



# Series 616KD-LR Low Range Differential Pressure Transmitter

## Specifications - Installation and Operating Instructions

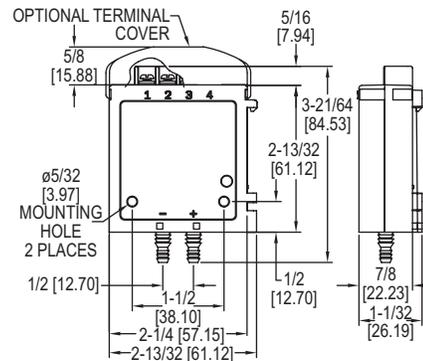
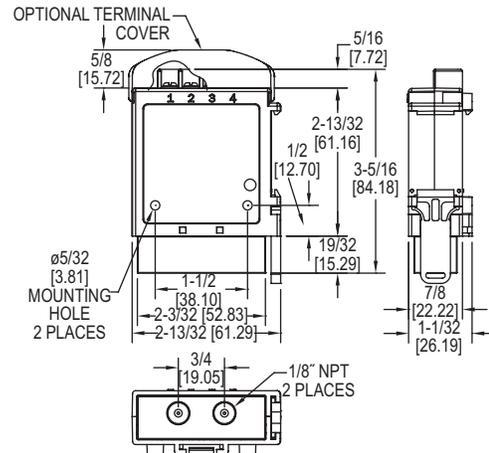


NPT Connection Block



Integral DIN Rail Mounting Kit

Digital push buttons set both zero and span



The **SERIES 616KD-LR** Low Range Differential Pressure Transmitter senses the pressure of air and compatible gases and sends a standard 4 to 20 mA and simultaneous voltage output signal. A wide range of models are available factory calibrated to specific ranges including low ranges down to 0.1 in w.c. (25 Pa). New enclosure enables the 616KD-LR to be mounted on a 35 mm DIN rail either via its side or back DIN rail clips. The 1/8" NPT process connection is also available in the Series 616KD-LR.

### INSTALLATION

#### 1. Location

Select a clean, dry mounting location free from excess vibration where the temperature will remain between 20 and 122°F (-6.7 and 50°C). 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 calibrated at the factory. Consult factory for other position orientations.

#### 3. 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. The 1/8" NPT process connection is available as an option as well.

#### 4. 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 on the top of the transmitter. Terminals are marked 1, 2, 3 and 4 as shown below. Determine which of the following circuit drawings applies to your application and wire accordingly. Shielded cable is recommended. Ground the shield at the power supply end only.

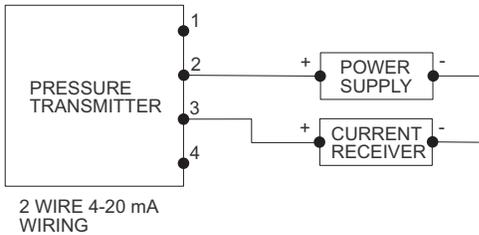
### SPECIFICATIONS

- Service:** Air and non-combustible, compatible gases.
- Wetted Materials:** Consult factory.
- Accuracy:** ±0.25% FS for ±0.4" (100 Pa) and ±0.5" (125 Pa), ±0.5% FS for ±0.25" (60 Pa), and ±1% FS for ±0.1" (25 Pa).
- Stability:** ±1% / year FSO.
- Temperature Limits:** 0 to 140°F (-17.8 to 60°C).
- Pressure Limits:** 1 psi max., operation; 10 psi burst.
- Power Requirements:** 10 to 35 VDC (2 wire), 17 to 36 VDC or isolated 21.6 to 33 VAC (3 wire).
- Output Signal:** 4 to 20 mA (2-wire), 0 to 5 VDC, 0 to 10 VDC (3-wire).
- Response Time:** 2.5 Hz sample rate.
- Zero and Span Adjustments:** Push button.
- Loop Resistance:** Current Output: 0 to 1250Ω max; Voltage Output: Min. load resistance 1kΩ.
- Current Consumption:** 40 mA max.
- Electrical Connections:** Screw-type terminal block.
- Process Connections:** Barbed, dual size to fit 1/8" & 3/16" (3 mm & 5 mm) ID rubber or vinyl tubing, or 1/8" NPT.
- Enclosure Rating:** NEMA1 (IP20).
- Mounting Orientation:** Vertical with pressure connections pointing down.
- Weight:** 1.8 oz (51 g).
- Agency Approvals:** CE.

### 2-Wire 4 to 20 ma Current Operation

**CAUTION** DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. SIMULTANEOUS OUTPUTS ARE NOT DESIGNED FOR AC VOLTAGE OPERATION.

The connections to the transmitter are made through terminals 2 and 3 on the terminal block as shown in Figure 2. The terminal block is removable and each of the terminals are labeled underneath the terminal block on the circuit board.



The range of appropriate receiver load resistances ( $R_L$ ) for the power supply voltage available is given by the formula listed below. Shielded 2-wire cable is recommended for control loop wiring. Ground the shield at the power supply end only.

**NOTICE** The receiver may be connected to either the negative or positive side of the loop, whichever is most convenient. Should polarity of the transmitter or receiver be inadvertently reversed, the loop will not function properly but no damage will be done to the transmitter.

