

ENERGY AND COMFORT

Critical Environments  
Monitors/Controllers

# **Models 8630-SM 8630-PM**

PRESSURA™  
Room Pressure Controller

Operation and Service Manual

P/N 1980242, Revision E  
May 2009



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8630-PM**  
PRESSURA™  
Room Pressure Controller

Operation and Service Manual

May 2009  
P/N 1980242 Rev. E

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## CONTENTS

<b>HOW TO USE THIS MANUAL</b> .....	iii
<b>PART ONE</b>	
<b>USER BASICS</b> .....	1
The Instrument .....	1
Operator Panel .....	3
Alarms .....	5
Before Calling TSI .....	5
<b>PART TWO</b>	
<b>TECHNICAL SECTION</b> .....	7
Software Programming.....	8
Menu and Menu Items.....	12
Calibration .....	25
Maintenance and Repair Parts.....	27
Troubleshooting Section.....	29
<b>APPENDIX A</b>	
<b>SPECIFICATIONS</b> .....	37
<b>APPENDIX B</b>	
<b>WIRING DIAGRAMS</b> .....	38
<b>APPENDIX C</b>	
<b>ACCESS CODES</b> .....	39

### How to Use This Manual

The PRESSURA™ Operation and Service Manual is divided into two parts. Part one describes how the PRESSURA™ unit functions and how to interface with the device. This section should be read by users, facilities staff, and anyone who requires a basic understanding of how the PRESSURA™ controller operates.

Part two describes the technical aspects of the product which includes operation, calibration, configuration, maintenance, and troubleshooting. Part two should be read by personnel programming or maintaining the unit. TSI recommends thoroughly reading this manual before changing any software items.

**NOTE:** This operation and service manual assumes proper PRESSURA™ controller installation. Refer to the Installation Instructions to determine if the PRESSURA™ controller has been properly installed.



## Part One

### User Basics

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Reading product manuals should not be a difficult and time-consuming process. This section provides a brief but thorough overview of the PRESSURA™ product by maximizing information with minimal reading. These few pages explain the purpose (The Instrument), and the operation (Useful User Information, Digital Interface Module, Alarms) of the unit. Technical product information is available in Part Two of the manual. The manual focuses on hospital isolation rooms, but the product information is accurate for any room pressure application.

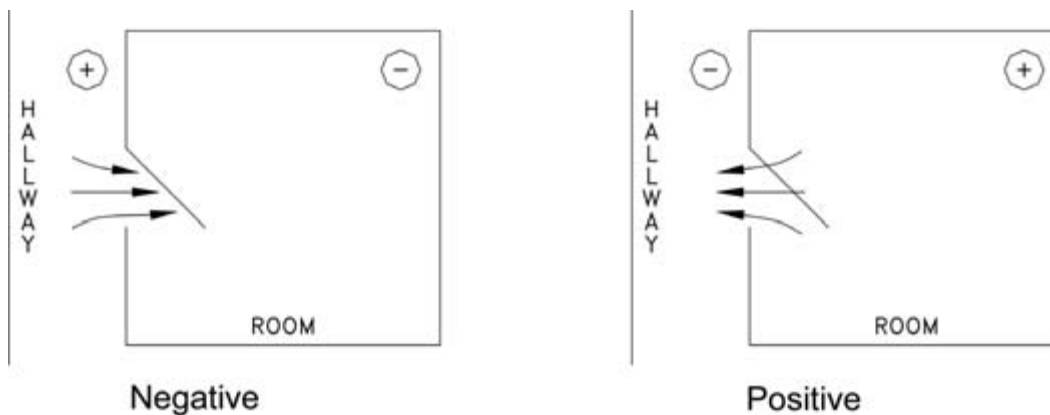
### The Instrument

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PRESSURA™ Room Pressure Controller measures and reports “room pressure”. Proper room pressure can control airborne contaminants that can adversely affect patients and hospital staff. For example, tuberculosis (TB) isolation rooms need negative room pressure (air flowing into the room), to minimize TB exposure to staff and other patients. Conversely, surgical areas and bone marrow patient rooms need positive room pressure (air flowing out of the room), to keep out contaminants that may adversely affect the patient.

