS PROCEDURE SHOULD BE USED ONLY IN THE EVENT OF A CATASTROPHIC FAILURE IN THE CABINET CONTAINING THE PANEL. THIS PROCEDURE SHOULD NEVER BE USED FOR NORMAL OPERATION OR UNDER NORMAL CONDITIONS.

CAUTION: THE GOAL OF THIS PROCEDURE IS TO EFFECTIVELY SHUT DOWN THE SOURCE OF GAS IN AN EMERGENCY SITUATION. IT IS ASSUMED THAT THE BUYER HAS MADE FULL PROVISIONS FOR SCRUBBING ANY RELEASE OF GAS INTO VENT LINES AND HAS TAKEN ADEQUATE SAFETY PRECAUTIONS FOR FIRE EVENTS, COMPONENT FAILURE OR ACTS OF GOD. SUPPORT EQUIPMENT INCLUDING, BUT NOT LIMITED TO SCRUBBERS AND FIRE RETARDATION SYSTEMS, ARE ASSUMED TO BE IN COMPLIANCE WITH THE PROVISIONS OF APPLICABLE CODES.

CAUTION: IN THE EVENT OF A CATASTROPHIC FAILURE, MAKE CERTAIN THAT THE BUYER'S RESPONSE TEAM IS FULLY TRAINED AND OUTFITTED WITH THE NECESSARY PROTECTIVE GEAR REQUIRED FOR HANDLING THE MATERIALS ON SITE.

1. Shut off the source of the gas using any means deemed acceptable by the user's company.

2. After putting on the aforementioned protective gear, enter the area where the cabinets are located.

3. If possible, WITHOUT OPENING THE DOOR OF THE CABINET, reach through the access port and turn off the Gas Cylinder Valve.

4. If possible, WITHOUT OPENING THE DOOR OF THE CABINET, reach through the access port and turn off the Process Valve (V1).

5. If possible, WITHOUT OPENING THE DOOR OF THE CABINET, reach through the access port and turn on the HP Vent Valve (V4).

6. If possible, WITHOUT OPENING THE DOOR OF THE CABINET, reach through the access port and open Purge Valve (V5).

7. If possible, WITHOUT OPENING THE DOOR OF THE CABINET, reach through the access port and open the LP Vent Valve (V3).

8. Exit the area IMMEDIATELY after doing these procedures on the affected panels.

9. Make notes as to which panels have been affected during this procedure. Give these notes to the local, state and federal response teams responding to the alarm conditions.

APPENDIX III

GENERAL SPECIFICATIONS

Approximate Panel Dimensions:

Width	Depth	Height	Total Weight
12"	5.5"	14"	55 lbs

Input/Output Connections:

Purge connection	Compression fitting, SS, 1/4" OD tube
Process connection	Compression fitting, SS, 1/4" OD tube
Vent connection	Compression fitting, SS, 1/4" OD tube
Pigtail	CGA Connection Specified

Internal Connections:

