Recalibrate a 0-30 psig unit to 3-15 psig would be to change onboard pressure sensor.) For example, the easiest way to but not to 0-30 psig). (Caution: Do not exceed the range of the sensor family (e.g., a 0-15 psig can be switched to a 3-15 psig, unit should not be switched to a range outside its pressure range switching, and split high/low ranging. A Type 2000 can be field calibrated to pressure ranges other than the standard ones by combinations of recalibrating output. The adjustments are interactive, so it may take iterations to reach the desired calibration.

Field-selectable features

Onboard switches after the user to easily reconfigure the Type 2000 for any of several electrical inputs, direct/reverse acting, or output split-ranging high/low. Fine tuning of the unit’s calibration may be necessary after a reconfiguration.

Direct/reverse acting

Direct Acting transducers regulate to their minimum output when supplied with minimum input maximum out with maximum. Reverse acting transducers regulate to their maximum output when supplied with maximum input maximum out with minimum.

Split ranging high & low

The Type 2000 can be configured to regulate either half (top or bottom) of its normal output range, when supplied with its normal full-ranging electrical input. For example, a 0-10V 0-30 psi unit set to split range low will regulate 0-15 psi. It will regulate 15 to 30 psi if split range high.

Hazards area & usage classification

Intrinsically safe (S Enclosure) Factory Mutual approved Class I, II, and III; Zones 1 and 2, Groups A, B, C, and D. CSA Division 1, Groups C & D. Ex-ia IIB Ci=0, Li=0, 24VDC, 50MA. Meets the requirements for CSA Class I Division 1 Group D gas use, including natural gas as the media flowing through the transducer; CE (Corzelian Connector Only) EN 50021-1:2001, commercial & light industry, 92/31/EEC Heavy industrial.

Easy access top cover

1) Removable cover provides access to the isolated electronics.
2) Bracket Mounting options: Panel, pipe, valve, DIN-rail.

Widen rangeability

The Type 2000 contains multi-turn Coarse-Zero, Fine-Zero, and Span adjustment potentiometers which are clearly marked on the circuit board or on the handy chart located on the inside of the cover. The three elements of calibration (Zero, Zero, and Span) are described below. Consult the Type 2000 User’s Manual for detailed calibration procedure, instructions, and test requirements.

Gain (damping) adjustment

The output response of the Type 2000 can be optimized for varying downstream volumes by adjusting the gain part of the control circuit. Adjust the Gain Pot counterclockwise for increased gain, clockwise for increased damping. For maximum allowable gain in your application, the pot should be turned downward and over one full revolution.

Zero & Span adjustment

The Type 2000 contains multi-turn Coarse-Zero, Fine-Zero, and Span adjustment potentiometers which can be adjusted positively. Adjustment of either Zero Pot changes the unit’s minimum output value while the Span Pot changes the maximum output. The adjustments are interactive, so it may take iterations to reach the desired calibration.

Wide rangeability

The Type 2000 can be field calibrated to pressure ranges other than the standard ones by combinations of recalibration, pressure range splitting, and split high/low ranging. A unit should not be switched to a range outside its pressure range switching, and split high/low ranging. Fine tuning of the unit’s calibration may be necessary after a reconfiguration.

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Direct Acting transducers regulate to their minimum output when supplied with minimum input maximum out with maximum. Reverse acting transducers regulate to their maximum output when supplied with maximum input maximum out with minimum.

Split ranging high & low

The Type 2000 can be configured to regulate either half (top or bottom) of its normal output range, when supplied with its normal full-ranging electrical input. For example, a 0-10V 0-30 psi unit set to split range low will regulate 0-15 psi. It will regulate 15 to 30 psi if split range high.

Hazards area & usage classification

Intrinsically safe (S Enclosure) Factory Mutual approved Class I, II, and III; Zones 1 and 2, Groups A, B, C, and D. CSA Division 1, Groups C & D. Ex-ia IIB Ci=0, Li=0, 24VDC, 50MA. Meets the requirements for CSA Class I Division 1 Group D gas use, including natural gas as the media flowing through the transducer; CE (Corzelian Connector Only) EN 50021-1:2001, commercial & light industry, 92/31/EEC Heavy industrial.