Room pressure, or pressure differential, is created when one space (hallway) is at a different pressure than an adjoining space (patient room). When a pressure differential is created between two spaces, air is forced to flow from the higher pressure space to the lower pressure space. The direction of air flow is one component of proper room pressure. The second component of room pressure is the speed or how fast is the air moving between the two spaces. The PRESSURA™ controller provides both pieces of information by measuring whether the air is flowing into or out of a room, and the speed of the air.

Negative room pressure is present when air flows from a hallway / ante room into the patient room. If air flows from the patient room into the hallway / ante room the room is under positive pressure. Figure 1 gives a graphic example of positive and negative room pressure.



**Figure 1: Room Pressure**

An example of negative pressure is a bathroom with an exhaust fan. When the fan is turned on, air is exhausted out of the room creating a slight negative pressure in the bathroom compared to the hallway. This pressure differential forces air to flow from the hallway into the bathroom.

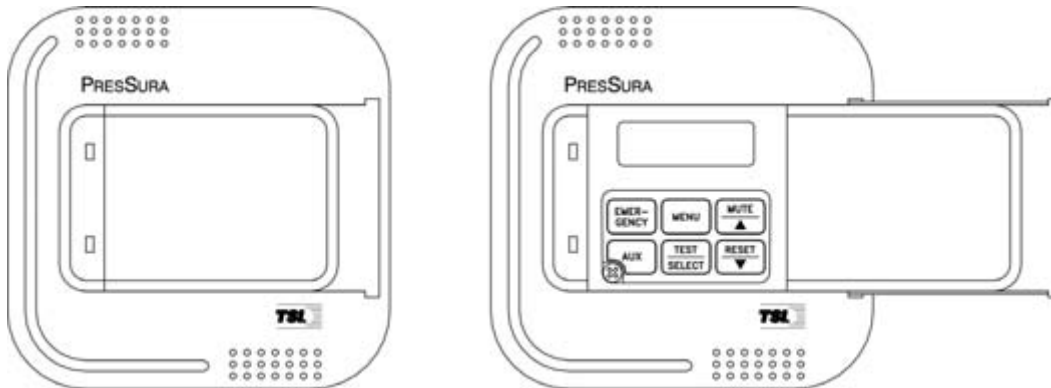
The PRESSURA™ device informs the staff when the room is under proper pressure, and provides alarms when the room pressure is inadequate. If the room pressure is in the safe range, a green light is on. If the pressure is inadequate, a red alarm lights and audible alarm turns on.

The PRESSURA™ controller consists of two pieces: a pressure sensor and a Digital Interface Module (DIM). The pressure sensor is mounted above the doorway entrance to the isolation room. Usually the DIM is mounted near the entrance to the isolation room or at the nursing station. The pressure sensor continuously measures the room pressure and provides room pressure information to the DIM. The DIM continuously reports the room pressure and activates the alarms when necessary. PRESSURA™ Room Pressure Controller is a continuous measuring system providing instant information on the room pressure.

### Useful User Information

The DIM has a green light and red light to indicate room pressure status. The green light is on when the room has proper room pressure. The red light comes on when an alarm condition exists.

Sliding the door panel to the right reveals a digital display and keypad (Figure 2). The display shows detailed information about room pressure, alarms, etc. The keypad allows you to test the device, and program or change the device parameters.



**Figure 2: Digital Interface Module (DIM)**

PRESSURA™ controller has two levels of user information:

1. PRESSURA™ controller has a red light and green light to provide continuous information on room pressure status.
2. PRESSURA™ controller has a hidden operator panel providing detailed room status information, self-testing capabilities, and access to the software programming functions.

**NOTE:** The unit provides continuous room pressure status through the red and green light. The operator panel is normally closed unless further information on room pressure status is needed, or software programming is required.



## User Keys - Gray with Black Letters

The four keys with black letters provide information without changing the operation or the function of the unit.

