

### MPV1 & MPV2

#### Specifications

##### Electrical

Supply voltage	15 - 24 VDC
Supply current	350 mA
Command signal	0 - 10 VDC   4 - 20 mA
Command signal impedance	VDC = 4.75 kΩ   Current = 100Ω
Monitor signal	0 - 10 VDC

##### Mechanical

Pressure range†	Vacuum - 150 psig (760 mmHg (Vac) - 12 Bar)
Output pressure	0 - 100% of range
Flow rate	Varies with inlet valve. See ordering information.
Port size	1/8" NPT
Min closed end volume	1 in <sup>3</sup>
Filtration recommended	40 Micron (included)
Linearity/Hysteresis	<±0.02% F.S. BFSL
Repeatability	<±0.02% F.S.
Accuracy	<±0.2% F.S.
Resolution	Up to ±0.005% F.S.

##### Wetted Parts ‡

Elastomers	Fluorocarbon
Manifold	Brass
Valves	Nickel plated brass
Pressure transducer	Silicon, aluminum

##### Physical

Operating temperature	32 - 158°F (0 - 70°C)
Weight	1 lbs (0.45 kg)
Protection rating	IP 65
Housing	Aluminum (anodized)

† Pressure ranges are customer specified. Output pressures other than 100% are available. ‡ Others available.



#### Description

The MPV series valve uses closed loop technology for pressure control. It gives an output pressure proportional to an electrical command signal input. An MPV1 is a single loop unit; an MPV2 is a dual or double loop unit.

The MPV is a high resolution pressure regulator consisting of valves, manifold, and electronic controls. Pressure is controlled by the use of two valves. One is a typical ON/OFF solenoid and the other is a variable orifice valve. The variable orifice valve functions as inlet control, the other as exhaust. The inlet valve operates proportionally to the command supplied by the control circuit. This variable orifice effect allows precise control of pressure at low flow conditions and avoids the digital steps of traditional ON/OFF solenoids. The exhaust solenoid allows excess media to be vented from the system.

The MPV1 pressure output is measured by an internal pressure transducer and provides a feedback signal to the electronic controls. An MPV2 uses an external pressure transducer to maintain pressure downstream should the application need to be further downstream from the MPV. This external feedback is sent to the electronic controls.

The feedback signal is compared with the command signal input. A difference between the two signals causes one of the valves to open, allowing flow in or out of the system. Controlling these two valves maintains accurate pressure.

A monitor output is provided for the system measurement. All MPV valves come standard with an analog voltage monitor output. MPV1 monitor output is an amplified signal from the internal pressure transducer.

#### WARNING

These products are intended for use in industrial compressed gas systems only. Do not use these products where pressures and temperatures exceed the specifications listed.

# INSTALLATION

## DIN Rail Mount

A DIN rail MPV comes assembled to a DIN rail with a universal foot to allow all modules to be snapped onto all available DIN footprints:

