

# **PROPORTION** *AR*



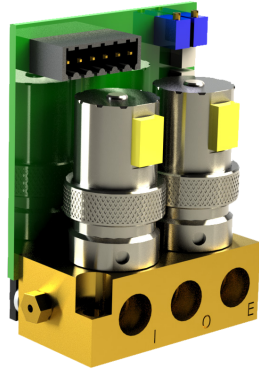
## **HIGH RESOLUTION ELECTRO-PNEUMATIC PRESSURE REGULATORS**

**High and ultra-high resolution pressure control for the most sensitive applications, like leak testing, micro-dispensing and microfluidics**

# Specifications - QPV, MPV, SPV



**QPV**



**MPV**



## QPV and MPV

### Electrical

Supply voltage .....	15-24 VDC
Supply current.....	100-350 mADC
Command VDC.....	0-10 VDC
Command current.....	4-20 mADC
Monitor VDC.....	0-10 VDC
Command signal impedance.....	Voltage: 10 kΩ/VDC 4.75 Current: 100 kΩ

### Mechanical

Inlet pressure .....	Full vacuum-165 PSIG
Pressure range†.....	Full vacuum-150 PSIG
Flow rate .....	Based on inlet valve orifice size
Filtration required .....	40 micron
Resolution (max).....	±0.015% F.S.
Accuracy .....	±0.25% F.S.
Hysteresis .....	±0.2% F.S.
Repeatability .....	±0.02% F.S.
Port size.....	1/8" NPT Female
Minimum Critical Volume.....	1 in <sup>3</sup>

### Wetted Parts

Elastomers .....	Fluorocarbon
Manifold .....	Brass (Aluminum also available on QPV)
Valves .....	Nickel Plated Brass
Pressure Transducer .....	Silicon, Aluminum

### Physical

Operating Temperature .....	32°-158° F (0°-70° C)
Weight	
QPV .....	1.02 lbs
Panel Mount MPV .....	0.8 lbs
Manifold Mount MPV .....	Based on number of stations
DIN Rail Mount MPV .....	0.9 lbs
Electrical connector	
QPV .....	6-pin Hirschmann
MPV.....	6-pin DIN connector

## SPV

### Electrical

Supply voltage .....	15-24 VDC
Command signal .....	0-10 VDC
Monitor Signal .....	0-10 VDC
Current Draw.....	140 mA Max

### Mechanical

Max Inlet Pressure .....	165 PSIG
Pressure range†.....	Full vacuum-150 PSIG
Flow rate .....	Based on inlet valve orifice size
Resolution (max).....	±0.015% F.S.
Accuracy .....	<±0.25% F.S.
Repeatability .....	<±0.02% F.S.
Thread Type .....	10-32 UNF
Mounting Type.....	DIN Rail, Manifold, Panel Mount
Minimum Critical Volume.....	1 in <sup>3</sup>

### Wetted Parts

Elastomers .....	Viton
Base Manifold .....	304 SS
Ind Manifold.....	Clear-coat Anodized Aluminum
Valves .....	Nickel Plated Brass
Pressure Transducer .....	Silicon, Aluminum

### Physical

Ambient Temperature .....	-4°-158° F (-20°-70° C)
Media Temperature .....	-4°-131° F (-20°-55° C)
Weight .....	1 lbs (0.45 kg)

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

# Specifications - QL3



## QL3

### Electrical

Supply voltage .....	15-24 VDC
Supply current.....	250 mA DC (max)
Command signal .....	0-10 VDC   4-20 mA DC
Voltage monitor signal.....	0-10 VDC @ 10 mA max
Current monitor signal.....	4-20 mA Sinking (Sourcing opt)
Command signal impedance.....	VDC: 4.7 k $\Omega$ Current: 100 k $\Omega$

