

The Advanced Pressure Monitor II (APM2) is a flexible, touch-screen local display unit that measures pressure, temperature, humidity, and air change rate for pressurized spaces for the purpose of ensuring integrity of ventilation and airflow. BACnet® communications enable a number of advanced features, and allows the APM2 to integrate seamlessly with Phoenix Controls Traccel® and Theris® family of BACnet valve controllers. One APM2 is also capable of supporting two rooms when used with optional accessories.

The APM2 provides a bright, easy-to-read display that combines a free-form message banner on the left one-third of the screen, together with dynamic room operating parameters on the right two-thirds of the screen. The touch-screen display makes the APM2 easy to operate by just pressing areas of the screen to perform functions. Nuisance alarms are virtually eliminated because of the high accuracy and reliability of the APM2, and through the use of eight types of alarm functions. If desired, the APM2 can be configured so it never needs to be touched by staff on the floor.

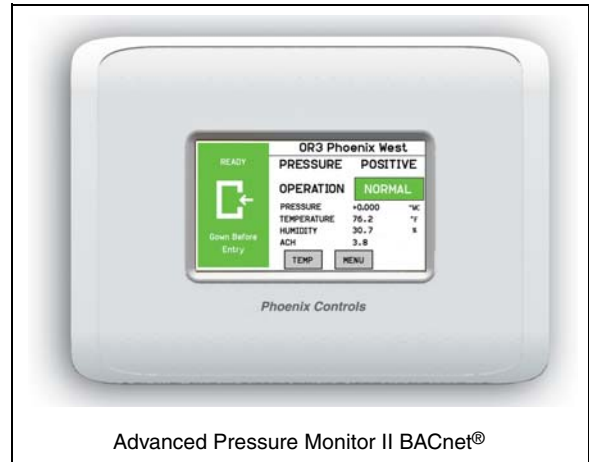
BACnet AND ADVANCED FEATURES

The APM2 hosts a BACnet MS/TP bus that enables easy integration with floor-level BACnet controllers. There are 156 objects supported by the APM2 that reflect configuration settings and data shown on the home screen. Read/write properties enable remote configuration and polling to capture long-term trend data. The APM2 BACnet pressure monitor also supports a number of advanced features, including:

- Occupancy control using the Message Banner to trigger changes in airflow and temperature
- On-screen temperature control bound to the local BACnet valve controller
- Display and alarming of air changes per hour (ACH)
- Full screen Message Banner
- Alarming disables if door is open
- French language home screen and keyboard
- Audit record of configuration changes
- Field-upgradable firmware

ACCURACY

Using pressure transducer technology, the APM2 is capable of sensing at a 0.5% (±0.25%) full scale accuracy and with a display resolution up to 0.0001"WC. It can meet the stringent requirements of pressure sensing for laboratory animal facilities, critical healthcare spaces, biocontainment cleanrooms and any application where very low room pressure sensing is required.



Advanced Pressure Monitor II BACnet®

STANDARD FEATURES

- 4.3" Color touch-screen TFT display
- Monitor two spaces with one APM2 (option)
- One-touch room mode change
- Message banner informs staff of room condition
- Two levels of password protection
- Visual/audible local or remote alarming
- Valve flow alarming
- Door status indicator
- Positive, negative, or neutral setpoints
- High speed differential pressure (dP) output (for active pressure control applications)
- Mode switches alarm setpoints for positive, negative or neutral rooms
- Resistant to spray washdown (IP-54)
- Resistant to decontamination chemicals
- Mounts in standard off-the-shelf electrical box
- Clone configuration feature



NOTE: If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

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SPECIFICATIONS

Choice of Full Scale Ranges			Environmental Data	
Bi-Directional	$\pm 0.05''$ WC (± 12.45 Pa) $\pm 0.10''$ WC (± 24.90 Pa) $\pm 0.25''$ WC (± 62.27 Pa) $\pm 0.50''$ WC (± 124.54 Pa) $\pm 1.00''$ WC (± 249.08 Pa)		Temperature Operating ³ °F (°C) 32 to +120 (0 to +50) Storage °F (°C) -20 to +160 (-30 to +70)	
Performance Data			Operating Humidity	5 to 95 % RH (non-condensing)
	Standard Accuracy	High Accuracy	Pressure Media	Air, or non-conductive non-explosive gasses
Accuracy RSS ^{1, 2} (at constant temp)	$\pm 0.5\%$ FS	$\pm 0.25\%$ FS	Altitude	6562 ft. (2000 m) max.
Non-linearity (BFSL-based)	$\pm 0.49\%$ FS	$\pm 0.24\%$ FS	Physical Description	
Hysteresis	$\pm 0.05\%$ FS	$\pm 0.05\%$ FS	Display	4.3" touch-screen TFT LCD, 480 x 272 pixels, dimmable, password protected
Non-repeatability	$\pm 0.05\%$ FS	$\pm 0.05\%$ FS	Faceplate and housing	Fire-retardant plastic (UL94V-0)
Zero setting tolerance	$\pm 0.5\%$ FS	$\pm 0.5\%$ FS	Electrical connections	Removable terminal blocks
Span setting tolerance	$\pm 0.5\%$ FS	$\pm 0.5\%$ FS	Pressure fittings	Barbed fittings for 1/4" flexible tubing
Stability per year	$\pm 1.0\%$ FS		Weight	1 lb. 3 oz. (590 grams)
Overpressure	15.00" WC (0.5 PSI)		Relay Type	SPDT
Thermal Effects¹			Relay Contact Rating	0.6A @125 Vac / 2A @ 30 Vdc
Zero	$\pm 0.03\%$ FS/°F ($\pm 0.05\%$ FS/°C)		Interoperability	
Span	$\pm 0.03\%$ FS/°F ($\pm 0.05\%$ FS/°C)		BACnet [®] compliant on MS/TP LAN at up to 76.8 Kbps	
Mounting			Mains Supply Voltage	
Rough-in electrical box	RACO 697, Appleton M3-350		Not to exceed 18-32 Vac, 50-60 Hz, isolated, resettable fuse, 9.6 VA maximum. Mains supply voltage fluctuations up to $\pm 10\%$	
Position	Housing to be 90° in reference to level surface, $\pm 5^\circ$			
Wire				
Power	2 or 3-conductor (depending on application) stranded unshielded twisted pair, 16-22 AWG			
I/O	Stranded shielded twisted pair, Belden 950x, 16-28 AWG			
Communications - 3-conductor, twisted, shielded 22 AWG cable (See "Phoenix Recommended Cables" on page 24)				
Inputs				
AI-1, AI-2	Analog Inputs. Multi-purpose, choose a function: - Function 1: Primary or secondary room input - Function 2: Tri-state input to switch pressure alarm thresholds 0 Vdc = Space is intended to be negative pressure. Alarm threshold values are placed in the negative range. 5 Vdc = Space is intended to be neutral pressure. Alarms are placed in the span zero neutral range. 10 Vdc = Space is intended to be positive pressure. Alarms threshold values are placed in the positive range. - Function 3: Temperature or humidity sensor (voltage output either 0-5 V or 0-10 V).			

DI-1	Digital Input, door status indicator or valve pressure switch indicator (choose one). Door status: visual on LCD, yellow on door open Dry contact Closed = Door closed or no valve alarm; Open = Door open or valve alarm Configurable, door open can disable alarming
Outputs	
AO-1	Analog Output. Filtered output signal of primary room pressure differential. Field selectable: 0-5 Vdc; 0-10 Vdc; or 4-20 mA. Speed of response = 100 ms Max., 3 time constants
DO-1	Digital Output. SPDT alarm relay to remote annunciator or the relay can be used for occupancy contact with message banner (choose one) Alarm deadband 0—10% of setpoint adjustable Contact rating 2.0A @ 30 Vdc/Vac, 0.6A @ 125 Vac Calibrated into a 50KΩ load, operable into a 5KΩ load or greater
Alarming	
Ranges	Positive, negative or spanning zero pressure (across neutral)
Audible	Dual piezo with 4 volume levels, (from 0—75dB)
Visual	LCD display Red = Alarm, Yellow = Warning, or Green = Normal, Backlight = 4 levels
Remote	Annunciation via Digital Output SPDT relay
Latch	Alarm must be acknowledged at the touch-screen and pressure must return within range
Silence	Selectable 0-9999 (9999 = forever) seconds
Delay	Selectable 0-9999 (9999 = forever) seconds
Valve	Flow alarm notification
BACnet	Alarm and event notification services
Display Parameters	
Temperature — °F or °C Pressure — "WC or Pa Humidity — %RH ACH (Air Changes per Hour) — calculated based on total supply or return airflow	
USB Port	
A mini-USB style port is provided for firmware updates or for copying configurations from one monitor to others that require similar parameters (i.e., cloning). Phoenix Controls REQUIRES either the Kingston DataTraveler 112 4GB flash drive or Sandisk Cruzer 2GB (minimum) flash drive, along with the aid of a short mini-USB adapter cable from Tensility Corporation (P/N 10-00003). No PC is required.	
Washdown and Chemical Resistance	
IP-54 rated against dust and liquid penetration. Exposed surfaces are chemically resistant to vaporized hydrogen peroxide (VHP), formaldehyde, chlorine dioxide (clidox), perchloric acid, sodium hypochlorite 3-6% (bleach), quaternary ammonium 7% in 1:128 tap water (ammonia).	
Regulatory Compliance	
CE, CSA, RoHS, WEEE, Electro Magnetic Compatibility Directive 2004/108/EC  	
¹ Units calibrated at nominal 70°F. Maximum thermal error computed from this datum. ² RSS is root sum of squares of non-linearity (BFSL), non-repeatability, and hysteresis. ³ Operating temperature limits of electronics only, not pressure transducer.	

