

Description

The Room Pressure Monitor is used to measure differential pressure in the range of 0.125 to 1"wc or 30 to 250 Pa. It combines precision high sensitivity silicon sensing capabilities and the latest ASIC technology to substantially reduce offset errors due to changes in temperature, stability to warmup, long term instability and position sensitivity. It features an LCD to display the pressure value, several bi-directional pressure ranges and field-selectable output signal types for the most flexible application. The device has an on-board auto-zero function as well as a connection for remote zeroing. It also features an optional alarm output with a variable trip point, a remote buzzer output with silence switch and a flashing alarm LED.

Before Installation

Read these installation instructions carefully before installing and commissioning the Room Pressure Monitor. Failure to follow these instructions may result in product damage. Do not use in an explosive or hazardous environment, with combustible or flammable gases, or in any other application where failure of the product could result in personal injury. Take electrostatic discharge precautions during installation and do not exceed the device ratings.

Mounting

Install the enclosure directly on a standard electrical box about four to five feet from the floor of the area to be controlled. Remove the enclosure cover by snapping the bottom edge loose and then unhook the cover from the base at the top edge. Route any wires through the back of the enclosure base and then through the wiring hole in the circuit board. To prevent erroneous readings due to air disturbances within the wall cavity, seal the conduit leading to the junction box. Use the two slotted mounting holes to install the base onto the electrical box or directly onto a flat wall surface with two screws but do not over-tighten. The enclosure has a multifunction base that has provisions for mounting on many standard electrical boxes. Carefully remove the pcb first to use another mounting configuration and ensure that the screw heads do not come in contact with the pcb or components. After installation the cover should be locked on by using the setscrew (1/16" or 1.5mm) located at the bottom of the enclosure.

The remote pressure pickup (mounted on an electrical wall plate) is typically mounted on the opposite side of the wall outside the room being monitored. It also mounts directly to a standard electrical box about four to five feet from the floor.

If the remote buzzer option is used, simply mount it directly to a standard electrical box.

Wiring Instruction

The transmitter has standard screw block connectors. Use shielded twisted pair wiring of at least 22 AWG for all connections and do not run the signal or power wires in the same conduit with wiring used to supply inductive loads such as motors. Depending on the load current, the relay output may require larger wire. Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local electrical codes.

This is a 3-wire sourcing device. Connect the positive dc or the ac voltage hot side (15-27 Vac or 20-35 Vdc measured at the transmitter) to the **POWER** terminal. The supply common is connected to the **COMMON** terminal. The device is reverse voltage protected and will not operate if connected backwards. It has a half-wave rectified power supply so the supply common is the same as the signal common. Several devices may be connected to one power supply and the output signals all share the same common. Use caution when grounding the secondary of a transformer or when wiring multiple devices to ensure the ground point is the same on all devices and the controller.

The analog output signal is available on the **PRESSURE OUT** terminal. This signal is jumper selectable for either voltage or 4-20 mA active output. In voltage mode the output can be set to 0-5 or 0-10 Vdc with the pcb pin jumpers. These options are clearly indicated on the circuit board. The current output operates in the Active mode and does not require a loop power supply. This means **the signal current is generated by the transmitter and must not be connected to a powered input or device damage will result.** Check the controller Analog Input to determine the proper connection before applying power. Both current and voltage signals are referenced to the **COMMON** terminal. The voltage output signal has a minimum load that it is able to drive, similarly the current signal has a maximum load. Follow the ratings in the Specification section or inaccurate readings may result.

The remote zero feature may be used by wiring a dry-contact (relay only) digital output between the **ZERO** and **COMMON** terminals. Remember that the zeroing process starts by shorting the **ZERO** and **COMMON** terminals. Do not apply voltage to the **ZERO** terminal.

The **RELAY** output is a normally open dry contact. Follow the ratings in the Specification section for this output when sizing the connection wires. The relay contacts will close during an alarm condition.

The **BUZZER** output connects to a remote buzzer that is mounted on a standard electrical wall plate. Two wires are required to operate the 24 Vdc remote buzzer. Follow the + and – designation on the pcb and the buzzer when making the connections.

Pneumatic Connections

This device has two pressure ports. The **Low** pressure port is closest to the pcb surface and the **High** pressure port is closest to the enclosure cover. The output signal reads a positive value when the port pressure is higher on the **High** port than the **Low** port so ensure these ports are connected correctly. One port will be left open to measure the room pressure where the enclosure is installed and the other port is connected to a remote pickup (mounted on an electrical wall plate). Typically the main enclosure is mounted in a room and the remote pickup is mounted outside the room to measure the differential pressure.

