ISF1

PROPORTION-AIR
Electro-Pneumatic Pressure Regulators & Flow Controllers

INSTALLATION & MAINTENANCE INSTRUCTIONS

DESCRIPTION / IDENTIFICATION

The ISF1 series control valve is an electronic pressure regulator designed to precisely and proportionally control the pressure of gaseous based on an electronic signal.

The ISF1 operates using two normally closed solenoid valves, a pressure sensor, and a control circuit. One valve is actuated to allow unregulated supply media into the system. The second valve is actuated to allow working media to vent to atmosphere. The pressure sensor provides feedback to the control circuit. The control circuit compares the pressure sensor feedback to the user supplied electronic command signal and actuates the appropriate valve until the two signals match.

The ISF1 series can be teamed with a variety of one-to-one pressure volume boosters for even greater flow.

HAZARDOUS AREA CLASSIFICATION

ISF1: Nonincindive for use in Class I, II & III, Division 2, Groups C thru G T4; Type 4X hazardous (classified) locations and suitable for use in Class II, Division 2, Groups E, F and G T4 ; Type 4X hazardous (classified) locations.

May be used with any non-corrosive compressible media compatible with the wetted materials.

Special Condition for Use:

1. *With Intrinsically Safe Process Connections.* Intrinsically safe process connections refers to process connections that under any condition of installation or operation will not change the nature of the hazardous (classified) area from a division 2 to a division 1 location.

NOTES: End user must determine fitness and suitability of the ISF1 control valve for their application.

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SPECIFICATIONS

ELECTRICAL

SUPPLY VOLTAGE	
P1 Option. 12 VDC	11 to 14.5 VDC (MAX)
P2 Option, 15-24 VDC (standard)	13.5 to 29 VDC (MAX)
SUPPLY CURRENT	< 80 mA
COMMAND SIGNAL	4-20 mA Differential
COMMAND SIGNAL IMPEDANCE	Current=100 Ω

MECHANICAL

PRESSURE RANGES	Full Vacuum - 150 psig
	(29.9 in. HG (Vac) - 10.3 Bar)
OUTPUT PRESSURE†	0-100% of range
FLOW RATE	0.80 SCFM @ 80 PSIG
	(23 L/min @ 5.52 Bar)
Min CLOSED END VOLUME	1 in^3
PORT SIZE	1/8" NPT
FILTRATION RECOMMENDED	40 Micron *(included)*
LINEARITY/HYSTERESIS	<±0.4% F.S. BFSL
REPEATABILITY	<±0.2% F.S.
ACCURACY	<±0.5% F.S.

PHYSICAL

OPERATING TEMERPATURE	32-104°F *(0-40°C) (T4)*
WEIGHT	2 lbs. *(0.91 Kg)*
PROTECTION RATING	IP65
HOUSING	Blue Anodized Aluminum

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

WETTED MATERIALS

PARAMTERS	Port 1 (Pressure Port)	Port 2 (Reference Port)
COVERS	High Temperature Polyamide	High Temperature Polyamide
SUBSTRATE	Alumina Ceramic	Alumina Ceramic
ADHESIVES	Epoxy, RTV	Epoxy, RTV
ELECTRONIC COMPONENTS	Ceramic, Silicon	Silicon, Glass, Gold, Solder

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.
- 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.
- Media vents through exhaust port. If the media is hazardous (classified), the exhaust port should be vented to a different location to maintain a Class I, Division 2 area at the unit.
- Supply voltage should not exceed 29 VDC. Exceeding 29 VDC supply will cause the internal fuse to blow. This item is non-replaceable.

Pneumatic Connections:

1. A typical 20 micron (minimum 40 micron) in-line filter is recommended on the inlet of the ISF1.
2. Connect supply pressure to the "IN" INLET PORT (figure 1). See Table 1 for maximum supply pressure.
3. Connect the "OUT" OUTLET PORT (figure 1) to the device being controlled.
4. Media vents through exhaust port. If the media is hazardous (classified), the threaded exhaust port (figure 1) should be vented to a different location to maintain a Class I, Division 2 area at the ISF unit.
5. Proceed with electrical connection.

TABLE 1
RATED PRESSURE FOR ISF1 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 150 psig *(7 up to 12 bar)*	150 psig *(12 bar)*

TABLE 2
ISF1 PIN DESIGNATORS

PIN	FUNCTION
1	DC COMMON
2	COMMAND (-)
3	NC
4	COMMAND (+)
5	NC
6	POWER

Electrical Connections:

1. Ensure all power is off before making any electrical connections.
2. Figure 1 shows the location of the ISF1 electrical connector and figure 2 shows the connector. Table 2 identifies each connection
3. Unless specified by label on unit, consult factory with model and serial number for supply voltage specifications.
4. Connect ground wire to intrinsically safe ground (figure 1).

