

# setra SRCM Room Pressure Monitor

## Installation Instructions



The Setra SRCM Room Pressure Monitor is designed for critical low differential pressure applications that require stringent pressure monitoring and alarming. The SRCM can be configured to monitor positive, negative or neutral pressures in protected environments and hospital isolation rooms per CDC guidelines. The SRCM is a complete system that includes a backlit color TFT (480x272 resolution) display with an intuitive graphic user interface which enables access to pressure, security, calibration, and alarm setup. The touch-screen display menus guide the user through setup, as well as enabling password protection. Color changing display and a local audible alarm (with time delay feature) alert personnel to system status. True differential pressure is displayed with a resolution of up to .0001". Setra's patented very low pressure capacitance sensor is dead ended and avoids the potential for cross contamination of the room and reference space as well as eliminating drift that results from fouling of flow based sensors, which by nature have a flow path connecting the protected and reference spaces. Additionally there are 2 levels of password protection available as well as optional BACnet MSTP communications.

### 1.0 INTENDED USE

The SRCM is designed for indoor use only to monitor critical environments by providing differential pressure indication. Typically this is between a monitored room and a reference space such as a corridor or ante room. The unit also provides monitoring, alarm and communications functions.

Typical Applications:

1. Hospitals – patient isolation and protection rooms, operating suites, intensive care and emergency rooms.
2. Pharmaceutical, semiconductor, precision manufacturing and clean rooms
3. Laboratories – medical research, BSL (Bio safety labs), radiation, vivarium, toxic metals and chemicals

### 1.1 SPECIFICATIONS

**Service:** Air or nonconductive, nonexplosive gases.

**Accuracy:** ±0.5% F.S., +/-0.25% FS optional

**Operating Temperature Limits:** 32 to 120°F (0 to 50°C).

**Operating Humidity Limits:** 5 min. to 95% max. RH (non-condensing).

**Thermal Effects:** ±0.03% F.S./ °F (± 0.05% F.S./ °C).

**Supply Voltage:**

18-30 VAC, 50-60 Hz.

**Power Consumption :** 5 W for Analog only unit and 10 W for Analog with BACnet option.

**Analog Inputs:** 0-5 Vdc, 0-10Vdc or 4-20 mA loop

**Analog Output:** Selectable 4-20 mA (2-wire), 0-5 VDC (3-wire), or 0-10 VDC (3-wire).

**Digital Input:** Contact closure for door status indication

**Loop Resistance (4-20mA output):** 500 Ω max..

**Electrical Connection:** Removable terminal blocks

**Pressure Fittings:** 3/16" Barbed fittings for 1/8" I.D. tubing.

**Housing:** LEXAN 920/940 Per UL 94 V-0

**Mounting:** Mounts to customer supplied 3 gang double deep electrical box

**Weight approx.:** 1.2 lbs

**Agency Approval:** CE, CSA Class 3631 05 and Class 3631 85 Pollution Degree 2 and installation Category 2.

**Communications:** BACnet MSTP ASC, optional, see setra.com for detailed PICS statement and Objects list.

### 1.2 SRCM FUNCTION

The SRCM senses very low differential pressure using high accuracy capacitive sensor technology. The pressure difference for these applications is the difference in static pressure between a critical environment room and its surrounding reference area (usually a hallway or another room). Maintaining and monitoring a static room pressure difference ensures that the critical environment room is either protected or isolated from a surrounding environment. Protection strategy requires a net positive room static pressure difference, while isolation requires a net negative static pressure difference. The SRCM can be programmed to monitor either positive or negative room static pressure. Low pressure sensing technology is coupled with multifunctional alarming and simple touchscreen user interface with password security protection. The BACnet communication option allows the device to communicate with other BACnet devices to allow the supervisory system to change configuration setups and monitor alarms in an open network.

**User Interface:** Touch Screen Display 480 x 272 TFT/WQVGA module, with LED backlight and 4-wire resistive touch screen

The SRCM indicates the status of the room being monitored using colors.

Color      Status

Green      Normal, Room Pressure is within alarm limits

Yellow     Warning, Door is open (Door input must be enabled) or pressure is within the alarm deadband

Red        Alarm. Room Pressure is outside alarm limits and alarm delay period has been exceeded.

