PROPORTION-AIR

PROPORTION-AIR PUMP CONTROLLER

The Proportion-Air Pump Controller is a rugged assembly for optimizing operational flow rate demands for most air-operated double diaphragm (AODD) pumps on the market.

Benefits

- Less frequent downtime for maintenance
- Reduced wear and tear on AODD pump diaphragms
- Prevent dry running and wasted air
- Lower noise levels
- Allows for consistent automation of pump operation
- 110 VAC power operation compatible with standard outlets or wiring
- 125 PSI maximum inlet pressure

Principle of Operation

The Proportion-Air Pump Controller is comprised of three components that operate with most diaphragm pumps to optimize operational variable flow rate demands. The first component is an electronically operated proportional pilot valve, housed in a NEMA 4X rated container, used to provide extremely accurate pneumatic control (See Figure 1.)

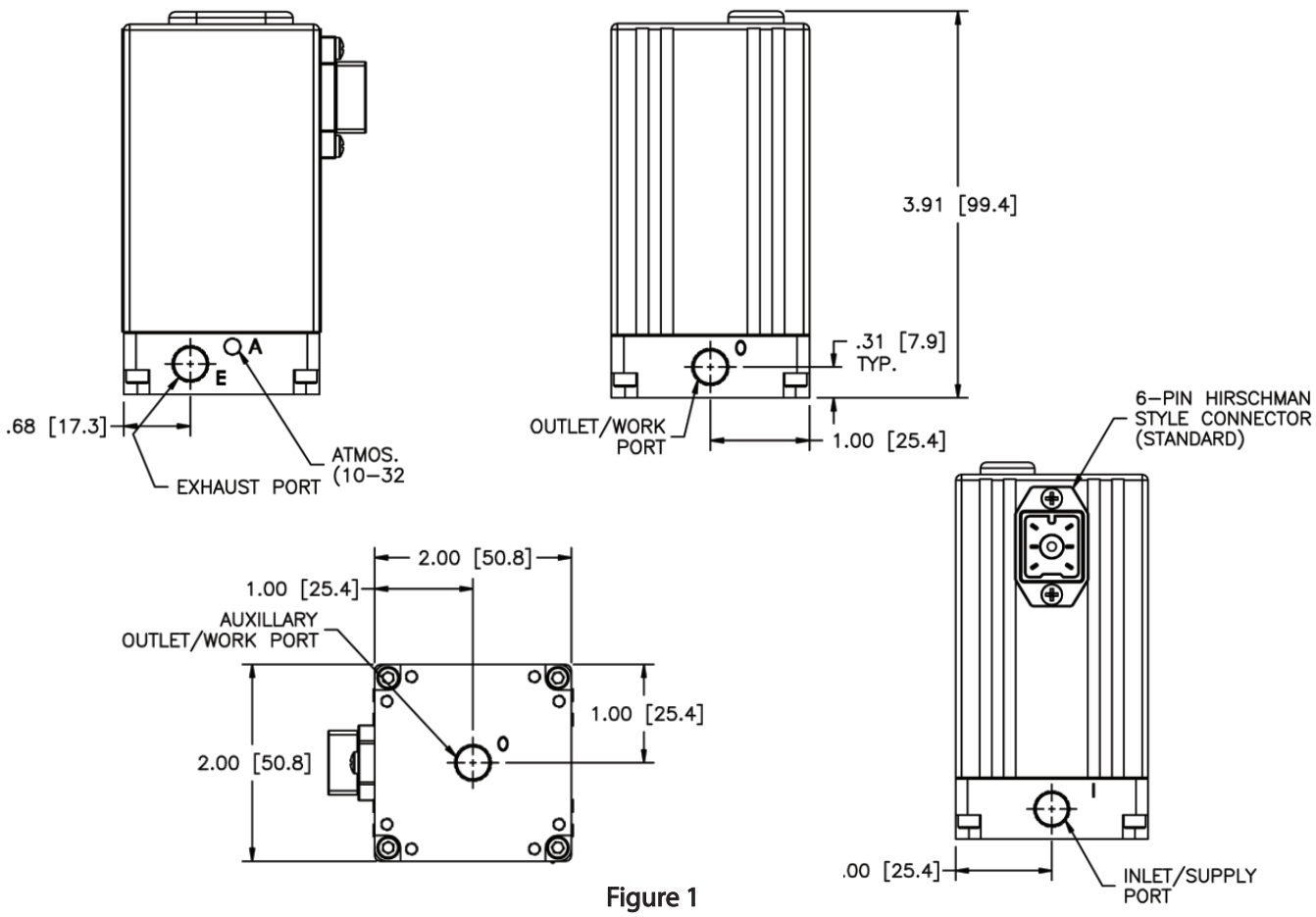

Figure 1

CAUTION!