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Hazards area & usage classification

Intrinsically safe (S Enclosure) Factory Mutual approved Class I, II, and III; Zones 1 and 2, Groups A, B, C, and D. CSA Division 1, Groups C & D. Ex-ia IIB Ci=0, Li=0, 24VDC, 50MA. Meets the requirements for CSA Class I Division 1 Group D gas use, including natural gas as the media flowing through the transducer; CE (Corzelian Connector Only) EN 50021-1:2001, commercial & light industry, 92/31/EEC Heavy industrial.
TYPE 2000 I/P & E/P TRANSDUCERS

- As voltage increases, the force applied by the actuator increases, so as to simultaneously the output of the pressure sensor is amplified and conditioned to pressure output as follows:

   The piezo-ceramic actuator serves as a control link between electrical input and the gap between the face of a nozzle and an adjacent surroundings.

Multiple input/output/mounting configurations

- Multiple input/output/mounting configurations

- Field-selectable inputs and direct/reverse/split electropneumatic needs of the world:

- Textiles
- Electric Utilities
- Chemical & Petrochemical Industries

Industry Applications Include:

- Chemical & Petrochemical Industries
- Petroleum Production
- Pipeline Transmission
- Electric Utilities
- Water & Wastewater Systems
- Pumps & Paper
- Textiles
- Semiconductors Industry
- Food & Beverage
- Environmental Control Systems
- Construction Equipment
- Agricultural Equipment
- Machine Tools
- Commercial Blending
- Automotive Testing & Assembly
- Industrial Equipment

Type 2000 Specifications

- 0.1% of full-scale output typical (0.25% guaranteed); includes effects of hysteresis, dead band, and repeatability

Specifications

- Electrical
  - Supply Voltage
  - Pneumatic
  - Electrical Port

- Electrical Port

- Temperature

- Accuracy

- Pressure

- Temperature Effect

- Supply Pressure Effect

- Supply Voltage Effect

- Stability

- Electro-Pneumatic

- NEMA 4 (IP66) explosion proof

Ordering Information

- Mounting Options

- Wiring Connections and Switch Positions

- Accessories

- Pneumatic Ports

- Approval Agency

- Agency Approval

- Agency Approval

- Agency Approval

- Agency Approval

- Agency Approval

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- Agency Approval
FIELD-SELECTABLE FEATURES

Drilled switches after the user to easily reconfigure the Type 2000 for any of several electrical inputs, direct/reverse acting, or output split-ranging high/low. Fine tuning of the unit's calibration may be necessary after a reconfiguration.

DIRECT/REVERSE ACTING

Direct Acting transducers regulate to their minimum output when supplied with minimum input maximum with maximum. Reverse Acting transducers regulate to their maximum in. Reverse Acting transducers regulate to their minimum output when supplied with maximum input maximum with minimum.

NORMAL FULL-RANGING ELECTRICAL INPUT

The Type 2000 can be configured to regulate either half (top or bottom) of its normal output range, when supplied with its normal full-ranging electrical input. For example, a 5-10V 0-10V unit set to split range low will regulate 0-15psi @ 0-10V. It will regulate 15psi @ 5-10V if set to split range high.

HAZARDOUS AREA & USAGE CLASSIFICATION

INTRINSIC SAFETY: [S Enclosure] Factory Mutual approved Class I, II, or III, Groups C and D. Underwriters, Class I, Division 1 Group C & T3, Ex ia IIC T6; EEx ia IIC T4 (-120˚C); CE; [Non-intrinsically safe] ABExp, Division 1 Group C & T3, Ex ia IIC T6; EEx ia IIC T4 (-120˚C); CE; [Concerta Connect Only] EN 50021-1:2003, conformal coated.

TRADEMARKS

Gordon, Marsh Bellofram, MAX-2000, T-2000 and Bellofram are registered trademarks of Marsh Bellofram Corporation.

IMPORTANT NOTICE

All information furnished herein is subject to change without notice. The user is responsible for determining the suitability of any product unit to meet the user’s specific requirements. Marsh Bellofram Corporation makes no warranty or representation regarding the suitability of any product unit to meet the user’s specific requirements. The user is responsible to ensure the suitability of any product unit to meet the user’s specific requirements.
DESCRIPTION
The Marsh Belforom Type 2000 is a robust electronic instrument that regulates incoming pressure supply downstream to a precise output pressure which is directly proportional to an electrical control signal. The secret to this Type 2000's reliable performance under a variety of demanding environmental conditions is a patented piezo-ceramic actuator with many industry-wide tests.

