



Gems Model 830 Wet/Wet Differential Pressure Transducer

RETURN POLICY

Returns are accepted on stock items up to 30 days from date of order. You must contact our Returns Department for a Return Authorization (RA) number. Return the goods - freight prepaid - in the original container and include original packing slip. C. O. D. returns are not accepted. Gems reserves the right to apply restocking charges.

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Important Points

- Gems products must be maintained and installed in strict accordance with the National Electrical Code and the applicable Gems Product Instruction Bulletin that covers installation, operating and proper maintenance. Failure to observe this information may result in serious injury or damages.
- Please adhere to the pressure and temperature limitations shown throughout this bulletin. These limitations must not be exceeded. These pressures and temperatures take into consideration possible system surge pressures/temperatures and their frequencies.
- Selection of materials for compatibility with the media is critical to the life and operation of Gems products. Take care in the proper selection of materials of construction, testing is required.
- Our sensors have been designed to resist shock and vibration. However, shock and vibration should be minimized.
- Our sensors must not be field-repaired.
- Physical damage sustained by product may render it unserviceable.

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1.0 GENERAL INFORMATION

Every Model 830 has been tested and calibrated before shipment. Gems Sensors 830 pressure transducers sense differential pressure and convert this difference in pressure to a proportional high level analog output. The 830 is supplied with either a 0 to 5 VDC or 0 to 10 VDC voltage output or a current output of 4 to 20 mA.

2.0 MECHANICAL INSTALLATION

2.1 Media Compatibility

Model 830 transducers are designed to be used with any gas or liquid compatible with 17-4 PH stainless steel, 300 series stainless steel and, viton/silicone or Buna-N "O"-Rings. The optional 3-valve manifold assembly is designed to be used with gases or liquids compatible with 360 Brass, Acetal plug valves and Nitrile O-rings. Never totally submerge the unit in any liquid.

2.2 Environment

The operating temperature limits of the 830 are as follows:

- Operating Temperature Range °F (C°) 0 to +175 (-18 to +80)
- Compensated Temperature Range °F (C°) +30 to +150 (-1 to +65)

2.3 Pressure Fittings

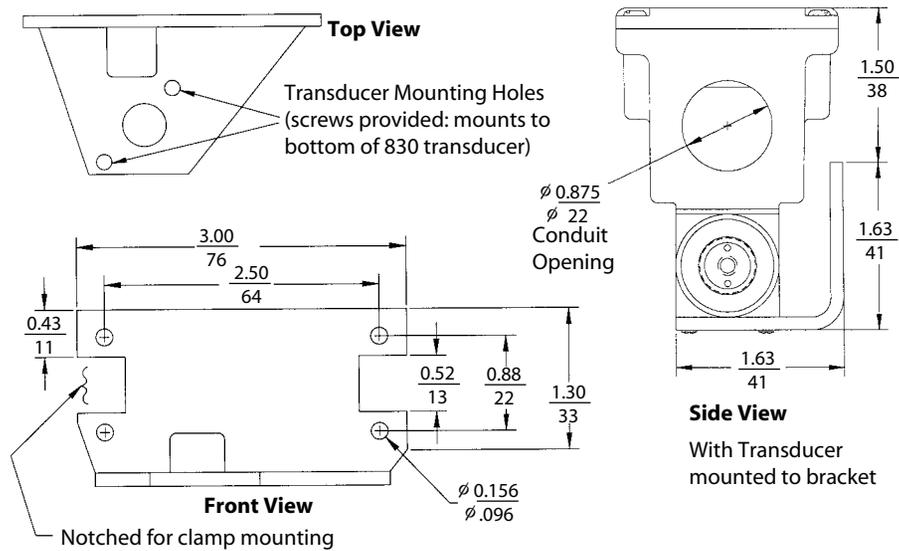
Typically, standard pipe fittings and installation procedures should be used. The Model 830 has 1/4" - 18 NPT internal fittings. The high pressure port is labeled "HIGH". The optional 3-valve manifold assembly is supplied with 1/4" - 18 NPT internal fittings.

2.4 Moisture Precautions

The Model 830 is provided with a 0.875 DIA conduit opening for electrical termination, intended for a 1/2" I.D. conduit connection. This opening must be sealed according to standard industry practice, in order to prevent moisture ingress into the Model 830.