Always disconnect power before working on units.

Principle of Operation

The second component is a diaphragm, air-piloted pressure regulator that offers higher flow rates that translate into faster responses. (See Figure 2. Please contact the factory for diagrams of additional regulator sizes.)

The third component is the NEMA 4X rated enclosure housing the power supply necessary for the proportional valve as well as a control potentiometer for manual operation. (See Figure 3.) A switch on the enclosure allows the user to select between manual control via the provided potentiometer or a remote control from a user supplied source, such as a process controller supplying a 4-20 mA signal. A 25-foot length of electrical cable to the proportional valve is provided.

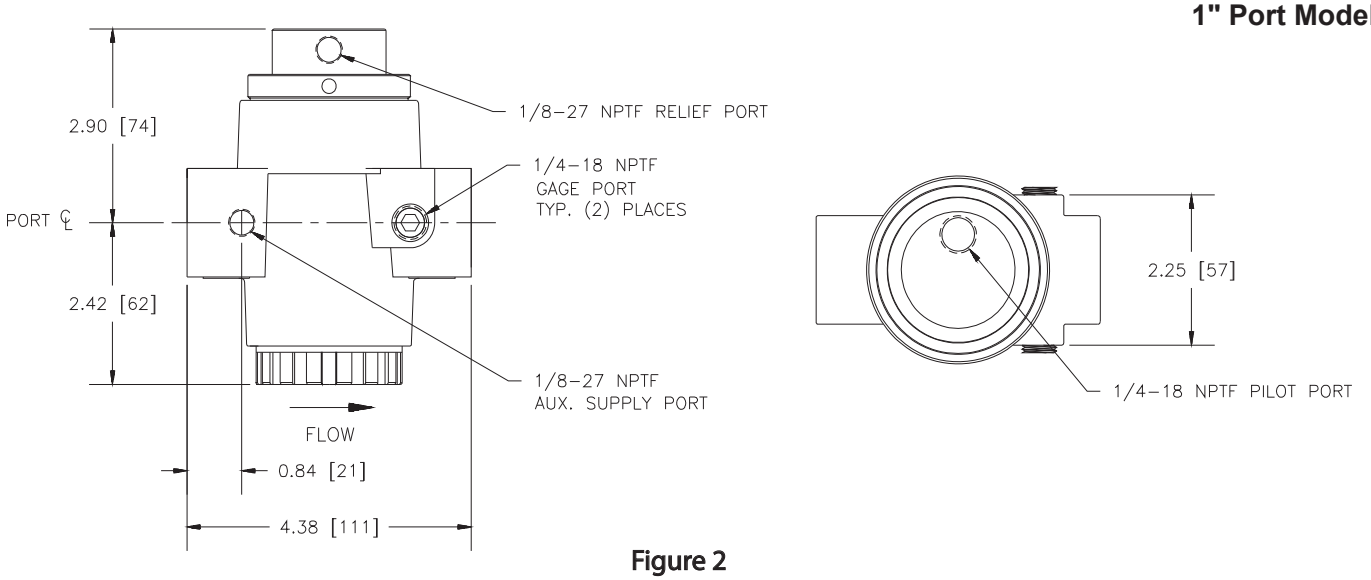

Figure 2

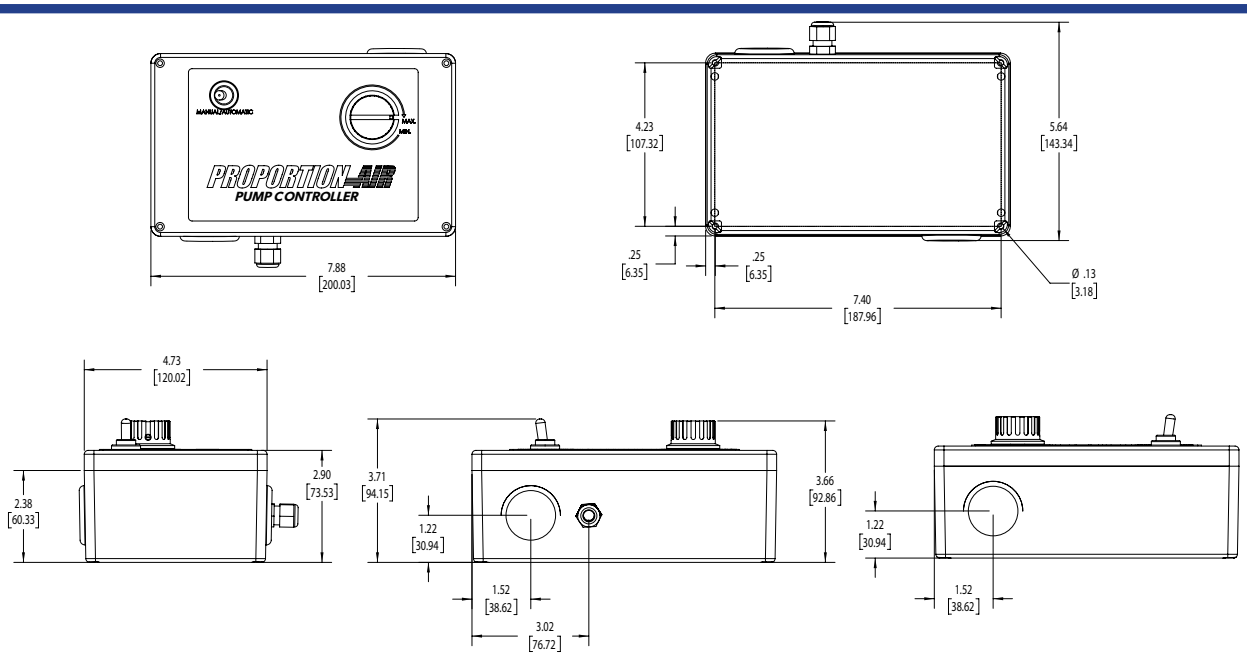

Figure 3

Installation

1. Connect the primary supply air to the IN port (Figure 4) of the air-piloted pressure regualtor and the inlet port of the electronically operated proportional pilot valve.
2. Connect the OUT port of the air-piloted pressure regualtor to the inlet of the pump being controlled.
3. Install a muffler (not provided) in the EXHAUST port of the air-piloted pressure regulator to protect internal parts from contamination and to reduce noise.
4. Unscrew the four screws on the top of the Pump Controller to access the power supply and automatic control connections.
5. Remove the plugs from the access points on the body of the enclosure.

   Top - PCB access

   Bottom - power supply access
6. (***Optional***) Connect the 4-20 mA command signal to the PCB.
7. Replace the top of the controller and screw back in place.
8. Connect the cable with 6-pin Hirschmann connector to the QBX.