Blue       Use to indicate room is safe to enter.

**Audible Feedback:** Buzzer will sound when pressure has exceeded alarm setpoint and alarm delay has timed out. Volume can be adjusted between 1 to 4 in relative sound levels up to the max level. The audible alarm can be disabled.

**Quick Room Mode Change:** Sometimes the room needs to be changed quickly from in use (Occupied) to out of use (Standby). This is accomplished by using 2 levels of password protection. The Operator level allows access to change room modes but no other changes. The Supervisor Level allows full access to all menus. In Standby mode no alarms are generated even if the pressure is outside limits. To change modes press the Menu key, press Setup Display key and change room status to Standby.

## 2.0 PARTS

### 2. 1 SRCM INCLUDED PARTS



Parts included in your order:

- SRCM assembly, including factory calibrated differential pressure sensor, qty 1
- SRCM Faceplate, qty 1
- RPS (Room Static Pressure Sensor) qty 0,1 or 2 (ordered separately)
- 1/4 inch Tubes, Silicone, with springs and barbed couplings, qty 2
- Mounting screws, 6-32x1/2 Phillips head, qty 5
- Mating Electrical Connectors, Phoenix contact MC plug kit, qty 1 with 3 green and 2 black connectors

### 2.2 PARTS REQUIRED AND TO BE SUPPLIED BY INSTALLER MOUNTING AND WIRING

To mount and install properly, the following components are required:

#### NOT INCLUDED and required for each SRCM

Triple Gang Double Deep Metal Electrical Box, RACO 697 or Appleton M3-350 or equivalent: 1

Green grounding screw: 1

Power and signal wiring, as needed

1/4" pressure tubing to run from the room(s) to the Pressure Monitor

Transformer, 24 VAC

Door Switch SPDT or SPST, N.O., as needed

Remote Pressure Transducers, as needed

Remote Annunciators, as needed

#### NOT INCLUDED and required for each SRAN (remote annunciator) and RPS (room pressure snubber)

Quantity

1 Single Gang Electrical Box

1/4" tubing as required to connect between the RPS and the SRCM

#### Overview of Physical Installation

Field Installation is broken up into 3 phases, "planning", "rough in" and "finish". To make installation easier the SRCM was designed to be mounted in a standard "off the shelf" electrical box that is readily available at Electrical Supply houses.

During planning decide what functions will be used, such as analog inputs, analog outputs, door contact inputs, annunciator (SRAN) etc. Order materials including rough in boxes, wiring, tubing, remote pressure sensors as required.

During "rough in" the field wiring and plumbing can be run in the walls and routed between the 3 gang electrical box, the BMS system, door contact switch, remote sensors (if applicable), power supply, earth ground, etc.

During "finish" phase the pressure tubing will be terminated at the monitor (if using the internal pressure sensor) and the wiring will be terminated at the electrical mating connectors (provided).

After the physical installation phase, the unit will be configured for the specific application through the Touch Screen user Interface.

Note that failure to perform installation as specified here may result in reduced safety or performance from the unit.

**Cleaning and Decontamination:** Unit is IP54 rated against dust and liquid penetration. Exposed surfaces are chemically resistant to vaporized hydrogen peroxide, formaldehyde, chlorine dioxide, perchloric acid, sodium, hypochloride 3-6% (bleach), and quaternary ammonia 7% in 1:128 tap water (amonia).

### 3.0 INSTALLATION

The SRCM is designed to be mounted in a standard triple gang double deep electrical box RACO 697 or Appleton M3-350 or equivalent.