### TEST Key

The **TEST** key initiates an instrument self-test. Pressing the **TEST** key activates a scrolling sequence on the display that shows the product model number, software version, and alarm values. The unit then performs a self test that tests the display, indicator lights, audible alarm, and internal electronics to ensure they are operating properly. If a problem with the unit exists, "DATA ERROR" will be displayed. You should have qualified personnel determine the problem with the unit.

### RESET Key

The **RESET** key performs two functions. 1) Resets the alarm light, alarm contacts, and audible alarm when in a latched or non automatic reset mode. The room pressure must be in the safe or normal range before the **RESET** key will operate. 2) Clears any displayed error messages.

### MUTE Key

The **MUTE** key temporarily silences the audible alarm. The time the alarm is temporarily silenced is programmable by you (see MUTE TIMEOUT). When the mute period ends, the audible alarm turns back on if the alarm condition is still present. **NOTE:** You can program the audible alarm to be permanently turned off (see AUDIBLE ALM).

### AUX Key

The **AUX** key is active only in specialty applications and is not used on the standard PRESURA™ controller. If the **AUX** key is used, a separate manual supplement will explain the **AUX** key function.

## Programming Keys - Gray with Blue Characters

The four keys with blue print are used to program or configure the unit to fit a particular application.

**WARNING:** Pressing these keys will change how the unit functions, so please thoroughly review the manual before changing menu items.

### MENU Key

The **MENU** key performs three functions. 1) Provides access to the menus when in the normal operating mode. 2) When the unit is being programmed, the **MENU** key acts as an escape key to remove you from an item or menu, without saving data. 3) Returns the unit to the normal operating mode. The **MENU** key is further described in the [Software Programming](#) section of this manual.

### SELECT Key

The **SELECT** key performs three functions. 1) Provides access to specific menus. 2) Provides access to menu items. 3) Saves data. Pressing the key when finished with a menu item will save the data, and exit you out of the menu item.

### ▲/▼ Keys

The ▲/▼ keys are used to scroll through the menus, menu items, and through the range of item values that can be selected. Depending on the item type the values may be numerical, specific properties (on / off), or a bar graph.

## Alarms

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PRESSURA™ controller has visual (red light) and audible alarms to inform you of changing conditions. The alarm levels (set points) are determined by hospital personnel, which could be the infection control group, charge nurse, or a facilities group depending on the hospital organization.

The alarms, audible and visual, will activate whenever the preset alarm level is reached. Depending on the PRESSURA™ model installed, programmed alarms will activate when room pressure is low or inadequate, when room pressure is high or too great, or when the supply or exhaust air flow is insufficient. When the isolation room is operating safely, no alarms will sound.

Example: The low alarm is preset to activate when the room pressure reaches -0.001 inches H<sub>2</sub>O. When the room pressure drops below -0.001 inches H<sub>2</sub>O (gets closer to zero), the audible and visual alarms activate. The alarms turn off (when set to unlatched) when the unit returns to the safe range which is defined as negative pressure greater than -0.001 inches H<sub>2</sub>O.

### Visual Alarm Operation

The red light on the front of the unit indicates an alarm condition. The red light is on for all alarm conditions, low alarms, and high alarms.

### Audible Alarms

The audible alarm is continuously on in all low and high alarm conditions. The audible alarm can be temporarily silenced by pressing the **MUTE** key. The alarm will be silent for a period of time (see MUTE TIMEOUT to program time period). When the timeout period ends, the audible alarm turns back on if the alarm condition is still present.

You can program the audible alarm to be permanently turned off (see AUDIBLE ALM). The red alarm light will still turn on in alarm conditions when audible alarm is turned off.

The audible and visual alarms can be programmed to either automatically turn off when the unit returns to the safe range or to stay in alarm until the **RESET** key is pressed (See ALARM RESET).

## Before Calling TSI

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The manual should answer most questions and resolve most problems you may encounter. If you need assistance or further explanation, contact your local TSI representative or TSI. TSI is committed to providing high quality products backed by outstanding service.

Please have the following information available prior to contacting your authorized TSI Manufacturer's Representative or TSI:

- Model number of unit\*                      8630-\_\_\_\_
- Software revision level\*
- Facility where unit is installed

\* First two items that scroll when **TEST** key is pressed

Due to the different PRESSURA™ models available, the above information is needed to accurately answer your questions.

