

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 T-1001 I/P and E/P Transducers Intrinsically Safe:

Class I, Division 1, Groups A, B, C, & D, T6 Ta = 40°C
Non-Incendive: Class I, Division 2, Groups A, B, C, & D, T6
 Entity Parameters: $V_{Max} = 28 V$, $I_{Max} = 150 mA$, $C_i = 0.22 \mu F$, $L_i = 0$.
 T-1001 I/P and E/P Transducers Explosion Proof: Class I, Division 1, Groups B, C, & D, T6

Dust-Ignition Proof: Classes II & III, Division 1, Groups E, F, & G, T6 Type 4X **NEMA 4X**

**Canadian Standards Association
T-1001 and T-1001XP I/P and E/P Transducers
Hazardous Locations:** Class I, Groups B, C, & D; Class II, Group E, F, & G; Class III; Encl 4 **NEMA 4:**
 I/P or E/P transducer, input 4-20, 10-50mA dc, 0-5, 1-5, 1-9 & 1-10V dc; supply voltage 40V dc max; supply current 100mA max; maximum ambient temp 70 °C.

Output pressure ranges:
 Standard: 3-9, 9-15, 3-15, 3-27, 6-30, 1-17 psig.
 Extended: 0-15, 0-120 psig.

T-1001 I/P and E/P Transducers

Hazardous Locations:
 Class I, Division 2, Groups A, B, C, & D:



Type 1001
Transducers



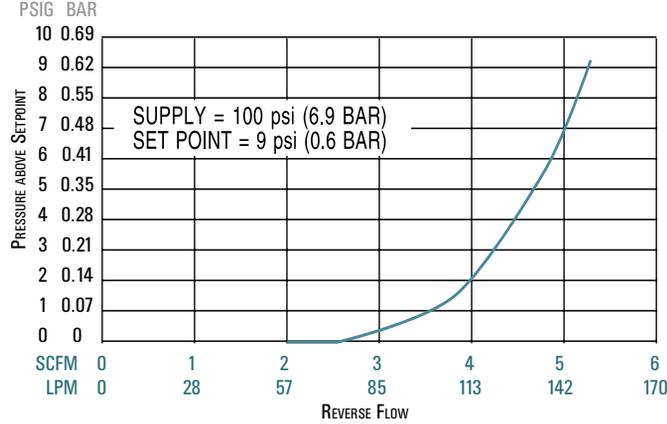
I/P transducer, rated input 4-20mA or 10-50mA, 30V dc max.
 E/P transducer, rated supply 24V dc, 10mA, rated 0-5, 1-5, 1-9 & 1-10V dc. IN COMPLIANCE WITH STD C22.2 No 213.

Intrinsically Safe and Non-Incendive Systems - Hazardous Locations:

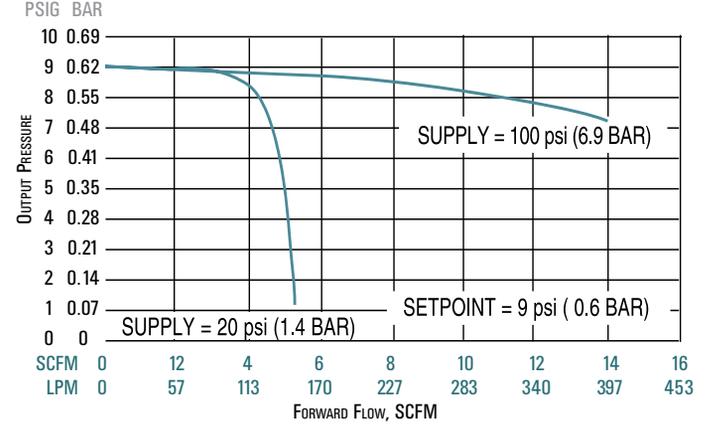
Class I, Groups A, B, C, & D:
 I/P transducer, rated input 4-20mA or 10-50mA, 30V dc max; intrinsically safe when connected through CSA Certified zener barrier devices or converters as per Bellofram Installation Instruction.
 E/P transducer, rated supply 24V dc, 10mA; rated input 0-5, 1-5, 1-9 & 1-10V dc; intrinsically safe when connected through CSA Certified zener barrier devices as per Bellofram Installation Instructions.