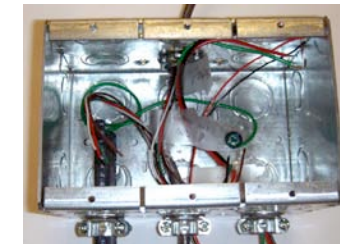
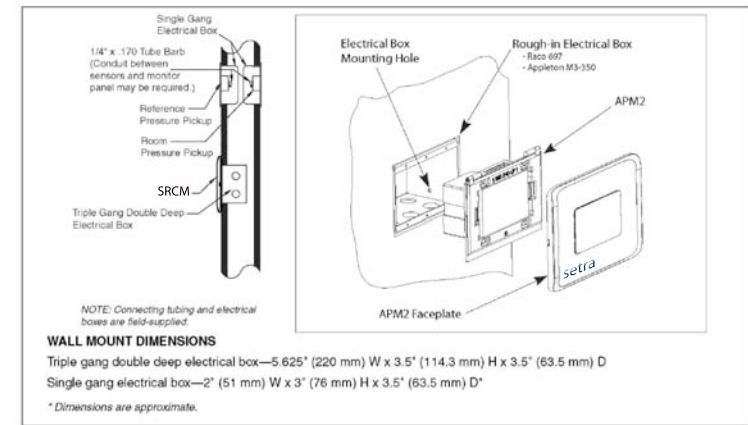
- A typical SRCM setup consists of a room pressure pick-up, a reference space pressure pickup and a room pressure monitor panel, which houses a differential pressure sensor.
- The two pressure pickup ports are installed in single gang electrical boxes, which are placed in the room walls.
- Standard 1/4" (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.

**NOTE:** Secure the triple gang-double deep electrical box to the stud(s) using the mounting hole in the side of the electrical box (see figure above 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.

#### 3.1 WIRING ELECTRICAL BOX (ROUGH IN)

Wiring must be performed by a licensed Electrician according to local and state electrical codes.

Use only the knockouts at the back of the rough in box. The front knockouts will be inaccessible once the room pressure monitor is installed. Strain relief tubing and wires, and seal box as required.



3 gang electrical box rough wiring and plumbing

The SRCM has the option to use the internal pressure sensor or external pressure transducers (ordered separately). If external pressure transducers are being used, no tubing needs to be run into the electrical box. The remote pressure transducer(s) will be separately mounted, plumbed and wired. The analog output of the transducer(s) will be run to the SRCM. If two rooms are being monitored, you have the choice to use the internal pressure sensor and an external (remote) transducer for the second room or two external remote transducers may be used and wired to the analog inputs in the back of the SRCM.

#### Layout the system in terms of wiring:

- All wires are 16 AWG max.
- Power 24 VAC, 10 VA.
- Annunciator/relay, remote alarm wiring if being used
- Analog output, 0-5 Vdc or 0-10 Vdc or 4-20 mA.
- Analog Input wiring, there are 2 analog inputs that can be used to bring signals from remote pressure transducers
- Digital Input, the digital input can be used as a door status indication, these would be wired to a door switch mounted in the door jamb.

#### 3.2 BACnet Wiring

BACnet MS/TP network, if that option has been ordered. BACnet suggested wiring is 22 AWG stranded wire in a shielded cable, a +, -, Gnd and shield should be run. This can be 2 twisted pairs with a separate cable shield. One twisted pair is used for communications, the second twisted pair can be used for communications ground and the shield wire can be connected to the other device shield wires.

BACnet hardware is implemented as isolated RS485. Wire to Connector COMM, labeled RS485. Connect TX line to B (+), RX to A (-) and ground wires to GND. Connect shields together with wire nut.

Hardware configuration is done using a five position dip switch located in the upper right hand section of the PCB as well as through the touch screen interface.

Switch Position	Function
1	Network Setup Enable
2	Not Connected (Not Used)
3	Pull Up Resistor
4	Termination Resistor
5	Pull Down Resistor

Use a small flat blade screwdriver or pen to push the switch to the right to turn the function on, otherwise it is off. Set Position 1 to on (right) to enable network setup. Complete the setup by using the Network Setup Screen.

If the unit will be at the end of the line, the pull up resistor can be enabled by pushing position 3 to on.

The termination resistor can be inserted by pushing position 4 switch on. The pull down resistor can be enabled by turning position 5 to on.

If Pull UP, Pull Down or Termination Resistors are not used, disable them by



pushing switch to the left.

Once the installation has been planned, locate and mount the electrical box and bring all power, earth ground, analog input, digital input, relay/annunciator, analog output communications wiring into the triple gang box. If an SRAN remote annunciator will be used then also mount a single gang electrical box in the desired location and run wires to it.