ORDERING GUIDE

MONITORS

APM2 00 - ENG - BAC - STL

PRODUCT FAMILY

APM2 = Advanced Pressure Monitor II, comes standard with white faceplate and two pressure pickup ports.

OPERATIONAL PRESSURE RANGE

00 = ±0.05" WC (12.45 Pa) (±0.5% accuracy)
 01 = ±0.10" WC (24.90 Pa) (±0.5% accuracy)
 03 = ±0.25" WC (62.27 Pa) (±0.5% accuracy)
 05 = ±0.50" WC (124.54 Pa) (±0.5% accuracy)
 10 = ±1.00" WC (249.08 Pa) (±0.5% accuracy)
 30 = ±0.05" WC (12.45 Pa) (±0.25% accuracy)
 31 = ±0.10" WC (24.90 Pa) (±0.25% accuracy)
 33 = ±0.25" WC (62.27 Pa) (±0.25% accuracy)
 35 = ±0.50" WC (124.54 Pa) (±0.25% accuracy)
 40 = ±1.00" WC (249.08 Pa) (±0.25% accuracy)

FACEPLATE LANGUAGE

ENG = English

NETWORK TYPE

BAC = BACnet Communications

OPTIONS

NPP = No pressure ports, APM2XX is provided without the two standard pressure pickup ports
 RET = Retrofit kit; includes modified APM2xx with 90 degree ports and faceplate that covers hole from APM1xx and excludes the two pressure pick-up ports that come standard with non-retrofit units. (see Note)
 STL = Simulated brushed steel faceplate (No extra charge)

NOTES: Cannot be ordered with ±0.25 accuracy pressure range APM2xx, nor with options "NPP" or "STL"
 Calibration certificates are provided with all products except ±1.00% accuracy

Accessories

APM2 AC - F01

PRODUCT FAMILY

APM2 = Advanced Pressure Monitor, second generation

PRODUCT OPTION

AC = Accessory

TYPE

ANC = Remote annunciator sounds an audible alarm; remote unit is located away from the wall-mounted unit housed in a single-gang stainless steel wall plate; includes a remote alarm speaker and remote acknowledge button to temporarily silence the alarm.
 PPP = Pressure Pickup Port, an additional single-gang stainless steel plate used to sense room pressure - two PPPs are included standard with the APM2.

For all of the following transducers:

Remote pressure transducers can be used with the APM2 to measure differential pressure in a secondary space. The 264 and 267 transducers sense differential pressure and convert this pressure difference to a proportional electrical output signal - either 0-5 Vdc or 0-10 Vdc, respectively. Using 0-10 Vdc (267 model) provides a higher resolution output signal than 0-5 Vdc (264 model). Standard accuracy is usually adequate for most critical room applications. Use high accuracy if building specifications require it.

F00 = 264 transducer, 0-5V output, ±0.05" WC (12.45 Pa) (±1.00% accuracy)
 F01 = 264 transducer, 0-5V output, ±0.10" WC (24.90 Pa) (±1.00% accuracy)
 F03 = 264 transducer, 0-5V output, ±0.25" WC (62.27 Pa) (±1.00% accuracy)
 F05 = 264 transducer, 0-5V output, ±0.50" WC (124.54 Pa) (±1.00% accuracy)
 F10 = 264 transducer, 0-5V output, ±1.00" WC (249.08 Pa) (±1.00% accuracy)
 F20 = 264 transducer, 0-5V output, ±0.05" WC (12.45 Pa) (±0.4% accuracy)
 F21 = 264 transducer, 0-5V output, ±0.10" WC (24.90 Pa) (±0.4% accuracy)
 F23 = 264 transducer, 0-5V output, ±0.25" WC (62.27 Pa) (±0.4% accuracy)
 F25 = 264 transducer, 0-5V output, ±0.50" WC (124.54 Pa) (±0.4% accuracy)
 F30 = 264 transducer, 0-5V output, ±1.00" WC (249.08 Pa) (±0.4% accuracy)
 F40 = 264 transducer, 0-5V output, ±0.05" WC (12.45 Pa) (±0.25% accuracy)
 F41 = 264 transducer, 0-5V output, ±0.10" WC (24.90 Pa) (±0.25% accuracy)
 F43 = 264 transducer, 0-5V output, ±0.25" WC (62.27 Pa) (±0.25% accuracy)
 F45 = 264 transducer, 0-5V output, ±0.50" WC (124.54 Pa) (±0.25% accuracy)
 F50 = 264 transducer, 0-5V output, ±1.00" WC (249.08 Pa) (±0.25% accuracy)
 T00 = 267 transducer, 0-10V output, ±0.05" WC (12.45 Pa) (±1.00% accuracy)
 T01 = 267 transducer, 0-10V output, ±0.10" WC (24.90 Pa) (±1.00% accuracy)
 T03 = 267 transducer, 0-10V output, ±0.25" WC (62.27 Pa) (±1.00% accuracy)
 T05 = 267 transducer, 0-10V output, ±0.50" WC (124.54 Pa) (±1.00% accuracy)
 T10 = 267 transducer, 0-10V output, ±1.00" WC (249.08 Pa) (±1.00% accuracy)
 T20 = 267 transducer, 0-10V output, ±0.05" WC (12.45 Pa) (±0.4% accuracy)
 T21 = 267 transducer, 0-10V output, ±0.10" WC (24.90 Pa) (±0.4% accuracy)
 T23 = 267 transducer, 0-10V output, ±0.25" WC (62.27 Pa) (±0.4% accuracy)
 T25 = 267 transducer, 0-10V output, ±0.50" WC (124.54 Pa) (±0.4% accuracy)
 T30 = 267 transducer, 0-10V output, ±1.00" WC (249.08 Pa) (±0.4% accuracy)
 T40 = 267 transducer, 0-10V output, ±0.05" WC (12.45 Pa) (±.25% accuracy)
 T41 = 267 transducer, 0-10V output, ±0.10" WC (24.90 Pa) (±.25% accuracy)
 T43 = 267 transducer, 0-10V output, ±0.25" WC (62.27 Pa) (±.25% accuracy)
 T45 = 267 transducer, 0-10V output, ±0.50" WC (124.54 Pa) (±.25% accuracy)
 T50 = 267 transducer, 0-10V output, ±1.00" WC (249.08 Pa) (±.25% accuracy)

APPLICATIONS

The APM2 may be applied in many ways. Four examples are given below:

1. Simple Variable Air Volume (VAV) Room with Flow Alarm

Tracking VAV supply and exhaust maintain consistent volumetric room offset under varying airflow conditions.

Pressure is monitored between the room and a reference space. An analog output (AO) makes the value of the pressure differential available to the BMS through the valve or directly via BACnet MS/TP. An alarm contact (DO) can trigger a remote annunciator or provide a local alarm. A (DI) alarm contact can be used to monitor valve flow alarm for loss of static pressure or jam alarm, which is shown on the display in red as a valve alarm. Valves are equipped with pressure switch option to provide loss of static pressure alarm.

