

Type 1001

I/P & E/P Transducers

Description

The Type 1001 is a patented family of electro-pneumatic instruments that is used to reduce a supply pressure to a regulated output pressure which is directly proportional to a two-wire current or three-wire voltage input. This design incorporates closed loop sensing of the output pressure to achieve excellent accuracy and vibration stability. It also features a unique damping circuit which can be adjusted to prevent overshoot and actuator "hunting." Model selection includes General Purpose (NEMA 1), Rainproof (NEMA 3R), and Watertight/Corrosion Resistant (NEMA 4X). NEMA 4X models are also explosion-proof, and all models are intrinsically safe.

Features

- 0.1% accuracy typical
- Closed loop pressure feedback control minimizes effects of vibration, temperature, supply pressure and mounting angle
- Built-in volume booster provides flows up to 12 SCFM
- Easy access zero and span adjustment
- Damping pot prevents over shoot and "hunting"
- Low air consumption
- Mounts at any angle (NEMA 3R limited)
- Compact and lightweight
- Virtually no sensitivity to supply pressure changes
- Removable orifice (screw) for easy maintenance

Applications

The Type 1001's precisely regulated pneumatic output can be used to operate:

- Valve actuators
- Louver and damper actuators
- Valve positioners
- Relays
- Clutches and brakes
- Controllers
- Air cylinders

Industry Applications Include:

- Liquid and Gas Processing
- Pulp and Paper
- Petrochemical Processing
- HVAC Systems
- Textile Productions
- Energy Management
- Environmental Control
- Medical Equipment

Calibration Adjustments

The Type 1001 contains multi-turn Zero and Span adjustment potentiometers which are accessible on NEMA 1 models by sliding the cover window open to its first detent position. Pots are clearly distinguished by legend on the cover. On NEMA 3R and 4X models, the

cover should be removed to reach the pots (marked Z for zero and S for span).

Adjust the pots clockwise to increase Zero and Span as required to optimize factory set output with appropriate input signal and supply pressure applied.

Damping Adjustment

To eliminate undesirable system oscillation, the Type 1001 features a unique damping adjustment. The output response is optimized to varying downstream volumes by adjusting the feedback time constant of the coil drive amplifier. This is accomplished on NEMA 1 models by sliding the cover window open to its second detent position to expose the single-turn Damping Potentiometer (remove the cover on NEMA 3R and 4X models). To optimize response, turn the pot fully counterclockwise until system oscillation is just eliminated. System oscillation may be observed by monitoring output pressure or by observing the behavior of directly actuated system components in response to a changing input.

Mounting

The Type 1001 transducers are designed to be position insensitive. They can be panel, valve, or pipe mounted at any angle (see NEMA 3R limitation) without a need for in place recalibration. Panel mounting can be either direct or with the bracket furnished with each unit. Mounting holes are located on the bottom and side to provide maximum mounting flexibility. Users may order the optional DIN Rail Adapter or a bracket suitable for either valve or 2" pipe mounting. Special pipe clamps may be ordered as a separate kit.

Agency Approval Notes

Factory Mutual (FM)

1001 I/P and E/P Transducers, P/N 966-ab4-0c

a = Input: 0, 1, 2, 3, 4 or 5.

b = Output: 0, 1, 2, 3, 4, 5 or 6.

c = Options: 01, 02, 03, 04, 05, 06, 07, 21, 31, 32, 41, 42, 43, 51, 52, 53, 54, 61, 62, 63, 64, 65, 71, 72, 73, 74, 75 or 76.

Intrinsically Safe: Class I, Div 1, Groups A, B, C, & D; T6; Ta = 40°C; 010100

Non-Incendive: Class I, Div 2, Groups A, B, C, & D; T6

Entity Parameters: VMax = 28 V, IMax = 150 mA, Ci = 0.22 µF, Li = 0.

T-1001 I/P and E/P Transducer, P/N 968-b1-ef

b = Input/output 2 digit number 00 - 99.

e = Standard or special calibration 0 or 1.

f = Option 00, 70, 60 or 76.

Explosion Proof: Class I, Div 1, Groups B, C, & D; T6;

Dust Ignition Proof: Classes II & III, Div 1, Groups E, F, & G; T6;

Type 4X

CSA Class No: 2258 02 Process Control Equipment For Hazardous Locations

Current or Voltage To Pressure transducer, Model Type 1001 and 1001XP, input 4-20, 10-50mA dc, 0-5, 1-5, 1-9 and 1-10V dc; supply voltage 40V dc max; supply current 100mA max; maximum ambient temp 70°C. Type 4. Output pressure ranges: Standard: 3-9, 9-15, 3-15, 3-27, 6-30, 1-17 psig. Extended: 0-15, 0-120 psig.