### Mechanical

Pressure range .....	0-5 PSIG through 0-125 PSIG
Output pressure† .....	0-100% of range
Flow rate .....	25 SCFM @ 120 PSIG inlet and 100 PSIG output
Filtration recommended.....	40 micron
Linearity.....	< $\pm$ 0.3% F.S. BFSI
Resolution .....	$\pm$ 0.05% F.S.
Accuracy .....	< $\pm$ 0.4% F.S.
Hysteresis .....	$\pm$ 0.05% F.S.
Repeatability.....	$\pm$ 0.02% F.S.
Port size.....	1/4" NPT, BSPP available
Minimum critical volume .....	5 in <sup>3</sup>

### Wetted Parts

Elastomers .....	Buna
Manifold .....	Aluminum nickel-plated
Valves .....	430FR SS, 360 Brass
Pressure Transducer .....	Utem 1000, Aluminum

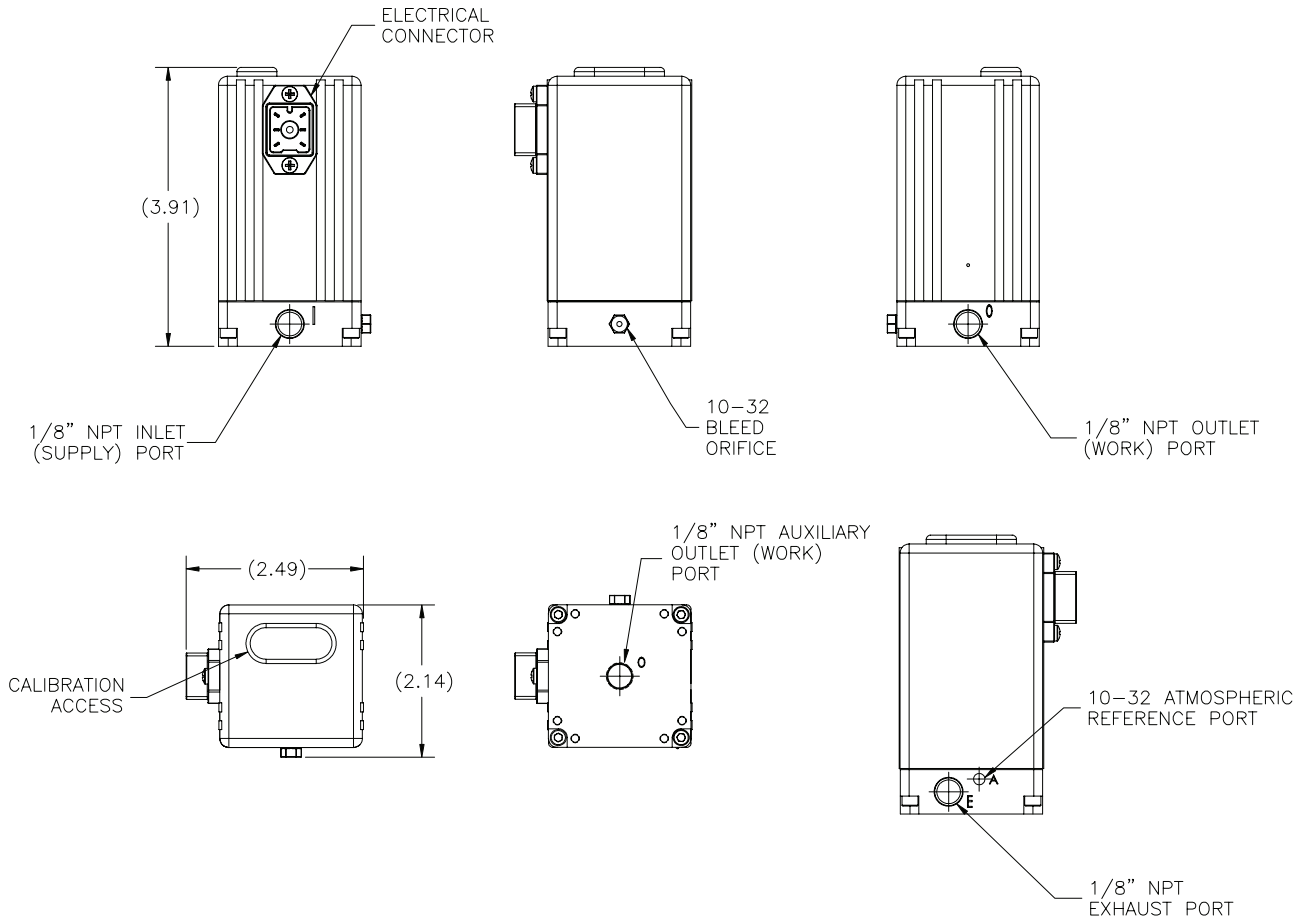
### Physical

Operating Temperature .....	32°-158° F (0°-70° C)
Dimensions.....	2"x2"x4.4" (51mm x 51mm x 111mm)
Weight.....	1.5 lbs (0.68 kg)
Housing.....	Aluminum (anodized)

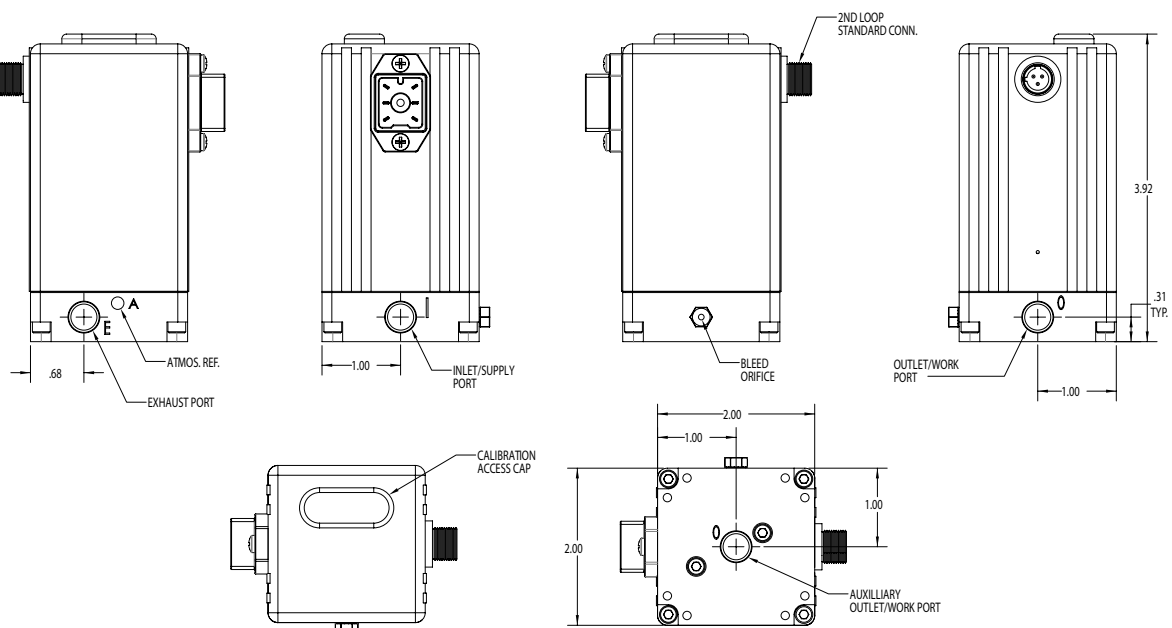
†Pressure ranges are customer specified. Output pressures other than 100% are available.