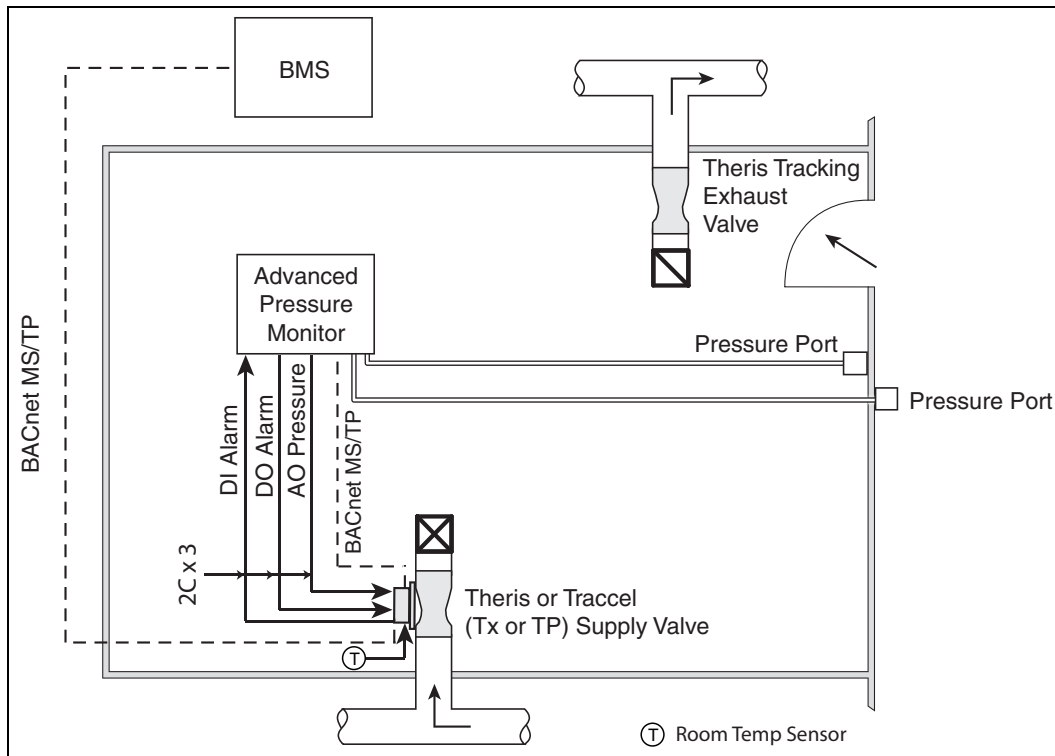


Figure 1. Simple VAV room application

2. Switchable Positive and Negative Room

Tracking VAV supply and exhaust valves maintain consistent volumetric room offset creating a pressurized space that is either positive or negative. APM2 pressure alarm setpoints are defined both positive and negative ranges. When the room is positive, the positive alarm setpoints are active. When the room is negative, the negative alarm setpoints are active. A network signal from the BMS changes the APM2 pressure mode as well as the valve air flow offset from positive to negative.

Local pressure control can also be accomplished using banner controlled occupancy status to switch DO (see example 4 for more details). DO from APM2 can be wired into a programmable multi-use input of the valve set up as local offset control. This will initiate an alternate volumetric offset programmed into the valve to change polarity of space. In addition, selection of alternate APM2 pressure alarm setpoints would be required.

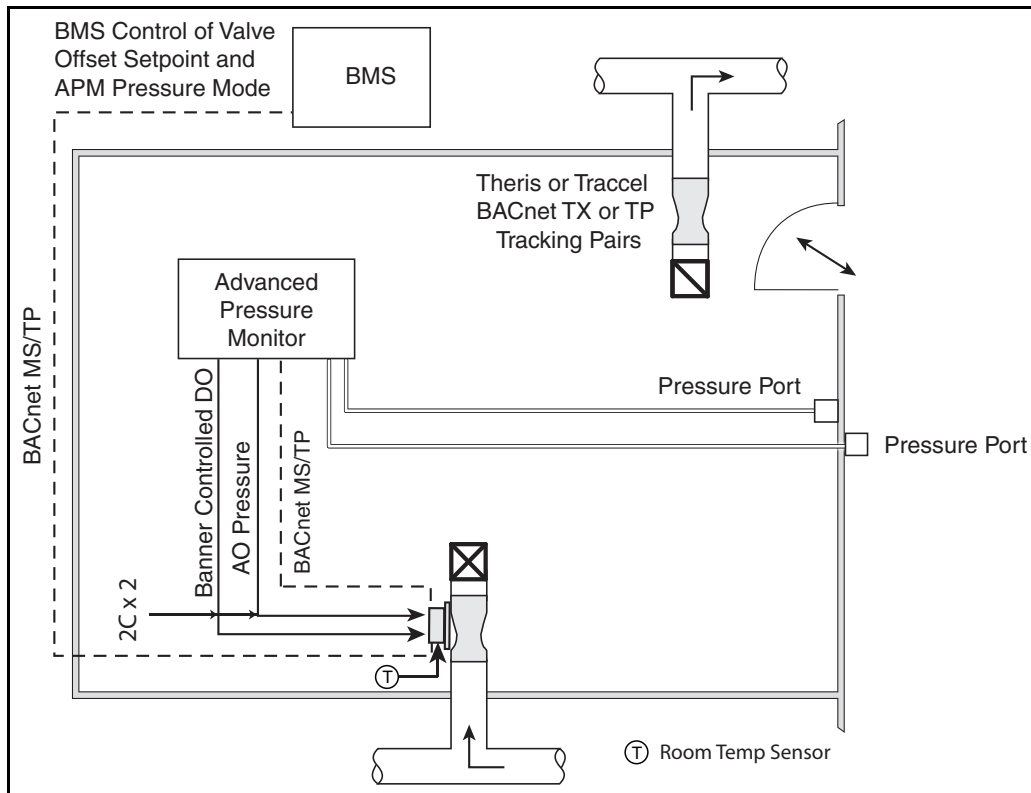


Figure 2. Switchable positive and negative room with reversible alarm setpoint

3. Primary Room with Anteroom

Tracking VAV supply and exhaust valves can be used to create two pressurized spaces that are both negative to their respective references. A secondary differential pressure signal (remote sensor accessory) is provided to the APM2. The APM2 can display pressure, temperature, humidity, and air changes per hour (ACH) of both the primary room and anteroom via external transducer and by reading network variables of second valve via MS/TP network. These values are also available to the BMS via the MS/TP network. In this example, the DI is used for monitoring the door switch which can disable the pressure alarm.

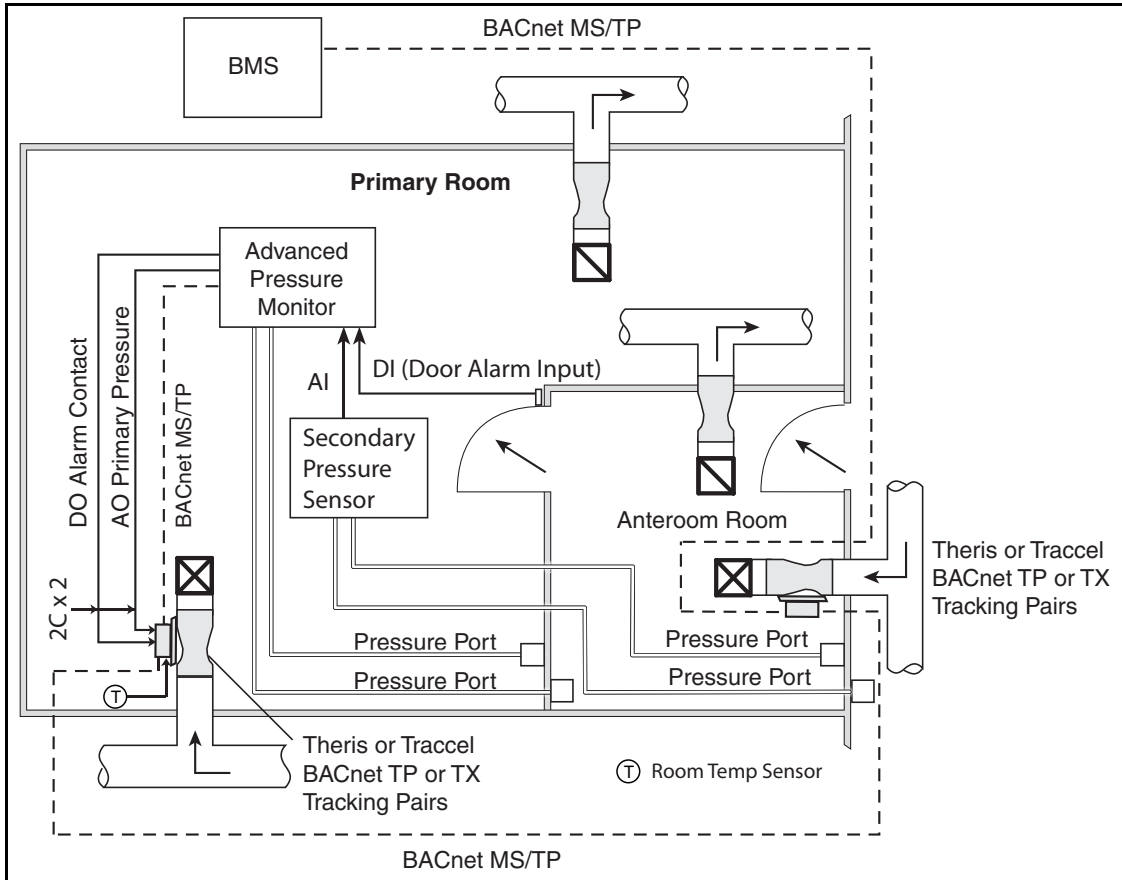


Figure 3. Primary room with anteroom application

4. VAV Room with Occupied and Unoccupied Modes

Tracking VAV supply and exhaust maintain consistent volumetric room offset under varying airflow conditions. The Message Banner (including user configurable text) is configured for specific colors to indicate Occupied and Unoccupied mode for the room. When the Occupied color is selected, the DO relay closes sending a signal to the BACnet valve multi-use input programmed for occupancy control. The valve will modify airflow and temperature based on programmed Occupancy settings. When the Unoccupied color is selected, the DO relay opens and the valve will revert to airflow and temperature based on programmed Unoccupied settings.

