PROPORTION-AIR

PRESSURE FLOW FORCE TENSION POSITION TORQUE VACUUM

Fluid Power and Fluid Control Solutions for the Oil and Natural Gas Industry

Hazardous Locations | Definitions

In Accordance with Article 500, National Electrical Code

Class I

Flammable Gases or Vapors

Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable.

Class I, Division 1

A Class I, Division 1 location is one in which ignitable concentrations of flammable gases or vapors may be present because:

1. They exist under normal operating conditions.
2. They exist frequently because of repair, maintenance operations, or leakage.
3. Breakdown or faulty operation of equipment or process which causes simultaneous electrical equipment failure.

Class I, Division 2

A Class I, Division 2 location is one in which ignitable concentrations of flammable liquids or gases may be present as a result of:

1. Accidental rupture or breakdown of the normally closed containers, systems or equipment.
2. A failure or abnormal operation of the venting equipment.
3. Being located adjacent to a Class I, Division 1 location from which ignitable concentrations of gases or vapors might occasionally be communicated.

Group A

Atmospheres containing acetylene

Group B

Atmospheres containing hydrogen, fuel and combustible process gases containing more than 30% hydrogen by volume, or gases or vapors of equivalent hazard such as butadiene, ethylene oxide, propylene oxide and acrolein.

Group C

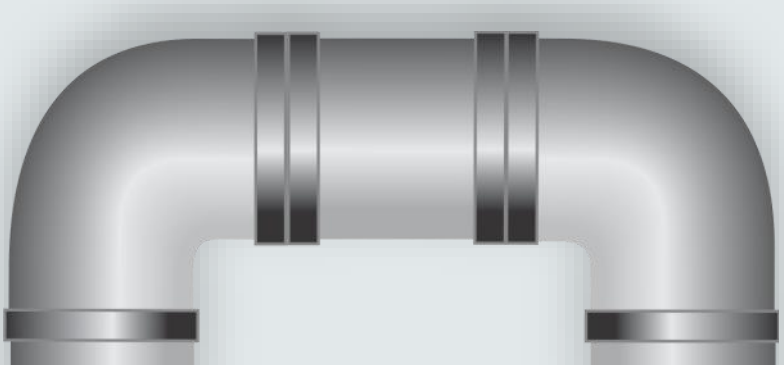
Atmospheres such as cyclopropane, ethyl ether, or gases or vapors of equivalent hazard.

Group D

Atmospheres such as acetone, ammonia, benzene, butane, ethanol, gasoline, hexane, methanol, methane, natural gas, naphtha, propane or gases or vapors of equivalent hazard.

5.1 Installation shall be in accord with the manufacturer's instructions and the National Electrical Code (ANSI/NFPA 70).
5.2 For guidance on installation, see ANSI/ISA RP12.6, "Installation of Intrinsically Safe Instrument Systems in Class I Hazardous Locations."
5.3 Tampering and replacement with non-factory components may adversely affect the safe use of the system.

Class II - Combustible Dust
Class III - Fibers and filings



**The above definitions are for general informational purposes only. Please consult the NEC and your local directives for specific guidelines in your area.*

INTRINSICALLY SAFE or EXPLOSION PROOF

An intrinsically safe rating means that the electronics or wiring contained within the equipment cannot spark or cannot accumulate enough energy to ignite the gas or vapor at the location. Additionally, the surface temperature of the equipment cannot get high enough to ignite the gas or vapor at the location.

Intrinsically Safe is the practice where one is restricting the energy available to electrical equipment in a potentially hazardous area so that a spark or hot surface cannot occur due to any type of electrical fault. The IEC (International Electrical Code) states that: "Equipment must not store or generate more than 1.2V, 0.1A, 20 micro joules and 25mW."

An explosion proof classification ***does not mean***:

- That equipment will survive an explosion

An explosion proof classification ***means***:

- That the equipment is housed or has an enclosure which prevents an internal spark from causing a much larger explosion. The enclosure must be engineered to contain any flash or explosion. The housing is generally constructed of stainless steel or cast aluminum and strong enough to contain an explosion should gas or vapors seep into the enclosure and ignite the internal electronics.

*ISQB is FM Approved Intrinsically Safe
*ISF is FM Approved Nonincindive

- **PIGGING** is the process of inspecting, cleaning or performing various maintenance operations on pipelines. The 'Pig' is launched from the *pig launcher* into the pipeline and controlled by regulating the flow of air, oil, natural gas or simply the product that is transferred in the pipeline. This process has been used for many years and with great success in the oil and gas industries.