# Dimensions - QPV1 & QPV2

## QPV1

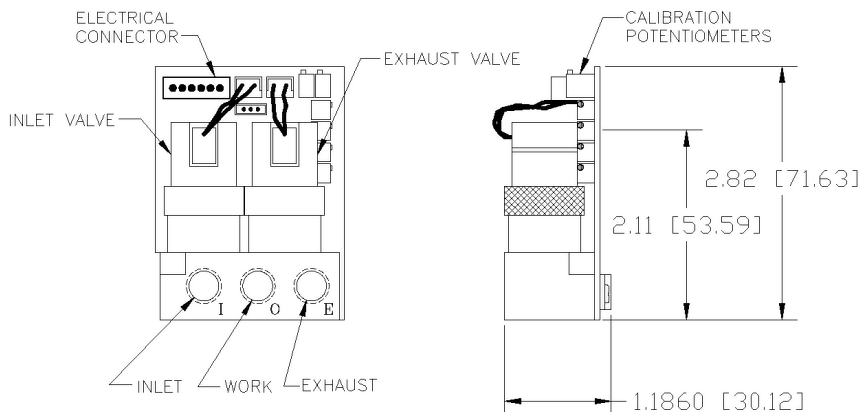


## QPV2

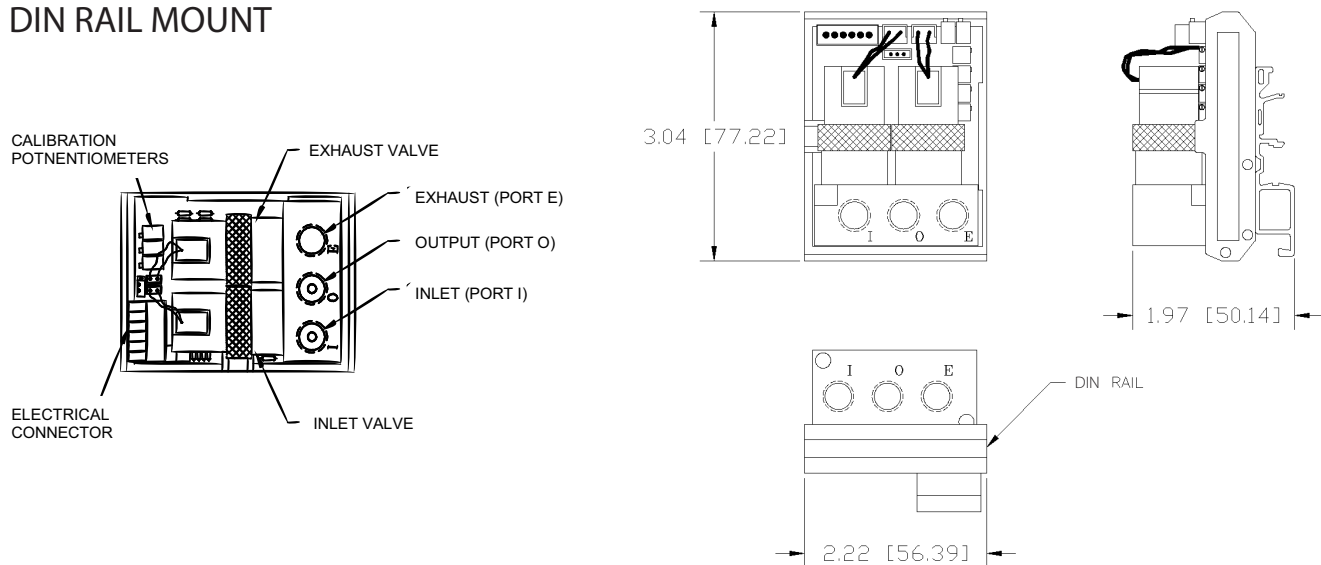


# Dimensions - MPV Mounts

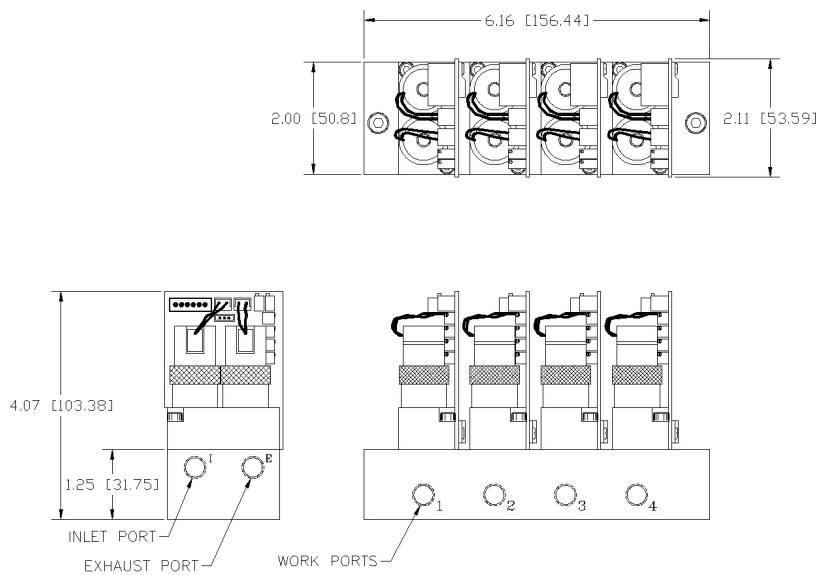
## PANEL MOUNT



## DIN RAIL MOUNT

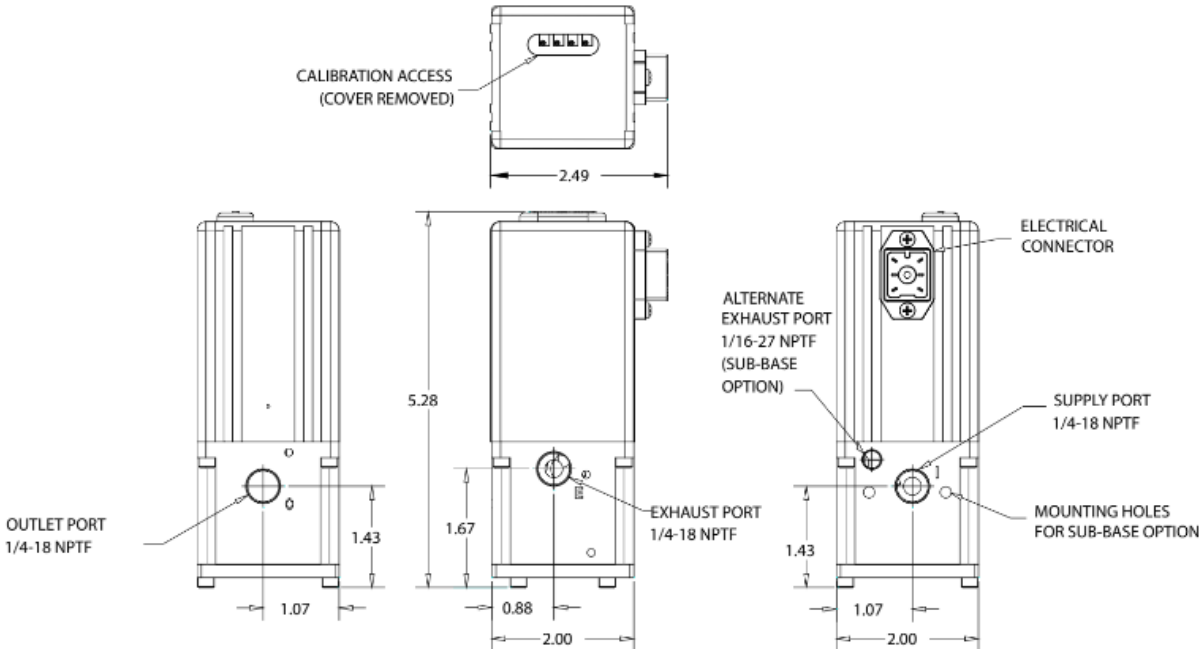


## MANIFOLD MOUNT

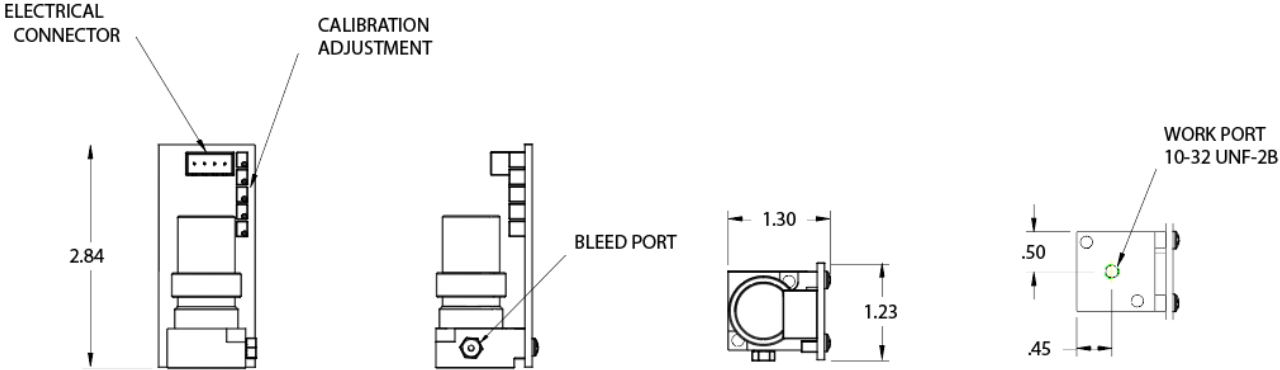


# Dimensions - QL3 & SPV

## QL3



## SPV



# QPV Configuration

# QPV

<b>ACCURACY</b>	±0.2% F.S.	<b>PRESSURE</b>	Full Vac to 150 PSIG (10 Bar)
<b>PORT SIZE</b>	1/8"	<b>MAX FLOW</b>	1 SCFM (28 SLPM)

The QPVM replaces the QPVT for all new applications.

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

1 Type
1 Single Loop
2 Dual Loop

2 Manifold Material
A Anodized Aluminum
B Brass

3 Thread Type
N NPT
P BSPP

4 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 #5)
A RS232 Modbus Serial Command (Requires X for Monitor Signal #5)
B RS485 Modbus Serial Command (Requires X for Monitor Signal #5)