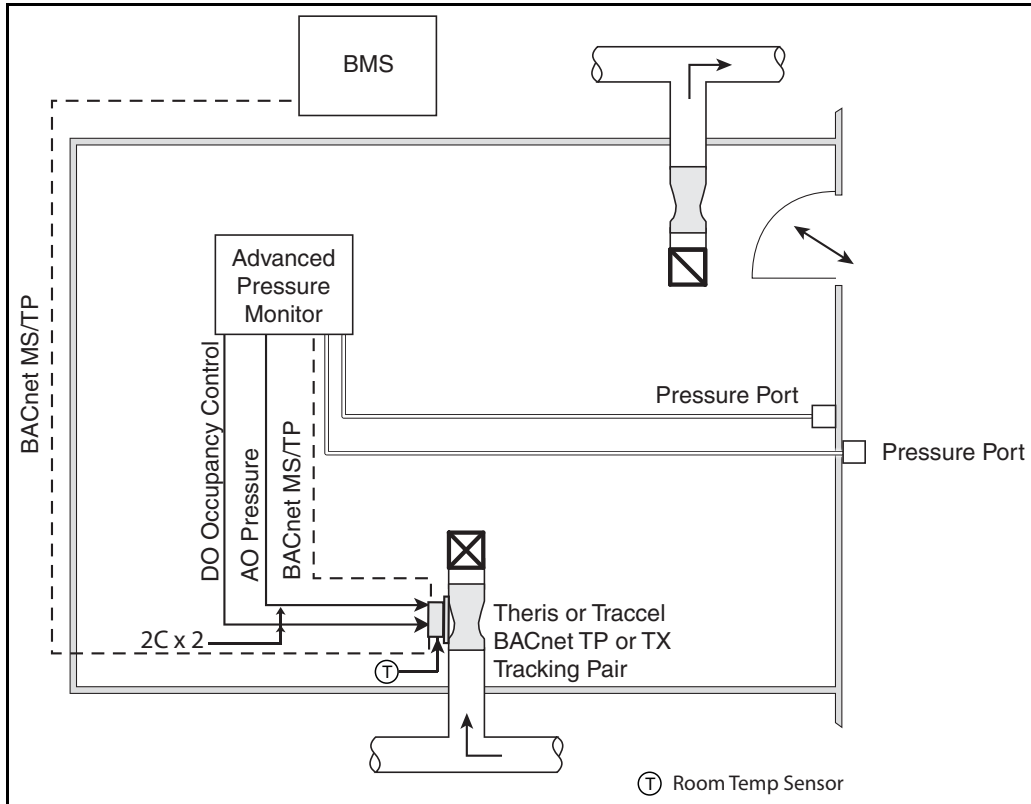


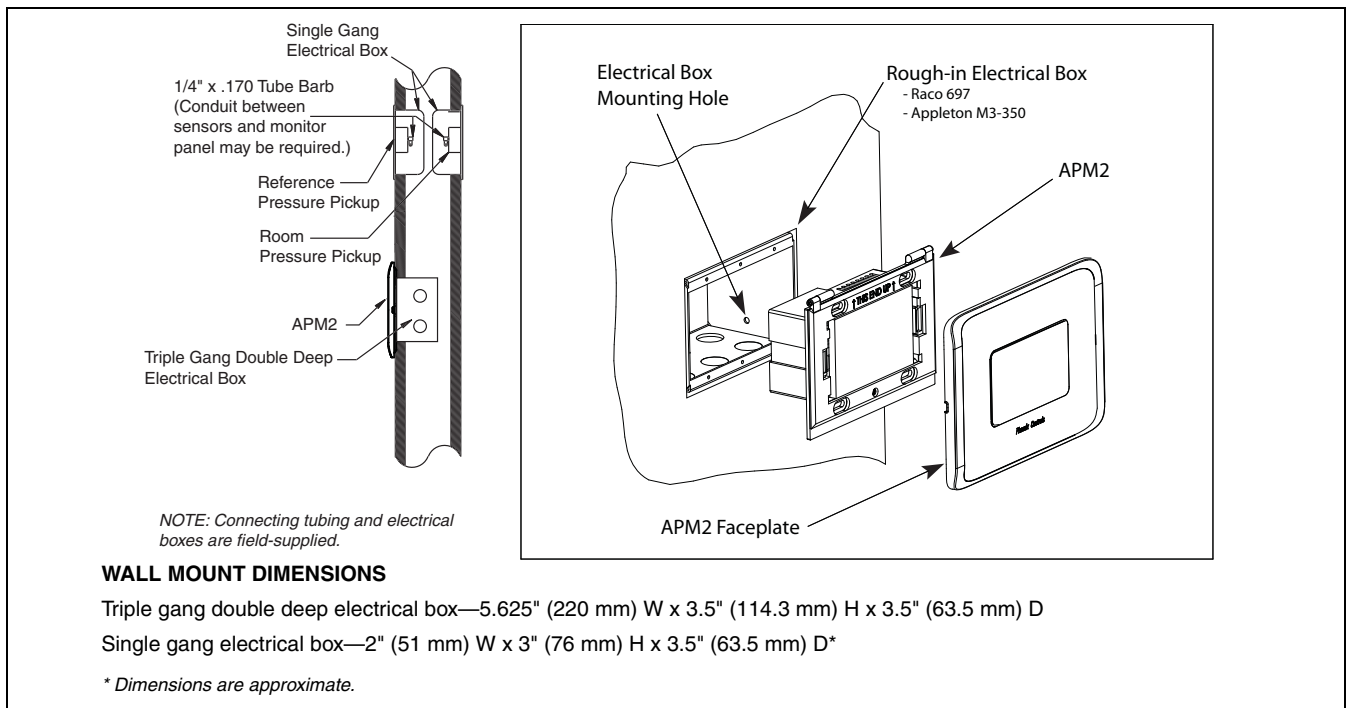
Figure 4. VAV room with occupied and unoccupied modes

INSTALLATION

Installation must be indoors, Pollution Degree 2, Installation category II.

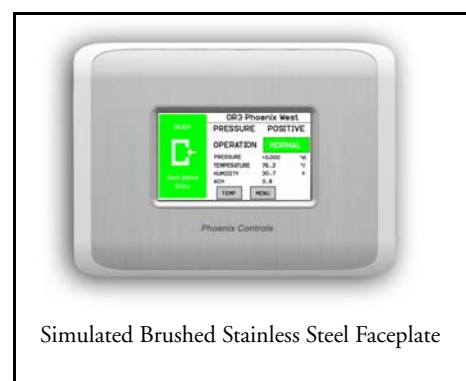
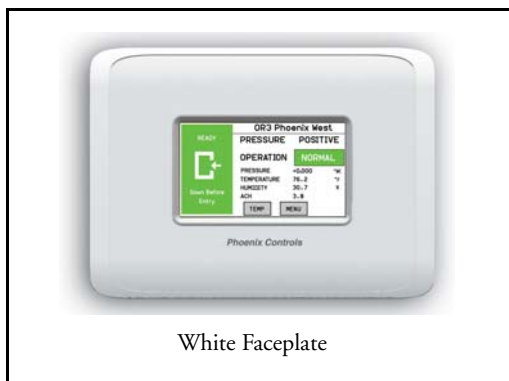
- Each APM2 consists of a room pressure pick-up, a reference space pressure pickup and a room pressure monitor panel, which houses a differential pressure sensor.
- The two pressure pickup ports are installed in single gang electrical boxes, which are placed in the room walls.
- Standard 0.25" (6 mm) control tubing, maximum 250 feet (76.2 meters) length, is run within the wall from the sensors to the monitor panel. In some code jurisdictions, the tubing must be in EMT conduit. Tubing and conduit is provided by others.
- Install in a triple gang-double deep electrical box (RACO 697, Appleton M3-350 or equivalent).

NOTE: Secure the triple gang-double deep electrical box to the stud(s) by using the mounting hole in the side of the electrical box (see figure below for mounting hole location). Drive the mounting screws from the inside of the electrical box into the wall studs to prevent sharp objects protruding into the electrical box.