Proportion-Air's **Flow Control Packages** offer 'real-time' feedback which equates to instant responses to changes in command or system fluctuations. These units are perfect for **air -driven pigging systems.**

Using differential pressure technology and various configurations, Proportion-Air's flow control packages will control flow ranges as low as 2 to 20 SCFH *(1 to 10 lit/min)* and as high as 25 to 250 SCFM *(708 to 7080 lit/min)*. These packages produce excellent repeatability of +/- 0.25% F.S.

FQPV2 & F-Series Flow Monitor

QB3 with Integrated Volume Booster

The QB3 is a compact precision closed-loop control package that allows for more than enough flow for most winch applications. This regulator can be used as a single valve or it can be manifold mounted for multiple process applications. Add a digital display for instant visual

0 to 150 psig (10 bar) • Accuracy/Repeatability: 0.25% / 0.2% F.S. • Max flow: 35 scfm (24 lit/sec)

New EPA Rule

EPA-HQ-OAR-2010-0505

On August 16th 2012, the EPA published the above rule, which states that continuous bleed natural gas-driven pneumatic controllers between the wellhead and the gas processing plant must have a bleed rate not greater than 6 SCFH. The gas industry had until October 15, 2013 to comply. ***The ISF1 complies*** *with a threaded exhaust port that can be routed to and consumed downstream.*

Clutch & Winch Control for Drilling Rigs

Photo Courtesy of DAPTECH, LLC

Controlling the speed of a winch that is used to drill and connect very long lengths of vertical piping is an excellent application for Proportion-Air's QB3 or QB2 with PSR (volume booster). The precise and positive control of this process alleviates many safety and efficiency concerns inherent when controlling the winch manually. In the past, operators would need to 'fan' the winch up and down to maintain a steady position while a new section is manually attached.

Without precise pressure control, an operator would have to massively overshoot and undershoot with the lever to get the winch to move in either direction. With Proportion-Air's products, much finer resolution is achieved with much smaller movements of the lever.

QB2 with PSR and DSY

This package provides plenty of control and flow to operate the larger winches. The QB2 electro-pneumatic pressure regulator applies pressure to the dome of the PSR based on constant feedback from the downstream DSY pressure transducer.

QB2 on PSR (volume booster) with DSY pressure transducer providing 2nd loop feedback

0 to 175 psig (12 bar) • Accuracy/Repeatability: 0.2% / 0.02% F.S. • Max flow: 3000 scfm (1415 lit/sec)

Mooney & Fisher Gas Valves are self-contained, pilot operated devices that can be piloted by the ISF1 for pressure reducing and backpressure applications where good regulation, simplicity and ease of maintenance are of prime importance. **These valves are used by oil and gas downstream and midstream refining, industrial gas control, commercial buildings and municipal gas utilities worldwide.** The ISF1 uses the gas that is being regulated to pilot the Mooney or Fisher Gas Valve.

ISF1 Electro-Pneumatic Control Valve

Potted for Natural Gas

- ⇒ **Non-Continuous Bleed Device**
- ⇒ **IP65 Housing**
- ⇒ **Threaded Exhaust Port**
- ⇒ **Not Sensitive to Mounting Position or Vibration**
- ⇒ **Vacuum Through 150 psig**
- ⇒ Non-Incendive for Class I, II, & III, Division 2, Groups C thru G with intrinsically safe process connections*

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

The ISF1 operates using two normally closed solenoid valves, a pressure sensor, and a control circuit. One valve is actuated to allow supply media into the system. The second valve is actuated to allow working media to vent through a threaded port 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.

ELECTRICAL SPECIFICATIONS

Supply Voltage	15-24 VDC (standard)*
Supply Current	< 80 mA
Command Signal	4-20 mA Differential
Command Signal Impedance	100 OHM

PHYSICAL SPECIFICATIONS

Operating Temperature	32-104 °F (0-40 °C)
Weight	2.5 lb.
Protection Rating	IP65
Housing	Anodized Aluminum

*Please consult the ISF1 Installation guide on our website before operating: *http://proportionair.com/products/electronic-pressure-regulators/intrinsically-safe-valves/isf1/*

MECHANICAL SPECIFICATIONS

Pressure Ranges	29.9 in. Hg (Vac) to 150 psig (10 bar)
Output Pressure	0-100% of range
Flow Rate	0.80 SCFM @ 80 psig
Min. Volume	1 cubic inch
Filtration Required	40 Micron
Linearity/Hysteresis	+/- 0.4% F.S.
Repeatability	+/- 0.2% F.S.
Accuracy	+/- 0.5% F.S.
Wetted Parts Transducer: Silicon, Aluminum, RTV	Elastomers: Fluorocarbon Manifold: Aluminum (Brass Optional) Valves: Nickel Plated Brass