The Bellofram T-1001 Transducers were tested and found to comply with Electromagnetic Compatibility Directive effective January 1, 1996. The relevant EMC specifications tested were the following: EN 50081-1 (1992) and EN 50082-1 (1992). A Technical Construction File, Serial #107 was written and Certificate of Conformity issued by a Competent Body.

Type 1001: Exhaust Capacity



Type 1001: Output Pressure Drop



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	-20°F to 160°F (-29 to 71°C)
Viton elastomers	0°F to 160°F (-18 to 71°C)
Storage Temperature Range	
Buna-N elastomers	-40°F to 200°F (-40 to 93°C)
Viton elastomers	-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	9 VDC to 28 VDC, less than 20 mA
General Purpose	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

* For models with zero output capability maximum supply pressure = 40 PSI (2.8 BAR) above maximum output, except for 0-100 PSI and 0-120 PSI models that have a maximum supply pressure of 130 PSI (9 BAR) & 140 psi (9.7 BAR) respectively.

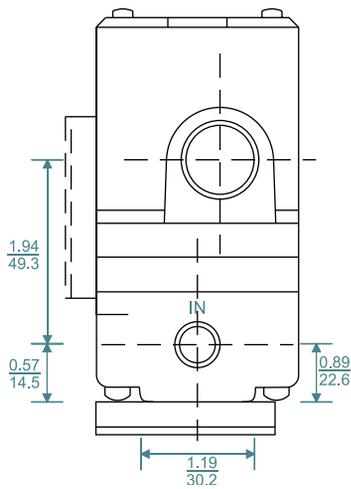
Bellofram specifies the use of instrument quality air (clean, dry, oil free) for all transducers. Transducers should be used within the following conditions:
Dew Point < 35°F (2°C) (indoor); Oil Content < 1PPM; Particles < 3µm.
The use of filters in the supply air system is highly recommended. Contact us for information on our filters and filter regulators.

Type 1001 Accessories	
Kits	Part Number
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

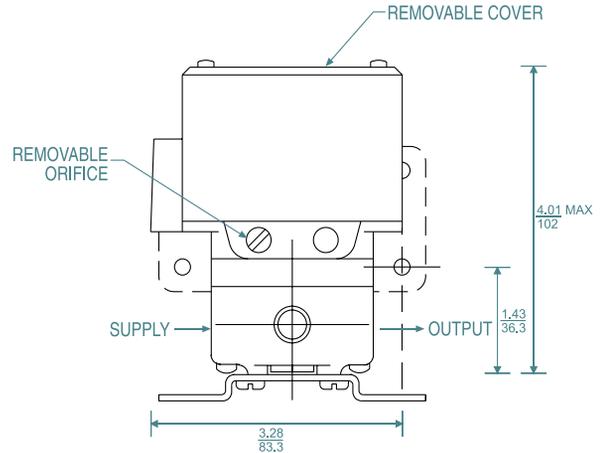
* Type 1 Kits to be used with Ø based output units and 1-17 PSIG unit.
** Type 2 Kits to be used with all other units.
*** Supplied standard with Nema 4X