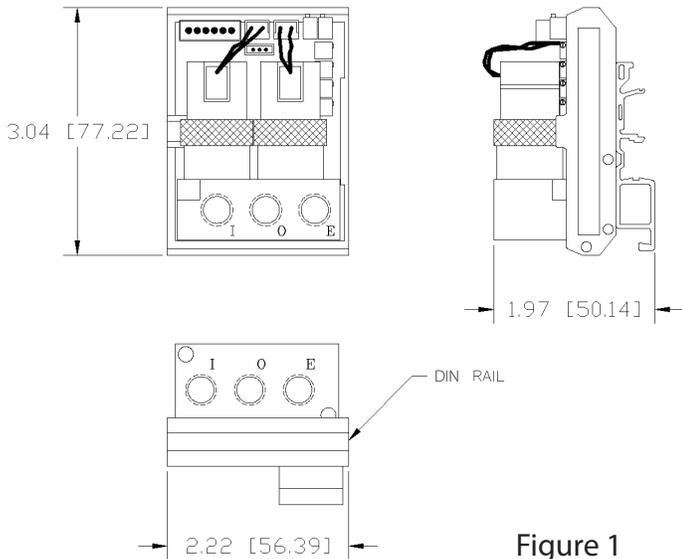


Figure 1

## Manifold Mount

1. Install the three O-rings in the O-ring grooves of the sub-base manifold.
2. Align the MPV over the three O-rings. Orientation of the MPV unit should be the same for all MPVs on the manifold and can be determined by the "I" and "E" marks on the MPV brass manifold and the aluminum sub-base manifold.
3. Insert the two cap screws that hold the valve to the sub-base manifold. Torque each screw to 8 in-lbs. and then torque each cap screw to 13-15 in-lbs.
4. To install the sub-base manifold to a panel use 1/4-20 socket head mounting screws.

## Panel Mount

The panel mount MPV can be assembled to a panel by inserting two 8-32 socket head cap screws into the manifold and torque each screw into the panel (Figure 2).

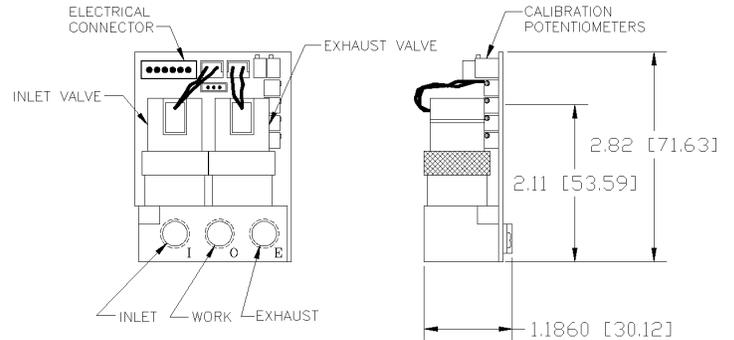


Figure 2

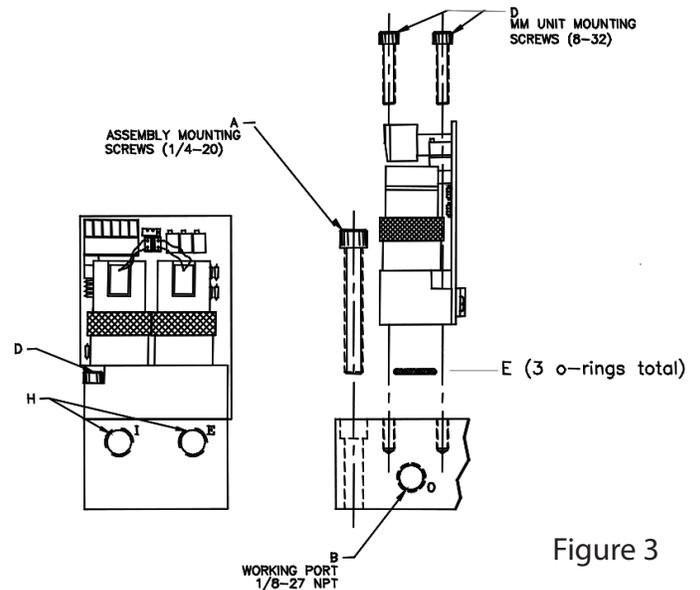


Figure 3

# PNEUMATIC CONNECTONS

1. **THIS STEP ONLY APPLIES FOR UNITS THAT ARE NOT MANIFOLD MOUNTED TO A SUB-BASE.** Apply a small amount of anaerobic sealant to the male threads of the in-line filter supplied with the MPV.
2. Connect supply pressure to port labeled "I," not to exceed rated supply pressure (Table 2).
3. For vacuum units, the vacuum supply must be connected to the exhaust E port.
4. Connect the outlet O port to the device being controlled.

# ELECTRICAL CONNECTONS

1. Ensure all power is off.
2. See Table 1 for each connector's function and label.
3. Identify the valve's command input and monitor output by referring to the calibration card.
4. Proceed to the section that relates to electrical connections as found on calibration card.