- **Oil Refinery Process Valves** control the flow and movement of oil, gas and air from one location to another throughout the entire refinery. Many of these processes require precise timing and automation. The electro-pneumatic ISQB accepts a 4-20 mA command from a PLC and uses air to automatically pilot many of these valves and control the flow of oil and gas by controlling pressure to the dome of the process valves and regulators. Being intrinsically safe, the ISQB has many potential applications within refineries.

ISQB1 Electro-Pneumatic Control Valve

⇒ FM Approved for CLASS I, II, III, DIV 1, Groups C,D,E,F,G*
⇒ IP65 Housing
⇒ No Bleed Design
⇒ Not Sensitive to Mounting Position or Vibration
⇒ Vacuum Through 150 psig

The ISQB1 series control valve is a closed-loop electronic pressure regulator designed to precisely and proportionally control the pressure of gaseous media based on an electronic control signal. **This regulator uses air for pilot pressure and is barrier powered and barrier controlled.**

The ISQB1 operates using two normally closed solenoid valves, a pressure sensor, and a control circuit. One valve is actuated to allow supply media into the system. The second valve is actuated to allow working media to vent through a threaded port 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.

ELECTRICAL SPECIFICATIONS

Supply Voltage	15-24 VDC (standard)*
Supply Current	< 80 mA
Command Signal	4-20 mA Differential
Command Signal Impedance	100 OHM

PHYSICAL SPECIFICATIONS

Operating Temperature	32-104 °F (0-40 °C)
Weight	2 lb.
Protection Rating	IP65
Housing	Anodized Aluminum

*Please consult the ISQB Installation guide on our website before operating:
http://proportionair.com/products/electronic-pressure-regulators/intrinsically-safe-valves/isqb1/

MECHANICAL SPECIFICATIONS

Pressure Ranges	29.9 in. Hg (Vac) to 150 psig (10 bar)
Output Pressure	0-100% of range
Flow Rate	0.80 SCFM @ 80 psig
Min. Volume	1 cubic inch
Filtration Required	40 Micron
Linearity/Hysteresis	+/- 0.4% F.S.
Repeatability	+/- 0.2% F.S.
Accuracy	+/- 0.5% F.S.
Wetted Parts Transducer: Silicon, Aluminum, RTV	Elastomers: Fluorocarbon Manifold: Brass Valves: Nickel Plated Brass

Example Part Number :	ISF	1	T	B	N	I	X	Z		P	150	PS	G	P2	BR
YOUR PART NUMBER :		1	T			I	X							Options	
Section ——>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	

1 Series

ISF	Nonincindive *(potted)*
ISQB	Intrinsically Safe

2 Type

1	Single Loop

3 Sensor Type

T	-14.7 to 150 psig

4 Manifold Material

B	Brass *(Standard)*
A	Aluminum

5 Thread Type

N	NPT *(Standard)*
P	BSPP *(Brass Manifold Only)*

6 Input Signal Range

I	4 to 20 mADC

7 Monitor Signal Range

X	No Monitor Signal

8 Zero Offset

N	0% Pressure is Below Zero
P	0% Pressure is Above Zero
Z	0% Pressure Starts at Zero *(Typical)*

9 Zero Offset Pressure

14.7	**This is an example.** Your number will be the bottom of your desired pressure range. Most often your number will be '0'.

10 Full Scale Pressure Type

N	100% Pressure is Below Zero
P	100% Pressure is Above Zero *(Typical)*
Z	100% Pressure is Zero

11 Full Scale Pressure

150	**This is an example.** Your number will be the top of your desired pressure range.

12 Pressure Unit

PS	PSI	Inches Hg	IH
MB	Millibars	Inches H_2O	IW
BR	Bar	Mm H_2O	MW
KP	Kilopascal	Kilograms cm^2	KG
MP	Megapascal	Torr	TR
MH	mm Hg	Centimeters H_2O	CW

13 Pressure Unit of Measure

A	Absolute Pressure
G	Gage Pressure

14 Popular Options

P1	12 VDC Power
P2	15-24 VDC Power
BR	Install Foot Bracket

You must choose between P1 and P2 options

ONE PRODUCT THOUSANDS OF WAYS

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