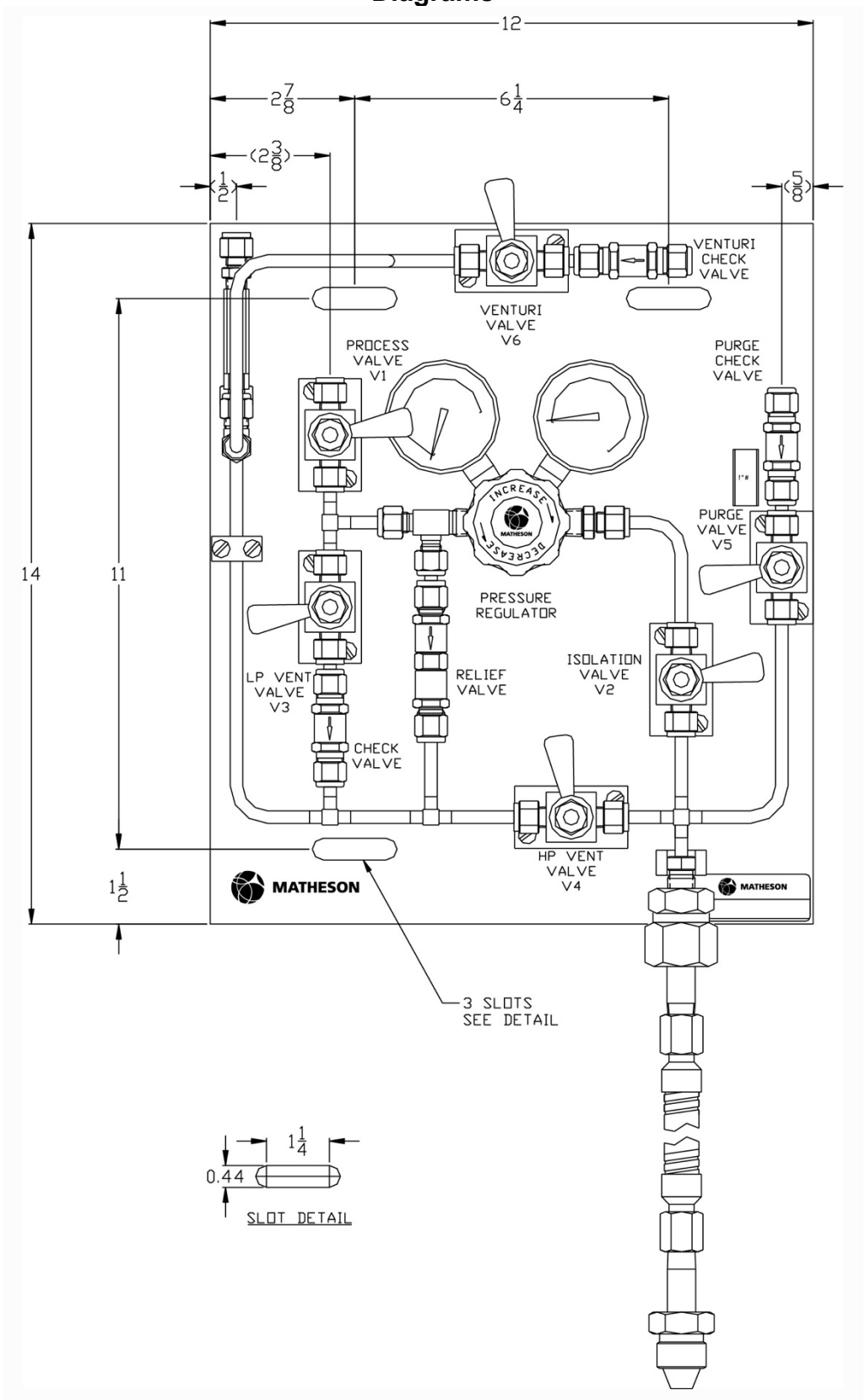
Welds	Orbitally welded
Make/Break	Compression fitting, SS, 1/4" OD tube

