

INSTALLATION, OPERATION AND MAINTENANCE GUIDE

QB4 Electro-Pneumatic Pressure Regulator

Specifications

Electrical

Supply voltage	15-24 VDC
Supply current	100-250 mA
Command signal	0-10 VDC 4-20 mA
Command signal impedance	
VDC	10 K Ω
Current.....	100 Ω

Analog Monitor Output

Voltage	0-10 VDC @ 20 mA max
Current	4-20 mA DC sinking or sourcing

Mechanical

Inlet pressure	Vacuum-165 PSIG
Pressure range†	Vacuum-150 PSIG
Min. regulated pressure	X PSIG
Output pressure	0-100% of range
Flow rate	200 SCFM @ 120 PSIG supply and 60 PSIG output
Min closed end volume	5 in ³
Port size	1/2" NPT (BSPP opt.)
Filtration recommended	40 micron
Linearity/Hysteresis	±0.3% FS
Repeatability	±0.5% FS
Temperature effect	% per X° C

Wetted Parts

Elastomers‡	Buna-N
Manifold	Nickel-plated aluminum or nickel-plated brass
Valves	Nickel-plated brass or 400 series SS
Pressure Transducer	Utem 1000, aluminum

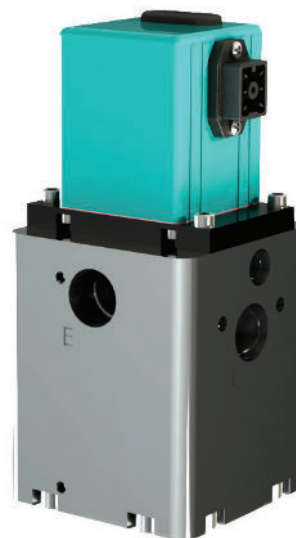
Physical

Operating temperature	32-158° F (0-70° C)
Weight	
Brass	8 lbs (3.65 Kg)
Aluminum	4 lbs (1.81 Kg)
Protection rating	IP65
Housing	Anodized aluminum
Connector	6-pin Hirschmann

*CE compliant, except for models with RS232, RS485, P2 Profiler and digital display.

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

‡Others available.



INSTALLATION

CAUTION: USE ONLY THE THREAD SEALANT PROVIDED. OTHER SEALANTS, SUCH AS PTFE TAPE AND PIPE DOPE, CAN MIGRATE INTO THE FLUID SYSTEM CAUSING FAILURES.

1. The valve can be mounted in any position without affecting performance. Mounting brackets (ordered separately) can be used to attach valve to a panel or wall surface.
2. A typical 40 micron in-line filter is recommended on the inlet of the QB4 valve. This is available from Proportion-Air as part number FPP-4.
3. A 1/4" plug is supplied with the valve. It can be used to plug the "alternate exhaust port" if the exhaust media should be captured or when the valve is used for vacuum or vacuum through positive pressure control. See Figure 1 for port location.

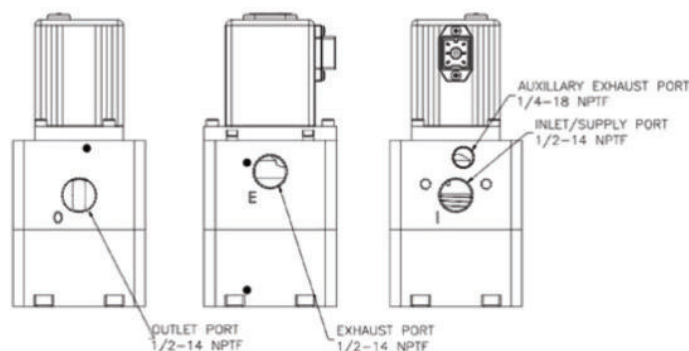


FIGURE 1

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

Positive Pressure Units

1. Connect supply pressure to the "I" inlet port (Figure 1) not to exceed the rated supply pressure. (See TABLE 1)
2. Connect the outlet "O" port (Figure 1) to the device being controlled.
3. The "E" exhaust port can be plumbed to a point outside the work area, fitted with a muffler or left open to atmosphere as the application dictates.
4. Proceed with "Electrical Connections" section.

