

INSTALLATION & MAINTENANCE INSTRUCTIONS

QB1X & QB2X

DESCRIPTION / IDENTIFICATION

The QBX series valve uses Proportion-Air closed loop technology for Pressure control. It gives an output pressure proportional to an electrical command signal input.

The QB1X is a complete closed loop system consisting of valves, manifold, housing and electronic controls. Pressure is controlled by the use of two solenoid valves. One valve functions as inlet control, the other as exhaust. The pressure output is measured by a pressure transducer internal to the QB1X and provides a feedback signal to the electronic controls. This feedback signal is compared with the command signal input. A difference between the two signals causes one of the solenoid valves to open, allowing flow in or out of the system. Accurate pressure is maintained by controlling these two valves.

The QB2X is similar to the QB1X but uses a double loop control scheme. In addition to the internal pressure transducer, the QB2X receives an electrical signal from an external sensing device. This primary feedback signal is compared against the command signal input. This comparison is then summed with the internal pressure transducer signal. The gain of the circuit is such that priority is given to the external feedback signal. A difference between the command signal and the feedback signal causes one of the solenoid valves to be activated.

A monitor output is provided for the system measurement. All QBX valves come standard with an analog voltage monitor output. QB1X monitor output is an amplified signal from the internal pressure transducer. QB2X monitor output is a buffered signal from the primary external transducer connected to the QB2X.

INSTALLATION

1. Apply a small amount of anaerobic sealant (provided) to the male threads of the in-line filter supplied with valve.

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

2. Install the in-line filter into the port labeled **I** on QBX valve.
3. For vacuum or vacuum through positive pressure units, the vacuum supply should be connected to the exhaust port of the QBX.
4. Connect supply line to the in-line filter port. Connect device being controlled to port labeled **O** on QBX valve.
5. For QBX, there are two output ports; one on the side of the manifold and one on bottom. The working port should be determined when ordering; check to ensure that the other port is plugged.
6. Mount valve accordingly.
7. The valve can be mounted in any position without affecting performance. Mounting bracket QBT-01 (ordered separately) can be used to attach valve to a panel or wall surface.
8. Proceed with electrical connections.



SPECIFICATIONS

ELECTRICAL

SUPPLY VOLTAGE	15-24 VDC
SUPPLY CURRENT	250 mA
COMMAND SIGNAL	0-10 VDC 4-20 mA
COMMAND SIGNAL IMPEDANCE	VDC=4.75 K Ω Current=100 Ω
ANALOGUE MONITOR SIGNAL	
VOLTAGE	0-10 VDC @ 20 mA max
CURRENT	4-20 mA Sinking (sourcing opt)

MECHANICAL

PRESSURE RANGES	Vacuum - 175 psig (760 mmHg (Vac) - 12 Bar)
OUTPUT PRESSURE†	0-100% of range
FLOW RATE	1.2 SCFM @ 100 psig inlet (34 L/min @ 6.89 Bar)
Cv CAPACITY	0.04
Min CLOSED END VOLUME	1 in ³
PORT SIZE	1/8" NPT
FILTRATION RECOMMENDED	20 Micron (included)
LINEARITY/HYSTERESIS	< \pm 0.15% F.S. BFS
REPEATABILITY	< \pm 0.02% F.S.
ACCURACY	< \pm 0.2% F.S.

WETTED PARTS ‡

ELASTOMERS	Fluorocarbon
MANIFOLD	Aluminum
VALVES	Nickel Plated Brass
PRESSURE TRANSDUCER	Silicon, Aluminum

PHYSICAL

OPERATING TEMPERATURE	32-158°F (0-70°C)
WEIGHT	1.02 lb. (0.50 Kg)
PROTECTION RATING	NEMA 4
HOUSING	Aluminum
FINISH	Black Anodized

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

RE-CALIBRATION PROCEDURE

All QBX control valves come calibrated from the factory by trained personnel using precision calibration equipment. The QBX 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 QBX valve appears to be out of calibration by more than 1%, it is not likely to be QBX. 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:

QB1X VALVES

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 QBX.
NOTE: THERE MUST BE A CLOSED VOLUME OF AT LEAST 1 CU. IN. (17 CC) BETWEEN THE VALVE OUTLET AND THE MEASURING DEVICE FOR THE VALVE TO BE STABLE.
3. Connect the correct supply source to the IN port of the QBX, making sure the pressure does not exceed the rating for the valve (See Table 1).
4. Locate the plastic calibration access cap on top of the QBX valve and completely remove it. Located underneath are two adjustment trim pots, Zero "Z" and Span "S". See figure 1 for pots location.
5. Only use this step if your device is totally out of calibration. If it is slightly out of calibration, omit this step and move on to paragraph 6. Using a small screwdriver, turn both trim pots 15 turns clockwise. Then turn both trim pots 7 turns counterclockwise. This will put the QB roughly at mid-scale.
6. Make correct electrical connections as noted. Make sure there is a proper meter in place to measure the command input to the QBX.
7. Set the electrical command input to MAXIMUM value.
8. Adjust the SPAN pot until MAXIMUM desired pressure is reached (clockwise *increases* pressure).
9. Set the electrical command input to MINIMUM value.
10. Adjust the ZERO pot until MINIMUM desired pressure is reached (clockwise *increases* pressure).
11. Repeat ZERO and SPAN adjustments, which interact slightly, until QB1 valve is calibrated back to proper range. Step 6 - 9.
12. Replace calibration access cap.

QB2X VALVES

This section assumes there is a properly scaled and calibrated transducer for use as 2nd loop feedback signal. For information on re-calibrating Proportion-Air DS series pressure transducers see sheet BR060.

1. Follow, in order, steps 1-5 as noted in the section titled QB1X VALVES.
2. Make correct electrical connections as noted. Make sure there is a proper meter in place to measure the command input to the QB2X. Make sure the 2nd loop signal is connected.
3. Set the electrical command input to MAXIMUM value.
4. Adjust the SPAN pot until MAXIMUM desired pressure is reached (clockwise *increases* pressure).
5. Set the electrical command input to MINIMUM value.
6. Adjust the ZERO pot until MINIMUM desired pressure is reached (clockwise *increases* pressure).
7. Repeat ZERO and SPAN adjustments, which interact slightly, until QB2X valve is calibrated back to proper range. Steps 3 - 6.
8. Replace calibration access cap.

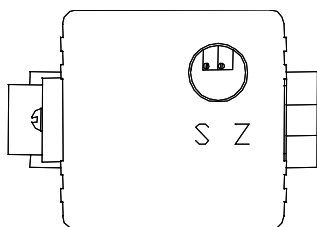


Figure 1

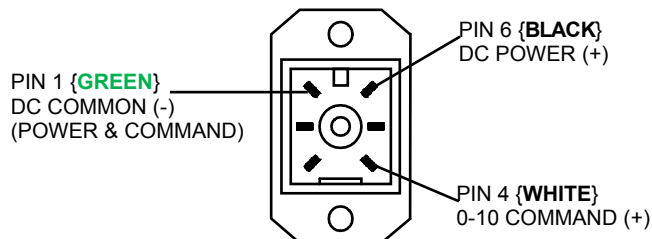
ELECTRICAL CONNECTIONS

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 on the last page of this sheet.
3. Proceed to the appropriate section corresponding to the type of valve being installed.

NOTE: ALL COLOR CODES RELATE TO QBX'S ORDERED FROM THE FACTORY WITH WIRE LEADS.

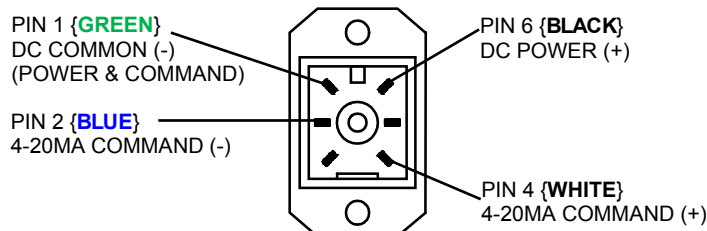
Voltage command valves

All voltage command QBX's use common node voltage, meaning the DC Common pin (Pin 1) is the common reference for both power and command. Pin 1 is used as both the command signal common and power supply common. The following diagram shows the proper connections.



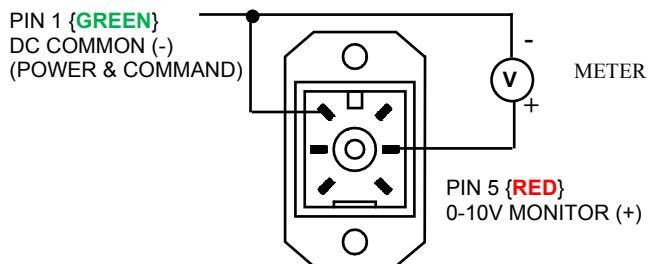
Current command valves

All current command QBX's use a differential current loop scheme (not isolated), meaning current flow is from Pin 4 to Pin 2 on the QB valve. Some applications may require the common of the power supply that provides loop power for the 4-20mA command to be tied to power supply common. The following diagram shows the correct connection for conventional current flow.