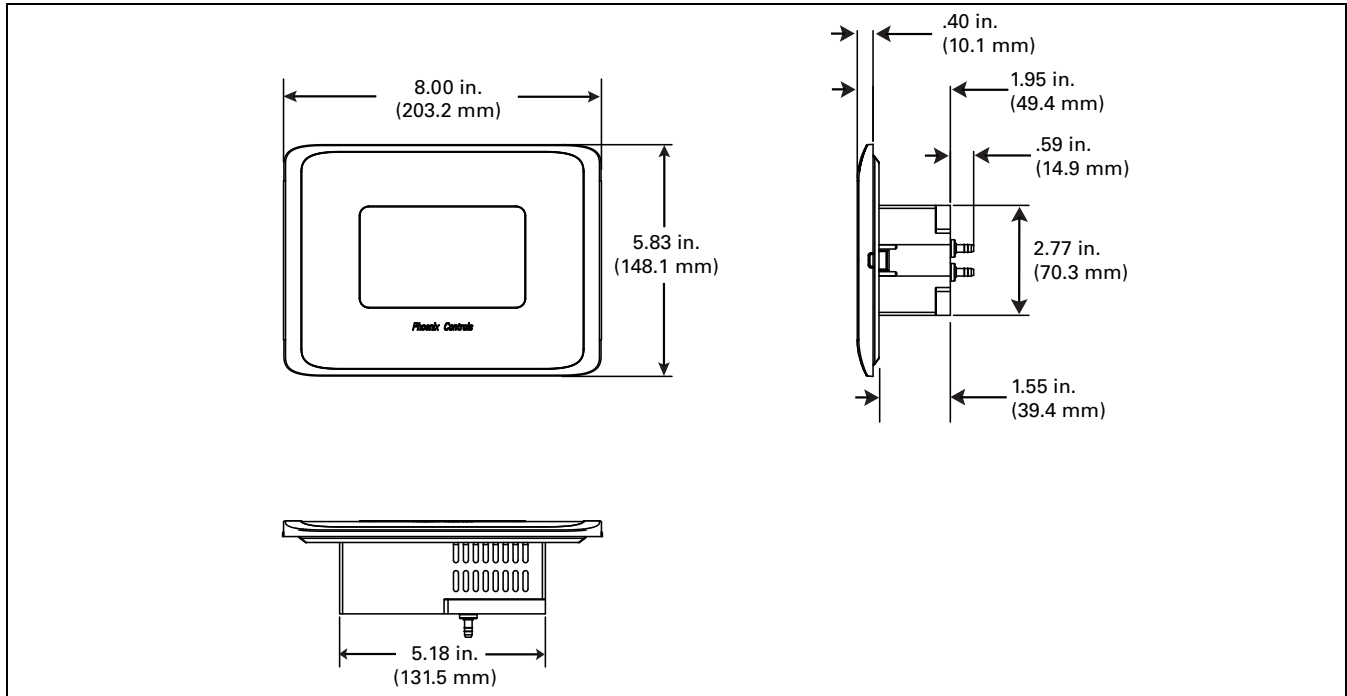


Faceplate

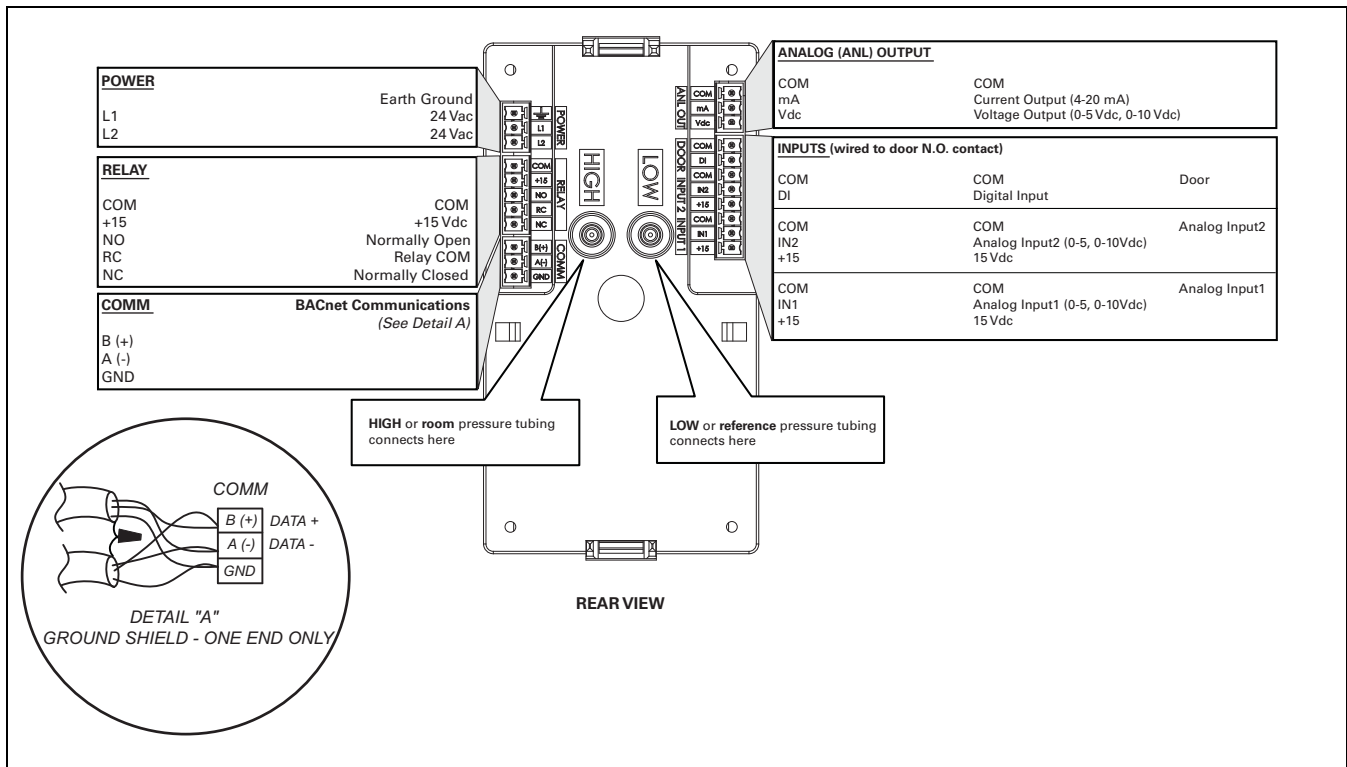
The faceplate of the APM2 is designed to snap-fit the unit and seal to the display and wall surface to resist the penetration of cleaning agents and dust (IP54). Available options are white or a simulated brushed stainless steel.



DIMENSIONS



WIRING



PHOENIX CONTROLS WIRING RECOMMENDATIONS

- All circuits must conform to the requirements of an NEC Class 2 (dry) circuit.
- Use multiple transformers instead of larger transformers when more than 100 VA is required.

- Each pressurization zone should have either a dedicated single-phase primary circuit, or a secondary circuit disconnect.
- Use cable sizes recommended by Phoenix Controls (See “Phoenix Recommended Cables” on page 24).
- Use stranded wire for ease of installation.
- Follow good wiring practices:
 - Locate cables away from sources of electrical interference (EMI/RFI).
 - Do not run signal or communication cable in the same conduit or wire way as power cables.
 - If signal cable must cross power cables place these at a 90-degree angle.
 - Shield or drain wires, if required, should be wrapped with insulating tape to prevent contact with exposed conductors or contacts.
 - Maintain a consistent color code or polarity all the way through the wiring system.
 - Power supply and signal isolation on I/O devices vary from manufacturer to manufacturer. Verify the wiring device manufacturer’s recommendations for isolating power and signal common connections and maintain polarity.
 - Local and national electrical codes take precedence.
- Strip 0.25" (6.4 mm) of insulation from each conductor, twist the strands, insert the conductor fully into the terminal block, and tighten the terminal.
 - Test the wire connection by pulling on each conductor.
- See “Ancillary Product Specifications” on page 18 for approved cable manufacturers and wire types.

Network Wiring (BACnet Controllers)

The quality of the cable and the cable installation, the number of devices, and the amount of data to be passed influence the practical cable length and communications speed (baud rate). Cabling has the greatest influence on the quality of communications. Depending on the quality of the installation, it may be necessary to reduce the baud rate to avoid intermittent communications. Using a larger gauge wire will not allow you to exceed the maximum recommended cable length.

Layout: Bus topology.

Cabling: Three-conductor, stranded, twisted-shield cable with the following electrical characteristics:

- Impedance between 100 and 130 Ω .
- Distributed capacitance between conductors less than 30 pF/ft (100 pF/m).
- Distributed capacitance between conductors and shield less than 60 pF/ft (200 pF/m).
- Phoenix Controls recommends 22 AWG (.65 mm) cable. Alternate wire sizes which meet these specifications may be used, but will not extend the maximum cable length per segment.

Segment Length: 4000 ft. (1219 m) maximum per segment using recommended wire.

Devices per Segment: A maximum of 50 devices is recommended.

Repeaters: Repeaters are required when making runs longer than 4000 ft (1219 m). Available from other vendors.

Terminating Resistors: Matched resistors required at each end of segment bus wired across (+) and (-). Use matched resistors rated 120 ohm 1/4W $\pm 5\%$.