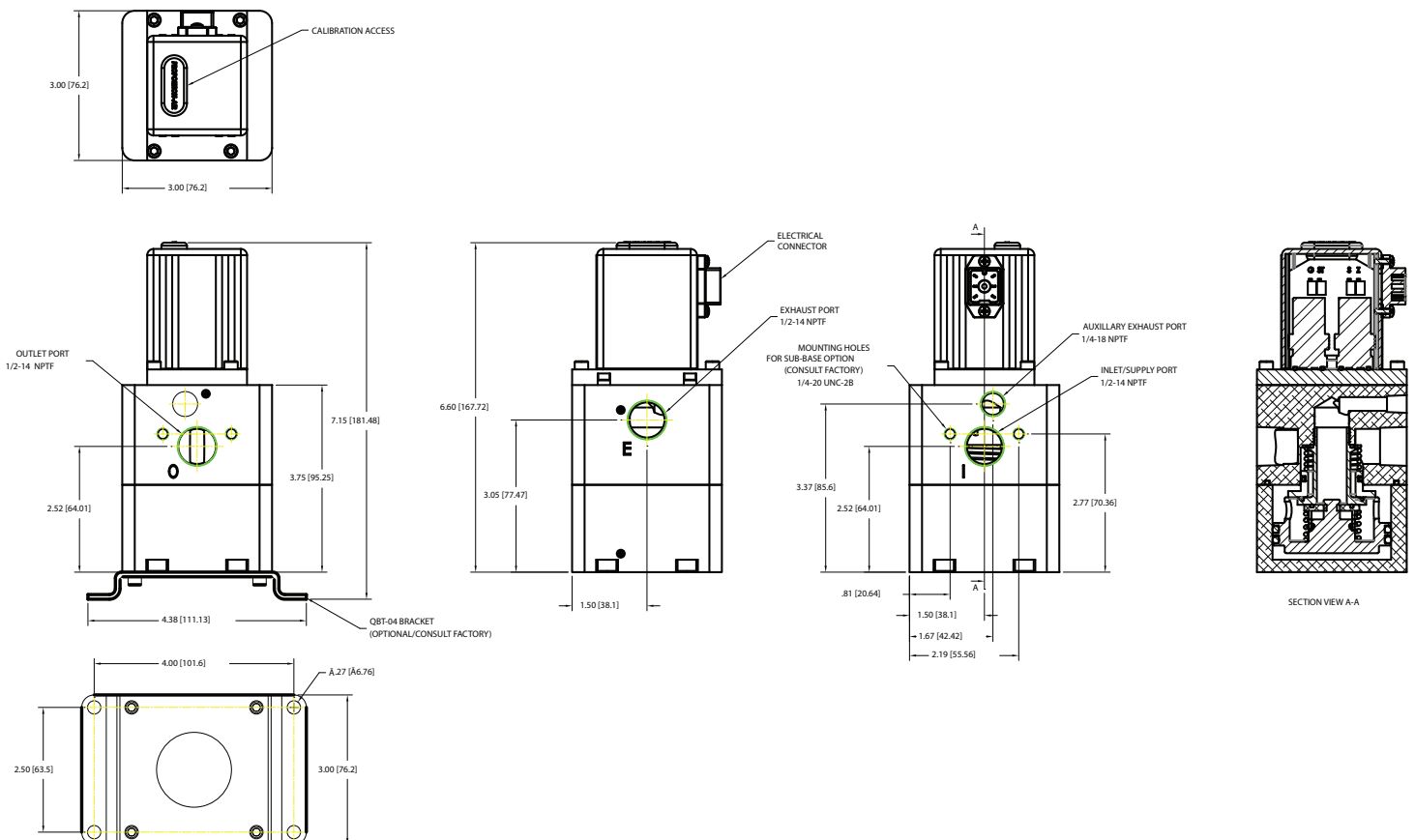
Vacuum Only & Vacuum Through Positive Pressure Units

1. Connect vacuum supply to the "E" exhaust port (Figure 1). The auxiliary exhaust port must be plugged with the 1/4" NPT pipe plug provided to prevent atmospheric air from leaking in to the vacuum supply.
2. Connect supply pressure to the "I" inlet port (figure 1) not to exceed the rated supply pressure. (Table 1). Positive supply pressure is required on vacuum and vacuum through positive pressure QB4 units. (Call Factory with Questions)
3. Connect the outlet "O" port (Figure 1) to the device being controlled.
4. Proceed with "Electrical Connections" section.