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

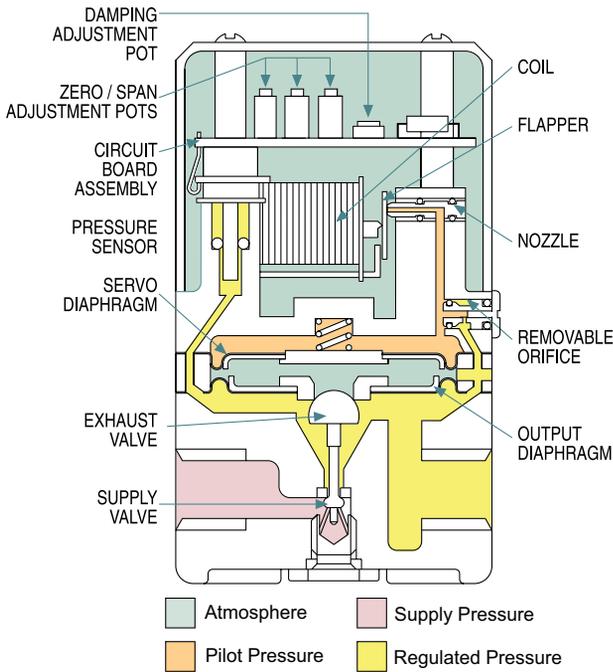
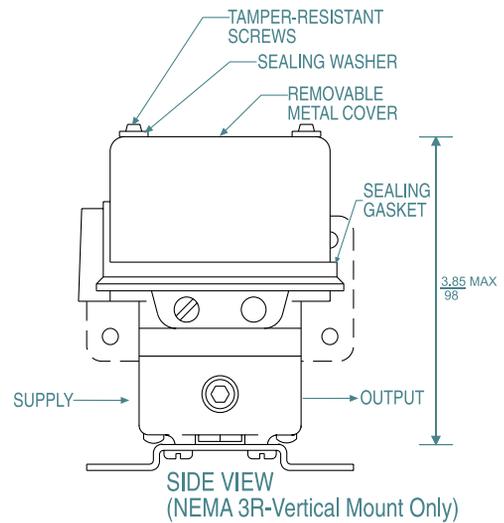
Front View



Side View

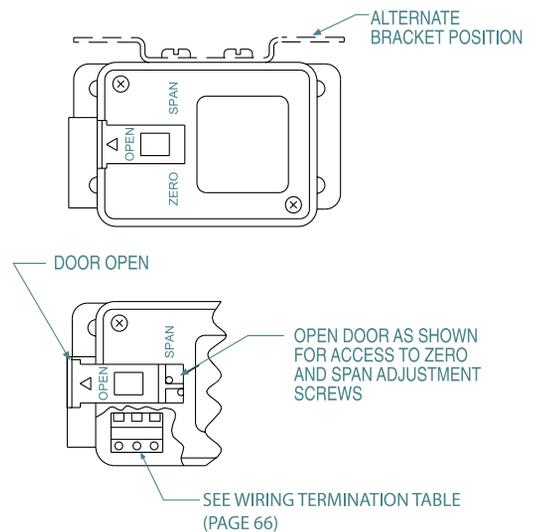


Side View (Vertical Mount Only) NEMA 3R

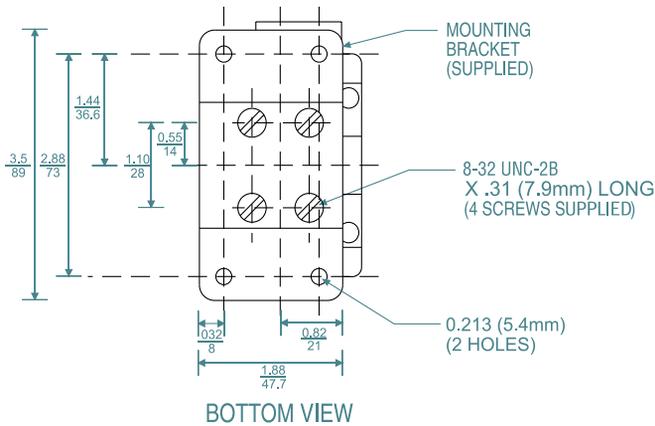


SIDE VIEW (NEMA 3R-Vertical Mount Only)