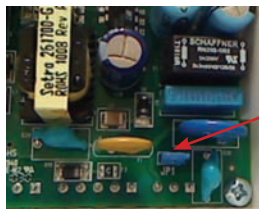
### 3.3 NETWORK SETUP

The BACnet setup screen is enabled by pushing position 1 switch (labeled MAC) of the on (right) position. After configuration, the switch must be moved to the off (left) position.

The Network Setup screen gives the option for the user to configure the Network and other parameters which have to be read from the network.

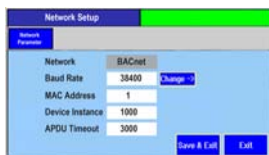
BACnet configuration requires the user to configure the following parameters:

1. Baud Rate — User can select any one of the 4 standard Baud rates for RS485 communication from 9600, 19200, 38400, and 76800 by using the change button. Auto baud features is not supported.



JP1

2. MAC Address — User can enter Medium Access Control address specific to this device by touching on this field. User can enter a value from 0 to 127 as this unit is a BACnet master, address 128 to 254 reserved for 254 and 255 reserved for Broadcast.



3. Device Instance — The Device Instance number must be unique within a BACnet internetwork to identify each device. Instance numbers are defined as 22 bit long, in decimal instance number ranges from 0 to 4194,3,03. FFFFDD is the network addressing scheme, here FFFF represents the Facility code, N is the number of the network in the building and DD ranges from 0 to 99 to represent the individual device on the network.

4. APDU Timeout — Indicates the amount of time in milliseconds between retransmission of an APDU requiring acknowledgement for which no acknowledgement has been received. The default value for this property will be 3,000 ms and max can be 65535.

Save and Exit to save settings or cancel to cancel setting changes.

Once complete, disable the BACnet setup by moving the dip switch position 1 to off (left) position.

After the unit returns to the menu screen disconnect the power to the unit and reconnect in order to boot up with the proper MAC address and Device Instance. The power can also be cycled by removing the Jumper JP1 and then reconnecting.

### 3.4 Plumbing (Rough In)

If the internal pressure sensor will be used then typically a Room Pressure Sensor pickup (RPS) is installed in the monitored room and another one is installed in the reference area (typically a hallway). ¼" nylon tubing is typically used to bring the pressure signal from the point of measurement to the pressure inputs on the SRCM.

Install a single gang electrical box inside the room. This will be used for the room pressure signal ( room monitor pressure port labeled HIGH). Run ¼" tubing from this electrical box to the 3 gang box that the pressure monitor (SRCM) will be mounted to in the finish stage of the installation. Be careful in running the tubing in a way that the tube is protected from being damaged either by being cut or penetrated by screws or nails or being crimped so that the pressure signal integrity is affected. Tape the open ends of the tubes closed to prevent contamination of the inside of the tubing during construction.

Install a second single gang box on the corridor, ante room or other ref. pressure area. This will be used for the low pressure side or reference side pressure signal. Tubing should be run to connect this RPS to the 3 gang box and connected to the monitors pressure port labeled LOW.

If an external sensor will be used then run the pressure signals (room and reference) to the remote transducer.



Single gang electrical box housing the RPS

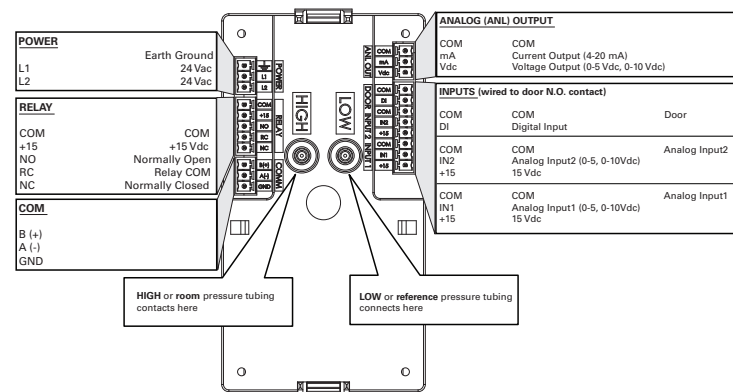
**PLUMBING (FINISH)** Use the following procedure for all room types positive, negative or neutral:

The biggest problem that can occur during plumbing is kinking the often stiff nylon ¼" tubing that is used for running pressure signals from the SRCM to the monitored spaces. To prevent buckling and collapse of this stiff tubing inside the electrical box use the supplied soft silicone tubing with external springs and tubing adapters to transition from the field tubing to the pressure fittings on the SRCM.

