



QL3 PRESSURE CONTROL VALVE INSTALLATION & MAINTENANCE INSTRUCTIONS

DESCRIPTION

The QL3 is a closed loop electronic pressure regulator consisting of two solenoid valves, an internal pressure transducer, and an electronic control circuit integrally mounted to a unique volume booster. The output pressure is proportional to an electrical input (command signal). The pressure is controlled by activating the solenoid valves, which apply pressure to the pilot side of the volume booster. One valve functions as inlet control, the other as exhaust. The output pressure of the volume booster is measured by a pressure transducer, which is internally mounted and provides a feedback signal to the electronic control circuit. This feedback signal is compared against the command signal input. Any differences between the command signal and the pressure feedback signal causes one of the solenoid valves to open to adjust the pressure in the pilot of the volume booster. Pilot pressure is adjusted so that desired output pressure is achieved and maintained. Since it is the actual desired work pressure that is being sensed and fed back to the control circuit, any mechanical hysteresis of the air piloted volume booster is automatically compensated for. This allows for our extraordinary accuracy and repeatability.

The QL3 improves and builds on the proven Proportion-Air QB3 series high performance by using a current driven variable orifice solenoid valve and a unique analog PID circuit. This variable orifice solenoid avoids the pressure "steps" prevalent in most feed and bleed I/P's. The PID circuit integrates error out quickly resulting in superior resolution. The combination of a stepless solenoid valve with a high speed analog PID on a high flow volume booster allows lots of air to be moved in a hurry, but precisely.

Command inputs come in a choice of either a 0-10 Vdc or 4-20 mA. The QL3 also provides an electrical monitor signal for output to a panel meter or controller for data acquisition or quality assurance needs. The monitor signal comes from the internal pressure transducer. All QL3's come standard with a 0-10 volt monitor signal with 4-20 mA optional. Providing this monitor signal as part of our standard package eliminates the need to purchase a separate transducer.

The uniqueness of the volume booster design is that it has no stamped gaskets or special molded diaphragm or seal parts. All of the parts related to normal maintenance are standard o-rings. Complete repair kits are available, but in case emergency repair is needed parts should be available from any fluid power distributor or even most neighborhood hardware stores. Since all sealing parts are o-rings a large variety of chemical compounds are readily available. You can select the compounds, which are most ideally suited to your process and environment.

The QL3 is used for pressures up to 150 psig. For pressure ranges between 150 and 500 psig, see the Proportion-Air QB3H series.

SPECIFICATIONS

ELECTRICAL

SUPPLY VOLTAGE.....	15-24 VDC
SUPPLY CURRENT.....	250mA max.
COMMAND SIGNAL	
VOLTAGE.....	0-10 VDC
CURRENT.....	4-20mA differential
COMMAND SIGNAL IMPEDANCE	
VOLTAGE.....	4.7 KΩ
CURRENT.....	100 Ω
ANALOG MONITOR SIGNAL	
VOLTAGE.....	0-10 VDC @ 10mA max
CURRENT.....	4-20mA Sinking or Sourcing

MECHANICAL

PRESSURE RANGES ¹	0 to 5 psig through 0-150 psig
OUTPUT PRESSURE ¹	0-100% of range
FLOW RATE	
FORWARD & EXHAUST	25 SCFM max @ 120 psig inlet & 100 psig outlet (708L/min @ 8.27 BAR inlet & 6.89 Bar outlet)
MIN. CLOSED END VOLUME.....	5 in ³
FILTRATION RECOMMENDED...	.40 micron actual
LINEARITY.....	<±0.3% F.S. BFSL ²
HYSTERESIS.....	0.05% F.S.
ACCURACY	<±0.4% F.S. ²
RESOLUTION.....	0.05% F.S.
WETTED PARTS ³	Elastomers - Buna N (3) Manifold - Aluminum Nickel Plated Valves - 430FR SS, 360 Brass Seal material: Viton & Buna-N P.Transducer - Utem 1000, Aluminum,

PHYSICAL

OPERATING TEMPERATURE.....	32-158°F [0-70°C]
DIMENSIONS.....	2in.X2 in.X4.4 IN (51mmX51mmX111mm)
WEIGHT.....	1.06 lb [0.50 Kg]
PROTECTION RATING.....	NEMA 4 / IP65
HOUSING.....	Aluminum (Anodized)
VOLUME BOOSTER.....	Electroless Nickel Plate

¹ Pressure ranges are customer specified. Custom pressure ranges are available. Any range 5 to 150.