The Type 2000 has been designed to meet the electro-pneumatic needs of the world:

- Multiple input/output/mounting configurations
- Field-selectable inputs and direct/reverse/split electronic instrument that regulates an incoming
- Controllers
- Clutches and brakes
- Valve positioners
- Louver and damper actuators
- The Type 2000 is precisely regulated pneumatic output can
- The Type 2000's precisely regulated pneumatic output can
- Industry Applications Include:
  - Chemical & Petrochemical Industries
  - Petroleum Production
  - Pipeline Transportation
  - Electric Utilities
  - Water & Wastewater Systems
  - Steam 
- Pressure
- Gas & Liquid Controls
- Controls
- Air cylinders
- Boiler Plants
- Building Automation
- Automotive Testing & Assembly
- Industrial Equipment
- Enclosure: N Electrical Port)

APPLICATIONS
The Type 2000/EP is ideal for control and pneumatic output and receives environmental conditions is a patented piezo-ceramic actuator with many industry-wide tests.

- Increased pilot pressure applied to the servo diaphragm directly causes opening
- Simultaneously the output of the pressure sensor is amplified and conditioned to
- The input current (I/P) or voltage (E/P) signal is conditioned to provide a normal-
- Pressure is also routed to an externally removable orifice which

PRINCIPLE OF OPERATION
The principle of operation is a feedback signal and control signal combine to produce the correct command signal to the supply valve and an increase in the output pressure until the output signal which is delivered as a DC voltage to the piezo-ceramic actuator. The Type 2000 is designed to meet the

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Function</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch-Selectable</td>
<td></td>
</tr>
<tr>
<td>Supply Power</td>
<td>5-28VDC</td>
</tr>
<tr>
<td>Ports (Input/Output)</td>
<td>1/4&quot; (NPT, BSPT, or BSPP threads)</td>
</tr>
<tr>
<td>Ports (Gauge)</td>
<td>1/8&quot; NPT</td>
</tr>
<tr>
<td>Connections</td>
<td>1/2&quot; NPT or 20mm Conduit</td>
</tr>
<tr>
<td>Power Supply</td>
<td>5-28VDC</td>
</tr>
<tr>
<td>External Terminal Block</td>
<td>S model only</td>
</tr>
<tr>
<td>DIN Hirschmann</td>
<td>S model only</td>
</tr>
<tr>
<td>Type K</td>
<td>S model only</td>
</tr>
<tr>
<td>DIN-Rail Bracket</td>
<td>Accessory</td>
</tr>
<tr>
<td>Manifold Plate</td>
<td>Accessory</td>
</tr>
<tr>
<td>Valve Bracket</td>
<td>Included</td>
</tr>
<tr>
<td>Pipe Bracket</td>
<td>Accessory</td>
</tr>
<tr>
<td>Pressure Gauge Kit</td>
<td>010-138-000</td>
</tr>
<tr>
<td>Filter Kit, 0.1 microns</td>
<td>010-140-000</td>
</tr>
<tr>
<td>Filter Element Kit</td>
<td>010-139-000</td>
</tr>
<tr>
<td>Manifold Adapter Kit</td>
<td>971-158-000</td>
</tr>
<tr>
<td>Panel Mounting Kit</td>
<td>010-135-000</td>
</tr>
</tbody>
</table>

NOTES:
- 3NEMA 4X / IP66 not available
- 4Including Natural Gas Use (E
- 5Bottom O-Ring Ports
- 2NEMA 4X / IP66 not available

TYPE 2000 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Function</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Pressure</td>
<td>0-120 psig</td>
</tr>
<tr>
<td>Supply Pressure (BAR)</td>
<td>0-8.3 BAR</td>
</tr>
<tr>
<td>Pressure Gauge Kit</td>
<td>010-138-002</td>
</tr>
<tr>
<td>Filter Kit, 60 microns</td>
<td>010-139-000</td>
</tr>
<tr>
<td>Manifold Adapter Kit</td>
<td>971-158-000</td>
</tr>
<tr>
<td>Panel Mounting Kit</td>
<td>010-135-000</td>
</tr>
</tbody>
</table>

ACCESSORIES

WIRING CONNECTIONS AND SWITCH POSITIONS
Type 2000 I/P & E/P Transducers

- As voltage increases, the force applied by the actuator increases, so as to
- The sum of the control signal and the feedback signal produces a command
- Simultaneously the output of the pressure sensor is amplified and conditioned to
- The input current (I/P) or voltage (E/P) signal is conditioned to provide a normal-pressure output as follows:

The piezo-ceramic actuator serves as a control link between electrical input and

- Changes, and mounting angle.