Type 1001
Transducers



The following equipment is in compliance with STD C22.2 No 213:

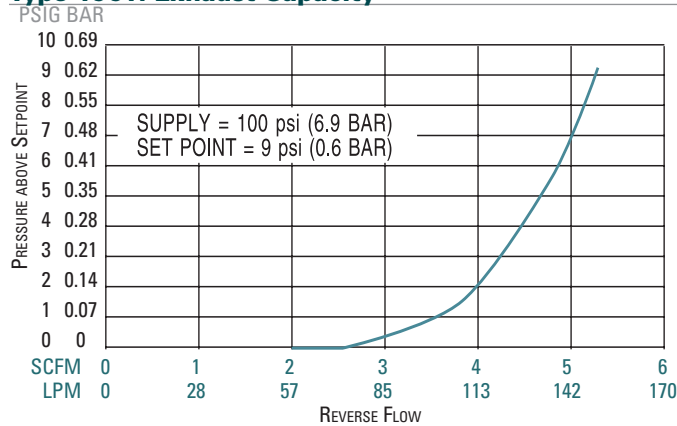
Class I, Division 2, Groups A, B, C and D:
Current to pressure (I/P) transducer, Model 1001, rated input 4-20mA or 10-50mA, 30V dc max. Voltage to pressure (E/P) transducer, Model 1001, rated supply 24V dc, 10mA, rated 0-5, 1-5, 1-9, and 1-10V dc.

Class No: 2258 03 Process Control Equipment - Intrinsically Safe and Non Incendive Systems - For Hazardous Locations

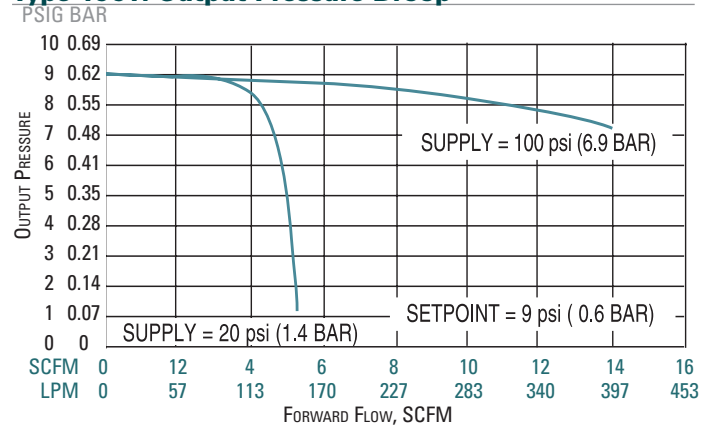
Class I, Groups A, B, C, D: Current to pressure transducer, Model 1001, rated input 4-20mA or 10-50mA, 30V dc max; intrinsically safe when connected through CSA Certified zener barrier devices or converters as per "Bellofram" Installation Instruction 010100. Voltage to pressure transducer, Model 1001, rated supply 24V dc, 10mA; rated input 0-5, 1-5, 1-9, and 1-10V dc; intrinsically safe when connected through CSA Certified zener barrier devices as per "Bellofram" Installation Instructions 010100.



