

# Preferred Instruments

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## JC-22XMTR-xxCO

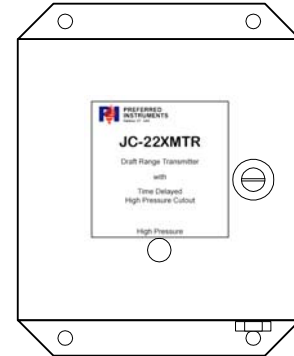
Draft Range Pressure Transmitter  
(+1" wc to -1" wc) with  
High Pressure Cutout (JC-22XMTR-HPCO)  
Low Draft Cutout (JC-22XMTR-LDCO)  
and 5 second Cutout Time Delay

### Installation Instructions

### Warning

Disconnect all sources of power before installing or servicing this equipment. Multiple Disconnects may be required.

If the JC-22XMTR-xxCO is used in a combustion draft control application, the High Pressure / Low Draft Cutout contact **MUST** be incorporated into the Flame Safeguard shutdown interlock circuitry. Burner interface wiring and JC-22XMTR-xxCO adjustment must be performed by a trained, experienced burner service technician.



### Specifications:

**Enclosure:** NEMA 4,12,13

#### **Transmitter**

Range: +1"wc to -1"wc  
Accuracy: +/- 0.75% FS  
Output: 4-20 mA (2-wire)  
Power Supply: 24 Vdc

#### **High Pressure Cut-Out**

Range: +0.15"wc to +4.0"wc  
Deadband: 0.09" wc  
Relay Contact: 10 A / 277Vac, ½ Hp / 120 Vac

#### **Low Draft Cut-Out**

Range: -0.15"wc to -4.0"wc  
Deadband: 0.09" wc  
Relay Contact: 10 A / 277Vac, ½ Hp / 120 Vac

### Description:

The JC-22XMTR-xxCO consists of two separate devices that are mounted in one enclosure and connected to a single pressure connection:

- 1) Draft Range Flue Gas Pressure Transmitter
- 2) Either a Time Delayed High Pressure Cutout or a Time Delayed Low Draft Cutout

Draft Range Pressure Transmitter: The JC-22XMTR-xxCO transmitter converts the connected pressure into a 4-20 mA signal per the following calibration: +1" wc = 4 mA, 0" wc = 12 mA, -1"wc = 20 mA.

The JC-22XMTR-xxCO sensor is designed for use with flue gas and corrosive flue gas condensate.

Typically the JC-22XMTR-xxCO 4-20 mA output is connected to a JC-22D Draft controller. The controller regulates the flue gas pressure by modulating the position of an outlet damper. The JC-22XMTR-xxCO 4-20 mA output can also be used with other types of controllers or as part of a SCADA monitoring system.

Time Delayed High Pressure Cutout: The **JC-22XMTR-HPCO** includes a positive pressure switch, a fixed 5 second 'off-delay' relay (to prevent nuisance trips), and a 'High Pressure' red indicator light. The time delay relay requires a 120 Vac power source for normal operation.

When the pressure is below the pressure switch setpoint: The red light is off, the timer is energized, and the Cutout relay contacts are closed.

When the pressure increases above the pressure switch setpoint:

The 'High Pressure' red light turns on and the timer input is de-energized.

Initially, the Cutout timer contacts remain closed.

If the pressure is above setpoint for longer than 5 seconds, the Cutout timer contacts open.

Time Delayed Low Draft Cutout: The **JC-22XMTR-LDCO** includes a negative pressure switch, a fixed 5 second 'off-delay' relay (to prevent nuisance trips), and a 'Low Draft' red indicator light. The time delay relay requires a 120 Vac power source for normal operation.

When the pressure is below the pressure switch setpoint: The red light is off, the timer is energized, and the Cutout relay contacts are closed.

When the pressure increases above the pressure switch setpoint:

The 'Low Draft' red light turns on and the timer input is de-energized.

Initially, the Cutout timer contacts remain closed.

If the pressure is above setpoint for longer than 5 seconds, the Cutout timer contacts open.

**Typical Uses of HPCO versus LDCO:**

The usage of High Pressure Cutout (HPCO) versus Low Draft Cutout (LDCO) is determined by the burner and boiler design. LDCO describes when the burner trips on a flue gas pressure rise above a negative cutout setpoint (i.e. -0.05" wc). HPCO describes when the burner trips on a flue gas pressure rise above a positive cutout setpoint (i.e. +0.05" wc). In both cases, the burner trips when the pressure rises. The difference is whether the cutout setpoint is negative or positive.

LDCO usages:

Atmospheric burners and older induced draft burners that rely exclusively on the negative pressure at the boiler outlet to suck the air and flue gas through the boiler. These systems require a negative pressure setpoint and the model JC-22XMTR-LDCO.