² Dependent on response adjustments. Valve can be field adjusted for best response for the actual application

³ Other elastomers are available. Consult factory.

Before you get started, please read these warnings:

- ◆ Examine the product. Ensure that you received what you ordered.
- ◆ Read this guide first before you start and save it for later use.
- ◆ You must have a good understanding of what the adjustments are on this product before using them.
- ◆ All compressed air and power should be shut off before installing, removing or performing maintenance on this product.
- ◆ Installation and use of this product should be under the supervision and control of properly qualified personnel in order to avoid the risk of injury or death.

CONNECTION PROCEDURE

Pneumatic Connections

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

1. The valve can be mounted in any position without affecting performance. A variety of mounting brackets (QBT-01, QBT-02, and QBT-03. SEE ordering info) 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 QL3 valve. This is available from Proportion-Air as part number FPP-2.
3. A 1/16" 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.

Positive Pressure Units

1. Connect supply pressure to the "I" port (Figure 1) not to exceed 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 connection.

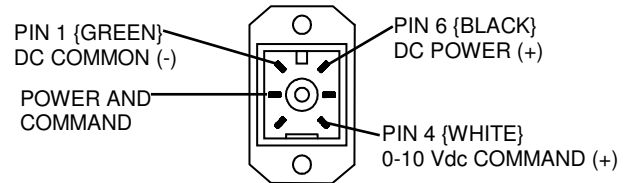
Electrical Connections

1. Turn off all power before making electrical connections.
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 QL3'S ORDERED FROM THE FACTORY WITH PRE-ASSEMBLED QBT-C-X CABLES.

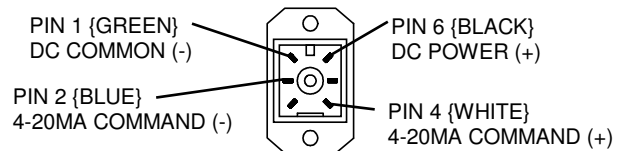
Voltage Command Valves (TFEE)

All voltage command QB3's use a single ended command, meaning the DC Common serves as both the power and command common.



Current Command Valves (TFIE)

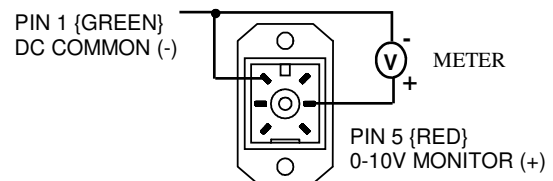
All current command QL3's use a differential current loop scheme (not isolated), meaning current flow is from Pin 4 to Pin 2 on the QL3 valve. Some applications may require the common of the power supply that provides loop power for the 4-20mA command to be tied to power supply common. The following diagram shows the correct connection for conventional current flow.



Voltage Monitor Valves

(TFEE or TFIE)

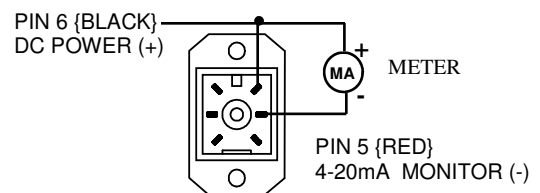
Use the following wiring diagram for QL3 valves with a voltage monitor output.



Current Monitor Valves

(TFEC or TFIC SINKING OUTPUT)

Use the following wiring diagram for QL3 valves with a current sinking monitor output.



Current Monitor Valves

(TFES or TFIS SOURCING OUTPUT)

Use the following wiring diagram for QL3 valves with a current sourcing monitor output.

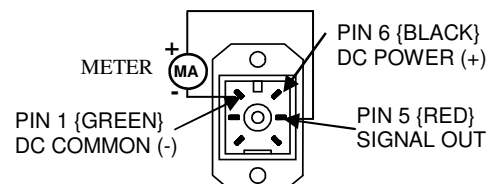


TABLE 1

RATED INLET PRESSURE FOR STANDARD QB3 VALVES

For valves ordered with MAX. calibrated pressure	Max. inlet pressure
5 through 10 psi positive	15 psig (1 bar)
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 150 psig (7 up to 10.3 bar)	165 psig (11.4 bar)

RE-CALIBRATION PROCEDURE :

All QL3 control valves come calibrated from the factory by trained personnel using precision calibration equipment. The QL3 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 QL3 valve appears to be out of calibration by more than 1%, it is not likely to be the QL3. 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.