Pressure Ratings:

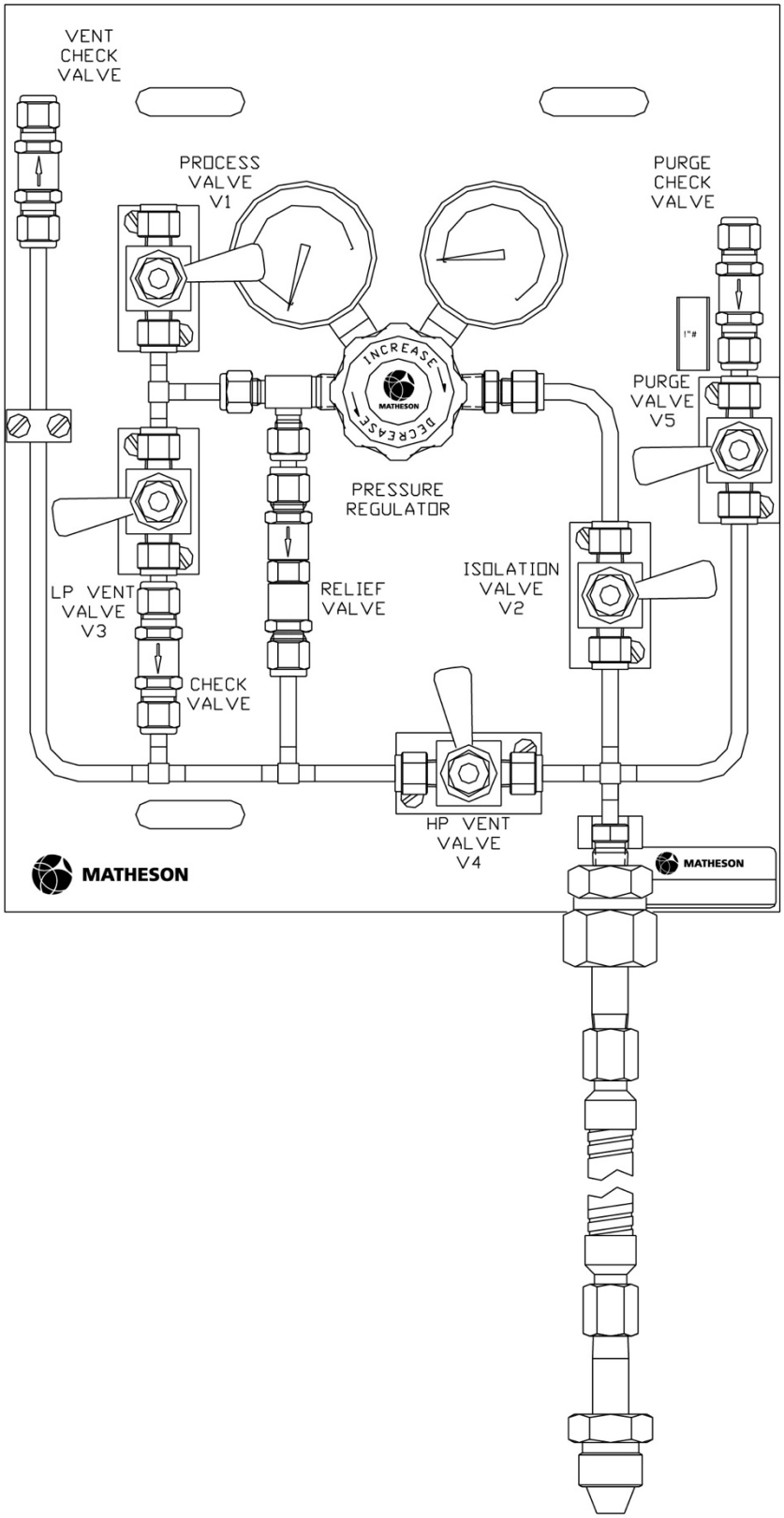
Maximum Inlet Pressure	3000 PSIG
Maximum Discharge Pressure	100 PSIG