HPCO usages:

Forced draft burners have a burner fan that generates positive pressure to push the air and flue gas through the boiler. These systems require a positive pressure setpoint and the model JC-22XMTR-HPCO *even if the draft control setpoint is negative.*

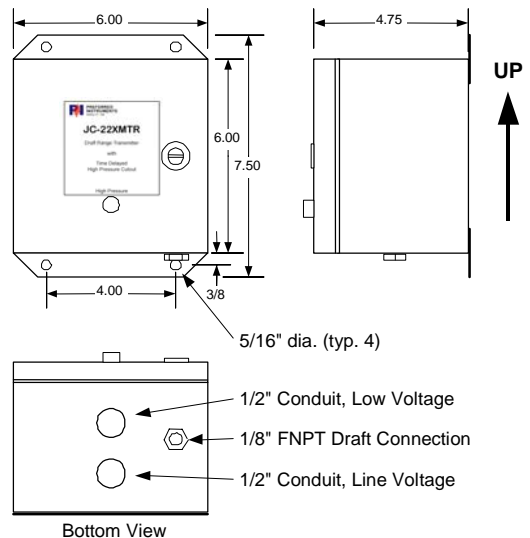
If a boiler has a forced draft burner and also has an Induced Draft fan (or an exceptionally tall stack) that creates a very negative draft, then a negative setpoint Low Draft Cutout might be required. Consult the boiler/burner manufacturer.

**Installation:**

Mount the JC-22XMTR-xxCO in a location that is free from excessive vibration and that will remain at a stable temperature within the 32 - 122 F range.

When connecting the draft impulse line to the JC-22XMTR-xxCO, use a second wrench to hold the 1/8" FNPT brass pressure connection to insure that the internal tubing does not rotate.

To prevent incorrect pressure measurements, the pressure tap in the duct should be flush with the inside wall of the duct and should be perpendicular to the primary flow pattern.

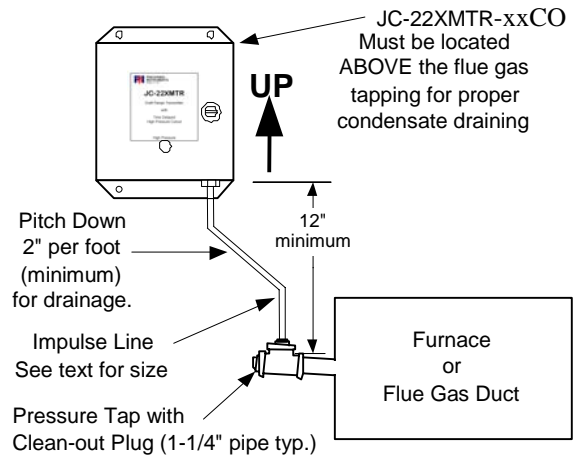


Installation (continued)

The JC-22XMTR-xxCO senses flue gas pressure. Burner flue gas contains a significant amount of water (as a vapor, due to the high temperature). The impulse line that connects the flue gas pressure tap to the JC-22XMTR-xxCO is at room temperature. The water vapor in the flue gas condenses inside the impulse line and becomes a liquid.

If the condensed water collects and remains in the impulse line, a false higher pressure will be applied to the JC-22XMTR-xxCO transmitter and cutout switch. This would cause improper draft control system operation and/or nuisance burner trips.

Mounting the JC-22XMTR-xxCO close to the pressure tap minimizes condensate drainage problems.



JC-22XMTR-xxCO mounting requirements:

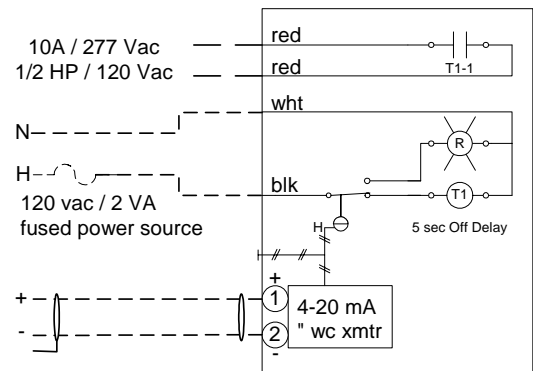
- 1) The JC-22XMTR-xxCO must be mounted ABOVE the pressure tap location and must be mounted UP, as shown in the figure.
- 2) Impulse Line size:
  - 1 - 10 ft run: > 1/4" ID (5/16" OD tubing, 1/8" pipe)
  - >10 ft run: > 1/2" ID ( 5/8" OD tubing, 1/2" pipe)
- 3) The impulse tubing must be pitched down at least 2"/ft (to insure condensate drainage).
- 4) Use compression fittings or unions at both ends of the impulse line to allow easy testing of the high pressure or low draft cutout interlock of the JC-22XMTR-xxCO.