Connector Label	Function
V-	DC Common
V+	DC Power
C+	Command +
C-	Command -
M	Monitor
E	2nd Loop In

## Command Signal (E, K, V)

All voltage command MPVs use common mode voltage, meaning the DC Common pin is the common reference for both power and command. Figure 4 shows the proper command connections.

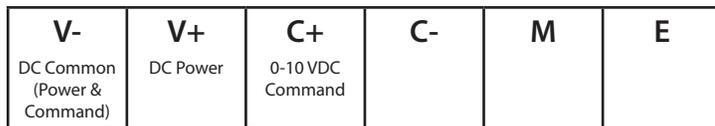


Figure 4

## Monitor Signal (E, K, V)

Use the following wiring diagram for MPV units with voltage monitor feedback. Figure 6 shows how to connect the voltmeter in parallel with the monitor output and ground.

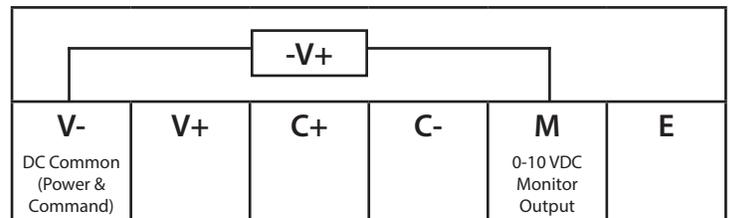


Figure 6

## Command Signal (I)

All current command MPVs use a differential current loop scheme, meaning current flow is from C+ to C- on the MPV valves. Figure 5 shows proper electrical connections for current command valves.

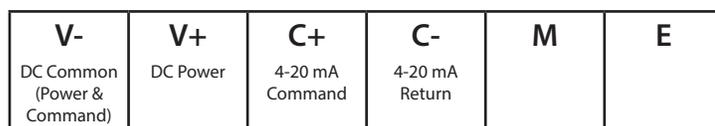


Figure 5

## MPV2 Second Loop

All MPV2 valves are designed to accept a 0-10VDC second loop input signal. Wire the external feedback signal to pin E on the electrical connector. Figure 7 shows where to connect the external feedback to the connector. NOTE: If using external feedback, transducer output must match pressure controller calibration.

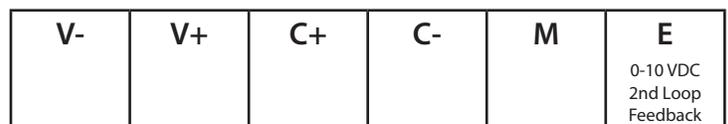


Figure 7

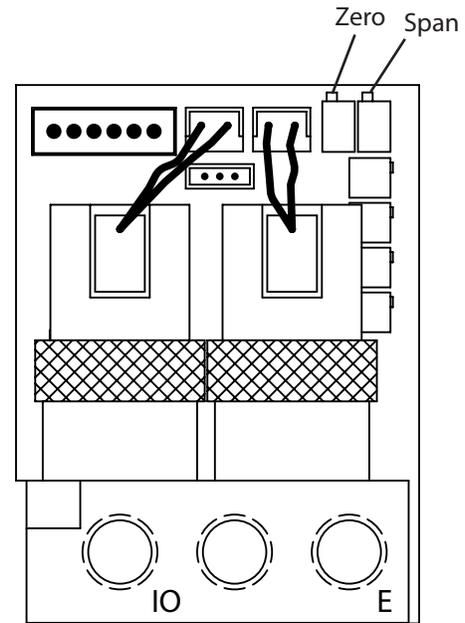
# RECALIBRATION PROCEDURE

All MPV valves come pre-calibrated from the factory using precision calibration equipment. If an MPV needs re-calibration, use the procedure described below:

1. Identify the inputs and outputs of the valve using the model number of the valve, calibration card included with the valve, and the information provided in this sheet.
2. Connect a precision measuring gage or pressure transducer to the OUT port of the MPV.
3. Connect the correct supply source to the IN port of the MPV, making sure the pressure does not exceed the rating for the valve (Table 2).
4. On the printed circuit board, locate the two adjustment potentiometers labeled S (span adjust) and Z (zero adjust).
7. Adjust the SPAN pot until MAXIMUM desired pressure is reached (clockwise increases pressure).
8. Set the electrical command input to MINIMUM value.
9. Adjust the ZERO pot until MINIMUM desired pressure is reached (clockwise increases pressure).
10. Repeat ZERO and SPAN adjustments (steps 6-10, which interact slightly, until QPV valve is calibrated back to proper range.