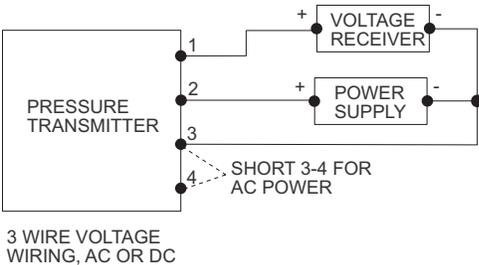
$$R_L = \frac{V_{ps} - 10.0}{20 \text{ mA DC}}$$

The maximum length of connecting wire between the transmitter and the receiver is a function of wire size and receiver resistance. That portion of the total current loop resistance represented by the resistance of the connecting wires themselves should not exceed 10% of the receiver resistance. For extremely long runs (over 1,000 feet), it is desirable to select receivers with lower resistances in order to keep the size and cost of the connecting leads as low as possible. In installations where the connecting run is no more than 100 feet, connecting lead wire as small as No. 22 ga. can be used.

### 3-Wire 0 to 10 V or 0 to 5V Voltage Operation

**CAUTION** DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT.

The connection to the transmitter are made to Terminals 1, 2, and 3 on the terminal block as shown in Figure 3. The terminal block is removable and each of the terminals are labeled underneath the terminal block on the circuit board. When connecting using a DC power source, make sure the AC/DC selection jumper is not present. If the polarity of the transmitter is inadvertently reversed, the unit will not function properly, but no damage will be done to the transmitter. When connecting to an AC power source, short terminals 3 and 4. Either lead of the supply power may be connected to PWR and COM without affecting the operation of the transmitter or damage to the transmitter.

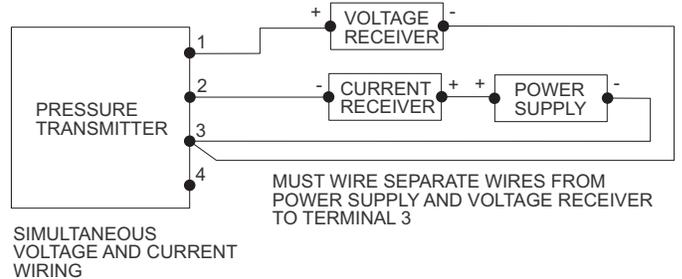


The minimum receiver load is 1K  $\Omega$ . The resistance due to the wire should be low compared to the receiver load resistance. While the voltage at the terminal block remains unchanged with a 10 mA current flow, resistive losses in the wiring do cause errors in the voltage delivered to the receiver. For a 1% accurate gauge, the resistance of the wires should be less than 0.1% of the value of the receiver load resistance. This will keep the error caused by the current flow below 0.1%.

### Simultaneous Current and Voltage Operation

**CAUTION** DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. SIMULTANEOUS OUTPUTS ARE NOT DESIGNED FOR AC VOLTAGE OPERATION.

The connection to the transmitter are made to Terminals 1, 2, and 3 on the terminal block as shown in Figure 4. The terminal block is removable and each of the terminals are labeled underneath the terminal block on the circuit board. The AC/DC selection jumper should be set for DC operation. The voltage output and the power supply must have separate wire leads that are only joined at terminal 2 of the transmitter. Additional error may occur for the voltage output if a single wire is used or if the wires are joined at the power supply or receiver.



For the current output, the maximum allowable loop resistance (wiring + receiver resistance) is dependent on the power supply. The maximum loop voltage drop must not reduce the transmitter voltage below 17 V. The maximum loop resistance can be calculated using the following equation:

$$R_{MAX} = (VPS - 17.0) / 0.02$$

Where VPS is the power supply voltage

The equation uses 17.0 instead of 10.0 used in current only equation. This represents the minimum voltage supply which is higher on the simultaneous output configuration due to the requirements of the voltage outputs.

Shielded 4-wire cable is recommended for control loop wiring. Ground the shield at the power supply end only. Should the polarity of the transmitter or receiver be inadvertently reversed, the unit will not function properly, but no damage will be done to the transmitter.

For voltage outputs, the minimum receiver load is 1K  $\Omega$ . The resistance due to the wire should be low compared to the receiver load resistance. While the voltage at the terminal block remains unchanged with a 10 mA current flow, resistive losses in the wiring do cause errors in the voltage delivered to the receiver. For a 1% accurate gauge, the resistance of the wires should be less than 0.1% of the value of the receiver load resistance. This will keep the error caused by the current flow below 0.1%.

**NOTICE** There is a 5 second delay from the time the zero or span calibration buttons is released until the time that the change in calibration takes place. This delay is used to prevent stress related offsets on the lower ranges.

### ZERO ADJUSTMENT

A single push button is provided to zero the transmitter. Allow transmitter to warm up for 20 minutes. The zero calibration can be set by applying zero pressure to both the pressure ports and pressing the zero button for 3 seconds.

### SPAN ADJUSTMENT

The span calibration can be adjusted only after setting the zero adjustment. It must be completed within 5 minutes of the last zero calibration. The span calibration button will be ignored until the zero calibration is completed. Apply pressure to the ports of the transmitter that is associated with the maximum output of the transmitter (20 mA, 5 V, or 10 V depending on output being used). Press and hold the span button for 3 seconds. On bi-directional models, separate spans can be performed on the positive and negative sides of the range.

### MAINTENANCE/REPAIR

Upon final installation of the Series 616KD no routine maintenance is required. The Series 616KD is not field serviceable and should be returned if repair is needed. Field repair should not be attempted and may void warranty.

### WARRANTY/RETURN

Refer to "Terms and Conditions of Sales" in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.