2.5 Mounting

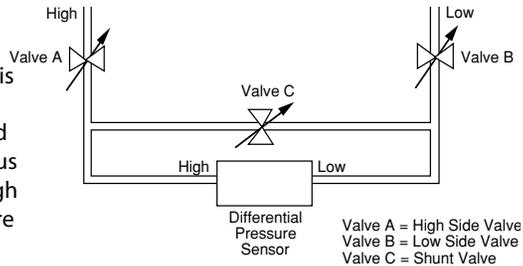
The Model 830 is supplied with a mounting bracket and two 6-32 x 3/8 hex head screws. Attach bracket to mounting location first, using holes or band clamp notches available on large section of the bracket. Attach transducer to bracket by using the two 6-32 x 3/8 hex head screws and the two tapped holes located on the underside of the transducer.



2.6 Installation Procedures

If the Model 830 is supplied with an optional 3-Valve Manifold assembly, refer to section 2.8, Optional 3-Valve Manifold Assembly Procedure, for further installation procedures. If the Model 830 is not supplied with a Gems 3-Valve manifold, the following installation procedure is recommended.

For differential pressure measurements at highline pressure (250 psig max.), it is recommended that the pressure sensor be installed with a valve in each line, plus a shunt valve across the high and low (reference) pressure ports, as shown.



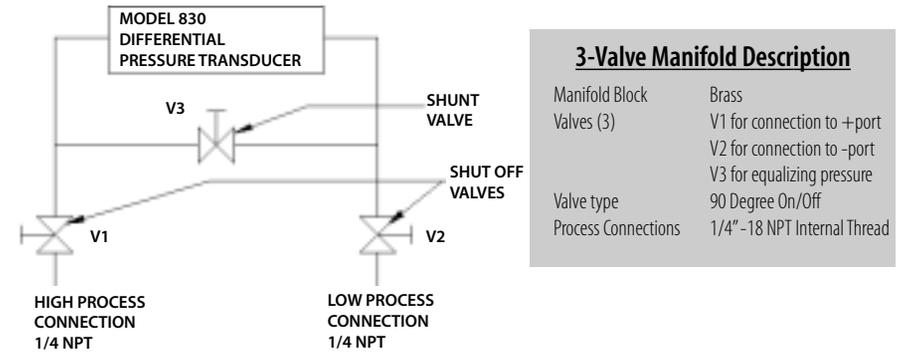
2.7 BLEEDING THE PRESSURE PORTS

3 bleed screws are on the side of the unit (2 for low pressure port, 1 for high pressure port). Install the transducer in its intended location and pressurize the ports. Back off the first bleed screw mounted on the flat side of the sensor body (2 turns max.) until liquid begins to flow out. After only bubble-free liquid flows out, retighten the bleed screw. Repeat same procedure for the second set of bleed screws located on the round section of the low pressure fitting.

Valve C should be open and Valves A and B closed whenever the system is first being wetted or pressurized. Valves A and B should then be opened slowly to avoid hammering. Valve C can then be closed and the system is operating.

When the differential pressure sensor is to be removed, Valve C must be opened first, then Valves A and B can be closed.

2.8 Optional 3-Valve Manifold Procedure



The 3-Valve Manifold Assembly is normally shipped with valves V1 and V2 closed and V3 open.

To place the Model 830 into service:

1. Confirm valves V1 and V2 are closed and valve V3 is open.
2. Mount the manifold and install process connections.
3. Slowly open V2, then V1.
4. Slowly open bleed screws on the Model 830
(see "Bleeding the Pressure Ports" section above) to bleed the lines of air.
5. Close the bleed screws on the Model 830.
6. Close V3.

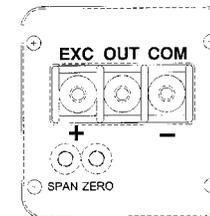
To take the Model 830 out of service:

1. Open V3 to equalize the pressure at the Model 830.
2. Close the V1 and V2.
3. Open the bleed screws on the Model 830.

3.0 ELECTRICAL INSTALLATION

To access electrical connections remove cover on top of Model 830.

Diagram 1



For voltage output, use COM, OUT and EXC terminals.

For current (4-20 mA) output, use + and - terminals.

3.1 Voltage Output Units

The Model 830 is a 3-wire circuit with three terminals available for wiring. The - Excitation and - Output are commoned on the circuit.

Input Power

The 830 can operate from either 9-30 VDC for 0-5 VDC output version or 13-30 VDC for 0-10 VDC output version.