Type 1001: Exhaust Capacity



Type 1001: Output Pressure Droop



Type 1001 Specifications

Accuracy (per ISA 51.1)	± 0.10% of output span, typical ± 0.25% of output span, maximum (Guaranteed)
Hysteresis	0.01% of output span, typical 0.10% of output span, maximum
Dead Band	No effect
Repeatability	0.01% of output span, typical 0.10% of output span, maximum
Ambient Temperature Effect	± 0.004% of nominal span per °F, typical ± 0.022% of nominal span per °F, maximum
Span	± 0.013% of calibrated span per °F, typical ± 0.022% of calibrated span per °F, maximum
Temperature Effect	0.02%/°F, zero and span effects combined
Operating Temperature Range Buna-N elastomers Viton elastomers	-20°F to 160°F (-29 to 71°C) 0°F to 160°F (-18 to 71°C)
Storage Temperature Range Buna-N elastomers Viton elastomers	-40°F to 200°F (-40 to 93°C) -15°F to 200°F (-26 to 93°C)
Vibration Effect	Less than 0.5% of span per 1G, 5-2000 Hz, 3G maximum, 3 axes
Mounting Position Effect	Not measurable
Loop Load, I/P Transducer	Less than 10 VDC drop at 20 mA Less than 12 VDC drop at 50 mA
Supply Voltage, E/P Transducer Intrinsically Safe/Nonincendive General Purpose	9 VDC to 28 VDC, less than 20 mA 9 VDC to 40 VDC, less than 20 mA
Supply Voltage Effect	No effect
Signal Impedance, E/P Transducer	6000 Ohm minimum
RFI/EMI Effect (NEMA 4X)	Less than 0.25% of span change in output 10V/meter, 20-1000 MHz. (Reference SAMA PML 33.1-1978, 2-abc)
Supply Pressure Sensitivity	No effect
Air Consumption:	0.07 SCFM (2 LPM) maximum
Supply Pressure	100 psig (6.9 BAR) maximum*
Port Sizes	Pneumatic: 1/4 NPT Electrical: 1/2 NPT

Type 1001 Accessories

Kits	Part Number
Std./Nitrile Repair Kit	971-122-001
Std./Fluorocarbon Repair Kit	971-122-002
Extended Range/Nitrile Repair Kit	971-122-003
Extended Range/Fluorocarbon Repair Kit	971-122-004
Panel Mounting Kit	010135-000
Valve Mounting Kit***	010134-000
2" Pipe Mounting Kit (Valve Mounting Kit is required)	010143-000
DIN Rail Adapter	010115-000
Cover for Locking Device Kit (for NEMA 4X enclosure only)	010136-000
Type 1 Orifice with Buna-N O-rings*	010137-000
Type 1 Orifice with Viton O-rings*	010137-002
Type 2 Orifice with Buna-N O-rings**	010137-001
Type 2 Orifice with Viton O-rings**	010137-003
Filter Kit, 60 microns	010139-000
Hirschmann® Connector Kit (Din 43 650-A) (3 prong plug, O-ring sealed)	010142-000
Pressure Gauge Kit, 15 PSI	010138-000
Pressure Gauge Kit, 30 PSI	010138-001
Pressure Gauge Kit, 60 PSI	010138-002
Pressure Gauge Kit, 160 PSI	010138-003

* Type 1 Kits to be used with Ø based output units and 1-17 PSIG unit.

** Type 2 Kits to be used with all other units.

*** Supplied standard with Nema 4X

Type 1001 Specials Table

Input	Output	Comments	Part Number
4-20 mA	20-100 kPa	NEMA 1	962-145-000
4-20 mA	20-100 kPa	NEMA 3R	962-146-000
4-20 mA	0-200 kPa	NEMA 1	962-148-000