Shield Grounding: Ground shield drain wire at single point earth (panel) ground, and not the TBC ground. Tape off shield drain wire at other end. Tie shield drain wire through at each TBC.

- Each APM2 counts as a 1/8 unit, up to 127 controllers can be on a single segment. Phoenix Controls recommends not placing more than 50 devices on a single physical network segment.
- At the last device on each end of the MS/TP segment, matched terminating resistors wired across Data+ and Data- are required for signal integrity. The resistors are not included.
- For more detailed information, refer to “Phoenix Recommended Cables” on page 24.

POINTS

The table in this section contains points available for integration in a BMS. The following table is a list of points for open BACnet integration.

APM2 BACnet Points Available for Integration

Object Instance	Object Name	Read or Write
<i>Device</i>		
DEV1	Device	Read Only
<i>Analog Input</i>		
A11	Primary Pressure	Read Only
A12	Secondary Pressure	Read Only
A13	Primary Temperature	Read Only
A14	Secondary Temperature	Read Only
A15	Primary Humidity	Read Only
A16	Secondary Humidity	Read Only
A19	Primary ACH	Read Only
A110	Secondary ACH	Read Only
<i>Analog Value</i>		
AV1	Theoretical analog output	Read Only
AV46	Sensor full scale	Read Only
AV2	Primary Pressure Low Range	Read Only
AV53	Primary Pressure High Range	Read Only
AV15	Primary Temperature Low Range	Read Only
AV16	Primary Temperature High Range	Read Only
AV29	Primary Humidity Low Range	Read Only
AV30	Primary Humidity High Range	Read Only
AV3	Primary Alarm Low Limit for Positive Pressure	Read/Write
AV4	Primary Alarm High limit for Positive Pressure	Read/Write
AV33	Primary Alarm Low Limit for Neutral Isolation	Read/Write
AV34	Primary Alarm High Limit for Neutral Isolation	Read/Write
AV31	Primary Alarm Low Limit for Negative Pressure	Read/Write
AV32	Primary Alarm High Limit for Negative Pressure	Read/Write
AV20	Primary Room Length	Read/Write
AV21	Primary Room Width	Read/Write

Object Instance	Object Name	Read or Write
AV22	Primary Room Height	Read/Write
AV18	Primary Room ACH Low Limit	Read/Write
AV19	Primary Room ACH High Limit	Read/Write
AV5	Secondary Pressure Low Range	Read Only
AV54	Secondary Pressure High Range	Read Only
AV40	Secondary Temperature Low Range	Read Only
AV41	Secondary Temperature High Range	Read Only
AV42	Secondary Humidity Low Range	Read Only
AV43	Secondary Humidity High Range	Read Only
AV6	Secondary Alarm Low Limit for Positive Isolation	Read/Write
AV7	Secondary Alarm High Limit for Positive Isolation	Read/Write
AV38	Secondary Alarm Low Limit for Neutral Isolation	Read/Write
AV39	Secondary Alarm High Limit for Neutral Isolation	Read/Write
AV36	Secondary Alarm Low Limit for Negative Isolation	Read/Write
AV37	Secondary Alarm High Limit for Negative Isolation	Read/Write
AV17	Secondary Room Length	Read/Write
AV23	Secondary Room Width	Read/Write
AV24	Secondary Room Height	Read/Write
AV25	Secondary Room ACH Low Limit	Read/Write
AV26	Secondary Room ACH High Limit	Read/Write
AV8	Alarm Delay	Read/Write
AV9	Mute Time Out	Read/Write
AV10	Buzzer Volume	Read/Write
AV11	Deadband	Read/Write
AV12	Contrast Level	Read/Write
AV13	Pressure Resolution	Read/Write
AV14	Display Average	Read/Write
AV35	Window Size	Read Only
AV47	Primary Volumetric Flow	Read Only
AV48	Secondary Volumetric Flow	Read Only

Object Instance	Object Name	Read or Write
AV49	ADC Ch1 Input Low voltage	Read Only
AV50	ADC Ch1 Input High voltage	Read Only
AV51	ADC Ch2 Input Low voltage	Read Only
AV52	ADC Ch2 Input High voltage	Read Only
<i>Binary Input</i>		
B11	Digital Input Status	Read Only
<i>Binary Value</i>		
BV1	Relay Status	Read Only
BV2	Primary Pressure Unit	Read/Write
BV3	Secondary Pressure Unit	Read/Write
BV4	Primary Temperature Unit	Read/Write
BV10	Secondary Temperature Unit	Read/Write
BV5	Primary Room Dimension Unit	Read/Write
BV13	Secondary Room Dimension Unit	Read/Write
BV6	Alarm Latch Status	Read/Write
BV7	BMS Input Status	Read Only
BV8	Supervisory Password Status	Read/Write
BV9	Operator Password Status	Read/Write
BV11	User Define Text Status	Read/Write
BV12	Slider Status	Read/Write
BV14	Language Support	Read/Write
BV15	Alarm Condition Blink Status	Read/Write
BV16	Normal Condition Blink Status	Read/Write
BV17	Warning Condition Blink Status	Read/Write
BV18	Blink in Red	Read/Write
BV19	Blink in Green	Read/Write
BV20	Blink in Yellow	Read/Write
BV26	Blink in Blue	Read/Write
BV22	Audible Alarm Status	Read/Write
BV21	Primary Pressure Alarm Status in Neutral Isolation	Read/Write
BV23	Full Screen Condition Banner	Read/Write

Object Instance	Object Name	Read or Write
BV24	Primary Room Volumetric Flow Unit	Read/Write
BV25	Secondary Room Volumetric Flow Unit	Read/Write
<i>Multi State Input</i>		
MSI1	System Operation Status	Read Only
<i>Multi State Value</i>		
MSV1	Analog Output Type	Read Only
MSV2	Primary Room Pressure Mode	Read/Write
MSV13	Secondary Room Pressure Mode	Read/Write
MSV3	Color Mode	Read/Write
MSV14	Red Condition Banner Mode	Read Only
MSV15	Green Condition Banner Mode	Read Only
MSV16	Yellow Condition Banner Mode	Read Only
MSV31	Blue Condition Banner Mode	Read Only
MSV5	Pressure to Display	Read/Write
MSV10	Primary Room Pressure Input Source	Read Only
MSV17	Primary Room Temperature Input Source	Read Only
MSV19	Primary Room Humidity Input Source	Read Only
MSV9	Secondary Room Pressure Input Source	Read Only
MSV23	Secondary Room Temperature Input Source	Read Only
MSV25	Secondary Room Humidity Input Source	Read Only
MSV8	Pressure Alarm Status	Read Only
MSV4	ACH Status	Read Only
MSV11	Digital Input Configuration	Read/Write
MSV12	BMS Input Source	Read Only
MSV29	Room Occupancy Status	Read/Write
MSV6	Primary Parameter 1	Read Only
MSV18	Primary Parameter 2	Read Only
MSV20	Primary Parameter 3	Read Only
MSV22	Primary Parameter 4	Read Only
MSV7	Secondary Parameter 1	Read Only
MSV24	Secondary Parameter 2	Read Only

Object Instance	Object Name	Read or Write
MSV26	Secondary Parameter 3	Read Only
MSV28	Secondary Parameter 4	Read Only
MSV30	ACH_Configuration	Read/Write
<i>Character String Value/Proprietary Object</i>		
1	Primary Room Label	
2	Secondary Room Label	
7	Audit Trail String 1	
8	Audit Trail String 2	
9	Audit Trail String 3	
10	Audit Trail String 4	
11	Audit Trail String 5	
12	Technical Support ID	
13	Statutory Message for Red Color Mode	
14	Statutory Message for Yellow Color Mode	
15	Statutory Message for Green Color Mode	
16	User Defined Text for Red Color Mode	
17	User Defined Text for Yellow Color Mode	
18	User Defined Text for Green Color Mode	
19	Statutory Message for Blue Color Mode	
20	User Defined Text for Blue Color Mode	
<i>Notification Class</i>		
NC1	Primary Room Pressure Out of Limit	
NC2	Primary Room Pressure Alarm	
NC3	Secondary Room Pressure Warning	
NC4	Secondary Room Pressure Alarm	
NC6	Primary Room ACH Out of Limit	
NC7	Primary Room ACH Alarm	
NC8	Secondary Room ACH Out of Limit	
NC9	Secondary Room ACH Alarm	
NC5	Digital Input Open	
<i>Event Enrollment</i>		

Object Instance	Object Name	Read or Write
EE1	Primary Room Pressure Warning	
EE2	Primary Room Pressure Alarm	
EE3	Secondary Room Pressure Warning	
EE4	Secondary Room Pressure Alarm	
EE6	Primary Room ACH Out of Limit	
EE7	Primary Room ACH Alarm	
EE8	Secondary Room ACH Out of Limit	
EE9	Secondary Room ACH Alarm	
EE5	Digital Input Status	

MAINTENANCE

Advanced Pressure Monitor II requires no ongoing preventative maintenance. Once the field engineer has completed the field start-up, the monitor will provide years of continuous operation. If calibration is required to verify accuracy of measurement, field calibration can be done using a calibration device such as a Setra Micro-Cal Model 869. Field calibration should be done by properly trained personnel.