5000 Series Panel
Dimensions

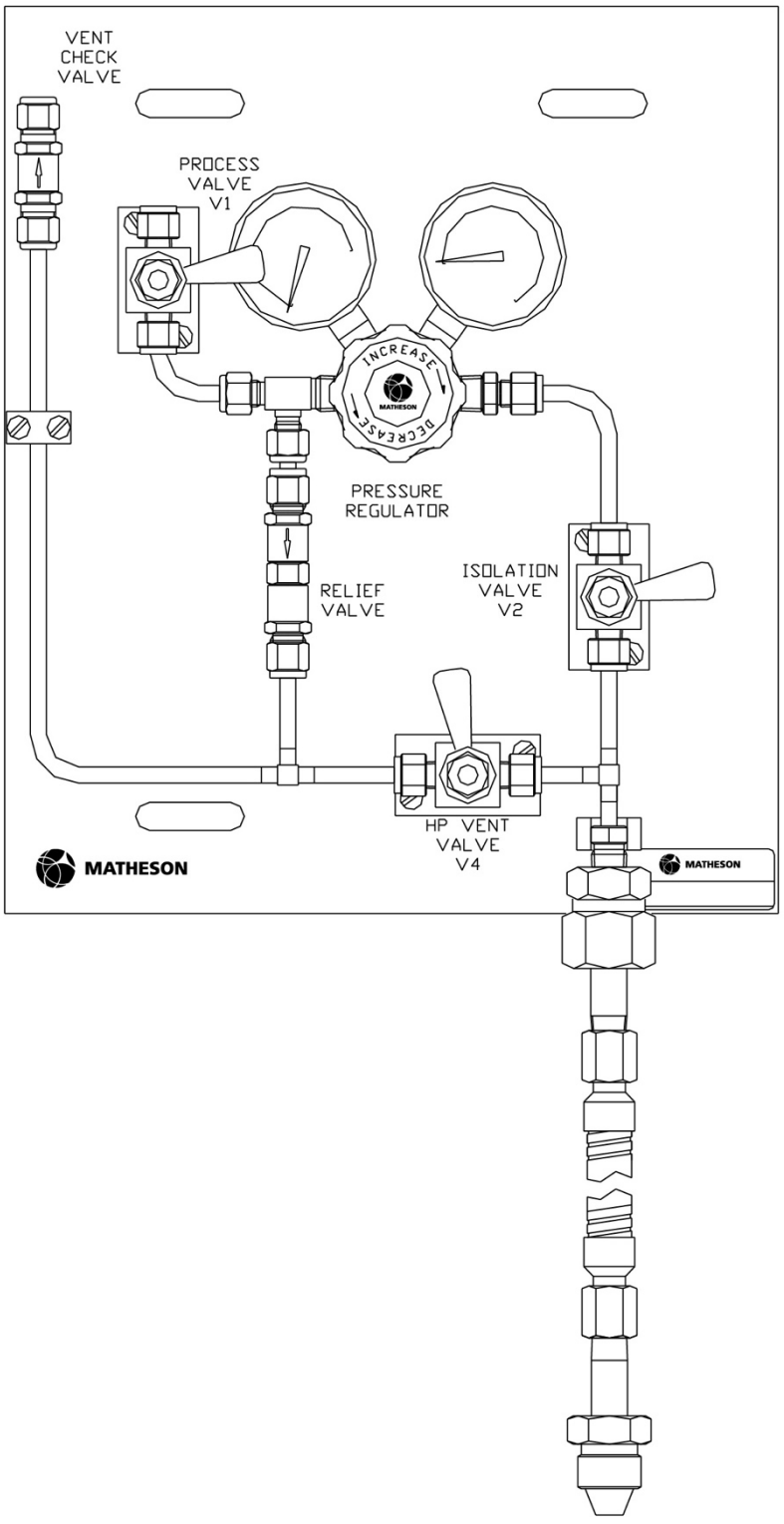
Diagrams



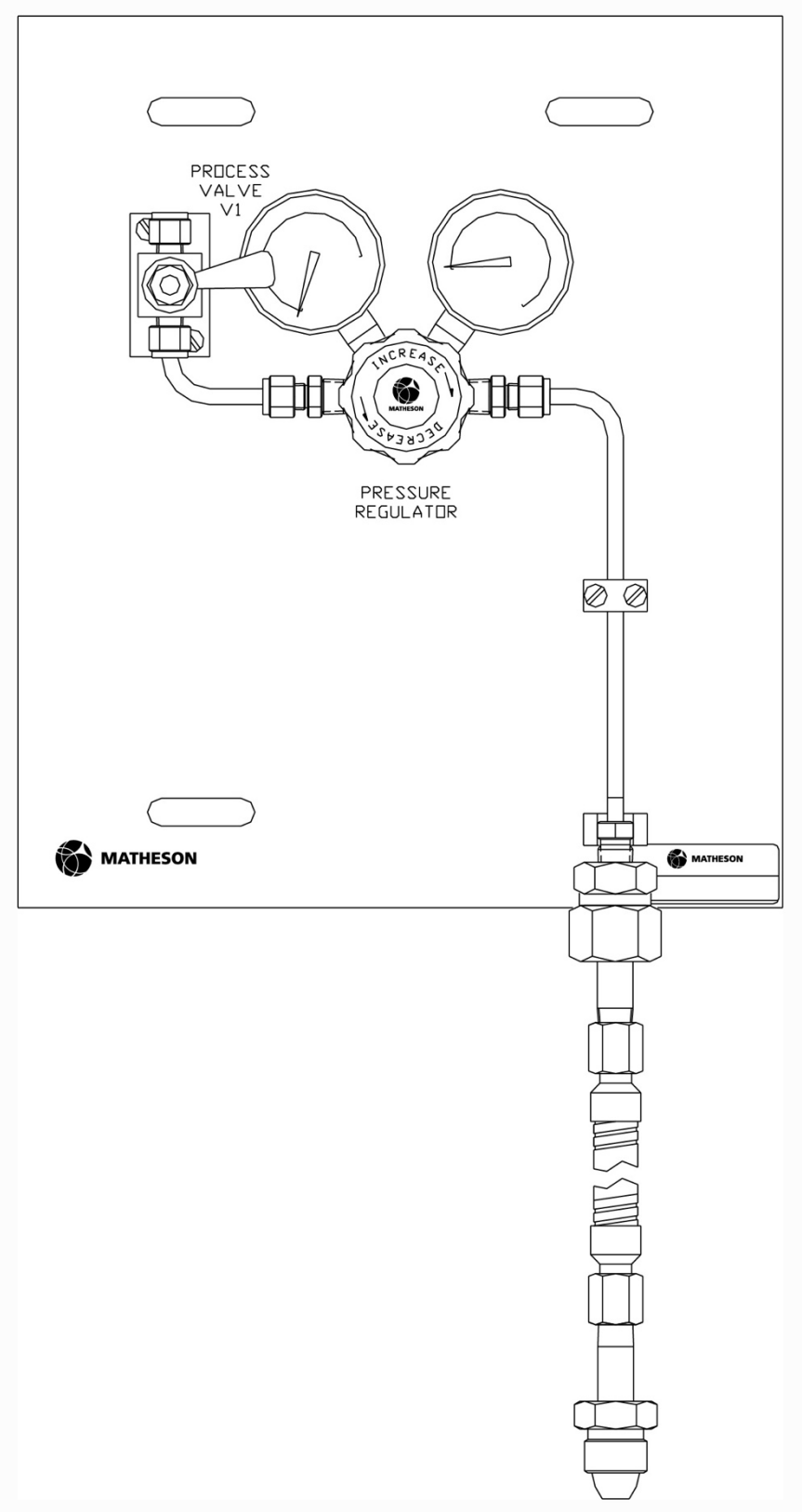
Five Valve Panel