Type 1001 Ordering Information

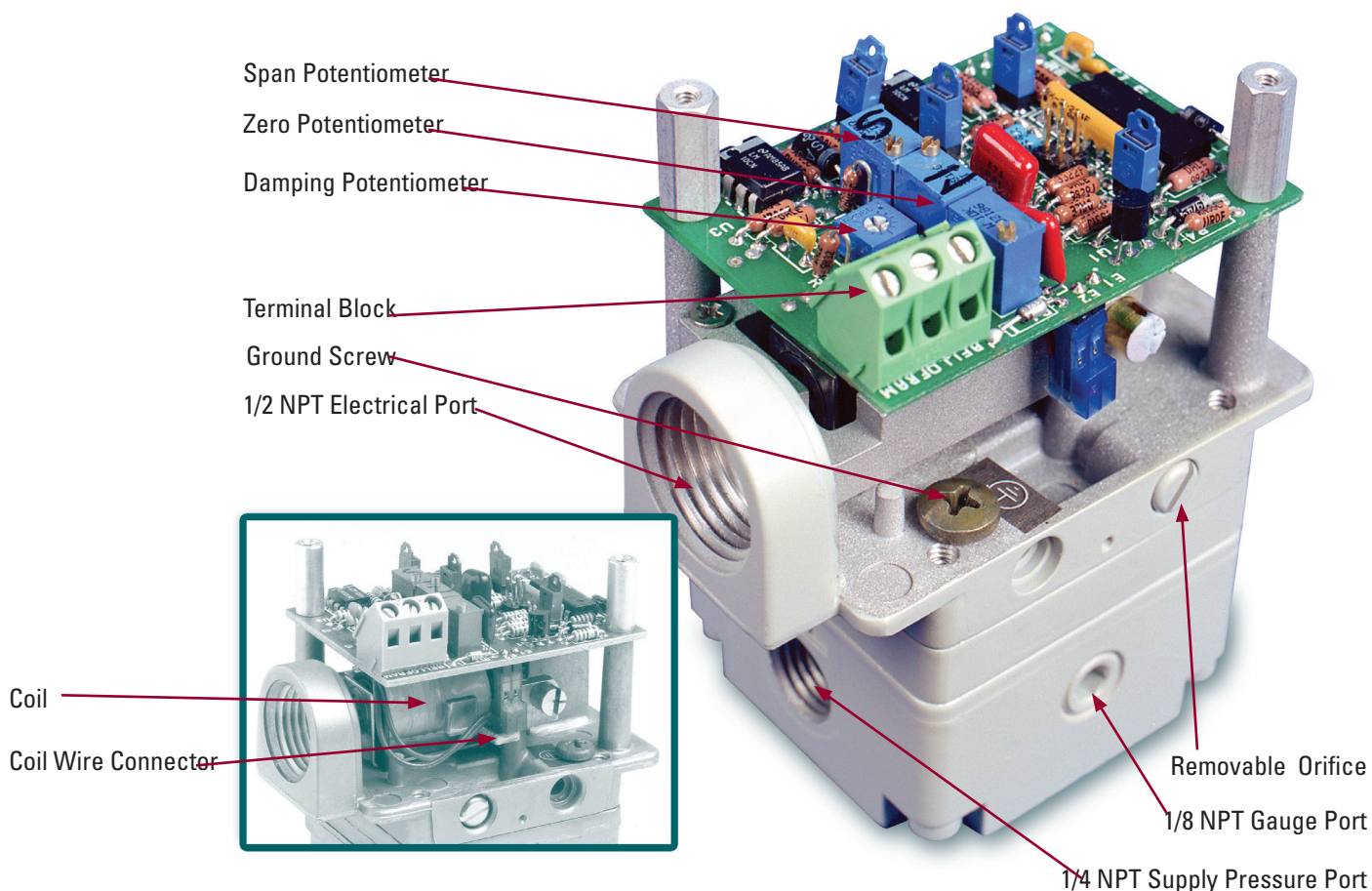
9	6			0		
		↑	↑↑	↑	↑↑	Enclosures
	6					NEMA 1, General Purpose ²
	7					NEMA 3R, Rainproof ²
	8					NEMA 4X, Water-tight, Dust-tight, Corrosion Resistant, and Explosion-Proof ²
		--				Calibration
						See Input / Output matrix below ¹
						Agency Approvals
				0		Intrinsically Safe (standard)
				1		Factory Mutual and CSA Explosion Proof
						Options
					00	None
					06	Fluorocarbon Elastomeric Diaphragm

Notes to Nomenclature:

1. Transducer operating in the voltage mode (E/P), can be adjusted with the "span" potentiometer for any input between 0-10 VDC.

The input range is limited to a minimum 4VDC difference between 100% and 0% Input voltage.

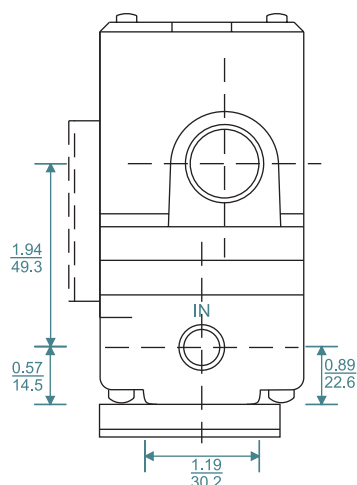
2. Standard NEMA 1 enclosure is conversion coated only. Standard NEMA 3R and NEMA 4X enclosures are epoxy painted.



