

## Installation Guide

### Mounting

The unit may be mounted in any position but typically is installed on a vertical surface with the pressure ports on the right and the cable entrance on the left. Avoid locations with severe vibrations or excessive moisture. The enclosure has a standard 1/2-inch conduit opening and may be installed with either a conduit coupler or a cable-gland-type fitting.

1. Ensure there is enough space around the unit to make the pressure and electrical connections.
2. *For the TPE-1477 (only), cut a 5/8-inch hole in the duct and insert with the probe opening facing into the airflow.*
3. Use screws threaded through the case's mounting holes to fasten the assembly to the duct. Do not overtighten.

### ⚠ WARNING

**Do not use in explosive or hazardous environments, with combustible or flammable gasses, as a safety or emergency stop device, or in any other application where failure of the product could result in personal injury.**

### Plumbing

The output signal reads a positive value when the port pressure is higher on the High port (the probe in the TPE-1477) than the Low port.

Use clean, new, 0.170-inch I.D. flexible tubing for the pressure connections (Low port only in the TPE-1477). Arrange the tubing to minimize stress on the connections and prevent kinking.

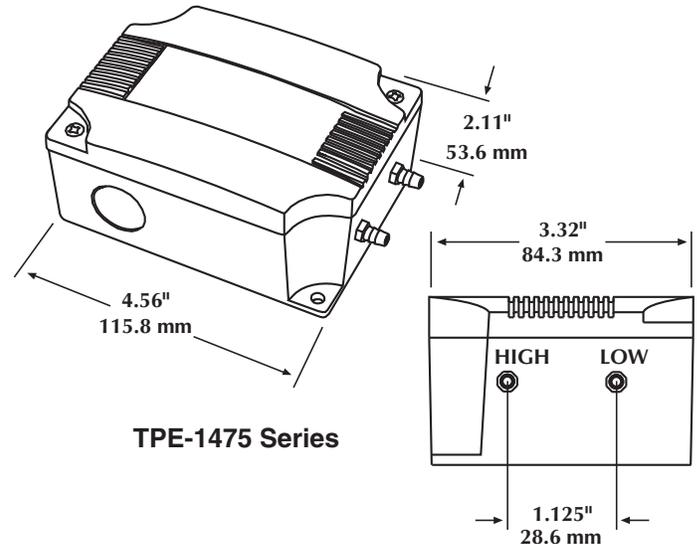
Run a return line from the Low port to the vicinity of the point being measured. **Do not leave the Low port open to the atmosphere** or inaccurate measurements may result.

### ⚠ CAUTION

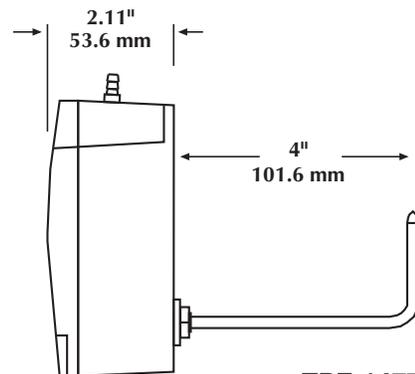
**Do not allow debris to fall into the pressure ports. Contamination can damage sensor.**

### ⚠ CAUTION

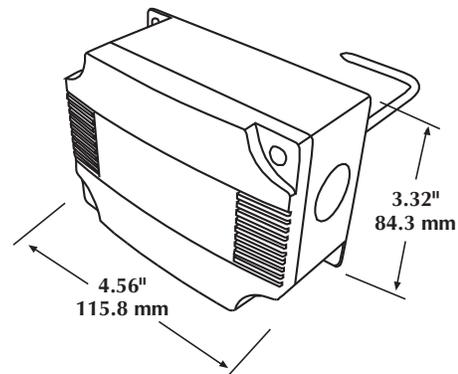
**Use electrostatic discharge precautions during installation. Do not exceed the device ratings.**



TPE-1475 Series



TPE-1477 Series



TPE-1477

# Wiring

Use at least 22 AWG, shielded, twisted-pair wiring for all connections. Do not locate device wires in the same conduit with wires supplying inductive loads.

1. Connect the **positive DC voltage** or the **hot side of the AC voltage** to the **PWR** terminal.
2. Connect the power supply **common (COM)** to the appropriate terminal according to the application. (See sample wiring diagrams.) This device is reverse-voltage protected and will not operate if connected backwards.
3. The analog output signal is available on the **OUT** terminal. This signal is switch-selectable for either **Voltage** or **4–20 mA** output. In voltage mode, either **0–5** or **0–10 VDC** can also be selected.

**NOTE:** The detectors have a half-wave type power supply. The power supply common is the same as the output signal common.