The device is supplied with tubing connected to the **Low** pressure port that must also be connected to the remote pickup. If necessary, route the pressure tubing through the pcb wiring hole and out the back of the enclosure base. Arrange the tubing to minimize stress on the connections and ensure there are no kinks in the tubing. The tubing may be moved from the **Low** to the **High** port if the application requires it.

Ensure the tubing to be used is clean and do not allow material to fall into the pressure ports as contamination could damage the sensor. When removing tubing use care to avoid breaking the ports. In some cases it is better to cut the tubing off rather than pulling it off but be careful not to cut the fitting or an air leak may occur.

Configuration

The transmitter is configured with push-on type jumpers located on the circuit board as shown on the pcb drawing. These jumpers are used to select the output signal type.

The unit is factory configured to operate in the 4-20 mA output mode. This can be changed to the voltage mode by moving the jumper from the position marked **Current** to the position marked **Voltage**. If the jumper is rotated 90 degrees and installed incorrectly the product will not work and device damage may occur. Once the output mode is changed to voltage, the output scale may be changed to either 0-5 or 0-10 Vdc. This is done by moving the single jumper to the **5V** or **10V** position. The pressure range is marked on the device label. The available pressure ranges are shown in the following chart:

Pressure Range for Available Models							
RP01	RP02	RP03	RP04	RP05	RP06	RP07	RP08
± 1 “wc	± 0.5 “wc	± 0.25 “wc	± 0.125 “wc	± 250 Pa	± 125 Pa	± 60 Pa	± 30 Pa

Power Up Instruction

Before turning on the power, verify all wiring to ensure that it complies with the wiring information described above and verify that the output signal type is correctly selected on the jumpers. Also, review the specifications to ensure the power supply is correct and that the pressure is within the correct range. The product should be allowed to warm-up for several minutes before attempting to verify accuracy. Allow the transmitter to operate for 20 minutes before any calibration is performed.

Operation can be verified by measuring the output signal. For voltage output configuration, measure the voltage between the **PRESSURE OUT** and **COMMON** terminals. The voltmeter should read between 0-5 or 0-10 Vdc depending on the output range selected. For current output configuration, insert a mA meter in series with the **PRESSURE OUTPUT** terminal and it should read between 4 and 20 mA.

Operation

For a bipolar range such as ± 1“wc, the pressure applied to the **High** port should be higher than 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. In this case the Range is 1” and the Offset is 1”. The output pressure can be calculated as follows:

4-20 mA	Pressure = [(Output current – 4 mA) / 16 mA] x 2 x Range – Offset
0-5 Vdc	Pressure = (Output voltage / 5 V) x 2 x Range – Offset
0-10 Vdc	Pressure = (Output voltage / 10 V) x 2 x Range – Offset

In the case of ± 1” wc, 4 mA or 0 V = -1“wc and 20 mA or 5 V or 10 V = +1“wc. Since the transmitter is linear, 0“wc would be 12 mA or 2.5 V or 5 V.

The alarm option operates as follows. A setpoint can be set with the **Alarm Setpoint** control on the pcb. Rotating the control clockwise changes the setpoint from the minimum to the maximum pressure of the range, from –MAX to +MAX. The LCD will show the setpoint briefly while it is being adjusted and will revert to normal display when adjustment stops. When the input pressure exceeds the setpoint for at least 5 seconds, then the alarm condition is set.

When the alarm condition is set, the relay contacts will close (**RELAY** output), the buzzer will activate (**BUZZER** output) and the LED will flash. The relay output can be used to signal the controller of the alarm condition or to drive a load such as a remote warning light. The buzzer will activate with a loud pulsing sound if installed. The alarm condition can be silenced by pressing the **SILENCE** switch on the device. This will cause the relay contacts to open and the buzzer to stop sounding. However, the alarm condition is still set and the LED will continue to flash to indicate an alarm has occurred. When the input pressure decreases below the setpoint for at least 5 seconds then the alarm condition will be removed. When the alarm condition is removed by decreasing pressure, then the LED, relay and buzzer will be shut off.

Calibration

Only a zero calibration is necessary. With both ports open to the ambient pressure, press and hold the **ZERO** button for at least 3 seconds. Release the button after at least 3 seconds and the device will calculate and store the new zero point. This can also be done remotely by shorting the **ZERO** terminal to the **COMMON** terminal with a dry contact.

