

DMPR-RA001 Differential Pressure Transducer

Product Bulletin

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The DMPR-RA001 Differential Pressure Transducer is an accurate and economical solution for measuring and reporting differential pressure when used in conjunction with the AD-1250 Air Measuring Station or AD-1251 Probe with Differential Pressure Transducer.

The heart of the unit is a micro-machined single-crystal silicon piezoresistive pressure sensor. The sensor receives a five-point error correction over the compensated temperature range for excellent accuracy, repeatability, and stability. The unit comes standard in an IP66-rated enclosure with short circuit resistant outputs and reverse polarity resistant inputs to perform under real-world conditions.

The unit installs quickly by connecting standard 1/8 in. Inside Diameter (I.D.) tubing to the two pressure ports. The various output ranges and pressure ranges are all field-selectable with Dual Inline Package (DIP) switches, and the auto-zeroing process is microprocessor-controlled for simplicity.



Figure 1: DMPR-RA001 Differential Pressure Transducer

Table 1: Features and Benefits

Features	Benefits
4.5 Character LCD Screen	Displays differential pressure.
Field-Selectable Ranges	Allow selection of best input range for application.
Field-selectable Outputs	Allow matching transducer output to controller input.

Applications

This product converts the differential pressure between the low and high pressure ports to an analog output signal. Used in Building Energy Management Systems, the DMPR-RA001 transducer provides the performance necessary for proper building airflow control.

Sample Specification

Furnish and install, at locations shown on plans or as in accordance with schedules, an air measuring station pressure transducer, with integral LCD screen indicating actual differential pressure.

The transducer shall be housed in a polycarbonate enclosure that bears an IP66 rating.

The enclosure shall have a hinged cover for access to all DIP switches for field adjustment.

DIP switches shall allow for field selection of 0 to 5 VDC, 0 to 10 VDC, or 4 to 20 mA output signal.

Additionally, DIP switch settings shall accommodate field selection of a minimum of five pressure ranges from 0 to 2.5 in. W. C.

The transducer shall have an auto-zero function that is microprocessor controlled.

The transducer assembly shall contain a micro-machined, single-crystal silicon, piezoresistive pressure sensor with strain gauges to change resistance as a function of applied pressure.

Sensor shall be paired with an application-specific integrated circuit to digitally compensate for thermal sensitivity.

Accuracy of the transducer shall be $\pm 0.5\%$ on the 0 to 0.1 and ± 0.25 in. Water Column (W.C.) pressure ranges. Accuracy of the transducer shall be $\pm 0.25\%$ on all other ranges (0 to .5 in. W.C., 0 to 1.0 in. W.C., and 0 to 2.5 in. W.C.) Stability shall be $\pm 2\%$ (of span selected) per year.

Dimensions

See Figure 2 for dimensional information.

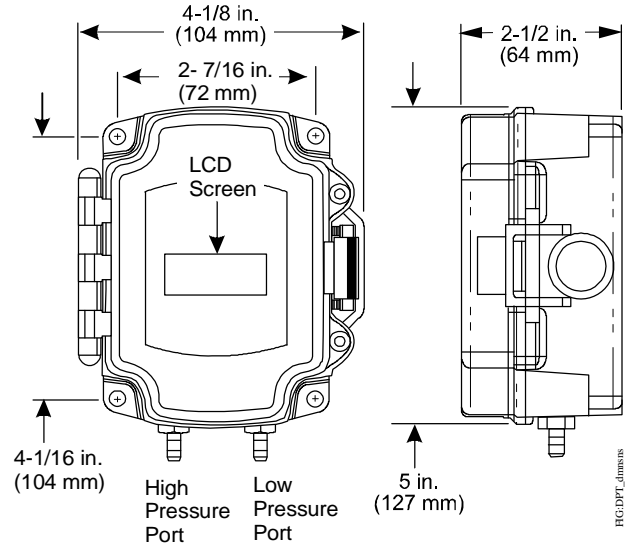


Figure 2: DMPR-RA001 Dimensions

Operation

Selecting the Pressure Range

To adjust the pressure range, set DIP switches 1 through 4, as shown in Figure 3.

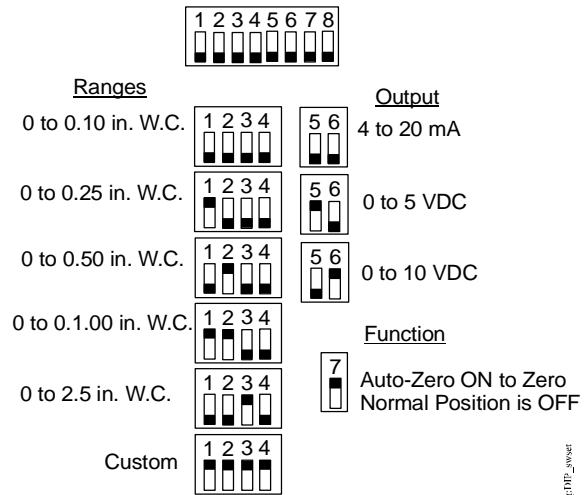


Figure 3: DIP Switch Settings for the DMPR-RA001 Transducer

Selecting the Voltage or Current Output Range

To adjust the voltage output range or to select 4 to 20 mA, set DIP switches 5 and 6 to the desired output range, as shown in Figure 3.