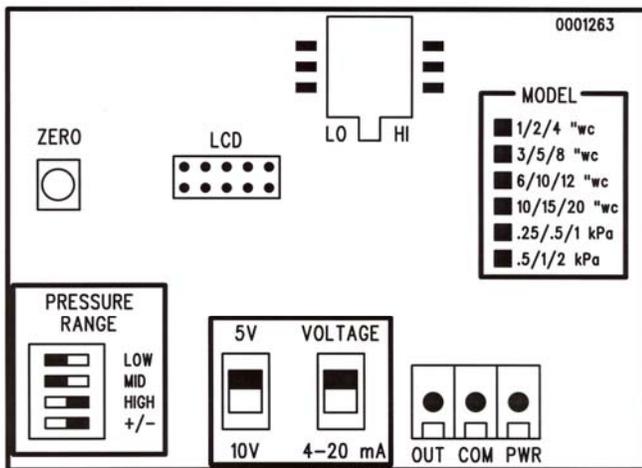
Therefore, several units may be connected to one power supply and the output signals will share the same signal common.

## ⚠ CAUTION

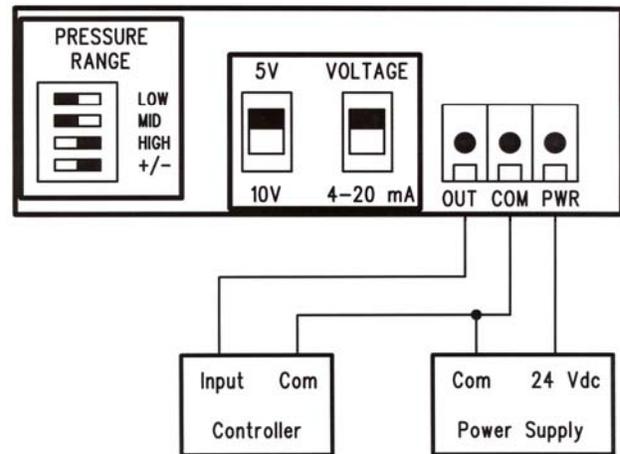
**When grounding the secondary of an AC transformer or when wiring multiple devices, ensure that the circuit ground point is the same on all devices and the controller.**

The analog output signal is typically connected directly to the Building Automation System and used as a control parameter or for logging purposes.

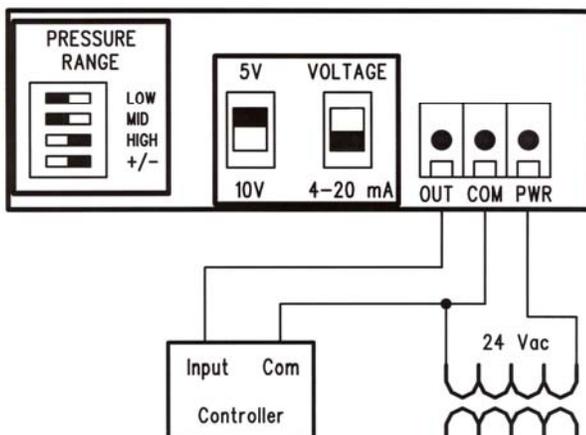
**NOTE:** To convert a 4–20 mA output signal into a 1–5 VDC signal for controllers, insert a 250 ohm resistor between the controller's + and – inputs.



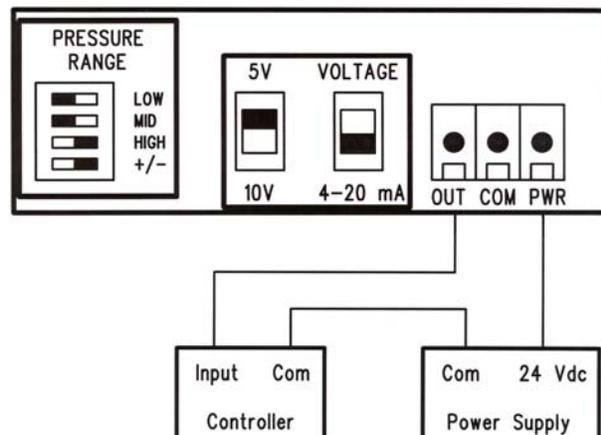
24 VDC Power Supply with 0–5 VDC Output



24 VAC Power Supply with 4–20 mA Output



24 VDC Power Supply with 4–20 mA Output



# Set-up and Operation

## Configuration

Switches select the output signal type and the input pressure range. The device is factory configured to operate in the 4–20 mA output mode but can be changed to voltage mode by switching from **4–20 mA** to **Voltage**. (See the board drawing.) Ensure the switch for 5V (for 0–5 VDC output) or 10V (for 0–10 VDC output) is in the required position.

For the desired **input pressure range** of the particular model, set the Pressure Range switches (see the circuit board drawing) according to the chart below.

Switch Setting	TPE-1475/1477-__ Pressure Range		
	21	22	24
Low	0 to 1" wc	0 to 3" wc	0.25 kPa
Med	0 to 2" wc	0 to 5" wc	0.5 kPa
High	0 to 4" wc	0 to 8" wc	1 kPa
+/-	When selected (On), +/- converts range from 0 to x to ±x. For example, this selection would change a TPE-1475-21 with high setting from 0 to 4" to ±4" (-4 to 4). This gives each model a total of six unique ranges.		