Table 1
Rated Inlet Pressure for Standard QB4 Valves

Max Calibrated Pressure	Max Inlet Pressure
Vacuum only	5 psig (0.34 bar)
Vacuum to 10 psig	15 psig (1.0 bar)
10.1 to 30 psig (0.70 to 2 bar)	35 psig (2.4 bar)
31 to 100 psig (2.1 to 7 bar)	110 psig (7.6 bar)
101 to 150 psig (7 to 10.3 bar)	165 psig (11.4 bar)

Dimensions



ELECTRICAL CONNECTIONS

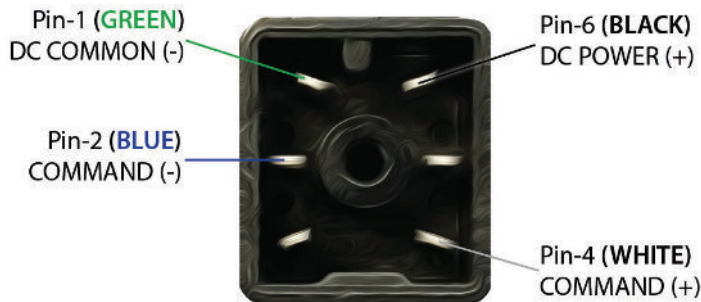
1. Turn off all power to valve.
2. Identify the valve's command input and analog output using the calibration card included in the package and the ordering information section later in this booklet.
3. Proceed to the appropriate section corresponding to the type of valve being installed.

NOTE: ALL COLOR CODES RELATE TO THE FACTORY-WIRED QBT POWER CORD.

Command Signal Configurations

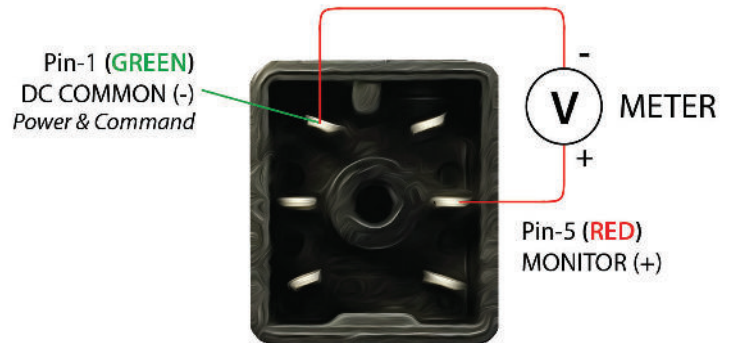
Voltage and Current Command (E, I, K, V)

All voltage command QB3's use a differential command. If a single ended voltage will be used, tie the command return wire to DC common. Current command also uses a differential loop where the command flow is from Pin 4 to Pin 2. Some applications may require the common of the device that provides loop power for the 4-20mA command to be tied to power supply common.

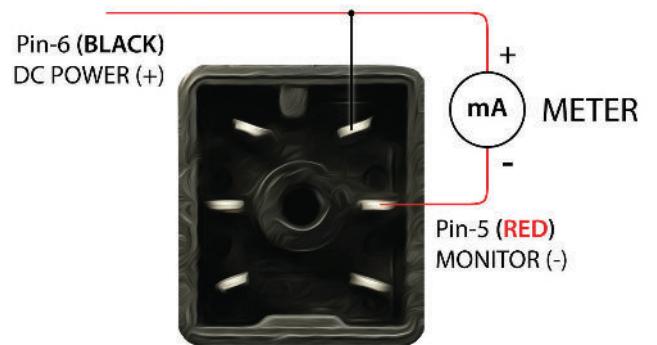


Monitor Signal Configurations

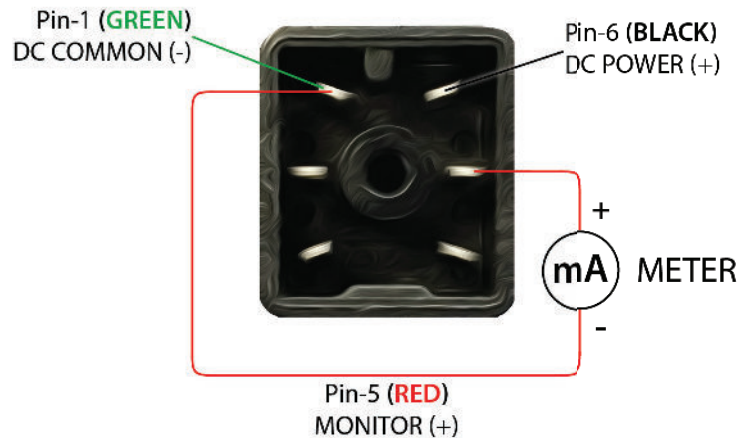
Voltage Monitor (E, K, V)



Current Sinking Monitor (C)



Current Sourcing Monitor (S)