N Ethernet/Proportion-Air (Requires X for Monitor Signal #5)
P P2 Profiler (Integrated)

5 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 #4)
V 1 to 5 VDC (Requires V for Command Signal Range #4)
C 4 to 20 mA DC (Sinking)
S 4 to 20 mA DC (Sourcing)

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

7 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

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

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

10 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 #11)	TR
MH Millimeters Hg	Centimeters H <sub>2</sub> O	CW
PA Pascal		

11 Pressure Unit of Measure
A Absolute Pressure
D Differential Pressure
G Gauge Pressure

12 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	
Adder if two proportional valves are selected.	

13 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)

14 Bleed Orifice
N No Bleed Orifice
L Factory Standard Bleed Orifice (0.004")
2 Non-Standard Bleed Orifice (0.002")

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

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 QPV 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.



Options
3D 3-Pin Connector
BF Bottom Mount 1/4" Male Fitting
BR Foot-Mounted Bracket + Install
DD Digital Display
O2* Oxygen Cleaned
O3 Oxygen Cleaned Non-O2 Use
P1 12-VDC Power

Recommended Accessories	
QBT-C-6 6 ft. Power/Command/Monitor Cable	
QBT-01 Wrap-Around Mounting Bracket	
QBTS-02* Uninstalled Foot-Mount Bracket and Screws	
*Include BR option on part number for factory-installed foot mount bracket	

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

# MPV 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)		

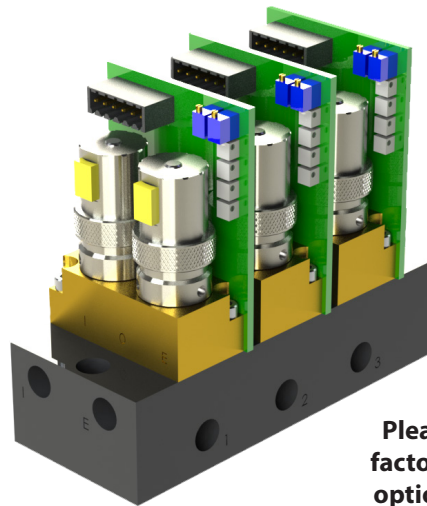
Example Part Number	MPV	1	D	B	N	E	E	Z		P	5	BR	G	B	X	L			
Section Reference ->		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	OPTIONS		