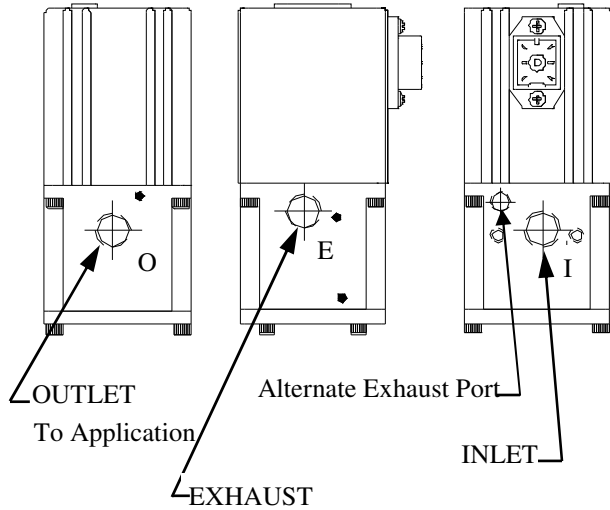


Figure 1

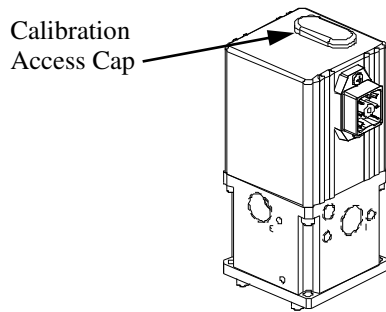
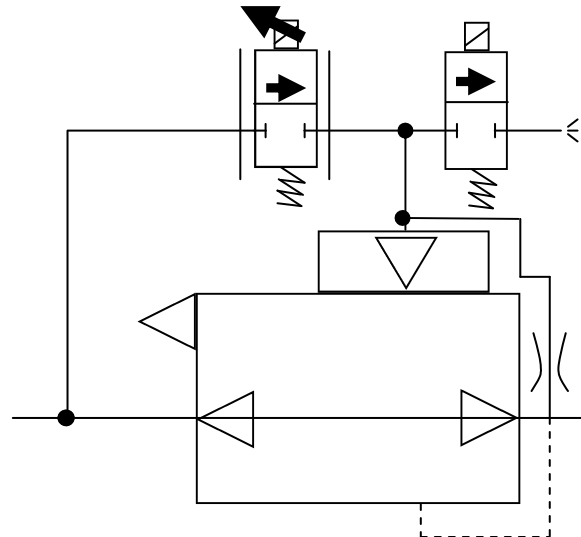


Figure 2

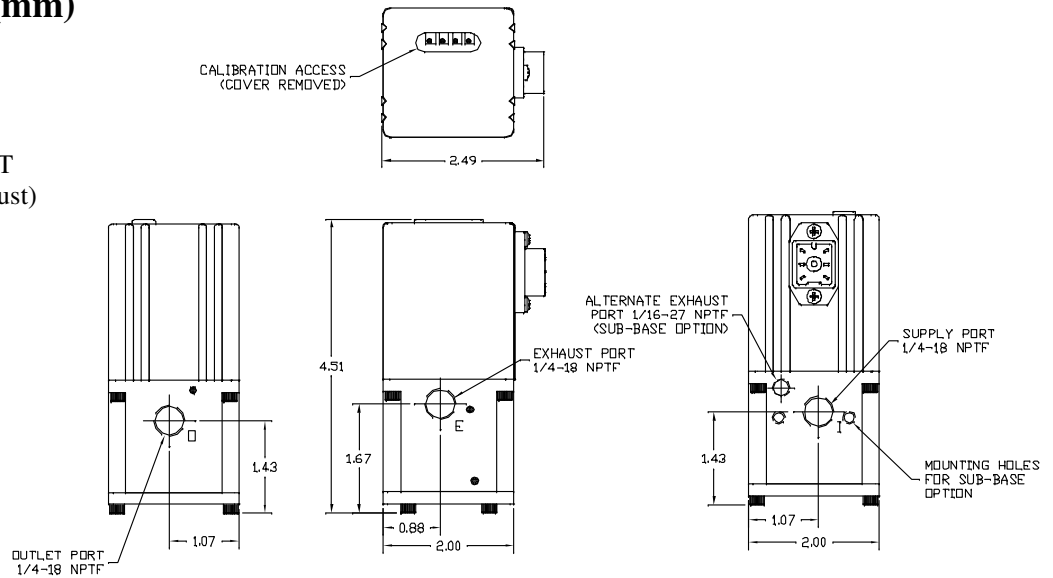


DIMENSIONS in (mm)