For the name of your local TSI representative or to talk to TSI service personnel, please call TSI at (800) 874-2811 (U.S. and Canada) or (001 651) 490-2811 (other countries).



## PART TWO

### Technical Section

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The PRESSURA™ controller is ready to use after being properly installed. The pressure sensor is factory calibrated prior to shipping, and should not need adjustment. The Digital Interface Module (DIM) is programmed with a default configuration that can be easily modified to fit your application.

The Technical section is separated into five parts that cover all aspects of the unit. Each section is written as independently as possible to minimize flipping back and forth through the manual for an answer.

The [Software Programming](#) section explains the programming keys on the DIM. In addition, the programming sequence is described, which is the same regardless of the menu item being changed. At the end of this section is an example of how to program the DIM.

The [Menu and Menu Item](#) section lists all of the software items available to program and change. The items are grouped by menu which means all calibration items are in one menu, alarm items in another, etc. The menu items and all related information including programming name, description of menu of item, range of programmable values, and how the unit shipped from the factory (default values). This manual covers two models. The features unique to the premium unit are **highlighted** in Figure 6, and are identified as *Premium model only* items.

The [Calibration](#) section describes the required technique to compare the pressure sensor reading to a thermal anemometer, and how to adjust the zero and span to obtain an accurate calibration. This section also describes how to zero a TSI flow station transducer.

The [Maintenance and Repair Part](#) section covers all routine maintenance of equipment, along with a list of repair parts.

The [Troubleshooting](#) section is split into two areas: Mechanical operation of the unit and system performance. Many external variables will affect how the unit functions so it is critical to first determine if the unit is having mechanical problems - i.e., no display on unit, remote alarms don't function, etc. If problems still exist, look for performance problems (i.e., doesn't seem to read correctly, display fluctuates, etc.). The first step is to determine that the system is mechanically operating correctly, followed by modifying the configuration to eliminate the performance problems.

## Software Programming

---

Programming the PRESSURA™ Room Pressure Controller is quick and easy if the programming keys are understood, and the proper key stroke procedure is followed. The programming keys are defined first, followed by the required keystroke procedure. At the end of this section is a programming example.

**NOTE:** It is important to note that the unit is always operating when programming. When a menu item value is changed, the new value takes effect *immediately* after saving the change, not when the unit returns to normal operating mode.

This section covers programming the instrument through the keypad and display. If programming through RS-485 communications, use the host computer's procedure. The changes take place immediately upon saving data in the instrument.

### Programming Keys

The four keys with blue characters (refer to Figure 4) are used to program or configure the unit to fit your particular application. Programming the instrument will change how the unit functions, so thoroughly review the items to be changed.



Figure 4. Programming Keys.

### MENU Key

The **MENU** key has three functions.

1. The **MENU** key is used to gain access to the menus when the unit is in the normal operating mode. Pressing the key once will exit the normal operating mode and enter the programming mode. When the **MENU** key is first pressed, the first two menus are listed.
2. When the unit is being programmed, the **MENU** key acts like an escape key.
  - When scrolling through the main menu, pressing the **MENU** key will return the unit to standard operating mode.
  - When scrolling through the items on a menu, pressing the **MENU** key will return you to the list of menus.
  - When changing data in a menu item, pressing the **MENU** key will escape out of the item without saving changes.
3. When programming is complete, pressing the **MENU** key will return the unit to normal operating mode.

### **SELECT Key**

The **SELECT** key has three functions.

1. The **SELECT** key is used to gain access to specific menus. To access a menu, scroll through the menus (using arrow keys) and place the flashing cursor on the desired menu. Press the **SELECT** key to select the menu. The first line on the display will now be the selected menu, and the second line will show the first menu item.
2. The **SELECT** key is used to gain access to specific menu items. To access a menu item scroll through the menu items until item appears. Press the **SELECT** key and the menu item will now appear on the first line of the display, and the second line will show the item value.
3. Pressing the **SELECT** key when finished changing an item will save the data, and exit back to the menu items. An audible tone (3 beeps) and visual display (“saving data”) gives confirmation data is being saved.