Attach pressure tubing as follows:

1. Install one of the supplied strain relief adaptors onto the end of the ¼" field tubing. Thread the tubes, with installed adaptor, through the conduit opening at the bottom of the electrical box to minimize extra tubing in the box.
2. Next push the open end of the soft silicone tubing onto the SRCM pressure tube port labeled "HIGH".
3. For the most pressure stable operation, an RPS installed in the reference pressure area is also recommended. In this case, install the RPS in a hallway or reference space. Attach the tube to the SRCM in the same way as for the "HIGH" port, except attach the tube to the "LOW" port.

### 3.4 WIRING (Finish)



View of rear of the monitor to show wiring and plumbing connections

The back of the Room Pressure Monitor has electrical connectors labeled with their function. The mating electrical connectors (supplied) are color coded, keyed, and labeled with the matching function.

#### Power, labeled POWER, L1, L2, ground symbol

Starting with the 3 pin Power connector. Connect the 24 VAC lines to L1 and L2. Connect a ground wire, GND, from a ground lug in the 3 gang box to the GND on the connector. The Monitor operates at 18-32 VAC, 50/60 Hz and consumes 2.6 W nominal, 5 W max. Do not turn on power until all other connections have been made.

#### Analog Output, labeled ANL OUT

If using the analog output and want Voltage output connect to the terminals labeled VDC and COM.

If using the analog out and want a 4-20 mA signal, connect to terminals labeled mA and COM. Connect this output to the BMS system or other monitoring device.

#### Analog Input, labeled DOOR, INPUT2, INPUT1

There are 2 analog inputs available for remotely mounted transducer inputs. These are INPUT1 and INPUT2.

A 15 (14.8 to 15.2) Vdc excitation is available to power up to 2 transducers. They can source 90 mA max. combined. It is labeled as +15 on the connectors, If using this to power a remote transducer, connect this to the +exc. terminal of the transducer. There are 3 potential analog inputs that can be measured, 0-5 Vdc, 0-10 Vdc and 4-20 mA.

For 0-5 Vdc or 0-10 Vdc inputs connect the +output of the transducer to terminal labeled IN1, connect the common output of the transducer to the terminal labeled COM. For 4-20 mA loops install a precision 250 ohm resistor between the terminals labeled mA and COM. The monitor will be measuring the voltage across this resistor as 1-5 VDC corresponding to 4-20 mA.

If you will be monitoring the status of a door position, wire the contacts labeled DOOR (DI & COM) to the normally open contacts on a door jamb switch. The monitor will show the door "warning" (when enabled) when the door is open. The door jamb switch should be closed when the door is closed and open when the door is open.

Note: For CE compliance a properly grounded shielding cable is required for analog input and output.

#### 3.4.1 RELAY AND ANNUNCIATOR OUTPUT (labeled RELAY)

There is an SPDT dry contact available. When an alarm occurs the Normally Open (NO) and the Common (COM) internal contacts will be closed. During no alarm conditions the Normally Closed (NC) and COM are shorted. This relay can also drive a remote Annunciator.

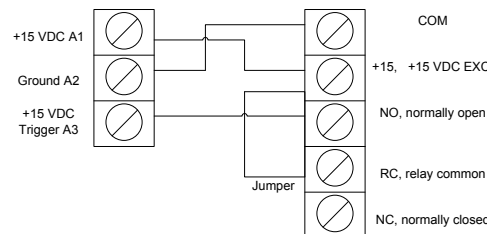
#### 3.4.2 OPTIONAL REMOTE ANNUNCIATOR WIRING SRAN wiring

In the figure below, the SRAN remote annunciator connector is at left, and the SRCM connector is at right:

+15 VDC power: Connect the +15 VDC from the Relay Connector to terminal A1 at the SRAN. This supplies 15V exc. to the Annunciator for powering the circuit during normal conditions.  
Power Return: Connect the COM of Relay Connector to Ground A2 at the SRAN

On of the relay connector: Connect a short jumper between the +15 and RC, this will connect the internal 15V supply to the common of the internal alarm relay. Connect the NO on the relay output to the +15 VDC trigger, A3 terminal on SRAN.