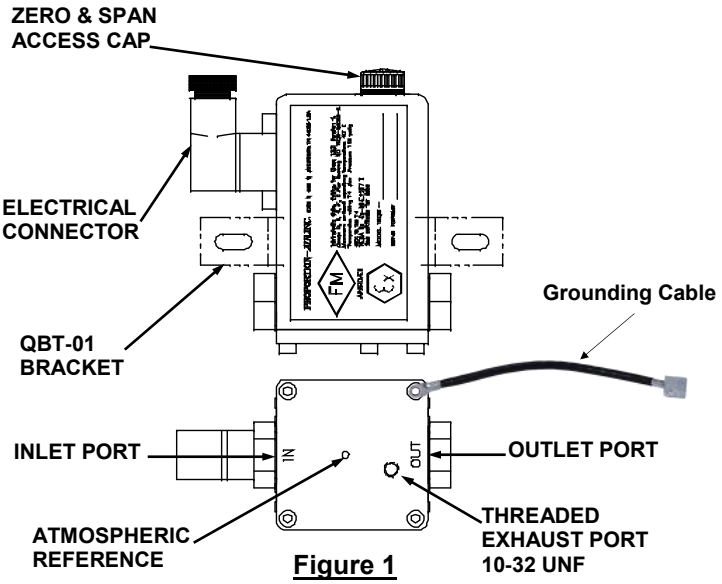


Figure 1

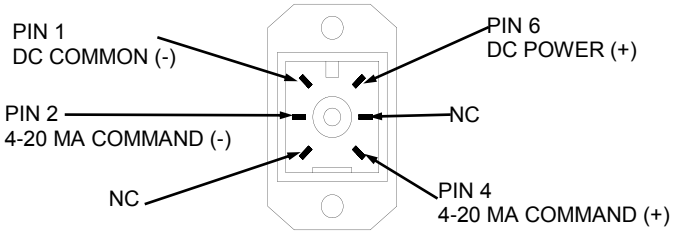


Figure 2

RE-CALIBRATION PROCEDURE

All ISF1 valves come calibrated from the factory by trained personnel using precision calibration equipment. The ISF1 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 ISF1 appears to be out of calibration by more than 1%, it is not likely to be ISF1. Check the system for plumbing leakage, wiring and electronic signal levels. Verify the accuracy of your measuring equipment before re-calibrating. If the ISF1 valve needs re-calibration, use the procedure described below:

Re-calibration:

1. Wire the ISF1 according to the section titled "Electrical Connections."
2. Connect a precision pressure gage or pressure transducer to the OUTLET PORT of the ISF1.

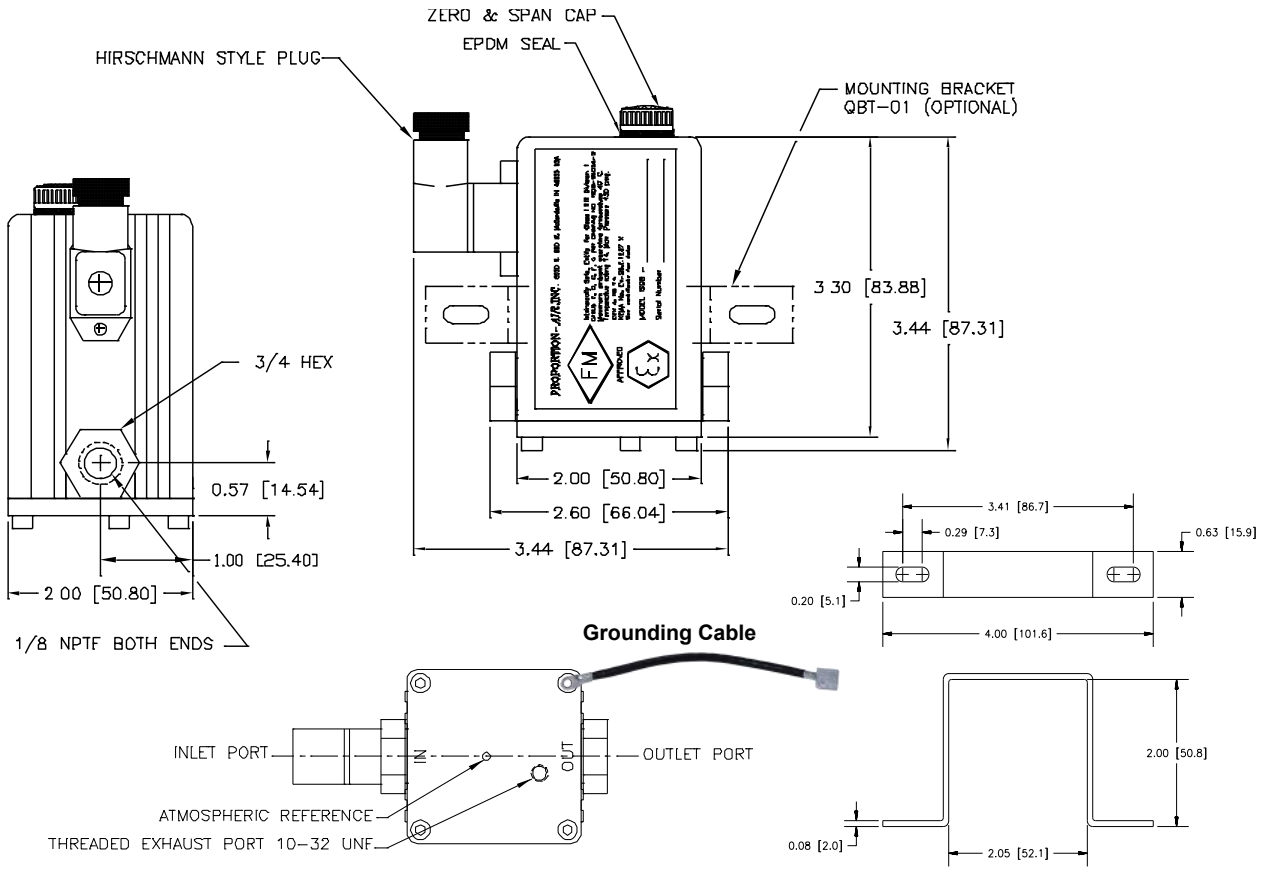
NOTE: There must be a closed volume of at least 1 in^3 between the OUTLET PORT and the measuring device for the ISF1 to be stable.