Configuration

RE-CALIBRATION PROCEDURE

QB4

Example Part Number

<div>QB4</div> <div>Example Part Number</div>				ACCURACY				±0.4% F.S.				PRESSURE				Full Vac to 150 PSIG (10 Bar)			
				PORT SIZE				1/2"								MAX FLOW			
QB	4	T	A	N	I	C	Z		P	75	PS	G							
		1	2	3	4	5	6	7	8	9	10	11	OPTIONS						

Section Reference

1 Type		2 Manifold Material	
T -14.7 to 150 psi		A Nickel-Plated Aluminum	
		B Nickel-Plated Brass*	
		*Includes O2 Cleaning	
3 Thread Type			
N NPT			
P BSPP			
4 Input Signal Range		5 Output 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*	
V 1 to 5 VDC*		V 1 to 5 VDC* ¹	
A RS232 Serial Input* ¹		C 4 to 20 mA DC (Sinking)	
B RS485 Serial Input* ¹		S 4 to 20 mA DC (Sourcing)	
P P2 Profiler (Integrated)		*Requires E, I or K for Input Signal Range (#4)	
*Requires V for Monitor Signal (#5)		*Requires V for Input Signal Range (#4)	
*Requires X for Monitor Signal (#5)			
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 below), 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 less than or equal to 150 psig*			
		*Min Output Pressure = 3 PSI (200 mbar)	
10 Pressure Unit			
PS	PSI	Inches Hg	IH
MB	Millibars	Inches H ₂ O	IW
BR	Bar	Millimeters H ₂ O	MW
KP	Kilo-pascal	Kilograms/cm ²	KG
MP	Mega-pascal	Torr (Requires A for Unit of Measure #11)	TR
MH	Millimeters Hg	Centimeters H ₂ O	CW
PA	Pascal		
11 Pressure Unit of Measure			
A Absolute Pressure			
G Gauge Pressure			

All QB3 control valves come calibrated from the factory by trained personnel using precision calibration equipment. The QB3 valve is a closed loop control valve using a precision electronic pressure sensor. Typical drift is less than 1% over the life of the product. If your QB3 valve appears to be out of calibration by more than 1%, it is not likely to be QB3. Check the system for plumbing leakage, wiring and electronic signal levels. Verify the accuracy of your measuring equipment before re-calibrating. Consult factory if you have any questions or require assistance. If the QBX valve needs re-calibration, use the procedure described below:

1. Wire control valve according to the "Electrical Connections" section.
2. Connect a precision measuring gauge or transducer to the outlet port of the QB3. NOTE: THERE MUST BE A CLOSED VOLUME OF AT LEAST 5 CU. IN BETWEEN THE VALVE OUTLET AND THE MEASURING DEVICE FOR VALVE TO BE STABLE.
3. Plumb control valve according to "Installation" section. Make sure supply pressure does not exceed the rating for the valve (see table 1).
4. On the printed circuit board, locate the two adjustment potentiometers SPAN and ZERO. (See figure 2)
5. 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 QB3 roughly at mid scale.
6. Set the electrical command input to MAXIMUM value.
7. Adjust the SPAN potentiometer until MAXIMUM desired pressure or vacuum is reached (clockwise to increase pressure).
8. Set the electrical command input to 10 percent of full value (1VDC for 0-10VDC unit or 5.6mA for 4-20mA unit).
9. Adjust the ZERO potentiometer until 10 percent of maximum desired pressure or vacuum is reached. (clockwise increases pressure).
10. If at any time during the calibration procedure the control valve oscillates or becomes unstable for more than one second, turn the hysteresis potentiometer counter-clockwise until the oscillation stops, then turn it one more complete turn (same direction).
11. The ZERO and SPAN potentiometers interact slightly. Repeat steps 5-10 until no error exists.
12. Verify unit shuts off by going to zero command. Check linearity by going to at least six pressure points throughout the full range.

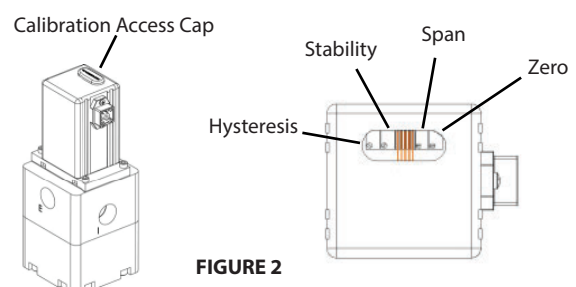


FIGURE 2



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 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.