
CES MP

DRAFT RANGE AUTO ZERO TRANSMITTERS

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CES 467MP DRAFT RANGE AUTO ZERO TRANSMITTER

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1.0 UNPACKING AND INSPECTION

Unpack the transmitter and visually inspect to insure that it has not been damaged during shipping. Insure that no packing material is lodged in the pneumatic fittings. CES will not be responsible for damage that occurs due to improper installation. The warranty will be voided if the unit has been removed from the case or there are signs of unauthorized repairs.

2.0 INSTALLATION-MECHANICAL

The unit should be mounted to a flat, level, grounded plate. Critical dimensions are shown on the data sheet for your model.

2.1 INSTALLATION-ELECTRICAL

Determine the power requirements for the unit you are installing. Follow the wiring diagram, and all applicable local and federal codes. CES is not responsible for damage caused by improper installation.

2.2 INSTALLATION-PNEUMATIC

Care should be taken to insure that the unit will not see more than 1.5 times the full scale pressure rating. Over pressuring of the unit for even a short period of time can permanently damage the transmitter. Insure that water or other contaminant cannot enter the transmitter. Over pressure or contamination damage is not covered under warranty.

2.3 SETUP

Each CES MP Draft Range AutoZero Transmitter is calibrated at the factory to the range given at time of order. Although the units are Autozero, differences in grounds or monitoring devices can cause zero offset. If your unit does not read zero after the 30 minute stabilization period, follow the directions in the calibration section to adjust the transmitter.

The zero may also need to be adjusted if; it is the initial installation, it has been turned off for a long period of time, it has been returned to factory for repair, or if it is being returned to operation after a calibration.

3.0 AUTO ZERO OPERATING SEQUENCE

When first powered up the CES MP Draft Range Autozero Transmitters will enter a warm-up mode. This allows the electronics to stabilize before it is put into operation. Once the unit has stabilized, it will preform an Auto zero cycle. This warm-up mode, including the Auto zero cycle last for about 30 seconds.

The CES MP Draft Range Autozero Transmitters will enter an Auto Zero Cycle (AZC) for several reasons, when the power is first applied to the unit, when the unit's intelligent zero circuit determines it is necessary, or when the PLC In pin (CES 467 only) is pulsed if the unit is equipped with the PLC option.

When the unit enters the AZC, the Out Of Range (OOR) light comes on. At the same time an internal solenoid valve is energized. The output of the unit is held at it current level. At this time the Zeroing circuit is waiting for pneumatics to settle out. After a few seconds, the OOR light will go off. The zeroing circuit then starts the actual zeroing process. When the unit is zeroed or when the unit determines that it is out of range the valve will de-energize and the unit will return to normal operation. If the unit is out of range the OOR light will flash. If this happens return the unit for repairs.

4.0 VARIABLE DAMPING

The variable dampening circuit allows the user to adjust the response of both the transmitter and display sections of the unit. The user can adjust the damping pot to filter out instabilities caused by turbulence at the sensing unit. The variable damping is accessible thru the face plate.

1. Turn the Damping pot fully counter-clockwise. This sets the damping to it's minimum.
2. Connect a multimeter to the output of the unit.
3. With the system running at some known constant adjust the damping until there is minimum jitter in the output.
4. Turn the pot back in the opposite direction until the jitter increases.
5. Now adjust the pot in the center of these positions.

4.1 OPTIONAL SQUARE ROOT RESPONSE CURVE

The optional Square Root Response Curve allows the MP Draft Range Autozero Transmitter to directly indicate flow without the need to do flow calculations elsewhere.

4.2 REMOTE AUTO ZERO (PLC)

The option remote AutoZero allows the 467MP to be interfaced with existing systems (such as a PLC.) An Autozero cycle can be started by applying a momentary dry contact closure to ground, to the AZ start pin. The unit will continue to perform Autozero cycles as long as the contact is held to ground.

The AZ status pin provides the user with a normally open, held closed relay contact during an Autozero Cycle. (The units may be ordered with normally open, held closed during run at time of order.) When the 467MP starts an AUTO ZERO CYCLE, the relay energizes, signaling the user that an AUTO ZERO is in progress. The PLC can then lock out the controller action to prevent windup. This allows a central control system to have complete control over the circuit.