3. Provide supply pressure to the INLET PORT of the ISQB1. (See figure 1). Make sure supply pressure does not exceed the rating for the valve. (see table 1)
4. Remove the zero and span plug on top of the ISF1 to access the ZERO and SPAN adjustment potentiometers (figure 1).

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 paragraph 5. Using a small screwdriver, turn both potentiometers 15 turns clockwise. Then turn them 7 turns counter clockwise. This will put the ISF1 roughly at mid scale.

5. Set the electrical command input to 20mADC. Adjust the SPAN potentiometer until MAXIMUM desired pressure is reached (clockwise to increase pressure).
6. Set the electrical command input to 10 percent of full value (5.6mA).
7. Adjust the ZERO potentiometer until 10 percent of maximum desired pressure is reached. (clockwise increases pressure).
8. The ZERO and SPAN potentiometers interact slightly. Repeat steps 5-10 until no error exists.
9. Verify unit shuts off by going to 4mADC command. Check linearity by going to at least six pressures throughout the full range.

ISF1 & BRACKET DIMENSIONS



ISF & ISQB

ACCURACY	±0.5% F.S.	PRESSURE	Full Vac to 150 PSIG *(10 Bar)*
PORT SIZE	1/8"	MAX FLOW	1.2 SCFM *(34 SLPM)*

Example Part Number

ISF1	T	B	N	I	X	Z		P	10	BR	G	P2	TF
1		2	3	4	5	6	7	8	9	10	11	OPTIONS	

Section Reference

1	Series
ISF1	Nonincindive ISF1
ISQB1	Intrinsically Safe ISQB1

2	Manifold Material
B	Brass
A	Anodized Aluminum

3	Thread Type
N	NPT
P	BSPP *(Brass Manifold Only)*

4	Input Signal Range
I	4 to 20 mADC

5	Output Signal Range
X	No Monitor

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

10	Pressure Unit *(no additional fee - all)*		
PS	PSI	Inches Hg	IH
MB	Millibars	Inches H_2O	IW
BR	Bar	Millimeters H_2O	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_2O	CW
PA	Pascal		

11	Pressure Unit of Measure
A	Absolute Pressure
G	Gauge Pressure

Mandatory Power Requirement Option - ISF ONLY	
P1	12V Power
P2	15-24 V Power

PLEASE NOTE: The user has the additional responsibility of supplying and or ensuring that the connector/cable that is used with any Proportion-Air ISQB or ISF1 series FM approved product, meets all local and national codes for intrinsically safe wiring.

Recommended Accessories	
QBT-01	Wrap-Around Mounting Bracket
QBT-02	Foot-Mount Bracket *(Installed)**
	* Use Option **BR** for Foot-Mount Bracket

Safety Precautions

Please read all of the following Safety Precautions before installing or operating any Proportion-Air, Inc. equipment or accessories. To confirm safety, be sure to observe 'ISO 4414: Pneumatic Fluid Power - General rules relating to systems' and other safety practices.

Warning

Improper operation could result in serious injury to persons 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-Air, 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 persons or damages 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 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.

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