**NOTE:** The MPV uses an advanced analog PID circuit to modulate the internal solenoid valves. These potentiometers are set at the factory and should not require adjustment. These settings are based on the specific parameters of your application. If the response of the MPV requires adjustment, contact the factory for special instructions.

5. **NOTE: ONLY USE THIS STEP IF DEVICE IS COMPLETELY OUT OF CALIBRATION. IF IT IS SLIGHTLY OUT OF CALIBRATION, PROCEED TO STEP 6.** With a small screwdriver, turn both potentiometers 15 turns clockwise. Then turn them 7 turns counter clockwise. This will put the MPV roughly at mid scale.
6. Set the electrical command input to MAXIMUM value.



**Table 2**  
Rated Pressure For MPV Valves

Max Calibrated Pressure	Max Inlet Pressure
-1 to 1 psig	Consult factory
Vacuum to 30 psig	35 psig
31 to 100 psig	110 psig
101 to 150 psig	165 psig

# DIMENSIONS

## PANEL MOUNT

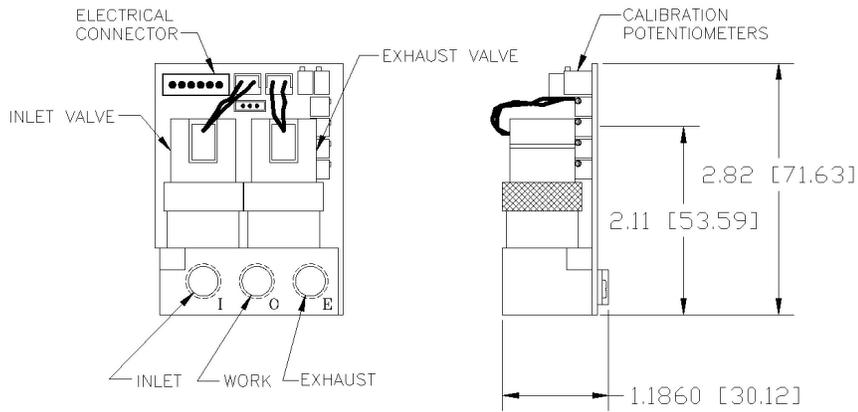


Figure 8

## DIN RAIL MOUNT

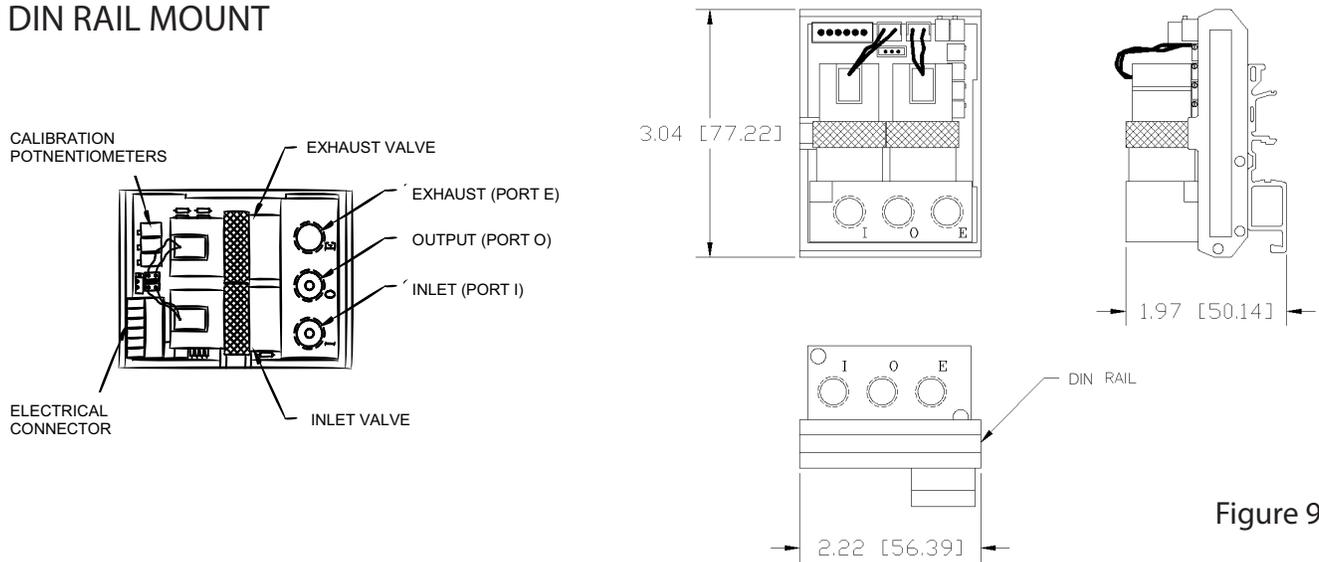


Figure 9

## MANIFOLD MOUNT

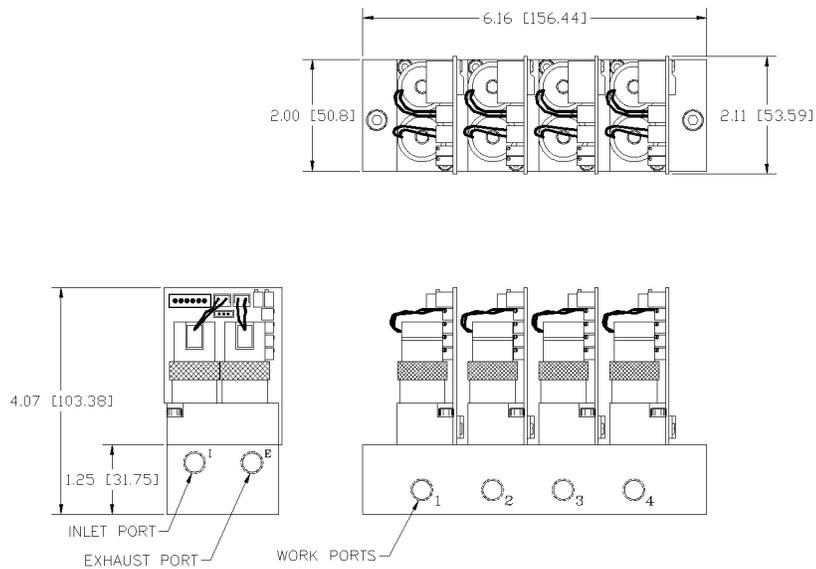


Figure 10

**Notes:**

1. All dimensions are inches [mm].
2. All dimensions are for reference only.

# CONFIGURATION

## MPV

<b>ACCURACY</b>	±0.2% F.S.	<b>PRESSURE</b>	Full Vac to 150 PSIG (10 Bar)	<b>MOUNTING OPTIONS</b>	1. DIN Rail Mount 2. Panel Mount 3. Manifold Mount (up to 12)
<b>PORT SIZE</b>	1/8"	<b>MAX FLOW</b>	1 SCFM (28 SLPM)		

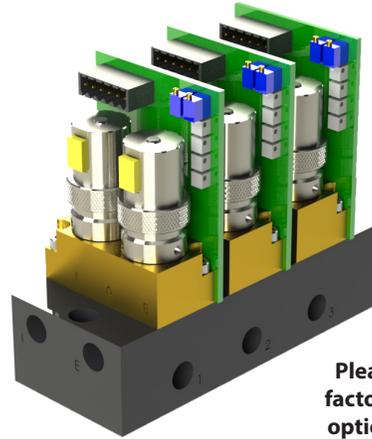
Example Part Number	MPV	1	D	B	N	E	E	Z		P	5	BR	G	B	X	L			
Section Reference ->		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	OPTIONS		