- Precise, reliable performance under extreme
- Multiple input/output/mounting configurations
- Field-selectable inputs and direct/reverse/split
- Electronic instrument that regulates an incoming

- Pressure is also routed to an externally removable orifice which

- Supply pressure is reduced by the supply valve to provide an

- On an incoming orifice which

- Supply valve and an increase in the output pressure until the output

- Effects of temperature, supply pressure changes, supply voltage

- RFI/EMI, humid / oil-

- 0.1% of full-scale output typical (0.25% guaranteed);

- Pneumatic Ports
- Electro-Pneumatic Needs of the World:

- Controllers
- Clutches and brakes
- Relays
- Louver and damper actuators

- The Type 2000’s precisely

- Forward Flow
- 0-60 0-4.1 50 3.5 21 595
- 0-60 0-4.1 50 3.5 21 595
- 0-30 0-2.1 30 2.1 21 595
- 0-30 0-2.1 30 2.1 21 595
- 0-15  0-1.0 15  1.0 19 538
- 0-5 0-0.3 5  0.3 11 312
- 0-2 0-0.1 2  0.1 4 113
- psig BAR psig BAR scfm LPM

- 140 psig supply pressure

- 60 microns 010-139-000
- Manifold Adapter Kit 971-158-000
- DIN Rail Adapter 010-115-000
- Valve Mounting Kit 010-134-000
- Panel Mounting Kit 010-135-000
- Pressure Gauge Kit 010-137-000
- 3/4" Pipe Mounting Kit 010-143-000
- Pressure Gauge Kit 010-142-000
- 4-20mA. 0-5, 1-5, 1-9, 1-10, or 0-10VDC

- 1-15 V 0-15 VDC Input Split Low 0-15 0-1.0 Acting
- 0.1% of full-scale output typical (0.25% guaranteed);
**Euro-Tuning Your Application**

For optimum performance in your application, the calibration of the Type 2000 can be free-tuned in the field. An easily-removable cover provides access to the isolated electronics. All potentiometers, connections, jumpers, and switches are clearly marked on the circuit board, or on the handy data sheet located on the inside of the cover. The three elements of calibration—Zero, Span, and Gain—are described below. Consult the Type 2000 User’s Manual for detailed calibration procedures, cautions, and instrumentation requirements.

**Gain (Damping) Adjustment**

The output response of the Type 2000 can be optimized for varying downstream volumes by adjusting the gain pot of the control circuit. Adjust the Gain Pot counterclockwise for increased gain, clockwise for increased damping. For maximum allowable gain in your application, the pot should be turned down only slightly past disappearance.

**Zero & Span Adjustments**

The Type 2000 contains multi-turn Coarse-Zero, Fine-Zero, and Span adjustment potentiometers which can be adjusted positively. Adjustment of either Zero Pot changes the unit’s minimum output while the Span Pot changes the maximum output. The adjustments are interactive, so it may be beneficial to reset both to start the calibration.

**Wide Rangeability**

The Type 2000 can be field-calibrated to a pressure range other than the standard one by combinations of recalibration, pressure range splitting, and split-ranging. A unit should not be switched to a range outside its pressure sensing range (e.g., a 0-15 psig unit cannot be switched to a 0-30 psig unit). Caution: Do not exceed the range of the sensor family (e.g., a 0-15 psig can be switched to a 3-15 psig, but not to 0-30 psig). (Caution: Do not exceed the range of the onboard pressure sensor.) For example, the easiest way to change a 0-30 psig unit to 3-15 psig would be to change the onboard pressure sensor. (For more details, refer to your Type 2000 User’s Manual.)

**Field-Selectable Features**

Directed switches allow the user to easily configure the Type 2000 for any of several electrical inputs, direct/reverse acting, direct/reverse ranging, and split high/low ranging. A unit’s configuration can be changed during normal full-ranging electrical input. For example, a 0-10 V 0-15 psi unit set to split range low will regulate 0-15 psi @ 0-10 V. It will regulate 15 psi to 30 psi @ 0-10 V if set to split range high.

**Direct/Reverse Acting**

Direct Acting transducers regulate to their minimum output when supplied with minimum input maximum output when maximum input. Reverse Acting transducers regulate to their maximum output when supplied with minimum input maximum output when maximum input.

**Split Ranging High & Low**

The Type 2000 can be configured to regulate either half (top or bottom) of its normal output range, when supplied with its minimum input maximum input. For example, a 0-10 V 0-15 psi unit set to split range low will regulate 0-15 psi @ 0-10 V. It will regulate 15 psi to 30 psi @ 0-10 V if set to split range high.

**Hazardous Area & Usage Classification**

**Intrinsically Safe**

[8] Enclosure, Factory Mutual Class I, Division 1, Group D, T4. 120V, 20mA. Meets the requirements for CSA Class I, Division 1, Group D gas units, including natural gas as the media flowing through the transducer. [3] CE (Controlled Connector Only) EN 50081-1:1989, commercial & light industry, EN50082-2 Heavy Industrial.