### **▲/▼ Keys**

The ▲/▼ keys are used to scroll through the menus, menu items, and through the range of item values that can be selected. Depending on the item type the values may be numerical, specific properties (on / off), or a bar graph.

**NOTE:** When programming a menu item, continuously pressing the arrow key will scroll through the values faster than if arrow key is pressed and released.

### **Keystroke Procedure**

The keystroke operation is consistent for all menus. The sequence of keystrokes to follow is the same regardless of the menu item being changed.

1. Press the **MENU** key to access the main menu.
2. Use the ▲/▼ keys to scroll through the menu choices. The blinking cursor needs to be on the first letter of the menu you want to access.
3. Press the **SELECT** key to access chosen menu.
4. The menu selected is now displayed on line one, and the first menu item is displayed on line 2. Use the ▲/▼ keys to scroll through the menu items. Scroll through the menu items until desired item is displayed.
5. Press the **SELECT** key to access chosen item. The top line of display shows menu item selected, while the second line shows current item value.
6. Use the ▲/▼ keys to change item value.
7. Save the new value by pressing the **SELECT** key (pressing the **MENU** key will exit out of menu function without saving data).
8. Press the **MENU** key to exit current menu, and return to main menu.
9. Press the **MENU** key again to return to normal instrument operation.

If more than one item is to be changed, skip steps 8 and 9 until all changes are complete. If more items in the same menu are to be changed, scroll to them after saving the data (step 7). If other menus need to be accessed, press the **MENU** key once to access list of menus. The instrument is now at step 2 of the keystroke sequence.

### Programming Example

The following example demonstrates the keystroke sequence explained above. In this example the positive pressure low alarm set point will be changed from +0.00035 inches H<sub>2</sub>O to +0.00050 inches H<sub>2</sub>O.

① Unit is in normal operation scrolling room pressure, flows, etc. Pressure is shown in this case:

```

PRESSURE
+.00085 "H2O
    
```

② Press the **MENU** key to gain access to the menus.

```

MENU
    
```

The first 2 menu choices are displayed.

```

ALARM
CONFIGURE
    
```

③ Press the **SELECT** key to access the ALARM menu.

```

SELECT
    
```

**NOTE:** Blinking cursor must be on A in Alarm.

Line 1 shows menu selected.  
Line 2 shows first menu item.

```

ALARM
NEG LOW ALM
    
```

④ Press the ▼ key until POS LOW ALM is shown on display.

```

▼
    
```

Menu selected  
Item name

```

ALARM
POS LOW ALM
    
```

⑤ Press the **SELECT** key to access the positive low alarm set point. The item name (POS LOW ALM) will now be displayed on line 1, and the item's current value will be displayed on line 2.

```

SELECT
    
```

Item Name  
Current Value

```

POS LOW ALM
+.00035 "H2O
    
```

⑥ Press the ▼ key to change the positive low alarm set point to 0.00050 inches H<sub>2</sub>O.

```

▼
    
```

```

POS LOW ALM
+.00050 "H2O
    
```

- 7 Press the **SELECT** key to save the new positive low alarm set point.

SELECT

Three short beeps will sound indicating that the data is being saved.

POS LOW ALM  
Saving Data

Immediately after the data is saved, the PRESSURA™ controller will return to the menu level displaying the menu title on the top line of the display and the menu item on the bottom line (goes to step 3).

ALARM  
POS LOW ALM

**WARNING:** If the **MENU** key was pressed instead of the **SELECT** key, the new data would not have been saved, and the PRESSURA™ controller would have escaped back to the menu level shown in step 3.