1 Type	2 Mounting Type	3 Manifold Material	4 Thread Type
1 Single Loop	D DIN Rail (Ports on Face)	A Anodized Aluminum	N NPT
2 Dual Loop	M Manifold (Ports on Bottom)	B Brass (typical)	P BSPP
	P Panel (Ports on Face)		H Manifold Mount (no threads)

5 Command Signal Range	6 Monitor Signal Range
E 0 to 10 VDC	X No Monitor
I 4 to 20 mA DC	E 0 to 10 VDC
K 0 to 5 VDC	K 0 to 5 VDC (Requires E, I or K for Command Signal Range #5)
V 1 to 5 VDC (Requires V for Monitor Signal #6)	V 1 to 5 VDC (Requires V for Command Signal Range #5)

7 Zero Offset	9 Full Scale Pressure Type
N 0% Pressure is Below Zero	N 100% Pressure is Below Zero
P 0% Pressure is Above Zero	P 100% Pressure is Above Zero
Z 0% Pressure is Zero (Typical)	Z 100% Pressure is Zero

8 Zero Offset Pressure	10 Full Scale Pressure
Typical is 0* - If greater than 30% of full scale pressure (#9), please consult factory.	Must be between less than or equal to 150 psig*
*If Z for Zero Offset, Please Leave this Section (#7) Blank	*Adder if Full Scale Pressure is <13.5"H2O



**Please consult the factory for manifold options and pricing**

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")	
2 Non-Standard Bleed Orifice (0.002")	

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

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

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.

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



# SPV Configuration

## SPV

<b>ACCURACY</b>	±0.2% F.S.	<b>PRESSURE</b>	Full Vac to 150 PSIG (10 Bar)
<b>PORT SIZE</b>	10-32 UNF	<b>MAX FLOW</b>	1 SCFM (28 SLPM)

*The SPV employs a single proportional valve designed for compact under flow applications.*

Example Part Number	SPV	1	D	A	U	E	E	Z		P	9	BR	G	A	L		
Section Reference ->		1	2	3	4	5	6	7	8	9	10	11	12	13	14		OPTIONS

<b>1 Type</b>	<b>2 Mounting Type</b>
1 Single Loop	D DIN Rail (Threaded Face)
2 Dual Loop	M Manifold (Ports on Bottom)

<b>3 Manifold</b>	<b>4 Thread Type</b>
A Clear Anodized Aluminum	U 10-32 UNF

<b>5 Command Signal Range</b>
E 0 to 10 VDC
K 0 to 5 VDC
V 1 to 5 VDC (Requires V for Monitor Signal #6)

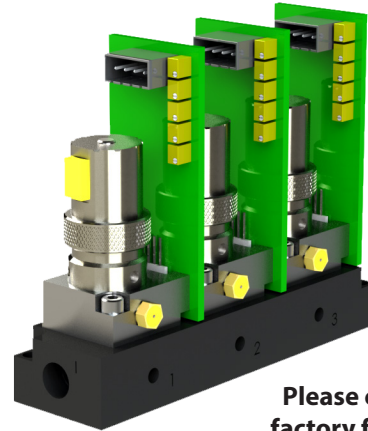
<b>6 Monitor Signal Range</b>
X No Monitor
E 0 to 10 VDC
K 0 to 5 VDC (Requires E or K for Command Signal Range #4)
V 1 to 5 VDC (Requires V for Command Signal Range #4)

<b>7 Zero Offset</b>
N 0% Pressure is Below Zero
P 0% Pressure is Above Zero
Z 0% Pressure is Zero (Typical)

<b>8 Zero Offset Pressure</b>
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

<b>9 Full Scale Pressure Type</b>
N 100% Pressure is Below Zero
P 100% Pressure is Above Zero
Z 100% Pressure is Zero

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



**Please consult the factory for manifold options and pricing**

<b>11 Pressure Unit</b>		
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	Centimeters H <sub>2</sub> O	CW
MH Millimeters Hg	Pascal	PA