4.3 OPTIONAL DISPLAY (CES 467 only)

The 467MP can be ordered with a 3 1/2 digit LCD display. This provides a local readout for reference without the need of an external display, making installation quicker and easier. The display can be calibrated to indicate in any engineering units providing direct indication of the variable being read.

4.5 OPTIONAL TEMPERATURE COMPENSATION (CES 467 only)

The Temperature Compensation option allows the output of the CES 467MP to directly represent flows at standard conditions such as SCFM (Standard Cubic Feet Per Minute). To accomplish this a 4 to 20 mA signal from a temperature transmitter is connected to the Temperature IN pin. Temperature Compensation is accomplished by reading the flow signal and the temperature reading and electronically manipulating the two signals.

5.0 MAINTENANCE AND CALIBRATION REQUIREMENTS

You will need a precision pressure source, a high resolution manometer and a high accuracy digital multimeter to do any re-calibrations on your transmitter. If you do not have access to these please return the unit to the factory for re-calibration. The zero can be adjusted in the field provided that there is no airflow in the duct. The hi and low input of the unit can be shorted

together with a piece of tubing to insure that it is getting a valid zero reading. **NOTE: Never remove tubes from the unit with airflow present. High static pressure in the ducts can over pressure the transmitter. Over pressure damage is not covered by warranty.** Care must be taken to avoid overpressuring the transmitter during any recalibration. If the unit is being calibrated to a different full scale reading and the unit has a display, the display will need to be re-calibrated.

5.1 SPLIT RANGE CALIBRATION

If your unit is a split range unit(Reads zero with a negative pressure applied and full scale with a positive pressure applied.) The calibration procedure is the same as for regular units, except you need to use the following formula to calibrate the Zero pressure point. Use the absolute value of the negative pressure(Ignore the sign and treat the number as a positive when doing the calculations).

Span= (Minimum Pressure + Maximum Pressure)
Reading at Zero Pressure: $ZP=(\text{Minimum pressure}/\text{Span})$
To convert this to voltage: $Z_{out}=ZP*\text{Max Voltage}$
To convert this to Current: $I_{out}=(ZP*16)+4$

Example: Minimum pressure is $-.1"$, Maximum pressure is $.2"$
Span= $(.1+.2)=.3$
 $ZP=.1/.3=.33$
 $V_{out}=.33*5=1.67V$ (for 5 volt units), $V_{out}=.33*10=3.33V$ (for 0-10 volt units)
 $I_{out} = (.33*16)+4 = 9.3 \text{ mA}$ (for current out units)

You should use these calculated values for the readings at zero pressure and follow the procedure to calculate your split range unit.

5.2 TRANSMITTER CALIBRATION

The case of the CES MP transmitter must be grounded to perform this calibration.

1. Connect a digital multimeter to the output of the unit.
2. Force the unit to perform an Autozero by pressing the Auto zero switch.
3. Check the multimeter and adjust the Autozero pot until the unit reads the appropriate zero reading.(Stop here if only adjusting zero)
4. Apply the desired full scale pressure.
5. Adjust the span pot until the meter reads the proper full scale reading.
6. Remove full scale pressure and force unit to auto zero. Repeat until desired results are obtained.