1 Type
1 Single Loop
2 Dual Loop

2 Mounting Type
D DIN Rail (Ports on Face)
M Manifold (Ports on Bottom)
P Panel (Ports on Face)

3 Manifold Material
A Anodized Aluminum
B Brass (typical)

4 Thread Type
N NPT
P BSPP
H Manifold Mount (no threads)



Please consult the factory for manifold options and pricing

5 Command Signal Range
E 0 to 10 VDC
I 4 to 20 mA DC
K 0 to 5 VDC
V 1 to 5 VDC (Requires V for Monitor Signal #6)

6 Monitor Signal Range
X No Monitor
E 0 to 10 VDC
K 0 to 5 VDC (Requires E, I or K for Command Signal Range #5)
V 1 to 5 VDC (Requires V for Command Signal Range #5)

7 Zero Offset
N 0% Pressure is Below Zero
P 0% Pressure is Above Zero
Z 0% Pressure is Zero (Typical)

9 Full Scale Pressure Type
N 100% Pressure is Below Zero
P 100% Pressure is Above Zero
Z 100% Pressure is Zero

8 Zero Offset Pressure
Typical is 0% - If greater than 30% of full scale pressure (#9), please consult factory.
*If Z for Zero Offset, Please Leave this Section (#7) Blank

10 Full Scale Pressure
Must be between less than or equal to 150 psig*
*Adder if Full Scale Pressure is <13.5" H2O

11 Pressure Unit		
PS PSI	Inches Hg	IH
MB Millibars	Inches H <sub>2</sub> O	IW
BR Bar	Millimeters H <sub>2</sub> O	MW
KP Kilo-pascal	Kilograms/cm <sup>2</sup>	KG
MP Mega-pascal	Torr (Requires A for Unit of Measure #12)	TR
MH Millimeters Hg	Centimeters H <sub>2</sub> O	CW
PA Pascal		

12 Pressure Unit of Measure
A Absolute Pressure
G Gauge Pressure

13 Inlet Valve
A 0.013" (proportional valve)
B 0.025" (proportional valve)
C 0.040" (proportional valve)
D 0.060" (proportional valve)
E 0.089" (proportional valve)
N No Inlet Valve*
X 0.040"* (digital valve)
*Vacuum Pressure Units Only

14 Outlet Valve
A 0.013"* (proportional valve)
B 0.025"* (proportional valve)
C 0.040"* (proportional valve)
D 0.060"* (proportional valve)
E 0.089"* (proportional valve)
N No Exhaust Valve
X 0.040" (digital valve)
*Vacuum Pressure Units Only

15 Bleed Orifice
N No Bleed Orifice
L Factory Standard Bleed Orifice (0.004")
Z Non-Standard Bleed Orifice (0.002")

**PLEASE CONTACT FACTORY FOR VALVE & ORIFICE SELECTION**

Options
BR Foot-Mounted Bracket + Install
DR Install DIN Rail Mounting Kit
O2* Oxygen Cleaned
O3 Oxygen Cleaned No O2
P1 12-VDC Power

\*O2 cleaning only available on brass manifold. Many other options are available. Please consult factory for more information.

Inlet valve orifice size and the exhaust valve are factory determined based on the application's flow and pressure specs. Bleed orifice is required when the MPV is used in an application that is static (no flow). Dynamic applications (under flow) do not require a bleed orifice to function properly. Please consult our Applications Team for your specific application needs. We are here to help you.

## **SAFETY PRECAUTIONS**

Please read the following safety information before installing or operating any Proportion-Air, Inc. equipment or accessories. To confirm safety, observe 'ISO 4414: Pneumatic Fluid Power - General rules relating to systems' and other safety practices.

