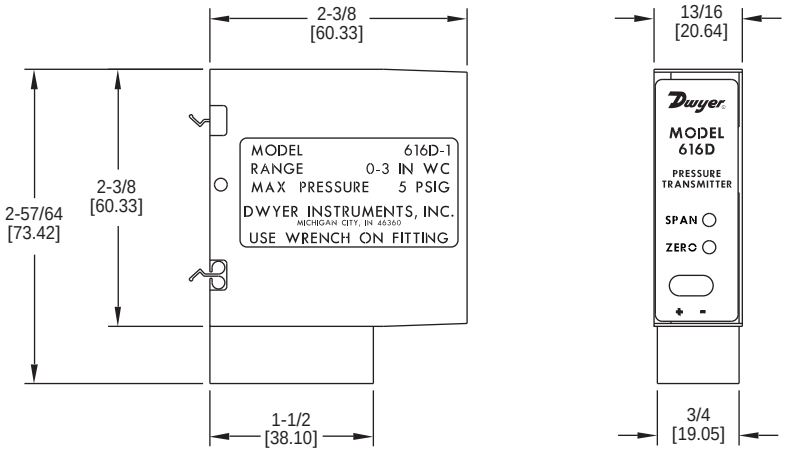
Series 616D DIN Rail Differential Pressure Transmitter

Specifications – Installation and Operating Instructions



The Series 616D Differential Pressure Transmitter senses the pressure of air and compatible gases and sends a standard 4-20 mA output signal. The 616D housing is specifically designed to mount on a 35 mm DIN rail in a panel. This mounting style allows for several units to be mounted closely together reducing required space. A wide range of models are available factory calibrated to specific ranges as listed in the chart below. The span and zero controls are for use when checking calibration. They are not intended for re-ranging to a significantly different span. Versatile circuit design enables operation in 2-wire current loops.

For applications requiring direct pressure readings or percent of full span output, the optional Model A-701 Digital Readout makes an ideal companion device. It provides a bright red 0.6″ high, 3-1/2 digit LED display while supplying power to the Series 616D transmitter. For additional information on these and other transmitters, see the Dwyer Instruments, Inc. full line catalog.

Series 616D Transmitter Models and Ranges

Model	Range	Max. Press.	Model	Range	Max. Press.
616D-1	0-3 in w.c.	2 psig	**616D-10**	0-30 psid	58 psig
616D-2	0-6 in w.c.	5 psig	**616D-11**	0-50 psid	150 psig
616D-3	0-10 in w.c.	5 psig	**616D-12**	0-100 psid	150 psig
616D-4	0-20 in w.c.	11 psig	**616D-13**	0-12 ft w.c.	29 psig
616D-5	0-40 in w.c.	11 psig	**616D-14**	0-20 ft w.c.	29 psig
616D-6	0-100 in w.c.	29 psig	**616D-3B**	1.5-0-1.5 in w.c.	2 psig
616D-7	0-200 in w.c.	29 psig	**616D-6B**	3-0-3 in w.c.	5 psig
616D-8	0-10 psid	29 psig	**616D-10B**	5-0-5 in w.c.	5 psig
616D-9	0-20 psid	58 psig	**616D-20B**	10-0-10 in w.c.	11 psig

SPECIFICATIONS
Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Accuracy: ±0.25% F.S. at 70°F.
Stability: ±1% F.S./yr.
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).
Pressure Limits: See chart.
Thermal Effect: ±0.055% F.S./°F (0.099% F.S./°C).
Power Requirements: 10-35 VDC (2 wire).
Output Signal: 4 to 20 mA.
Zero and Span Adjustments: Potentiometers for zero and span.
Loop Resistance: DC: 0-1250 ohms maximum.
Current Consumption: DC: 38 mA maximum.
Electrical Connections: Screw-type terminal block.
Process Connections: 1/8″ female NPT. Accessories included are 2 barbed fittings for 1/8″ (3.12 mm) and 3/16″ (4.77 mm) I.D. rubber or vinyl tubing.
Mounting Orientation: Vertical, on a 1.378″ (35 mm) DIN rail.
Weight: 4.8 oz (136 g).

INSTALLATION

1. Location
Select a clean, dry mounting location free from excess vibration where the temperature will remain between 20 and 120°F (-6.7 and 48.9°C). Distance from the receiver is limited only by total loop resistance. See Electrical Connections below. The tubing supplying pressure to the instrument can be practically any length required, but long lengths will increase response time slightly.

2. Position
A vertical position, with pressure connections pointing down, is recommended. That is the position in which all standard models are spanned and zeroed at the factory. They can be used at other angles, but final spanning and zeroing must be done while transmitter is in that alternate position.

Pressure Connections
Two integral barbed tubing connections are provided. They are dual-sized to fit both 1/8″ and 3/16″ (3.12 and 4.76 mm) I.D. tubing. Be sure the pressure rating of the tubing exceeds that of the operating ranges.

ELECTRICAL CONNECTIONS

CAUTION: Do not exceed specified supply voltage ratings. Permanent damage not covered by warranty will result. This unit is not designed for 120 or 240 volts AC line operation.

Electrical connections are made to the terminal block located in front of the transmitter. Terminals are marked + and - (See Figure B below).