Top View

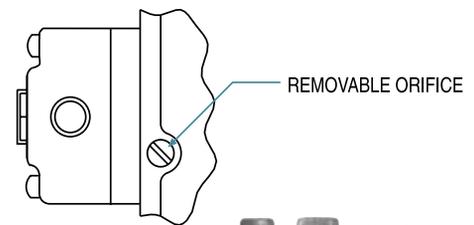
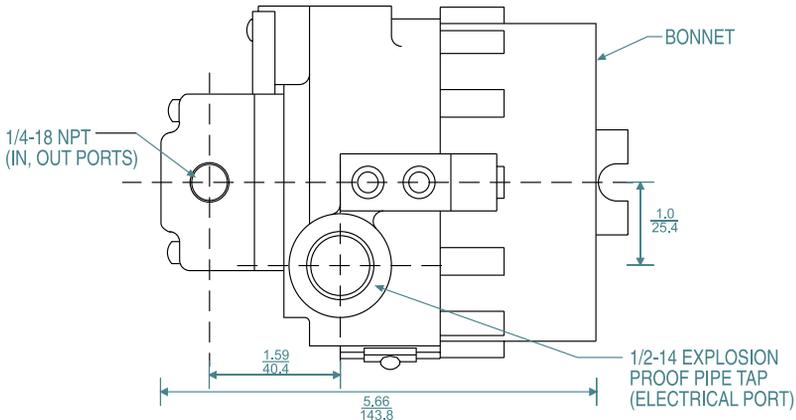
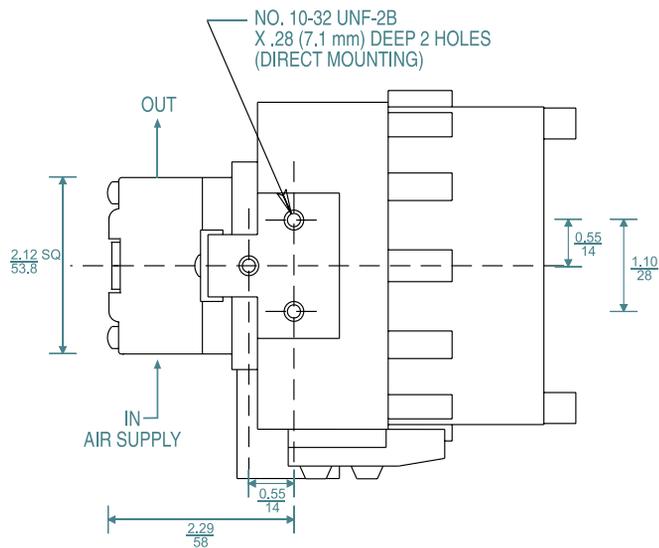


Bottom View

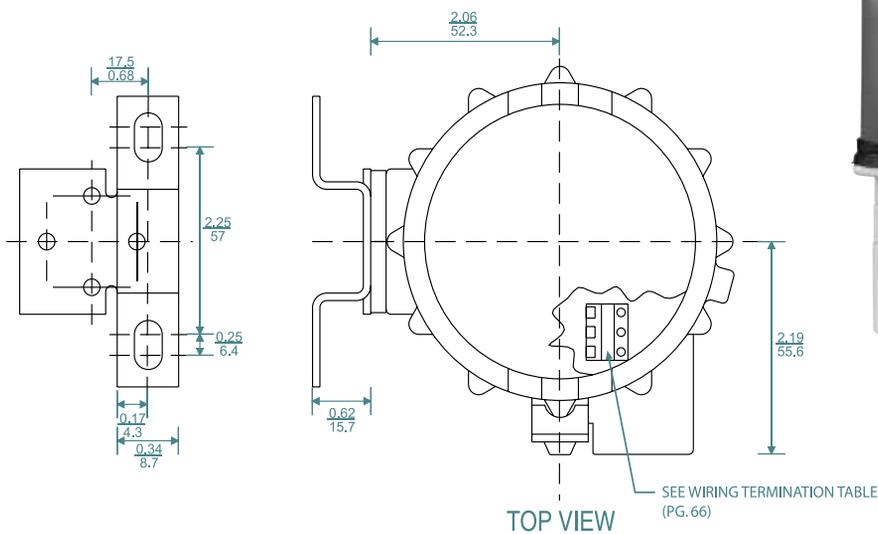


BOTTOM VIEW

Side Views



Bottom View



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 (+)