Using the Auto-Zero Function

To use the auto-zero function:

1. Remove the tubing from the pressure ports.
2. Use a small piece of tubing to connect the high and low pressure ports together, if possible.
3. Turn on DIP switch 7 to start the process. The LED light blinks fast and the output is forced to zero (4mA or 0 V).
4. When LED light blinks slowly, move DIP switch 7 to the off position.
5. Disconnect the tubing from Step 2, if used.
6. Reconnect the tubing from Step 1.

Wiring

There are three wires in the DPT

For 0 to 10 V:

- Red – 24 V power
- Black – Tie power and output commons
- White – Voltage out

For 4 to 20 mA - Loop Powered 2-wire

- Red = 7 to 45 VDC power +
- Black = 4 to 20 mA +
- White = Not used

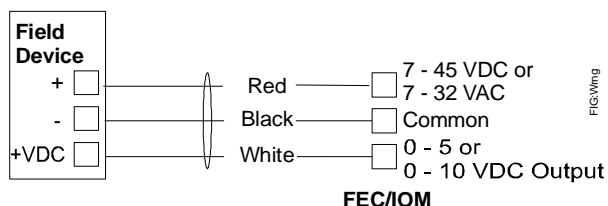


Figure 4: Three Wire Voltage Output

Output Termination

Table 2: Output Termination

Desired Output	Wire Connections
4 to 20 mA	Red (V+); Black (Return [4 to 20 mA Signal]), White (Not Used)
0 to 5 V or 0 to 10 V	Red (V+); Black (Ground), White (Output Voltage)

Two Wire Operation

Four to 20 mA is two wire operation. The red wire connects to a positive direct current voltage of 7 to 45 VDC, the black wire becomes the return of the 4 to 20 mA signal and the white wire, while unused, must be insulated from accidental contact with ground or any other potential. For 4 to 20 mA signaling, only direct current can be used to power the AMS810.

Three Wire Operation

Zero to 5 V or 0 to 10 V is three wire operation. The red wire connects to either 7 to 45 VDC or 7 to 32 VAC (0 to 5 VDC output) or 13 to 45 VDC or 13 to 32 VAC (0 to 10 VDC output), the black wire is connected to ground and the white wire is connected to an analog input of the controller. The white wire is insulated at the factory prior to shipping. Remove the connector and strip the insulation from the white wire for 0.5 V or 0 to 10 V operation.

To ensure that all wires are properly terminated, twist the stripped ends of each circuit together before inserting into the splice terminals. Gently tug on the wire after terminating to ensure a good connection. If the wire comes out of the termination repeat the splice procedure.

Selection

See Table 3 for ordering information.

Table 3: Ordering Information

Product Code Number	Description
DMPR-RA001	Differential Pressure Transducer

Repair Information

If the DMPR-RA001 Differential Pressure Transducer fails to operate within its specifications, replace the unit. For a replacement DMPR-RA001 Transducer, contact the nearest Johnson Controls® representative.

Technical Specifications

DMPR-RA001 Differential Pressure Transducer

Housing	Hinged, 4 x 5 x 2-1/2 in. IP-66 rated
Pressure Port Fittings	Barbed brass, accepts 1/8 in. or 5/32 in. I.D. tubing
Sensor	Micro-machined, single-crystal silicon, piezoresistive
LCD Screen	4.5 character, displays actual differential pressure
Field-Selectable Output Ranges	4 to 20 mA, 0 to 5 VDC, or 0 to 10 VDC
Power Requirements	7 to 45 VDC (4 to 20 mA output) 7 to 45 VDC or 7 to 32 VAC (0 to 5 VDC output) 13 to 45 VDC or 13 to 32 VAC (0 to 10 VDC output)
Power Consumption	4.9 mA maximum DC at 0 to 5 VDC or 0 to 10 VDC output 0.12 VA maximum AC at 0 to 5 VDC or 0 to 10 VDC output 20 mA maximum, DC only at 4 to 20 mA output
Field-Selectable Ranges, in. W.C.	Unidirectional: 0 to 0.1, 0 to 0.25, 0 to 0.50, 0 to 1.0, 0 to 2.5
Bi-Directional	Special order only
Accuracy	±0.5% on 0 to 0.1 and ±0.1 in. W.C. range ±0.5% on 0 to 0.25, in. W.C. range ±0.25% on all other ranges
Auto-Zero Function	Microprocessor-controlled
Temperature Limits	Storage: -40 to 203°F (-40 to 95°C) Operational: 32 to 140°F (-0 to 60°C) Compensated: 50 to 104°F (10 to 40°C)
Temperature Error	±2% of Span max (±1.0 in W.C. at 50 to 104°F)
Operating RH Range	0 to 95% RH, noncondensing
Overpressure	Proof 27.68 in W.C. (1 PSI), Burst 41.52 in W.C. (1.5 PSI)
Wiring	4 to 20 mA two wire (Current loop) or three wire (AC or DC powered, Voltage out)

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.



Building Efficiency

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