Wiring:

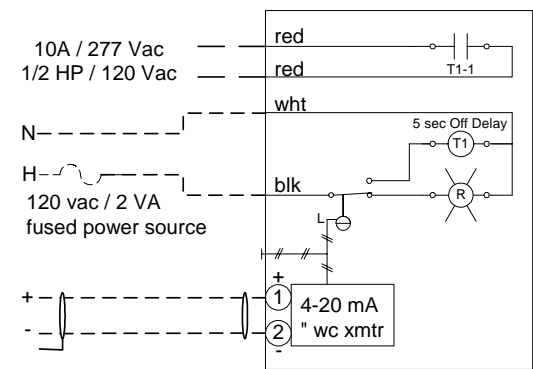
Follow all national and local electrical codes for all interconnecting wiring and grounding.

Run DC and AC wiring in separate conduits.

If the JC-22XMTR-xxCO is used in a combustion draft control application, the High Pressure or Low Draft Cutout contact MUST be incorporated into the Flame Safeguard shutdown interlock circuitry by a trained combustion service technician.



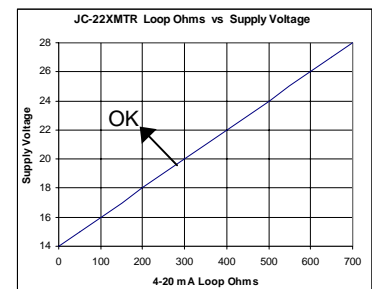
JC-22XMTR-HPCO  
Internal Wiring



JC-22XMTR-LDCO  
Internal Wiring

The JC-22XMTR-xxCO transmitter is a 2 wire, loop powered, 4-20 mA device. The 24 Vdc loop power is typically supplied by the JC-22D (or other) controller.

The Loop Ohms vs Supply Voltage must intersect above the line on the graph for proper operation.



## Adjustment:

### High Pressure or Low Draft Cutout:

Apply the desired Cutout Setpoint pressure to the JC-22XMTR-xxCO.

If the High Pressure (or Low Draft) light is off, slowly rotate the adjustment screw counter-clockwise until the light comes on.

If the High Pressure (or Low Draft) light was on, slowly rotate the adjustment screw clockwise until the light turns off, and then counter-clockwise until the light turns back on.

### 4-20 mA Pressure Transmitter Calibration:

The pressure transmitter is factory calibrated and should not need field calibration during start-up.

### Zero " W.C. Partial Calibration:

Disconnect the Impulse Line (at either end).

Adjust the Zero trimpot until the current output is 12.00 mA (or until the JC-22 displays 0.00" W.C.)

### Complete Calibration:

#### Required Tools for Calibration:

A test meter with 0.001 mA display resolution.

A low pressure source.

A inclined manometer with 0.005" wc resolution.

#### Calibration Data:

zero: 0" wc = 12.00 mA +/- 0.08 (11.92 - 12.08 mA)

span: +1" wc = 4.00 mA +/- 0.12 ( 3.88 - 4.12 mA)

Connect the 4-20 mA loop wiring to the 24 Vdc power supply and the controller, with the mA meter wired in series, and allow the transmitter to warm-up for at least 15 minutes before calibrating the unit.

Disconnect the external pressure impulse tubing, this applies 0" to the transmitter.

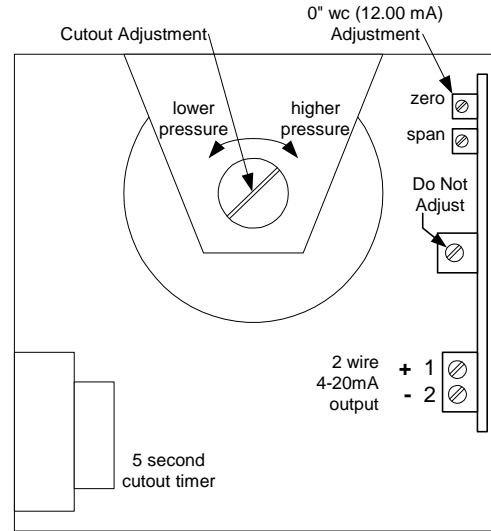
Adjust the 'zero' trim pot until output equals 12.00 mA +/- 0.08.

Apply +1.00" wc to the transmitter.

Adjust the 'span' trim pot until output equals 4.00 mA +/- 0.12.

Most pressure sources are noisy or drift, so the mA signal will also vary somewhat.

Repeat the 0" wc and +1" wc adjustments until both mA outputs are within tolerance.



JC-22XMTR-xxCO Internal Adjustments

## Replacement Parts:

<u>P/N</u>	<u>Description</u>
92393	Pressure Transmitter
92392	Pressure Switch
92391	5 second Time Delay Relay

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