### **WARNING**

Improper operation could result in serious injury or loss of life!

#### **1. PRODUCT COMPATIBILITY**

Proportion-Air, Inc. products and accessories are for use in industrial pneumatic applications with compressed air media. The compatibility of the equipment is the responsibility of the end user. Product performance and safety are the responsibility of the person who determined the compatibility of the system. Also, this person is responsible for continuously reviewing the suitability of the products specified for the system, referencing the latest catalog, installation manual, Safety Precautions and all materials related to the product.

#### **2. EMERGENCY SHUTOFF**

Proportion, Inc. products cannot be used as an emergency shutoff. A redundant safety system should be installed in the system to prevent serious injury or loss of life.

#### **3. EXPLOSIVE ATMOSPHERES**

Products and equipment should not be used where harmful, corrosive or explosive materials or gases are present. Unless certified, Proportion-Air, Inc. products cannot be used with flammable gases or in hazardous environments.

#### **4. AIR QUALITY**

Clean, dry air is not required for Proportion-Air, Inc. products. However, a 40 micron particulate filter is recommended to prevent solid contamination from entering the product.

#### **5. TEMPERATURE**

Products should be used with a media and ambient environment inside of the specified temperature range of 32°F to 158°F. Consult factory for expanded temperature ranges.

#### **6. OPERATION**

Only trained and certified personnel should operate electronic and pneumatic machinery and equipment. Electronics and pneumatics are very dangerous when handled incorrectly. All industry standard safety guidelines should be observed.

#### **7. SERVICE AND MAINTENANCE**

Service and maintenance of machinery and equipment should only be handled by trained and experienced operators. Inspection should only be performed after safety has been confirmed. Ensure all supply pressure has been exhausted and residual energy (compressed gas, springs, gravity, etc.) has been released in the entire system prior to removing equipment for service or maintenance.

### **CAUTION**

Improper operation could result in serious injury to people or damage to equipment!

#### **1. PNEUMATIC CONNECTION**

All pipes, pneumatic hose and tubing should be free of all contamination, debris and chips prior to installation. Flush pipes with compressed air to remove any loose particles.

#### **2. THREAD SEALANT**

To prevent product contamination, thread tape is not recommended. Instead, a non-migrating thread sealant is recommended for installation. Apply sealant a couple threads from the end of the pipe thread to prevent contamination.

#### **3. ELECTRICAL CONNECTION**

To prevent electronic damage, all electrical specifications should be reviewed and all electrical connections should be verified prior to operation.

### **EXEMPTION FROM LIABILITY**

**1. Proportion-Air, Inc.** is exempted from any damages resulting from any operations not contained within the catalogs and/or instruction manuals and operations outside the range of its product specifications.

**2. Proportion-Air, Inc.** is exempted from any damage or loss whatsoever caused by malfunctions of its products when combined with other devices or software.

**3. Proportion-Air, Inc.** and its employees shall be exempted from any damage or loss resulting from earthquakes, fire, third person actions, accidents, intentional or unintentional operator error, product misapplication or irregular operating conditions.

**4. Proportion-Air, Inc.** and its employees shall be exempted from any damage or loss, either direct or indirect, including consequential damage or loss, claims, proceedings, demands, costs, expenses, judgments, awards, loss of profits or loss of chance and any other liability whatsoever including legal expenses and costs, which may be suffered or incurred, whether in tort (including negligence), contract, breach of statutory duty, equity or otherwise.

### **WARRANTY**

Proportion-Air, Inc. products are warranted to the original purchaser only against defects in material or workmanship for eighteen (18) months from the date of manufacture. The extent of Proportion-Air's liability under this warranty is limited to repair or replacement of the defective unit at Proportion-Air's option. Proportion-Air shall have no liability under this warranty where improper installation or filtration occurred.

# **PROPORTION**

ProportionAir.com

8250 N 600 W

P.O. Box 218

McCordsville, IN 46055

*info@proportionair.com*

Handcrafted in the USA  
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