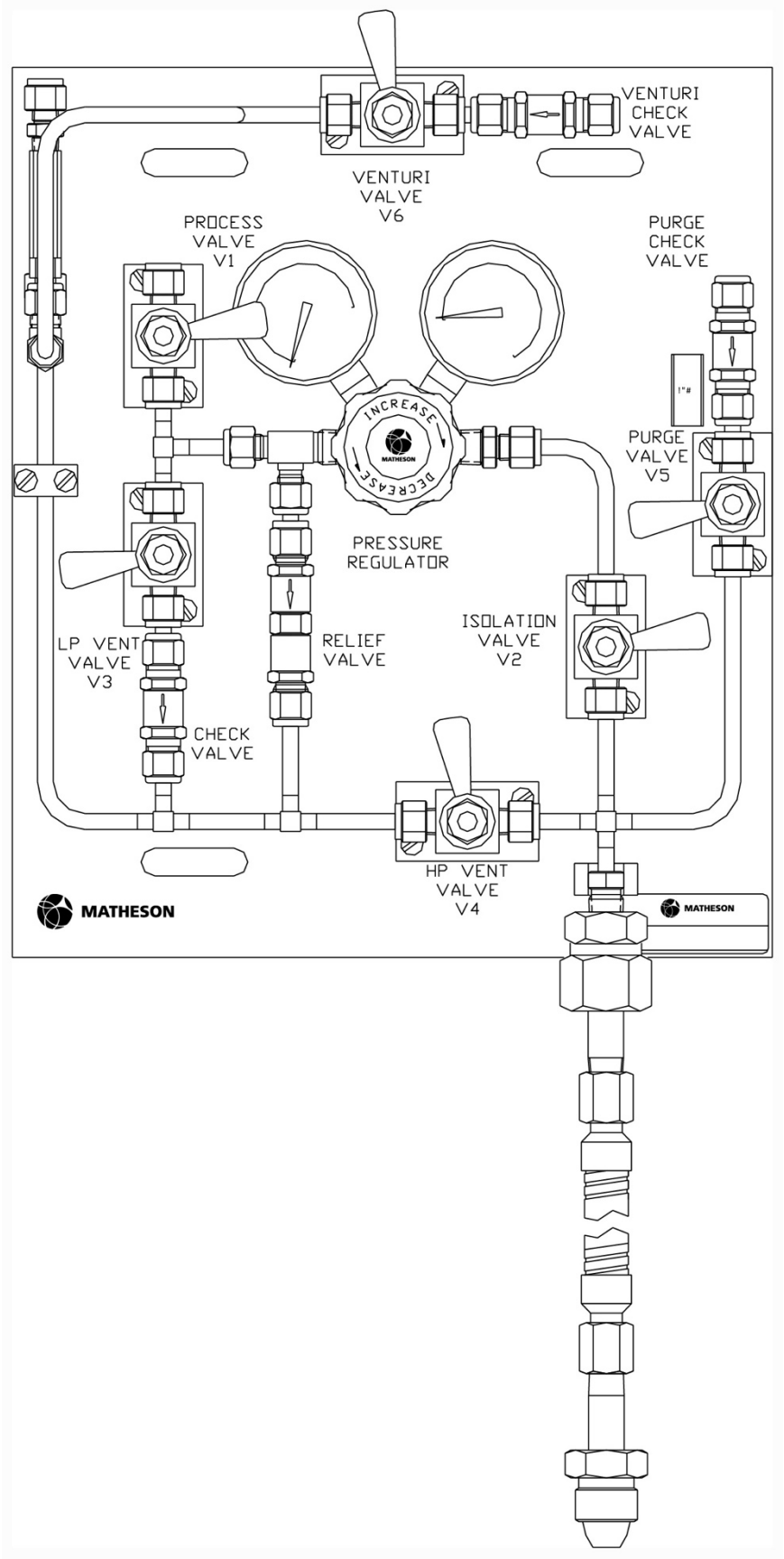
Three Valve Panel



One Valve Panel



Five Valve Panel with Venturi



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