Generally, it is not recommended that a 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.

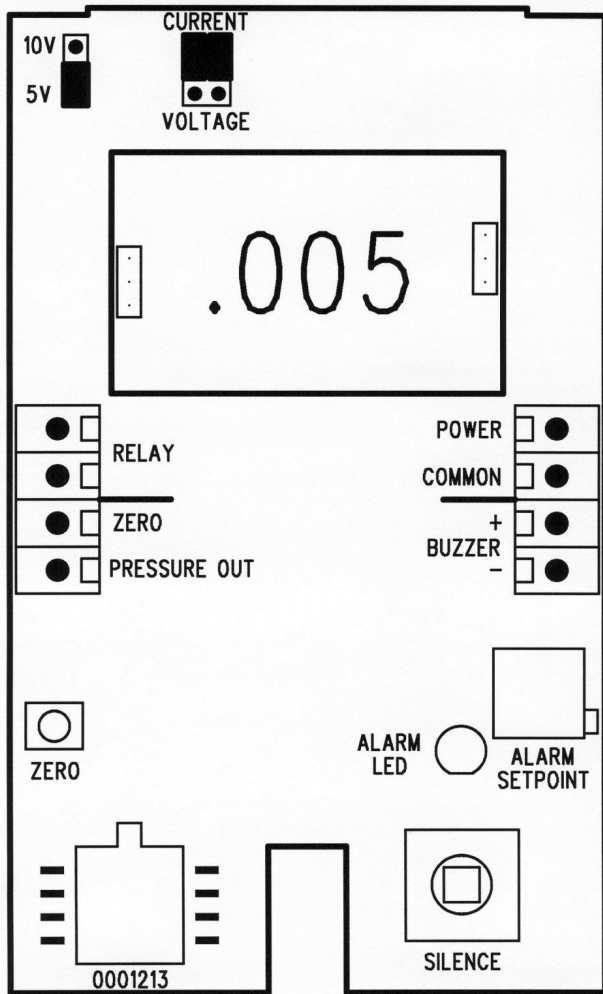
Specifications

Pressure Ranges	± 1 “wc, ± 0.5 “wc, ± 0.25 “wc, ± 0.125 “wc ± 250 Pa, ± 125 Pa, ± 60 Pa, ± 30 Pa
Accuracy	± 1% F.S.O. (± 2% F.S.O. for 0.125 “wc and 30 Pa ranges)
Measurement Type	Differential (two port)
Response Time	0.5 Sec
Thermal Effects	< ± 3.5% over compensated range
Compensated Range	0 - 70 °C (32 - 158 °F)
Over Pressure	100 “wc (24.9 kPa)
Operating Conditions	0 - 70 °C (32 - 158 °F), 10 - 90 %RH non-condensing
Power Supply (at transmitter)	15 - 27 Vac, 20 – 35 Vdc (non-isolated half-wave rectified)
Supply Current	< 30mA (base model), 50mA (with alarm options), 70mA (with buzzer connected)
Input Voltage Effect	Negligible over specified operating range
Protection Circuitry	Reverse voltage protected and output limited
Output Signal	4-20 mA (3-wire), 0-5 Vdc or 0-10 Vdc (3-wire), Pin jumper selectable
Current Output Drive Capability . .	550 ohms maximum
Voltage Output Drive Capability . .	2 Kohms minimum
Zero Adjustment	Pushbutton auto-zero (on device or remote)
Wiring Connections	Screw terminal block (14 to 22 AWG)
Pressure Connections	1/8” ID flexible tubing
Display	3 ½ digit LCD, 0.4” digit height

- Relay Output N.O. contact, 2.5 Amps @ 120 Vac, 2.5 Amps @ 30 Vdc
- Relay Trip Point Adjustable from ZERO to SPAN via trimpot
- Relay Delay 5 seconds on / 5 seconds off

- Enclosure Executive Space, 2.8" W x 4.7" H x 1.25" D (71 x 119 x 32mm)

- Weight 110 grams (3.9 oz)



Terminal	Function
POWER	From +24 Vac/dc of controller or power supply
COMMON	To GND or COMMON of controller
Pressure Out	To analog input of controller 4-20 mA or 0-5 Vdc or 0-10 Vdc
ZERO	To digital output of controller for remote zeroing
RELAY (2)	To digital input of controller or external annunciator
BUZZER +	To plus of remote buzzer
BUZZER -	To minus of remote buzzer

* Some models do not have all these features