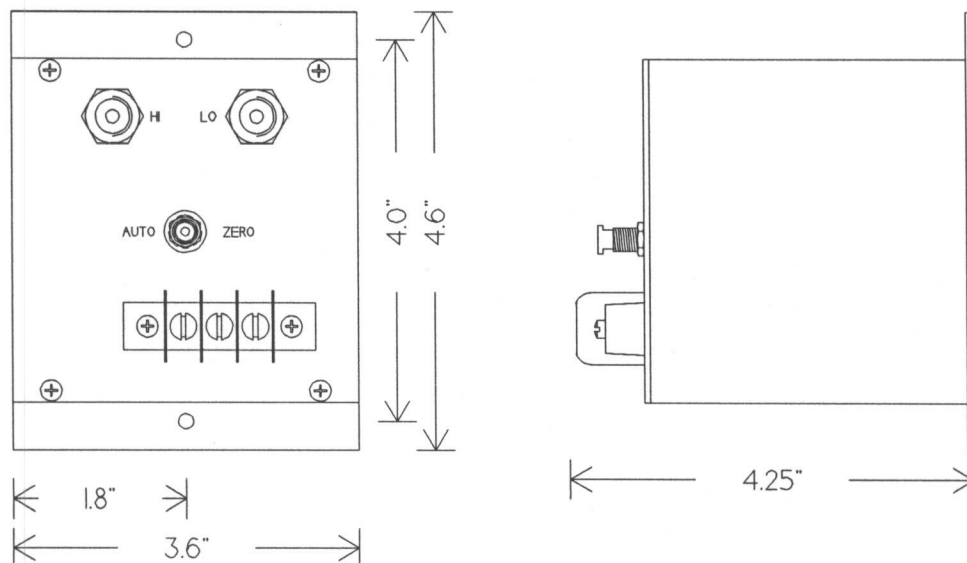
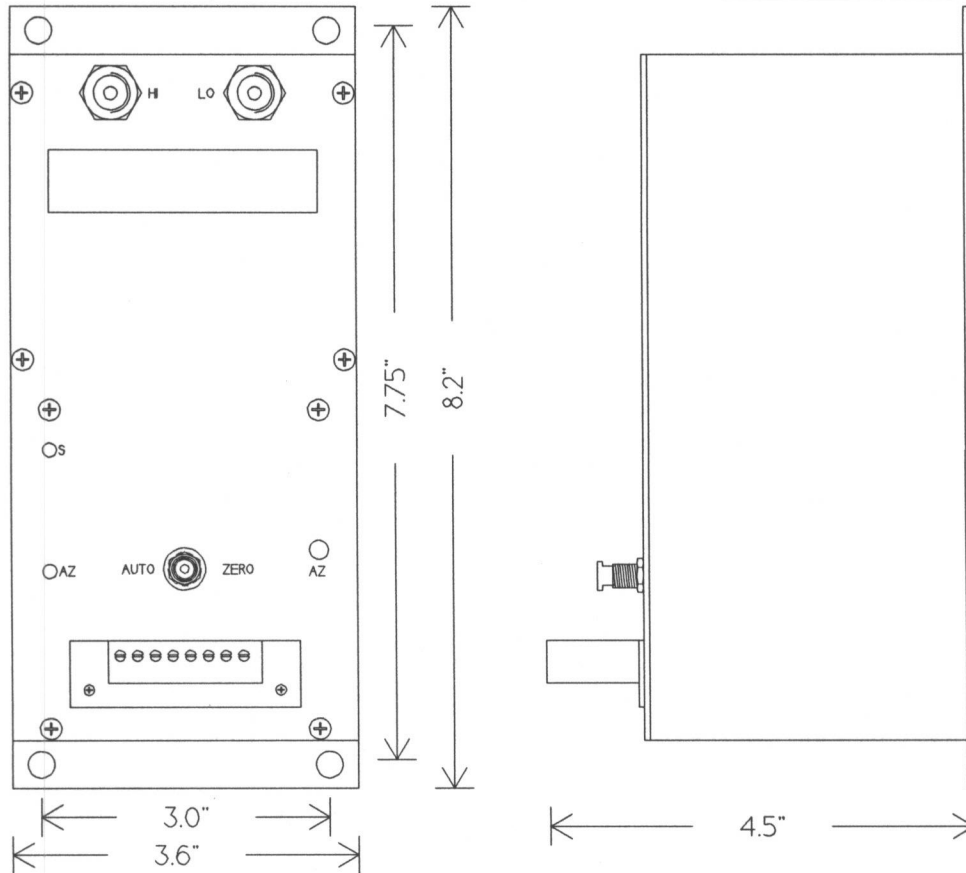
6.0 METER CALIBRATION (CES 467 only)

Your CES 467MP's output and display were calibrated to the units specified at the time of order. If the span is changed the display needs to be re-calibrated as well. The unit must be removed from service and taken to a suitable bench environment. The unit must be placed on a level surface and powered up for at least 30 minutes. In addition the case of the unit needs to be grounded. Differences in grounds will cause zero shifts.