<b>12 Pressure Unit of Measure</b>
G Gauge Pressure

<b>13 Inlet Valve</b>
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)

<b>14 Bleed Orifice</b>
N No Bleed Orifice
L Factory Standard Bleed Orifice (0.004")
2 Non-Standard Bleed Orifice (0.002")

<b>Options</b>
DR Install DIN Rail Mounting Kit
P1 12-VDC Power

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

<b>Recommended Accessories</b>	
H161569	Power Connector (Included with SPV)
DRMKT-SPV	DIN Rail Mounting Kit (add option DR to part number for kit + installation)

# QL3 Configuration

## QL3

ACCURACY	±0.4% F.S.	PRESSURE	0-5 thru 0-125 psig (8.6 Bar)
PORT SIZE	1/4"	MAX FLOW	25 SCFM (708 SLPM)

Example Part Number	QL	3	A	N	E	E	Z		P	125	PS	G	02		
Section Reference ->			1	2	3	4	5	6	7	8	9	10	OPTIONS		

<b>1</b>	<b>Manifold Material</b>	<b>2</b>	<b>Thread Type</b>
A	Nickel-Plated Aluminum	N	NPT
B	Nickel-Plated Brass	P	BSPP

<b>3</b>	<b>Command Signal Range</b>
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 #4)
A	RS232 Modbus Serial Command (Requires X for Monitor Signal #4)
B	RS458 Serial Command (Requires X for Monitor Signal #4)
P	P2 Profiler (Integrated)

<b>4</b>	<b>Monitor Signal Range</b>
X	No Monitor
E	0 to 10 VDC
K	0 to 5 VDC (Requires E, I or K for Command Signal Range (#3))
V	1 to 5 VDC (Requires V for Command Signal Range (#3))
C	4 to 20 mA DC (Sinking)
S	4 to 20 mA DC (Sourcing)

<b>5</b>	<b>Zero Offset</b>
P	0% Pressure is Above Zero
Z	0% Pressure is Zero (Typical)

<b>6</b>	<b>Zero Offset Pressure</b>
Typical is 0* - If greater than 30% of full scale pressure (#8), please consult factory.	
*If Z for Zero Offset, Please Leave this Section (#6) Blank	

<b>7</b>	<b>Full Scale Pressure Type</b>
P	100% Pressure is Above Zero
Z	100% Pressure is Zero

<b>8</b>	<b>Full Scale Pressure</b>
Must be less than or equal to 125 psig	

<b>9</b>	<b>Pressure Unit</b>		
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 #10)	TR
MH	Millimeters Hg	Centimeters H <sub>2</sub> O	CW
PA	Pascal		

<b>10</b>	<b>Pressure Unit of Measure</b>
G	Gauge Pressure



<b>Options</b>	
BR <sup>1</sup>	Foot-Mounted Bracket + Install
DD	Digital Display
O2*	Oxygen Cleaned
O3	Oxygen Cleaned Non-O2 Use
P1	12-VDC Power

<sup>1</sup>We highly recommend the BR option if using a foot-mounted bracket to prevent contamination or product damage with the QL3.

\*O2 cleaning only available on brass manifold.

Many other options are available. Please consult factory for more information.

<b>Recommended Accessories</b>	
QBT-C-6	6 ft. Power/Command/Monitor Cable
QBT-01	Wrap-Around Mounting Bracket
QBT-03*	Uninstalled Foot-Mount Bracket and Screws
*Include BR option on part number for factory-installed foot mount bracket. We highly recommend the BR option to prevent contamination or product damage with the QL3.	

# Safety Procedures

*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 100 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 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.

THE WARRANTY IS GIVEN IN-LIEU OF, AND BUYER HERBY EXPRESSLY WAIVES, WARRANTIES OR LIABILITIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY OBLIGATION OF PROPORTION-AIR WITH REGARD TO CONSEQUENTIAL DAMAGES, WARRANTIES OF MERCHANTABILITY, DESCRIPTION AND FITNESS FOR A PARTICULAR PURPOSE.

# PROPORTION AIR

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