

MODEL DT

Pressure Display Transmitter Low Differential Pressure

The Model DT is a low differential pressure transmitter which combines in one enclosure a transmitter and a display (see Fig.1). A choice of linear or square root output is available for the measurement and display of pressure or velocity. It is typically used for the monitoring of clean-room pressures, duct static and velocity pressures; as well as filter differential, draft, fume hood and other low pressure applications.

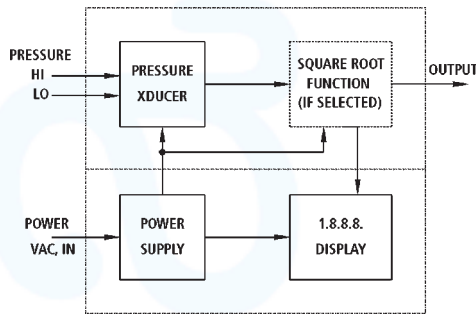


Fig.1 - Block diagram.

DESCRIPTION

The pressure sensing element is a differential capacitance cell for pressure measurements ranging from 0.1 to 5.0 inches of water (25 Pa to 1.0 kPa), or a piezoresistive (silicon) sensor for pressures from 5 inches of water to 30 PSI (1.0 kPa to 200 kPa).

The display section has 3 1/2 digits with bright, easy to read LEDs. The display is factory-calibrated to read in engineering units.

The transmitter section is offered with a linear or a square-root output of 4-20 mA, 0-5 Vdc or 0-10 Vdc.

Barb fittings and pluggable terminals with screw clamps are provided at the rear for quick and simple field connections.

SPECIFICATIONS

Accuracy

1. Linear output:

Accuracy of reading: standard $\pm 1.0\%$ of span + 1 digit (including non-linearity & hysteresis).

Transmitter accuracy: $\pm 1.0\%$ of span (including non-linearity & hysteresis)

2. Square root output:

Accuracy of reading: $\pm 1.0\%$ of span + 1 digit from 7 to 100% of velocity range no velocity reading below 7% (including non-linearity & hysteresis)

Transmitter accuracy: $\pm 1\%$ of span + 1 digit from 7 to 100% of output; no output below 7% (including non-linearity & hysteresis)

Warmup time: 5 minutes to rated accuracy

Power

Power requirements: 21 - 32 Vac 50/60 Hz 105-135 Vac 50/60 Hz or 210-265 Vac 50/60 Hz

Power consumption: 2.5 VA

Electrical connections: non-interchangeable power and signal plugs with #4-40 screw clamps; wire range is 14-22 AWG



Pressure Transmitter

Measures differential, gage pressure or vacuum

Medium: Air or inert gases

Standard pressure and velocity ranges: See reference tables D and E

Maximum safe momentary overpressure: See reference tables D and E

Zero & span adjustments: 15-turn potentiometers accessible behind red front filter.

Port connections: 3/16" (4.75 mm) Dia. suitable for 1/8" or 5/32" I.D Tygon™ or polyurethane tubing; 1/4" O.D. polyethylene tubing

Air filter at both ports

Display

Display: 3 1/2 digits 7 segments orange-red LEDs 0.56" (14.2 mm) high decimal point factory-programmable to 4 positions (1.8.8.8.)

Conversion rate: 3 readings/sec

Polarity: Automatic, no positive sign "-" negative sign

Overrange indication: Beyond 1999 display shows "1"

Zero & span adjustments: 15-turn potentiometers accessible behind red front filter

Output

4-20 mA: Maximum loop resistance is 550 Ohms sourcing (no external power supply required to power the loop)

0-5 Vdc or 0-10 Vdc: 5 mA maximum current, sinking or sourcing

Environmental

Operating temperature: 0°C to 52°C (32°F to 125°F)

Storage temperature: -40°C to 85°C (-40°F to 185°F)

Relative humidity: 0 to 90% non-condensing

Effect of temperature: $\pm 0.05\%/^{\circ}\text{C}$ signal or reading

Physical

Dimensions: 1/8 DIN case (see drawing).