Cleaning

Do not blow into the pressure tubing or fittings with mouth, compressed air or canned air. Such actions may permanently damage the pressure sensor. Do not clean or wash-down the APM2 with industrial cleaners or solvents. The housing may be wiped down with soap and water or isopropyl alcohol. The LCD may only be cleaned with isopropyl alcohol. Do not immerse unit.

AGENCY ELECTRICAL STANDARDS

This device falls into CSA "Pollution Degree 2" for PCB Installation and CSA "Installation Category 2".

This APM2 meets the following requirements:

- **CSA Standard C22.2 No. 0-M 91:** General Requirements - Canadian Electrical Code, Part 1
- **CAN/CSA C22.2 No. 0.4-04:** Bonding of Electrical Equipment
- **CAN/CSA C22.2 No. 61010-1-04:** Safety requirements for electrical equipment for measurement, control and laboratory Use Part-1: General Requirements
- **ANSI/UL61010-1 (Special Edition):** Safety requirements for electrical equipment for measurement, control and laboratory Use Part-1: General Requirements

ANCILLARY PRODUCT SPECIFICATIONS

NOTE: The following specifications are subject to changes without notice.

Model 264 Pressure Transducer (Remote Transducer 0-5 V Output)

Model 264 Pressure Transducer			
Performance Data			
	Standard Accuracy	Mid-Range Accuracy	High Accuracy
Accuracy¹ RSS (at constant temperature)	± 1.0 % FS	± 0.4 % FS	± 0.25 % FS
Non-linearity (BFSL)	± 0.96 % FS	± 0.38 % FS	± 0.22 % FS
Hysteresis	0.10% FS	± 0.10 % FS	0.10% FS
Non-repeatability	0.05% FS	± 0.05 % FS	0.05% FS
Thermal Effects²			
Compensated Range °F (°C)	0 - 150 (-18 - 65)		
Zero/Span Shift % FS/°F (°C)	0.033 (0.06)		
Maximum Line Pressure	10 psi		
Overpressure	Up to 10 psi (range dependent)		
Long-term Stability	0.5% FS / year		
Position Effect	Range	Zero Offset (% FS/G)	
Unit is factory calibrated at 0g effect in the vertical position	To 0.5" WC	0.60	
	To 1.0" WC	0.50	
Environmental Data			
Temperature			
Operating ³ °F (°C)	0 - +175 (-18 - +79)		
Storage °F (°C)	-65 - +250 (-54 - +121)		
Physical Description			
Case	Fire-retardant glass filled polyster (UL94 V-0 Approved)		
Dimensions	2.75" (69.85 mm) W x 5.062" (128.57 mm)H x 2.40" (61.07 mm) D		
Mounting	Four screw holes on removable zinc-plated steel base (designed for 2.75" snap track)		
Electrical Connection	Screw type terminal strip		
Pressure Fittings	3/16" OD barbed brass pressure fitting for 1/4" push-on tubing		
Zero and Span Adjustments	Accessible on top of case		
Weight (approximate)	10 ounces		
Pressure Media			
Typically air or similar non-conducting gases			
Electrical Data—Voltage			
Circuit	3-wire (Com, Exc, Out)		
Excitation	9 - 30 Vdc		
Output ⁴	0 - 5 Vdc ⁵		

Bi-directional output at zero pressure	2.5 Vdc ⁶
Output impedance	100Ω
Electrical Data—Current	
Circuit	2-wire
Output ⁷	4 - 20 mA ⁸
Bi-directional output at zero pressure	12 mA ⁹
Minimum supply voltage (Vdc)	9+0.02 x (resistance of receiver plus line)
Maximum supply voltage (Vdc)	30+0.004 x (resistance of receiver plus line)

¹ RSS of non-linearity, hysteresis and non-repeatability.

² Units calibrated at nominal 70 °F. Maximum thermal error computed from this datum.

³ Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher.

⁴ Calibrated into a 50KΩ load, operable into a 5KΩ load or greater.

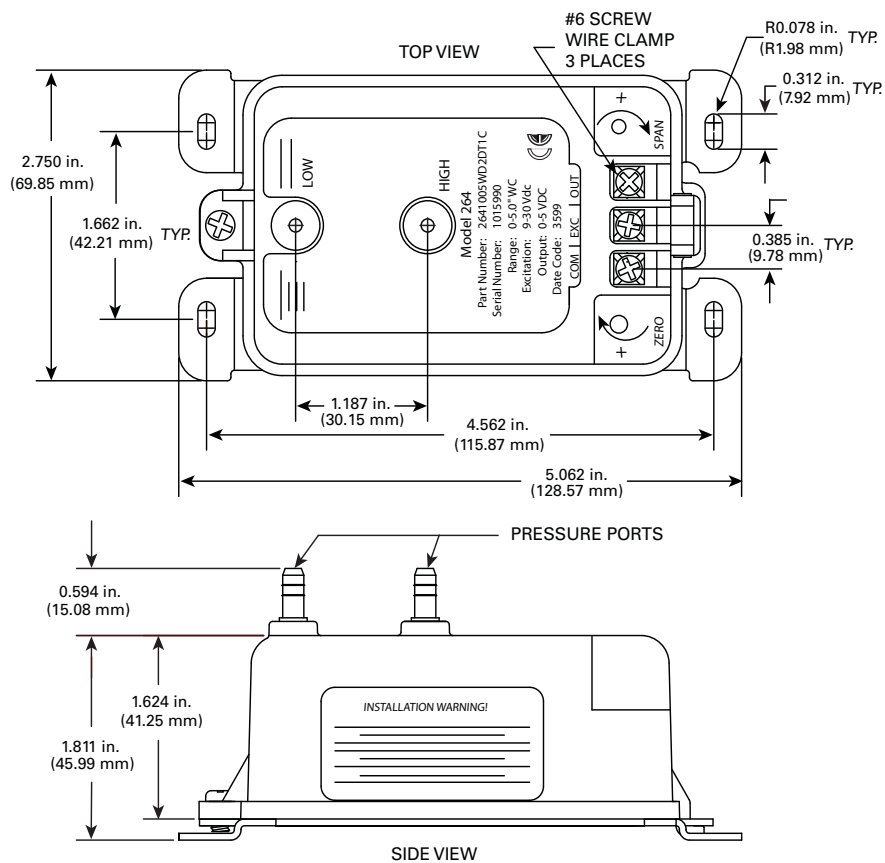
⁵ Zero output factory set to within ± 50 mV (± 25 mV for optional accuracies).

⁶ Span (full scale) output factory set to within ± 50 mV (± 25 mV for optional accuracies).

⁷ Calibrated at factory with a 24 Vdc loop supply voltage and a 250Ω load.

⁸ Zero output factory set to within ± 0.16 mA (± 0.08 mA for optional accuracies).

⁹ Span (full scale) output factory set to within ± 0.16 mA (± 0.08 mA for optional accuracies).