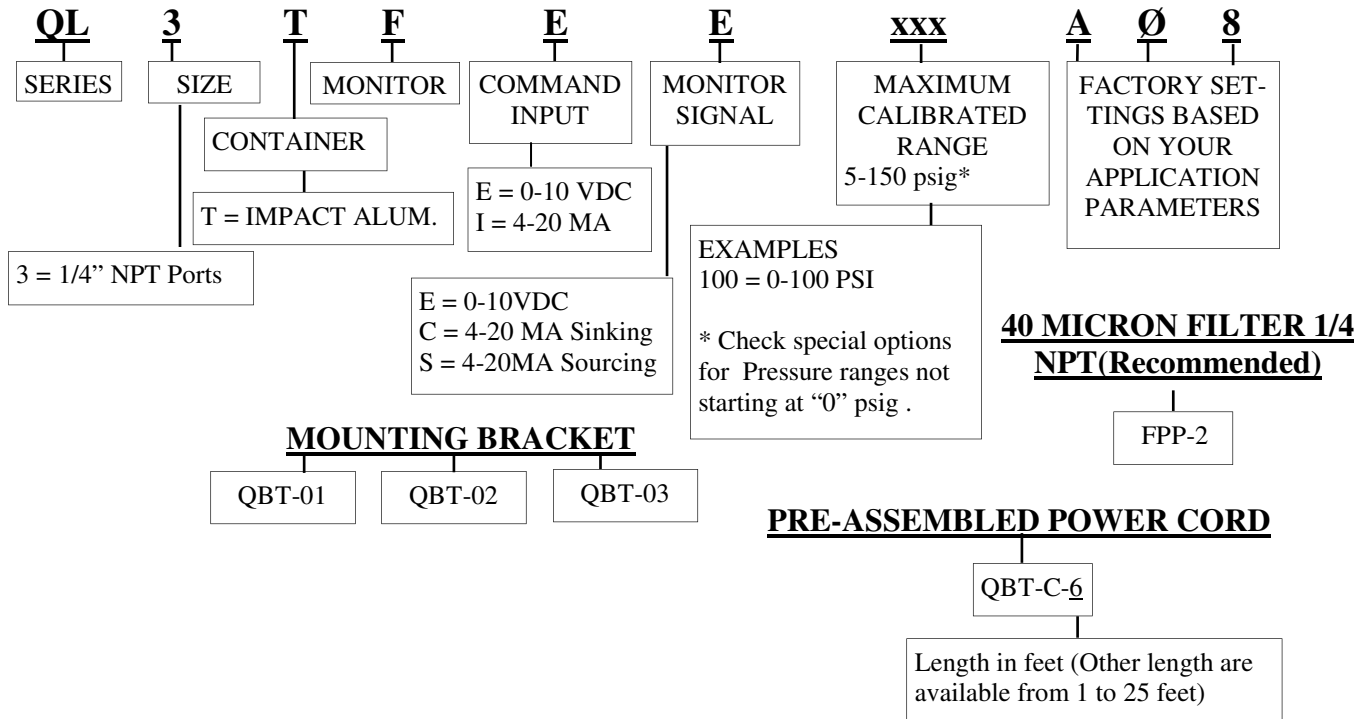
QB3 CONTROL VALVE

NOTES:

- 1.) ALL PORTS 1/4-18 NPT (except alternate exhaust)



ORDERING INFORMATION



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.

All specifications are subject to change without notice. **THIS WARRANTY IS GIVEN IN LIEU OF, AND BUYER HEREBY EXPRESSLY WAIVES, WARRANTIES OR LIABILITIES, EXPRESSED, 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.**

WARNING: Installation and use of this product should be under the supervision and control of properly qualified personnel in order to avoid the risk of injury or death.

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