Case material: Glass reinforced NORYL™ rated UL94V-1

Weight: 1.0 Lb (465 g)

WIRING DIAGRAM

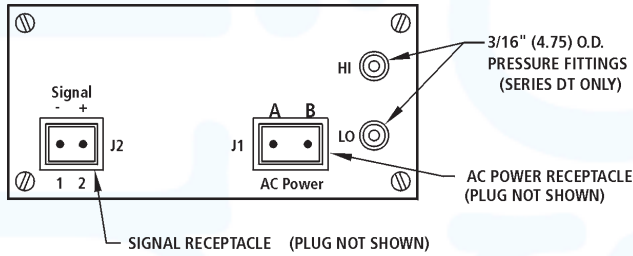


Fig. 2 Rear panel connections

Figure 2 is a view of the rear panel of the transmitter with the high and low pressure ports, the power receptacle J1 (with terminals labeled A & B) and the signal output receptacle J3 (with terminals).

ORDERING INFORMATION

Order Number (See Table below and Reference Tables D and E on pages 27 and 28)

DT - PS - IP - O - SO

EXAMPLE: DT - 1 - 13P - B - 10L

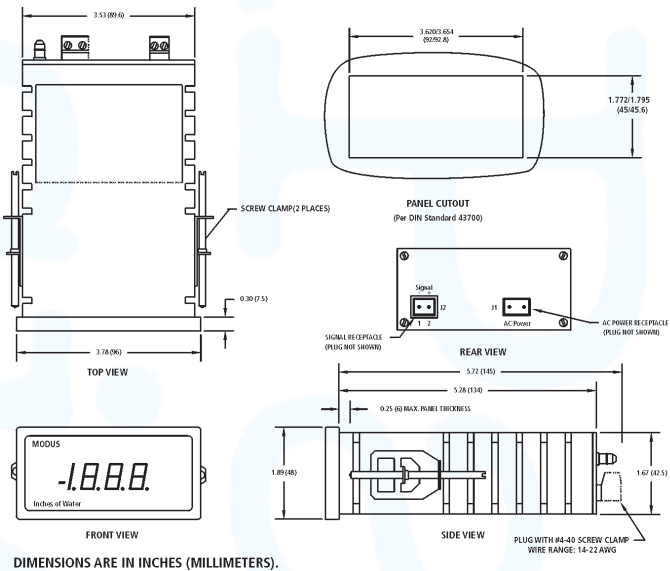
| PS = Power Supply | IP = Input Pressure | O = Offset (See Notes) | SO = Signal Output |
|--|--|---|---|
| 1 = 120 Vac, 50/60 Hz 2 = 240 Vac, 50/60 Hz 3 = 24 Vac, 50/60 Hz | See Table D for English or metric, or Table E for English or metric velocity (square root outputs) | 0 = No offset A = 1/4 offset B = 1/2 offset * Offset is not available on units with square root output | 05L = 0 to 5 Vdc 10L = 0 to 10 Vdc MAL = 4 to 20 mA. 05S = 0 to 5 Vdc square root 10S = 0 to 10 Vdc square root MAS = 4 to 20 mA square root |

NOTES

Offset

If the transmitter must operate when a reversal of pressure occurs, then an offset must be specified. To order a transmitter with offset zero, estimate the maximum positive pressure excursion needed and select the appropriate pressure range from Table D. Then estimate the maximum negative pressure excursion. If the negative excursion is about equal to the positive excursion, specify "B" offset. If the maximum negative excursion is less than half of the positive excursion, specify an "A" offset.

"0" No offset. At zero differential pressure, the output signal is:
4mA (4 to 20mA range),
0V (0 to 5V range),
0V (0 to 10V range).
Pressure excursion: 0% to 100% of Range, see Table A.



DIMENSIONS ARE IN INCHES (MILLIMETERS).

"A" 1/4 span offset. At zero differential pressure, the output signal is:
8mA (4 to 20mA range),
1.25V (0 to 5V range),
2.5V (0 to 10V range).

Pressure excursion: -33% to 100% of Range, see Table A.

"B" 1/2 span offset. At zero differential pressure, the output signal is:
12mA (4 to 20mA range),
2.5V (0 to 5V range),
5V (0 to 10V range).

Pressure excursion: -100% to 100% of Range, see Table A.