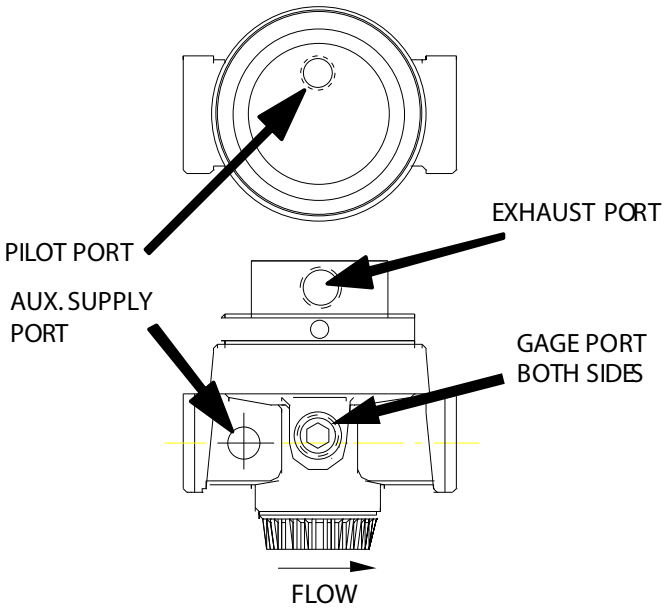

Figure 4

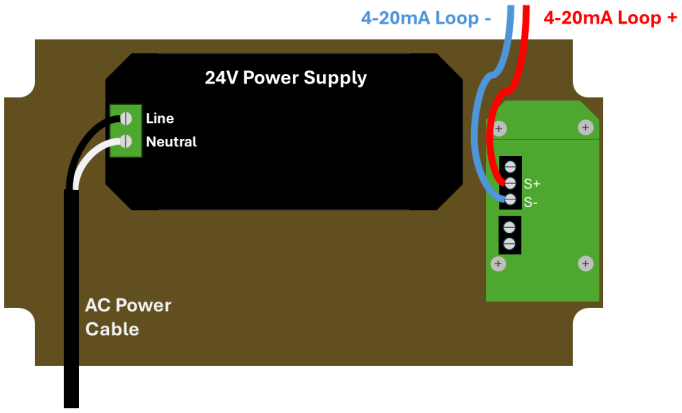

Figure 5

Operation

1. Plug in the controller to a power source. The controller is now controlling the signal.
2. If the Pump Controller is to be used without a remote controller providing a command signal, the manual/automatic switch must remain in manual mode. In manual mode, the command signal is controlled by the single turn potentiometer.
3. In automatic mode, the signal comes from the 4-20 mA control signal sent by the remote controller (Step 6b above).

   **If there is no 4-20 mA signal connected to the PCB the pump will shut off when switched to automatic mode.*

Maintenance

PSR - Volume Booster
(Pre-load Procedure)

1. Remove retaining ring using span-wrench.
2. Make sure there is grease on the diaphragm's relief stem (E).
3. Place diaphragm (A) in the PSR body.
4. Make sure diaphragm (A) is not pinched and is seated flat on the plastic ring inside the PSR body.
5. Place dome (F) on the diaphragm (A).
6. Place retaining ring on the body and hand turn it, leaving it one turn loose.
7. Apply 5-10 psig of air to the pilot air signal port (it may make a slight "pop" sound).
8. Tighten the retaining ring using a span-wrench then remove pilot air pressure.

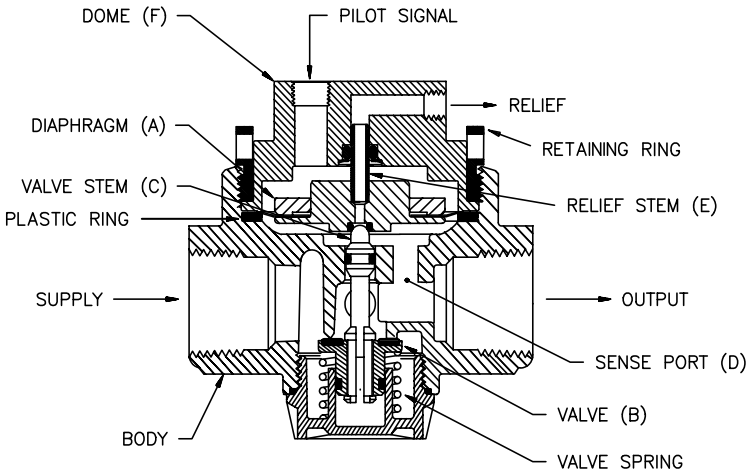

Figure 6

QBX - Proportional Pilot Valve
(Re-calibration Procedure)

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.
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 6 for pots location.
5. *NOTE: 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 step 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.

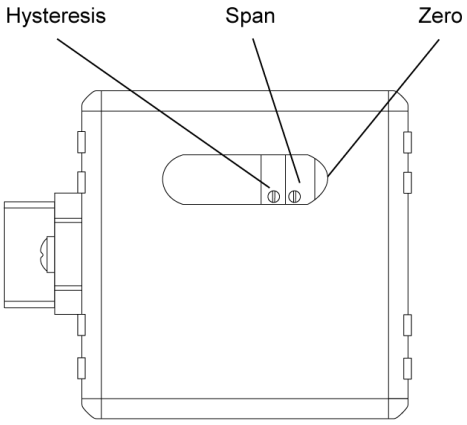

Figure 7

Configuration

PC

Example Part Number	PC	3	P	N
Section Reference ->		1	2	3

1	Port Size
2	1/4″
3	3/8″
4	1/2″
6	3/4″
8	1″
A	1-1/4″
B	1-1/2″

2	Paint Options
P	Painted black
U	Unpainted *(Ports 2, 3, 4, 6 & 8 only)*

3	Thread Type
N	NPT
P	BSPP

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-AIR

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Handcrafted in the USA

ISO 9001-2015 Certified