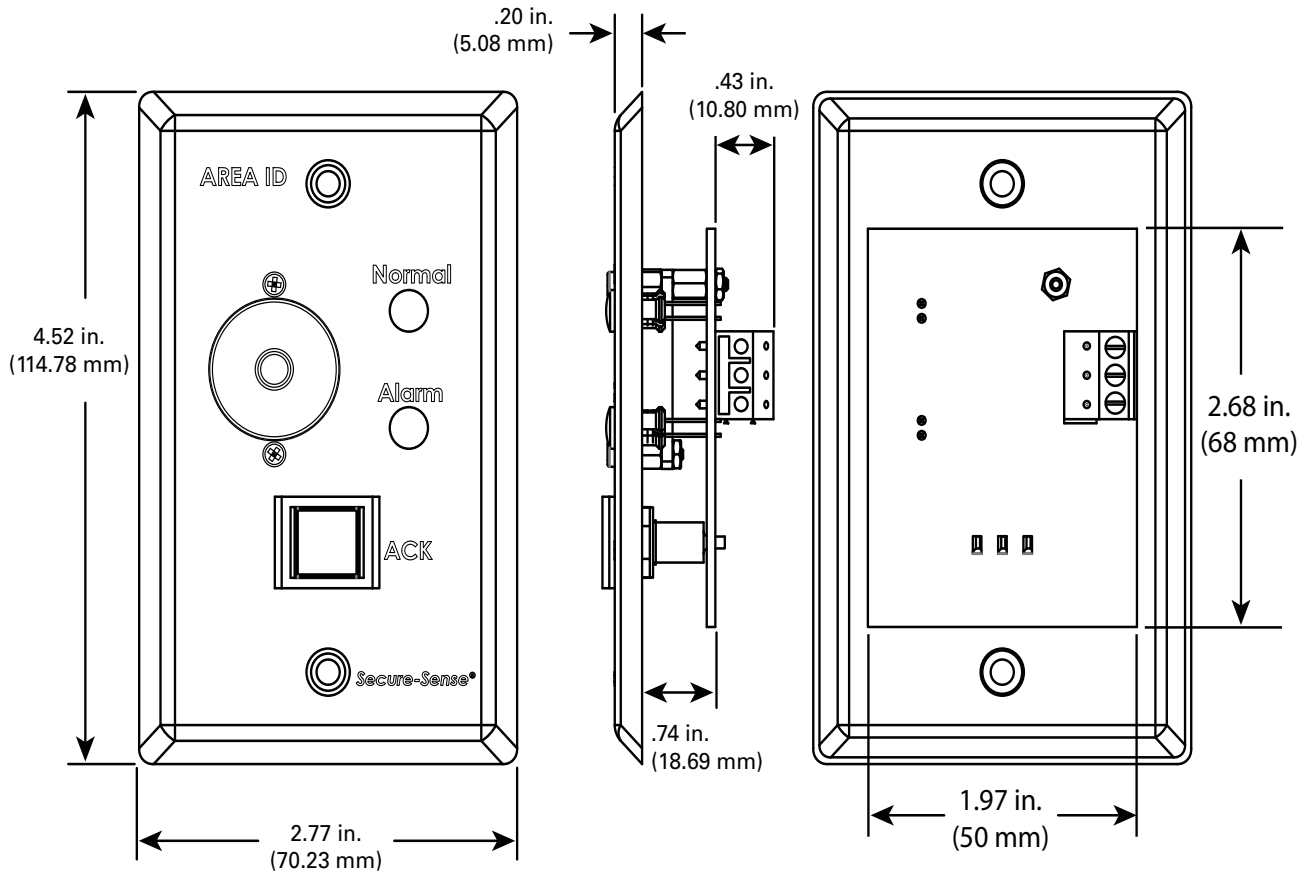


Model 267 Pressure Transducer (0-10V Output)

Performance Data			
	Standard Accuracy	Mid-Range Accuracy	High Accuracy
Accuracy ¹ RSS (at constant temperature)	± 1.0 % FS	± 0.4 % FS	± 0.25 % FS
Non-linearity (BFSL)	± 0.98 % FS	± 0.38 % FS	± 0.22 % FS
Hysteresis	0.10% FS	± 0.10 % FS	0.10% FS
Non-repeatability	0.05% FS	± 0.05 % FS	0.05% FS
Thermal Effects ²			
Compensated Range °F (°C)	40 - 150 (5 - 65)		
Zero/Span Shift % FS/°F (°C)	± 0.033 (± 0.06)		
Maximum Line Pressure	10 psi		
Overpressure	Up to 10 psi (range dependent)		
Warm-up Shift	± 0.1% FS Total		
Position Effect	Range	Zero Offset (% FS/G)	
Unit is factory calibrated at 0g effect in the vertical position	To 0.5" WC	0.60	
	To 1.0" WC	0.50	
Environmental Data			
Temperature			
Operating ³ °F (°C)	0 - +150 (-18 - +65)		
Storage °F (°C)	+65 - +180 (-54 - +82)		
Physical Description			
Case	IP65/NEMA plastic-filled polycarbonate (UL94 V-0 Approved)		
Dimensions	6.20" (158 mm) W x 2.68" (68 mm) H x 3.65" (93 mm) D		
Electrical Connection	Screw type terminal strip		
Electrical Termination	PG-9/PG13.5 Strain relief, 1/2" conduit opening, or 9-pin D-sub connector NOTE: 9-pin D-sub connector is not suitable for NEMA4/IP-65 environments		
Pressure Fittings	3/16" O.D. barbed brass for 1/4" push-on tubing (Standard) Static Pressure Probe (Optional) 1/4" NPTF brass (Optional)		
Weight (approximate)	9 ounces (255 g)		
Pressure Media			
Typically air or similar non-conducting gases			
Electrical Data—Voltage			
Circuit	3-wire (Exc, Gnd, Sig)		
Excitation/Output (0-5 Vdc output) Excitation/Output (0-10 Vdc output)	9 - 30 Vac / 12 - 40 Vdc 11 - 30 Vac / 13 - 40 Vdc		
Bi-directional output at zero pressure	Mid-range of specified output		
Output impedance	100Ω		
Re-ranging	5 position dip switches (inside case)		

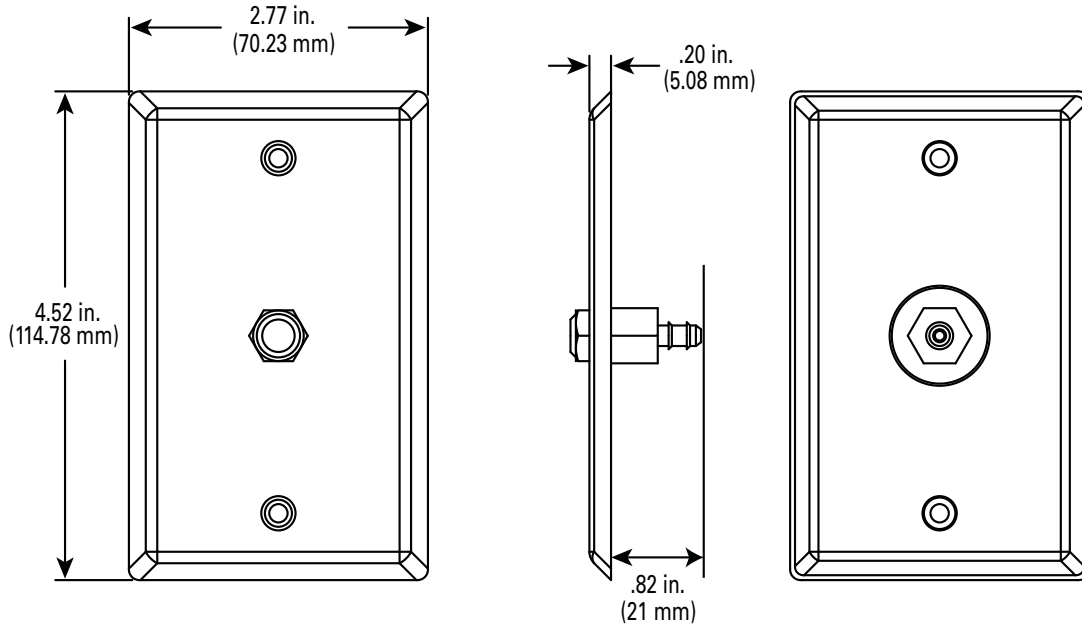
Remote Annunciator

Enclosure	2.75" W x 4.5" H stainless steel wall cover plate
External Supply	15 Vdc, 50 mA maximum
Display Panel	Green and red LED indicators and Acknowledge (ACK) switch
Audible Alarm	0-85 dBA measured 4" from annunciator
Acknowledge Switch	Momentarily turns off audible alarm



Pressure Pickup Port

Cover	Stainless steel standard wall cover plate
Mounting	Standard single gang electrical box (2 screws included)
Dimensions	2.77" (70.23 mm) W x 4.52" (114.78 mm) H x 1.02" (26.08 mm) D
Pressure Fitting	1/4" flexible push-on tubing (Standard)



PHOENIX RECOMMENDED CABLES

Cable Type	Plenum Rated	Function	Wire Gauge	Primary Vendor/Part #	Alternate Vendor/Part #	Color Code	Notes
TSP	No	I/O signal wiring	22	Belden 9501		1: Black&Red	Twisted Shielded Pair
2 TSP	No	I/O signal wiring	22	Belden 9502		1: Black&Red 2: Black&White	Two Twisted Pair, Shielded
3C Round	No	Signal	22	Belden 8443		1: Red 2: Black 3: Green	Must be stranded
3C or 4C Round	Yes	Signal	22	Belden 88444	Windy City 004380	1: Red 2: Black 3: Green 4: White (not used as 3C)	Must be stranded
4C Round	No	Signal	22	Belden 8444	Manhattan M13304	1: White 2: Green 3: Black 4: Red	Must be stranded
5C Round	No	Signal	22	Belden 8445	Manhattan M13305	1: White 2: Brown 3: Black 4: Red 5: Green	Must be stranded
8C	No	Signal	22	Belden 9421	Manhattan M13308	1: White 2: Orange 3: Black 4: Red 5: Green 6: Yellow 7: Blue 8: Brown	No substitutes
8C	Yes	Signal	22	Comtran 4956		1: White 2: Orange 3: Black 4: Red 5: Green 6: Yellow 7: Blue 8: Brown	No substitutes
3C MS/TP	No	Shielded	22	Belden 3106A (120 ohm)		1: White with Orange stripe 2: Orange with White stripe 3: Blue with White stripe	Shielded with drain
3C MS/TP	Yes	Shielded	22	Connect-Air W223C-2060YPC		1: Black 2: White 3: Red	Foil shield with drain wire