## ⚠ CAUTION

**Check that all connections and switch positions are correct before applying power to the TPE-1475/1477.**

## Power-up

Proper operation can be verified by measuring the output signal. For voltage output configuration, measure the voltage between the OUT and COM terminals. The voltmeter should read between 0 to 5 VDC or 0 to 10 VDC, depending on the output range selected. For current output configuration, insert a mA meter in series with the OUT terminal. The mA meter should read between 4 and 20 mA.

## Operation

If the TPE-1475 is set to a **unipolar** range, such as 0 to 2" wc, then the pressure applied to the **High** port must be higher than the pressure applied to the **Low** port. If the **Low** port is left open to ambient pressure and the **High** port is used to measure a positive pressure, then the output pressure can be calculated using the following formulas:

### 4–20 mA:

$$\text{Pressure} = [(\text{Output current} - 4 \text{ mA}) / 16 \text{ mA}] \times \text{Range}$$

### 0–5 VDC:

$$\text{Pressure} = (\text{Output voltage} / 5 \text{ V}) \times \text{Range}$$

### 0–10 VDC:

$$\text{Pressure} = (\text{Output voltage} / 10 \text{ V}) \times \text{Range}$$

With 0–2" wc, for example, 4 mA or 0 V = 0" wc and 20 mA or 5 V or 10 V = 2" wc. Since the transmitter is linear, 1" wc would be 12 mA or 2.5 V or 5 V.

**NOTE:** If the positive pressure connection is reversed, the transmitter will always output 4 mA or 0 V.

If the TPE-1475 is set to a **bipolar** range, such as ±2" wc, then the pressure applied to the **High** port should be higher than the pressure applied to the **Low** port for a positive output response. In this case, differential pressure can be measured using both ports. If the **High** port has a positive pressure with respect to the **Low** port, then the output indicates a positive pressure. Negative pressure is indicated if the **High** pressure is less than the **Low** pressure. For bipolar ranges, the output pressure can be calculated as follows:

### 4–20 mA:

$$\text{Pressure} = [(\text{Output current} - 4 \text{ mA}) / 16 \text{ mA}] \times 2 \times \text{Range} - \text{Offset}$$

### 0–5 VDC:

$$\text{Pressure} = (\text{Output voltage} / 5 \text{ V}) \times 2 \times \text{Range} - \text{Offset}$$

### 0–10 VDC:

$$\text{Pressure} = (\text{Output voltage} / 10 \text{ V}) \times 2 \times \text{Range} - \text{Offset}$$

With ±2" wc, for example, 4 mA or 0 V = -2" wc and 20 mA or 5 V or 10 V = +2" wc. Since the transmitter is linear, 0" wc would be 12 mA or 2.5 V or 5 V.

## Calibration

All pressure ranges are factory calibrated and no calibration is necessary. The user may adjust the zero point if desired when changing ranges. Make sure the unit is warmed up for at least 10 minutes (1 hour is best) before making a zero adjustment.

With **both ports open** to the ambient pressure, **press and hold the Zero** button for **at least 3 seconds**.

Release the Zero button after at least 3 seconds. The device will calculate and store the new zero point.

It is not recommended that the span calibration be performed in the field unless a high-quality calibrator with low differential pressure ranges is available and the temperature of the sensor can be maintained. Contact the factory for information on this type of calibration.

## Maintenance

No routine maintenance is required. Each component is designed for dependable, long-term reliability, and performance. Careful installation will also ensure long-term reliability and performance.

## Accessories

HFO-0015	Low-pressure pick-up tube, 4" (101 mm) long
HFO-0016	Low-pressure pick-up tube, 6" (152 mm) long
SSS-1002	Differential pressure flow sensor, one sensing point, 3-5/32" (80 mm) length
SSS-1003	Differential pressure flow sensor, two sensing points, 5-13/32" (137 mm) length
SSS-1004	Differential pressure flow sensor, three sensing points, 7-21/32" (195 mm) length
SSS-1005	Differential pressure flow sensor, four sensing points, 9-29/32" (252 mm) length
XEE-6111-040	Transformer, 120-to-24 VAC, 40 VA, <b>single</b> -hub
XEE-6112-040	Transformer, 120-to-24 VAC, 40 VA, <b>dual</b> -hub

## Key Specifications

### Output Signal Options

4–20 mA (2-wire)

0–5 VDC or 0–10 VDC (3-wire)

### Current Output Drive Capability

400 ohm maximum @ 24 VDC

### Voltage Output Drive Capability

10K ohm minimum

### Power Supply (at transmitter)

20 to 28 VAC/VDC (non-isolated half-wave rectified)

### Supply Current

< 4 mA

### Protection Circuitry

Reverse voltage protected and output limited

### Wiring Connections

Screw terminal block (14 to 22 AWG)

### Zero Adjustment

Push-button auto-zero

### Operating Conditions

32 to 158° F (0 to 70° C), 10 to 90% RH non-condensing

### Media Compatibility

Non-corrosive, non-ionic fluids such as clean dry air or inert gases

**NOTE:** For complete specifications and other information, see the [TPE-1475/1477 Series Data Sheet](#).

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