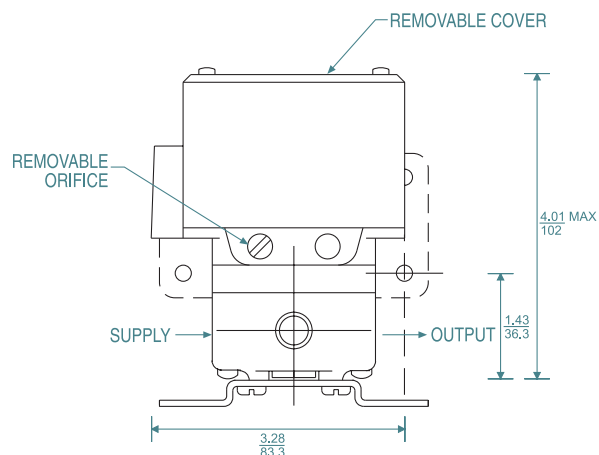
Type 1001 Standard Input/Output Matrix

PSIG	0-5	0-15	0-30	0-60	0-100	1-17	3-15	3-27	6-30	3-9	9-15	0-2	0-120
4-20 mA	19	06	20	08	09	05	02	03	04	00	01	13	07
10-50 mA	11	16	A5	98	89	15	12	87	14	10	90	B1	17
0-5 VDC	21	26	18	28	29	25	22	35	24	30	31	B2	27
1-5 VDC	A1	36	A6	38	39	97	32	33	34	50	41	B3	37
1-9 VDC	A2	46	40	48	49	45	42	43	44	60	51	B4	47
1-10 VDC	A3	56	B6	58	59	55	52	53	54	88	61	B5	57
0-10 VDC	A4	66	70	68	69	65	62	63	64	80	99	23	67

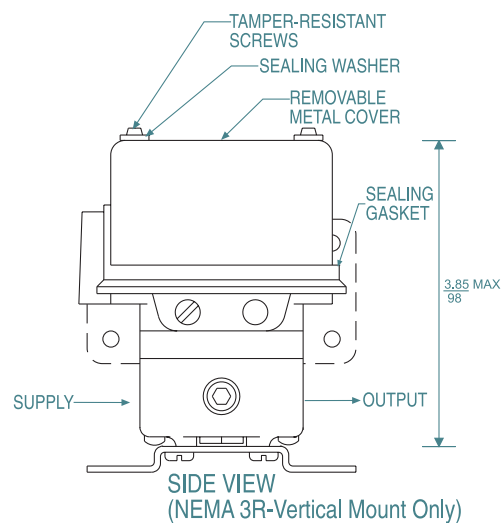
Front View



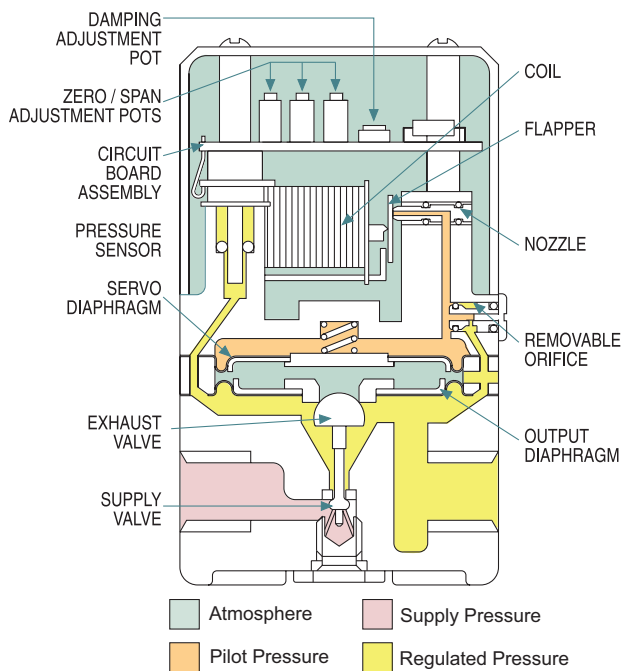
Side View



Side View (Vertical Mount Only) NEMA 3R

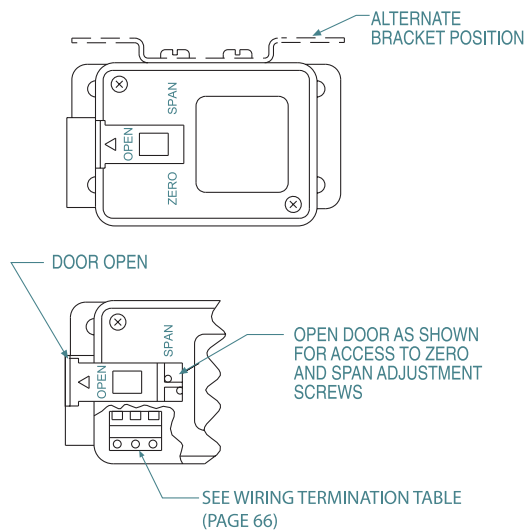


SIDE VIEW
(NEMA 3R-Vertical Mount Only)