1. Remove the face plate from the unit. Connect the inputs with a short piece of tubing. Connect a digital meter to the output of the unit. Force the unit to perform an AUTO ZERO CYCLE by pressing the Auto zero Button.

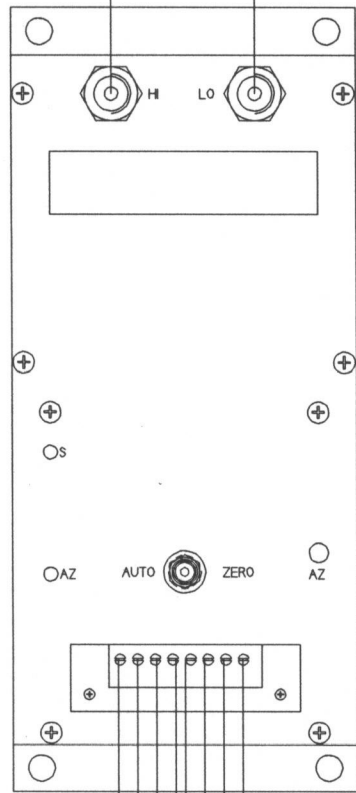
2. Adjust the display's zero pot until the desired reading at zero pressure (or flow) is displayed.
3. Remove the piece of tube shorting the pneumatic input.
4. Apply the full scale pressure to the transmitter.
5. Insure the proper full scale reading is obtained on the digital multimeter.
6. Adjust the Span pot of the meter until the desired full scale reading is displayed.
7. Remove pressure and check zero reading. Repeat until the desired results are obtained.

7.0 DRAWINGS AND DIAGRAMS



TOTAL PRESSURE

STATIC PRESSURE



COMMON ——— AC POWER HOT (AC POWERED
 OUTPUT ——— AC POWER NEUTRAL (UNITS ONLY)
 +24 VDC ——— PLC OUT*
 PLC COMMON ——— PLC IN*
 TEMP TRANSMITTER INPUT*
 *PLC UNITS ONLY

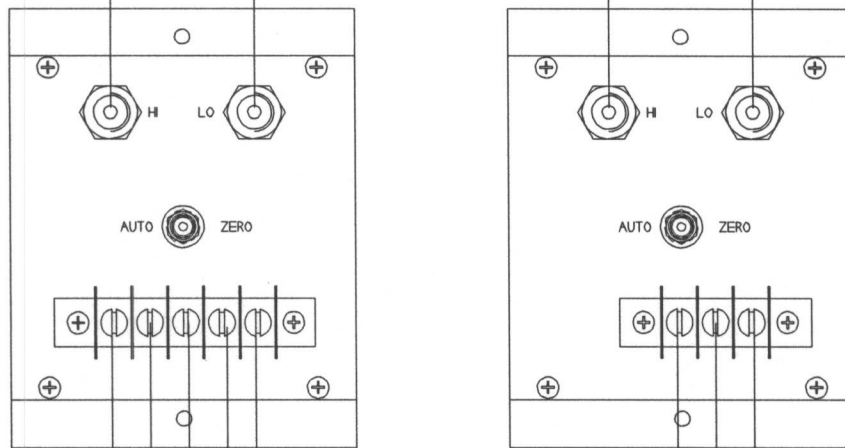
PLC USES PIN 1 AS THE COMMON WHEN EQUIPPED WITH BOTH TEMP AND PLC OPTIONS.

TOTAL PRESSURE

TOTAL PRESSURE

STATIC PRESSURE

STATIC PRESSURE



AC POWER HOT ——— COMMON ———
 AC POWER NEUTRAL ——— OUTPUT ———
 +24 VDC ———

LOCATION _____

SERIAL NUMBER _____

SPAN _____ **OUTPUT** _____