When an alarm occurs and after the programmed alarm delay times out the internal relay will supply 15 V to the Annunciator circuit to actuate the audible buzzer and the red LED.



#### Non-Setra Remote Annunciator

The SRCM can drive other annunciators that are powered by a 15V supply, 50 mA max current draw., and accept a 15V trigger.

#### Completing Finish Wiring

Connect all the electrical connectors matching the wiring connector with the mates on the back of the unit. Connect the pressure signals to the HIGH and LOW ports on the back of the unit. The springs on the outside of the tubing are there to prevent buckling of the tube. As you push the unit into the electrical box push the black instrument tubing into the conduit tube or into the wall. Ideally the supplied silicone tube is the only tubing in the electrical box after the unit is slid in as far as it will go. Mount the unit cover to the electrical box using 4 of the supplied mounting screws. Leaving screws slightly loose adjust the cover so that it is square. Securely tighten so that the back of the cover is tight to the finish wall surface.



Mount the front cover assembly.

### 4.0 MAINTENANCE

The SRCM is designed to operate in an indoor environment, monitoring clean, dry air.

Upon final installation of the SRCM Room Pressure Monitor, no routine maintenance is required. A periodic check of system calibration is recommended. The SRCM is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

#### CLEANING Important

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 SRCM 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.

### 5.0 AGENCY ELECTRICAL STANDARDS

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

The SRCM 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/UL610-10-1 (Second Edition): Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General Requirements

### 6.0 RETURNING PRODUCTS FOR REPAIR

When returning a product to Setra Systems, the material should be carefully packaged and shipped prepaid to: Setra Systems, Inc.,159 Swanson Road,Boxborough, MA 01719-1304, Attn.: Repair Department

To assure prompt handling, please refer to return instructions on our Web site at [http://www.setra.com/tra/repairs/cal\\_rep.htm](http://www.setra.com/tra/repairs/cal_rep.htm).

### 7.0 WARRANTY AND LIMITATION OF LIABILITY

SETRA warrants its products to be free from defects in materials and workmanship, subject to the following terms and conditions: Without charge, SETRA will repair or replace products found to be defective in materials or workmanship within the warranty period; provided that:  
a) the product has not been subjected to abuse, neglect, accident, incorrect wiring not our own, improper installation or servicing, or use in violation of instructions furnished by SETRA;  
b) the product has not been repaired or altered by anyone except SETRA or its authorized service agencies;  
c) the serial number or date code has not been removed, defaced, or otherwise changed; and  
d) examination discloses, in the judgment of SETRA, the defect in materials or workmanship developed under normal installation, use and service;  
e) SETRA is notified in advance of and the product is returned to SETRA transportation prepaid. Unless otherwise specified in a manual or warranty card, or agreed to in writing and signed by a SETRA officer, SETRA pressure, humidity, and acceleration products shall be warranted for one year from date of sale.

The foregoing warranty is in lieu of all warranties, express, implied or statutory, including but not limited to, any implied warranty of merchantability for a particular purpose. SETRA's liability for breach of warranty is limited to repair or replacement, or if the goods cannot be repaired or replaced, to a refund of the purchase price. In no instance shall SETRA be liable for incidental or consequential damages arising from a breach of warranty, or from the use or installation of its products. No representative or person is authorized to give any warranty other than as set out above or to assume for SETRA any other liability in connection with the sale of its products.  
For all CE technical questions, contact Setra Systems, USA. EU customers may contact our EU representative Hengstler GmbH, Uhländstr 49, 78554 Aldingen, Germany (Tel: +49-7424-890; Fax: +49-7424-89500).

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