* Offset is not available on units with square root output
When ordering a Model DT transmitter, supply the following four fields:
power supply, input pressure, offset and signal output. A typical part number may look as follows:
DT-1-13P-B-10L

TABLE D—STANDARD PRESSURE RANGES**English Units**

| Pressure Code (1) | Pressure Range | Displayed Units (2) | Resolution | Maximum Overpressure |
|-------------------|---|---------------------|------------|----------------------|
| 01E | 0-0.1 in. H ₂ O | .100 | 0.001" | 5.0" |
| 02E | 0-0.2 in. H ₂ O | .200 | 0.001" | 5.0" |
| 04E | 0-0.5 in. H ₂ O | .500 | 0.001" | 5.0" |
| 05E | 0-1.0 in. H ₂ O | 1.000 | 0.001" | 20.0" |
| 06E | 0-2.0 in. H ₂ O | 1.999 | 0.001" | 20.0" |
| 08E | 0-5.0 in. H ₂ O | 5.00 | 0.01" | 5 psid |
| 09E | 0-10.0 in. H ₂ O | 10.00 | 0.01" | 5 psid |
| 11E | 0-20.0 in. H ₂ O | 19.99 | 0.01" | 5 psid |
| 15E | 0-1 psid | 1.000 | 0.001"psid | 15 psid |
| 16E | 0-2 psid | 1.999 | 0.001"psid | 15 psid |
| 17E | 0-3 psid | 3.00 | 0.01"psid | 15 psid |
| 18E | 0-5 psid | 5.00 | 0.01"psid | 15 psid |
| 19E | 0-15 psid | 15.00 | 0.01"psid | 30 psid |
| 20E | 0-30 psid | 30.0 | 0.1"psid | 60 psid |
| **E | Contact factory for other pressure ranges, displayed units and resolution | | | |

Metric Units, millimeters of water

| Pressure Code (1) | Pressure Range | Displayed Units (2) | Resolution | Maximum Overpressure |
|-------------------|---|---------------------|------------|----------------------|
| 01M | 0-2.50 mm H ₂ O | 2.50 | 0.01 mm | 125 mm |
| 02M | 0-5.00 | 5.00 | 0.01 mm | 125 mm |
| 04M | 0-10.0 | 10.00 | 0.01 mm | 125 mm |
| 05M | 0-25.0 | 25.0 | 0.1 mm | 500 mm |
| 06M | 0-50.0 | 50.0 | 0.1 mm | 500 mm |
| 08M | 0-100 | 100.0 | 0.1 mm | 3.5 m |
| 09M | 0-250 | 250 | 1.0 mm | 3.5 m |
| 11M | 0-500 | 500 | 1.0 mm | 3.5 m |
| 13M | 0-1.00 meter | 1.000 | .001 meter | 10 m |
| 14M | 0-2.50 meter | 2.50 | .01 meter | 10 m |
| 15M | 0-5.00 meter | 5.00 | .01 meter | 10 m |
| 16M | 0-10.0 meter | 10.00 | .01 meter | 20 m |
| 17M | 0-20.0 meter | 19.99 | .01 meter | 40 m |
| **M | Contact factory for other pressure ranges, displayed units and resolution | | | |

Metric Units, pascals

| Pressure Code (1) | Pressure Range | Displayed Units (2) | Resolution | Maximum Overpressure |
|-------------------|---|---------------------|------------|----------------------|
| 01P | 0-25 Pa | 25.0 | 0.1 Pa | 1.25 kPa |
| 02P | 0-50 Pa | 50.0 | 0.1 Pa | 1.25 kPa |
| 04P | 0-100 Pa | 100.0 | 0.1 Pa | 1.25 kPa |
| 05P | 0-250 Pa | 250 | 1 Pa | 5.0 kPa |
| 06P | 0-500 Pa | 500 | 1 Pa | 5.0 kPa |
| 08P | 0-1.0 kPa | 1.000 | 1 Pa | 35 kPa |
| 09P | 0-2.5 kPa | 2.50 | 10 Pa | 35 kPa |
| 11P | 0-5.0 kPa | 5.00 | 10 Pa | 35 kPa |
| 13P | 0-10 kPa | 10.00 | 10 Pa | 100 kPa |
| 14P | 0-25 kPa | 25.0 | 100 Pa | 100 kPa |
| 15P | 0-50 kPa | 50.0 | 100 Pa | 100 kPa |
| 16P | 0-100 kPa | 100.0 | 100 Pa | 200 kPa |
| 17P | 0-200 kPa | 199.9 | 100 Pa | 400 kPa |
| **P | Contact factory for other pressure ranges, displayed units and resolution | | | |

(1) Use this code when ordering.