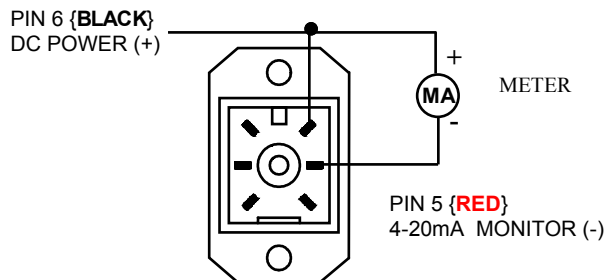
Voltage monitor (TFEE or TFIE)

Use the following wiring diagram for QBX valves with a voltage monitor output.

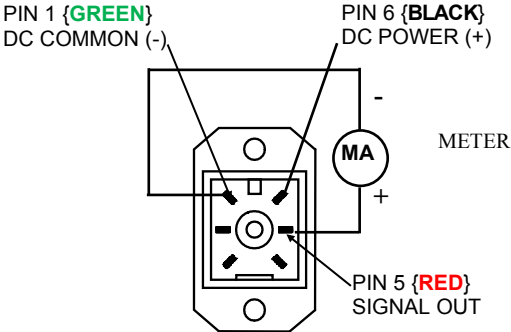


Current monitor (TFEC or TFIC)

Use the following wiring diagram for QBX valves with a current sinking monitor output.



Current Sourcing Monitor (TFES or TFIS)

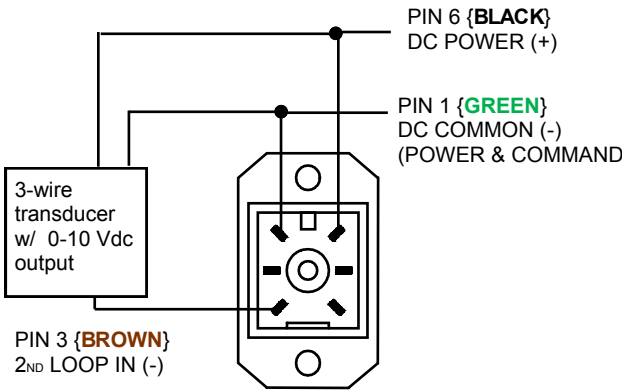


QB2X SECOND LOOP CONNECTIONS

All QB2X valves are *designed to accept a 0-10 volt second loop input signal, unless ordered with special option code S230 (4-20 mA second loop input)*. Reference the following wiring diagrams for details.

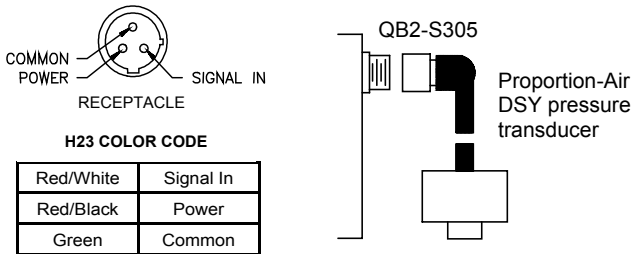
Standard QB2 valves

Second loop signal is wired into the main electrical connector.



QB2X-S305 option valves

Second loop signal is plugged into auxiliary receptacle on opposite side.