Excitation	Connected to positive terminal of DC Power Supply
COM	Connect as the reference for power supply and output signal
OUT	Connect to positive terminal of Control or Pressure Monitor

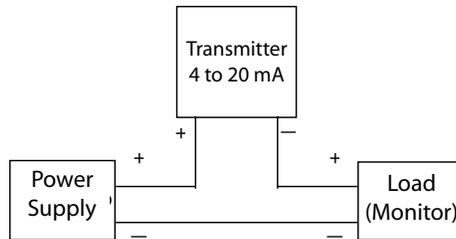
3.2 Current Output Units

Model 830 (current output) transducers are true 2-wire, 4-20 mA current output devices and deliver rated current into any external load of 0-1000 ohms. The 4-20 mA current output units are designed to have current flow in one direction only. **PLEASE OBSERVE POLARITY.**

We suggest that an electrical cable shield be connected to the system's loop circuit ground to improve electrical noise rejection.

MIN Supply Voltage: $9 + .02 \times (\text{Resistance of receiver plus line})$

MAX Supply Voltage: $30 + .004 \times (\text{Resistance of receiver plus line})$



4.0 CALIBRATION

The 830 transducer is factory calibrated and should require no field adjustment. Whenever possible, any zero and/or span offsets should be corrected by software adjustment in the user's control system. However, zero and span adjustments are made by removing the cover on the top of the 830 and the 6-32 seal screws in the plastic terminal block. Be sure to reinstall seal screws after zero and/or span adjustments. Current output transducers (4-20 mA) are factory calibrated using a 250 ohm load at 24 VDC. Zero and span adjustments are approximately 300 mV (for voltage units) and ± 1.0 mA (for current units), individually.

The 830 Series is calibrated with the diaphragm in the vertical position (pressure ports horizontal). For use in other orientations, position the unit and adjust the zero by following the calibration procedure in the previous section.

Optimal results will be achieved by using the factory calibrated position. The 830 position effect is as follows (pressure ports in vertical plane): $\pm 2\%$ per g for $\pm .5D$, $\pm 1D$, $1D$, $2D$ ranges. $\pm 1\%$ per g for all other standard ranges. There is a negative output shift with the high pressure port facing up and a positive shift in the output with the high pressure port facing down.

4.1 Voltage Output Zero Adjustment

While monitoring the voltage between the positive output (OUT) and common, and with both pressure ports open to atmosphere, the zero may be adjusted. For unidirectional pressure ranges, turn the zero adjustment screw until a reading of 0.05 VDC (± 25 mV for 0-5 VDC output or ± 50 mV for 0-10 VDC output) is achieved. For bidirectional pressure ranges, set zero to 2.550 VDC (± 25 mV) for 0-5 VDC output or 5.050 VDC (± 50 mV) for 0-10 VDC output.

4.2 Voltage Output Span Adjustment

(Complete the zero adjustment before setting span.)

Span or full scale output adjustments should only be performed by using an accurate pressure standard (electronic manometer, digital pressure gage, etc.), with at least comparable accuracy to the 830 series ($\pm 0.25\%$ full scale). With full range pressure applied to the high pressure port (reference port open to atmosphere), adjust output to 5.050 VDC (± 25 mV) or 10.050 VDC (± 50 mV).

Example 1: Unidirectional pressure range of 0 to 1 PSI
Apply 1 PSI, adjust output to 5.050 VDC (or 10.050 VDC)

Example 2: Bidirectional pressure range of $\pm .5$ PSI
Apply .5 PSI, adjust output to 5.050 VDC (or 10.050 VDC)

4.3 Current Output Zero Adjustment

While monitoring the current output, and with both pressure ports open to atmosphere, the zero may be adjusted. For unidirectional pressure ranges, turn the zero adjustment screw until a reading of 4 mA (± 0.08 mA) is achieved. For bidirectional ranges, set zero to 12 mA (± 0.08 mA).

4.4 Current Output Span Adjustment

Span or full scale output adjustments should only be performed by using an accurate pressure standard (electronic manometer, digital pressure gage, etc.), with at least comparable accuracy to the 830 series ($\pm 0.25\%$ full scale). With full range pressure applied to the high pressure port (reference port open to atmosphere), adjust span to achieve 20 mA (± 0.08 mA) output.

Example 1: Unidirectional pressure range of 0 to 1 PSI
Apply 1 PSI, adjust output to 20 mA

Example 2: Bidirectional pressure range of $\pm .5$ PSI
Apply .5 PSI, adjust output to 20 mA