(2) This column shows the number of digits that are displayed and the position of the decimal point.

TABLE E**Velocity Ranges, feet per minute**

| Pressure Code (1) | Pressure Range | Velocity Range | Displayed Units (2) | Resolution | Maximum Overpressure |
|-------------------|---|-----------------|---------------------|------------|---------------------------|
| capacitance cell | | | | | |
| 01F | 0-0.1 in. H ₂ O | 90 - 1266 fpm | 1.27 | 10 fpm | 5.0 in. H ₂ O |
| 02F | 0-0.2 in. H ₂ O | 125 - 1791 fpm | 1.80 | 10 fpm | 5.0 in. H ₂ O |
| 04F | 0-0.5 in. H ₂ O | 200 - 2832 fpm | 2.83 | 10 fpm | 5.0 in. H ₂ O |
| 05F | 0-1.0 in. H ₂ O | 280 - 4005 fpm | 4.00 | 10 fpm | 20.0 in. H ₂ O |
| 06F | 0-2.0 in. H ₂ O | 400 - 5664 fpm | 5.66 | 10 fpm | 20.0 in. H ₂ O |
| 08F | 0-5.0 in. H ₂ O | 4625 - 8955 fpm | 8.96 | 10 fpm | 50.0 in. H ₂ O |
| 09F | 0-10.0 in. H ₂ O | 885 - 12665 fpm | 12.7 | 100 fpm | 50.0 in. H ₂ O |
| **F | Contact factory for other pressure or velocity ranges, displayed units and resolution | | | | |

1. Use this code when ordering.

2. The velocities are accurate for dry air at standard conditions (air density of 0.075 lb/ft³; barometric pressure of 29.92 inches of mercury and temperature of 70°F). It is also assumed that standard pitot tubes similar to those described in the accessory bulletin are used. The velocities are derived from the following formula:

$$V = 4005 \sqrt{H_v} \quad \text{Where: } V \text{ is air velocity in feet per minute}$$

$$H_v \text{ is velocity pressure in inches of water}$$

Velocity Ranges, meters per second

| Pressure Code (1) | Pressure Range | Velocity Range | Displayed Units (2) | Resolution | Maximum Overpressure |
|-------------------|---|----------------|---------------------|------------|----------------------|
| capacitance cell | | | | | |
| 01V | 0-2.5 mm H ₂ O | 0.45 - 6.4 m/s | 6.50 | 0.01 m/s | 125 mm |
| 02V | 0-5.0 mm H ₂ O | 0.63-9 m/s | 9.00 | 0.01 m/s | 125 mm |
| 04V | 0-10.0 mm H ₂ O | 0.90 - 13 m/s | 13.0 | 0.1 m/s | 125 mm |
| 05V | 0-25.0 mm H ₂ O | 1.4 - 20 m/s | 20.0 | 0.1 m/s | 500 mm |
| 06V | 0-50.0 mm H ₂ O | 2.0 - 29 m/s | 29.0 | 0.1 m/s | 500 mm |
| 08V | 0-100 mm H ₂ O | 2.8 - 40 m/s | 40.0 | 0.1 m/s | 1250 mm |
| 09V | 0-250 mm H ₂ O | 4.5 - 64 m/s | 64.0 | 0.1 m/s | 1250 mm |
| **V | Contact factory for other pressure or velocity ranges, displayed units and resolution | | | | |

1. Use this code when ordering.

2. The velocities are accurate for dry air at standard conditions (air density of 1.201 kg/m³; barometric pressure of 760 mm of mercury and temperature of 21°C). It is also assumed that standard pitot tubes similar to those described in the accessory bulletin are used. The velocities are derived from the following formula:

$$V = 4.037 \sqrt{H_v} \quad \text{Where: } V \text{ is air velocity in meters per second}$$

$$H_v \text{ is velocity pressure in millimeters of water}$$