QB2X-S230 option

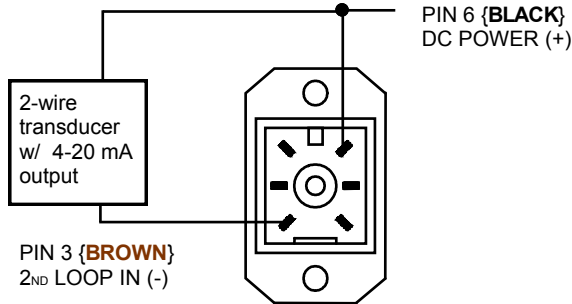
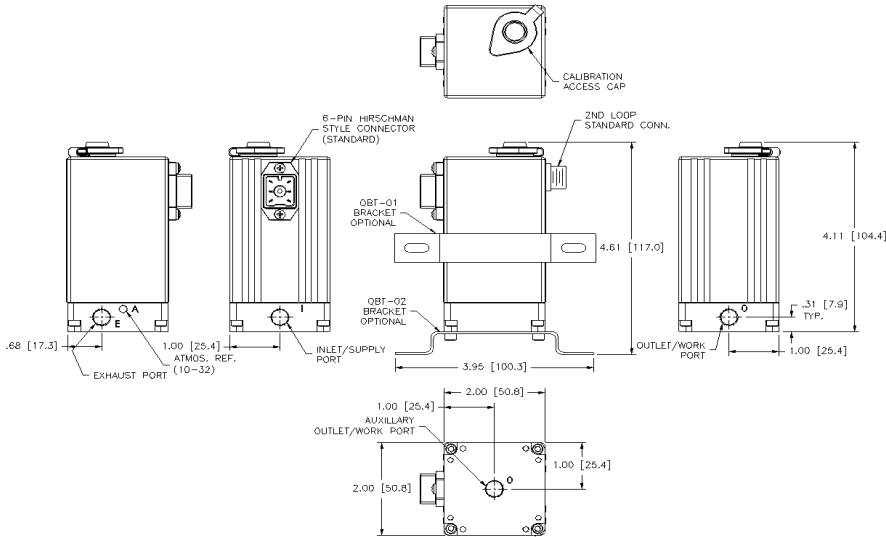


TABLE 1

RATED INLET PRESSURE FOR STANDARD QB VALVES

For valves ordered with MAX. calibrated pressure of:	Max. inlet pressure is:
Vacuum up to 10 psig (0.69 bar)	Consult factory
10.1 up to 30 psig (0.70 up to 2 bar)	35 psig (2.4 bar)
31 up to 100 psig (2.1 up to 7 bar)	110 psig (7.6 bar)
101 up to 175 psig (7 up to 12 bar)	190 psig (13 bar)
176 up to 300 psig (12.1 up to 20.7 bar)	330 psig (22.8 bar)
301 up to 500 psig (20.8 to 34.5 bar)	550 psig (37.9 bar)

NOTE: Valves with options S67, S91, or S106 can handle higher inlet pressures. Inlet pressure are not the same for valves mounted to volume boosters. Consult factory for further information.



Example Part Number : **QB 1 X A N E E N 14.7 P 150 PS G 3D TF**

YOUR PART NUMBER : **QB X A N**

Section —> 1 2 3 4 5 6 7 8 9 10 11 Options

1 Type

- 1 Single Loop
- 2 Double Loop (*external feedback*)

2 Manifold Material

- A 6061 Aluminum

3 Thread Type

- N NPT

4 Input Signal Range

- E 0 to 10 Vdc
- I 4 to 20 mADC
- K 0 to 5 Vdc
- N Ethernet* (*please call*)
- V 1 to 5 Vdc*¹

*Requires N for Monitor Signal Range

*¹Requires V for Monitor Signal Range

5 Monitor Signal Range

- X No Monitor
- E 0 to 10 Vdc
- K 0 to 5 Vdc*
- N Ethernet*¹ (*please call*)
- V 1 to 5 Vdc*²
- C 4 to 20 mADC (*Sinking*)
- S 4 to 20 mADC (*Sourcing*)

*Requires E, I, or K for Input Signal Range

*²Requires V for Input Signal Range

*¹Requires N for Input Signal Range

6 Zero Offset

- N 0% Pressure Starts Below Atmosphere
- P 0% Pressure Starts Above Atmosphere
- Z 0% Pressure Starts at 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 (#6), please leave blank

8 Full Scale Pressure Type

- N 100% Pressure Ends Below Atmosphere
- P 100% Pressure Ends Above Atmosphere
- Z 100% Pressure Ends at Zero

9 Full Scale Pressure

Must be less than or equal to 175 psig

10 Pressure Unit

- | | | | |
|----|--------------------------------------|------------------------------|----|
| PS | PSI (<i>Ethernet Must Use PSI</i>) | Inches Hg | IH |
| MB | Millibars | Inches H ₂ O | IW |
| BR | Bar | mm H ₂ O | MW |
| KP | Kilopascal | Kilograms/cm ² | KG |
| MP | Megapascal | Torr* | TR |
| MH | mm Hg | Centimeters H ₂ O | CW |

*Requires A for Pressure Unit of Measure

11 Pressure Unit of Measure

- A Absolute Pressure
- G Gage Pressure

Recommended Accessories

- QBT-C-6 6 ft. Power Cable
- QBT-01 Wrap-Around Bracket
- QBT-02 Foot-Mount Bracket (*Installed*)*

*Use Option BR for Foot-Mount Installed

Proportion-Air products are warranted to the original purchaser only against defects in material or workmanship for one (1) year 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.