**Explosion Proof**

[9] Enclosure, N Electrical Port, G Agency Approval Certified to CSA standards. Class I, Division 1, Group C & D, T3. Exa-BB, Db, Loc, 240VDC, 20mA. Meets the requirements for CSA Class I, Division 1, Group D gas units, including natural gas as the media flowing through the transducer. [4] ATEX Approvals: II 1 G Ex ia IIC T4 (-II 1 G Ex ia IIC T4 (E) - 0.78) Enclosure, N Electrical Port, G Agency Approval Certified to CSA standards. Class I, Division 1, Group C & D, T3. Exa-BB, Db, Loc, 240VDC, 20mA. Meets the requirements for CSA Class I, Division 1, Group D gas units, including natural gas as the media flowing through the transducer. [5] CE (Controlled Connector Only) EN 50081-1:1989, commercial & light industry, EN50082-2 Heavy Industrial.

**Electro-Pneumatic I/P & E/P Transducers**

Marsh Bellofram T-2000 Dimensional Drawings

**Input Port Options**

- 1/4-18 NPT Connections
- 3/8-16 NPT Connections
- 1/2-14 NPT Connections
- 3/4-14 NPT Connections
- 1”-8 NPT Connections
- 1”-12 NPT Connections
- 1”-16 NPT Connections

**Output Port Options**

- 1/8-27 NPT Connections
- 1/4-28 NPT Connections
- 3/8-24 NPT Connections
- 1/2-19 NPT Connections
- 1”-8 NPT Connections
- 1”-12 NPT Connections
- 1”-16 NPT Connections

**Electrical Port Options**

- 0/4-20mA Connections
- 4-20mA Connections
- 20mA Connections
- 4-20mA Connections
- 20mA Connections
- 4-20mA Connections
- 20mA Connections
- 4-20mA Connections

**Pressure Range**

- 0-15 psi
- 0-30 psi
- 0-60 psi
- 0-100 psi
- 0-150 psi
- 0-200 psi
- 0-250 psi
- 0-300 psi

**Current Range**

- 4-20mA
- 0-20mA
- 0-10mA
- 0-5mA
- 0-2mA
- 0-1mA
- 0-0.5mA

**Power Supply**

- 9-32VDC
- 11-48VDC
- 48-60VDC
- 110VAC
- 220VAC

**Environmental Conditions**

- Temperature: Min 32°F / Max 122°F
- Humidity: 5-95%
- Operating Pressure: 15-30 psi
- Operating Temperature: Min 32°F / Max 122°F
- Humidity: 5-95%
- Air Flow: Up to 21 SCFM

**Usage Classifications**

- Commercial & light industry
- EN-50082-2 Heavy Industrial

**Agency Approvals**

- CSA: Class I, Division 1, Groups C & D, T4
- UL: Class 1, Division 1, Groups C & D, T4
- CE: (Controlled Connector Only) EN 50081-1:1989, commercial & light industry, EN50082-2 Heavy Industrial
- ATEX Approvals: II 1 G Ex ia IIC T4 (-II 1 G Ex ia IIC T4 (E) - 0.78)
- Factory Mutual: Class I, Division 1, Groups C & D, T3
- EEx ia IIC T4 (E)

**Mounting Options**

- In-Line
- Direct: Holes on left rear and bottom faces
- Bracket Mounting Options

**Electrical Port**

- Same as Input Port

**Output Port**

- 3/4” BSPT
- 1/2” NPT
- 1/4” NPT

**Input Port Options**

- 3/8” BSPT
- 1/2” NPT
- 1/4” NPT

**EASY ACCESS TOP COVER**

1) Isolated electronics
2) Calibration adjustments
3) Configuration switches
4) Detailed information inside of cover

**Output Port**

- Same as Input Port

**Mounting Options**

- In-Line
- Direct: Holes on left rear and bottom faces
- Bracket Mounting Options

**Integral Booster**

- 2X M3X0.5
- 4X M3X0.5
- .360 X .375 DEEP

**Pressure Range**

- 0-15 psi
- 0-30 psi
- 0-60 psi
- 0-100 psi
- 0-150 psi
- 0-200 psi
- 0-250 psi
- 0-300 psi

**Current Range**

- 4-20mA
- 0-20mA
- 0-10mA
- 0-5mA
- 0-2mA
- 0-1mA
- 0-0.5mA

**Power Supply**

- 9-32VDC
- 11-48VDC
- 48-60VDC
- 110VAC
- 220VAC

**Environmental Conditions**

- Temperature: Min 32°F / Max 122°F
- Humidity: 5-95%
- Operating Pressure: 15-30 psi
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