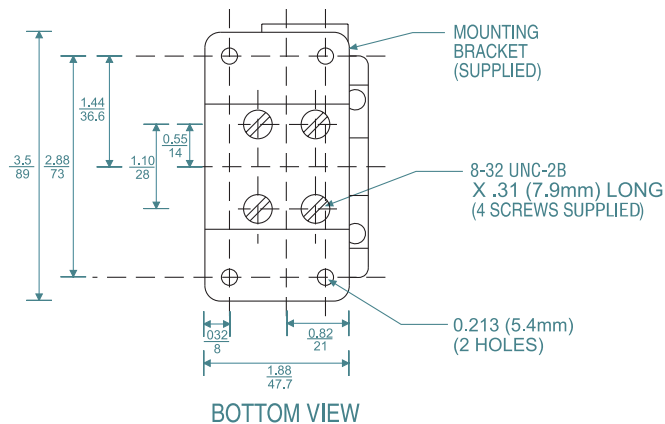


Atmosphere Supply Pressure
Pilot Pressure Regulated Pressure

Top View

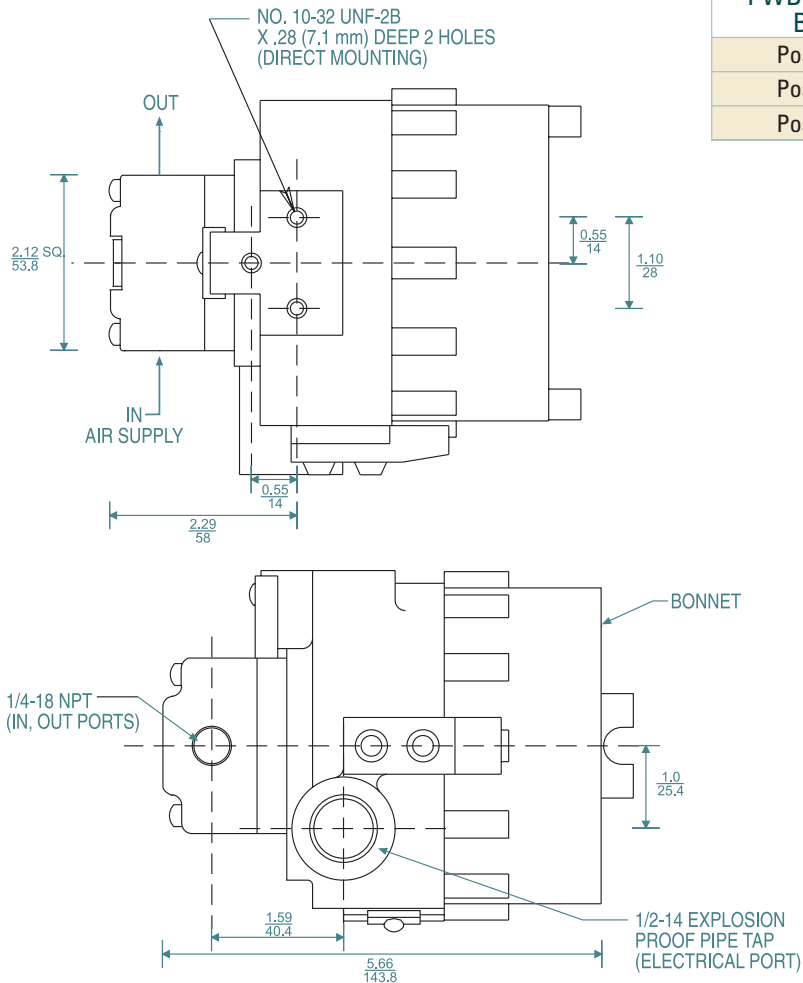


Bottom View



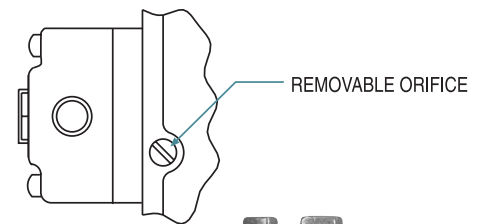
BOTTOM VIEW

Side Views



Type 1001 EX Wiring Termination

PWB Terminal Block	I/P Transducer	E/P Transducer
Position 3	Positive (+)	Supply (+)
Position 2	No Connection	Common
Position 1	Negative (-)	Signal (+)



Bottom View