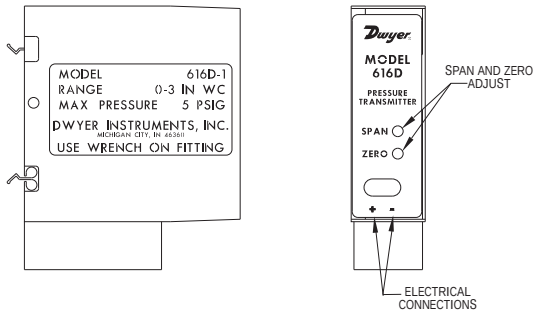


Figure B

Wire Length

The maximum length of wire connecting transmitter and receiver is a function of wire size and receiver resistance. Wiring should not contribute more than 10% of the receiver resistance to total loop resistance. For extremely long runs (over 1000 feet), choose receivers with higher resistance to minimize size and cost of connecting leads. Where wiring length is under 100 feet, hook-up wire as small as 22 AWG can be used.

2-Wire Operation

An external power supply delivering 10-35 VDC with minimum current capability of 40 mA DC (per transmitter) must be used to power the control loop. *See Figure C for connection of the power supply, transmitter and receiver.* The range of appropriate receiver load resistance (R_L) for the DC power supply voltage available is expressed by the formula and graph in *Figure D.* Shielded two wire cable is recommended for control loop wiring. If grounding is required, use the negative side of the control loop after the receiver. Otherwise, in 2-wire operation it is not necessary to observe polarity of control loop connections.

2-Wire Connections

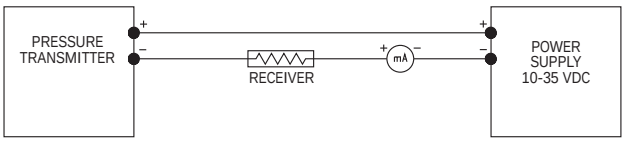


Figure C

Power Supply Voltage – VDC (2-wire)

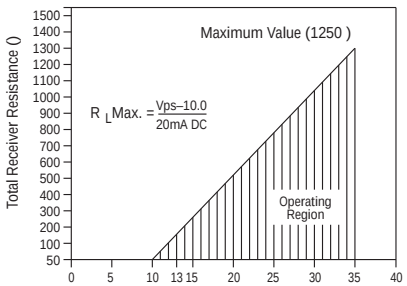


Figure D

Calibration Check

Each Series 616D Transmitter is factory calibrated to the range given in the model chart. To check calibration and adjust if necessary, the following procedure should be used. For purposes of clarification in these instructions, range is defined as that pressure which, applied to the transmitter, produces 20 milliamps of current in the loop. Zero pressure is always assumed to be 4 milliamps.

1. With the transmitter connected to the companion receiver, insert an accurate milliameter in series with the current loop. The milliameter full scale range should be 30 mA or greater.
2. Connect a controllable pressure source to one leg of a tee with the other two legs connected to the high pressure port of the transmitter and the third leg to an accurate test gage or manometer, in an appropriate range. The low pressure port should be vented to atmosphere. Calibration must be performed with the unit in the same position in which it will be mounted.
3. Apply electrical power to the unit and allow it to stabilize for 10 minutes.
4. With no pressure applied to the transmitter, adjust ZERO control so that loop current is 4 mA. See Figure B.
5. Apply full range pressure and adjust loop current to 20 mA using SPAN control. See Figure B.
6. Relieve pressure and allow transmitter to stabilize for 2 minutes.
7. Zero and span controls are slightly interactive, so repeat steps 4 through 6 until zero and full range pressures consistently produce currents of 4 and 20 mA respectively.
8. Remove the milliameter from the current loop and proceed with final installation of the transmitter and receiver.

Voltage Input

Series 616D Transmitters can be easily adapted for receivers requiring 1-5 or 2-10 VDC inputs. Insert a 249 ohm, (1-5 VDC) or 499 ohm (2-10 VDC) resistor of the proper power rating in series with the current loop but in parallel with the receiver input. Locate this resistor as close as possible to the input. Because resistor accuracy directly influences output signal accuracy, we recommend use of a precision ±0.1% tolerance resistor to minimize this effect.

MULTIPLE RECEIVER INSTALLATION

An advantage of the standard 4-20 mA DC output signal produced by the Series 616D Transmitter is that any number of receivers can be connected in series in the current loop. Thus, an A-701 Digital Readout, an analog panel meter, a chart recorder, process controlling equipment or any combination of these devices can be operated simultaneously. The only requirement is that each component be equipped for a standard 4-20 mA input and the proper polarity of the input connections be observed when inserting the device in the current loop. If any of the units display a negative or downscale reading, the signal input leads are reversed.

MAINTENANCE

Upon final installation of the Series 616D Differential Pressure Transmitter and the companion receiver, including the A-701 Digital Readout, no routine maintenance is required. A periodic check of the system calibration is recommended following the procedures explained under *Calibration Check.* The Series 616D Transmitter is not field serviceable and should be returned, freight prepaid, to the factory if repair is required. Please enclose a description of the problems encountered plus any available application information. The A-701 should be returned directly to its manufacturer for service. See the A-701 instructions for address.

Printed in U.S.A. 6/10 FR# 01-443269-00 Rev. 2