- 8 Press the **MENU** key once to return to the menu level:

MENU

ALARM  
CONFIGURE

- 9 Press the **MENU** key a second time to return to the normal operating level:

MENU

Unit is now back in normal operation

PRESSURE  
+.00085 "H<sub>2</sub>O

## Menu and Menu Items

---

The PRESSURA™ controller is a very versatile device which can be configured to meet your specific application. This section lists all of the menu items available to program and change (except diagnostics menu). Changing any item is accomplished by using the keypad, or if communications are installed through the RS-485 Communications port. If you are unfamiliar with the keystroke procedure please see [Software Programming](#) for a detailed explanation. This section provides the following information:

- Complete list of menu and all menu items
- Gives the menu or programming name
- Defines each menu item's function; what it does, how it does it, etc.
- Gives the range of values that can be programmed
- Gives default item value (how it shipped from factory)

The menus covered in this section are divided into groups of related items to ease programming. As an example all calibration items are in one menu, alarm information in another, etc. The manual follows the menus as programmed in the monitor. The menu items are always grouped by menu and then listed in menu item order, not alphabetical order. Figure 5 shows a chart of all Model 8630-SM standard monitor menu items. Figure 6 shows the additional menu items (in bold) available on the Model 8630-PM premium monitor.

<b><u>ALARM</u></b>	<b><u>CONFIGURE</u></b>	<b><u>CALIBRATION</u></b>	<b><u>INTERFACE</u></b>	<b><u>DIAGNOSTICS *</u></b>
NEG LOW ALM	ROOM MODE	SENSOR ZERO	OUTPUT RANGE	SENSOR INPUT
NEG HIGH ALM	DISPLAY AVG	SENSOR SPAN	OUTPUT SIG	SENSOR STAT
POS LOW ALM	UNITS	ELEVATION	ACCESS CODE	ANALOG OUT
POS HIGH ALM	ACCESS CODE	ACCESS CODE		KEY INPUT
ALARM RESET				LOW ALM REL
AUDIBLE ALM				ACCESS CODE
ALARM DELAY				
MUTE TIMEOUT				
ACCESS CODE				

\* Menu items located in [Troubleshooting](#) section

**Figure 5: Menu items - Model 8630-SM Standard Monitor**

**ALARM**

NEG LOW ALM  
NEG HIGH ALM  
POS LOW ALM  
POS HIGH ALM  
**MIN CFM ALM**  
**2 LOW ALM**  
**2 HIGH ALM**  
ALARM RESET  
AUDIBLE ALM  
ALARM DELAY  
MUTE TIMEOUT  
ACCESS CODE

**CONFIGURE**

ROOM MODE  
DISPLAY AVG  
UNITS  
**DUCT AREA**  
**ROOM VOLUME**  
**2 SENSOR**  
ACCESS CODE

**CALIBRATION**

SENSOR ZERO  
SENSOR SPAN  
**FLOW ZERO**  
**2SENSOR ZERO**  
**2SENSOR SPAN**  
ELEVATION  
ACCESS CODE

**INTERFACE**

**NET PROTOCOL**  
**NET ADDRESS**  
OUTPUT RANGE  
OUTPUT SIG  
ACCESS CODE

**DIAGNOSTICS \***

SENSOR INPUT  
SENSOR STAT  
ANALOG OUT  
KEY INPUT  
**FLOW INPUT**  
**2SENSOR IN**  
**2SENSOR STAT**  
LOW ALM REL  
**HIGH ALM REL**  
ACCESS CODE

\* Menu items located in [Troubleshooting](#) section

**Figure 6: Menu items - Model 8630 - PM Premium Monitor**

## ALARM MENU

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
NEGATIVE LOW PRESSURE ALARM	NEG LOW ALM	The NEG LOW ALM item sets the negative low pressure alarm set point. A low alarm condition is defined as when the magnitude of the room pressure falls below or goes in the opposite direction of the NEG LOW ALM set point.	OFF, 0 to -0.19500 "H <sub>2</sub> O	OFF
<p>This item is enabled when the <u>TSI</u> key switch is in negative room pressure position or when <u>negative</u> is selected in ROOM MODE item.</p>				
NEGATIVE HIGH PRESSURE ALARM	NEG HIGH ALM	The NEG HIGH ALM item sets the negative high pressure alarm set point. A high alarm condition is defined as when the magnitude of the room pressure rises above the NEG HIGH ALM set point.	OFF, 0 to -0.19500 "H <sub>2</sub> O	OFF
<p>This item is enabled when the <u>TSI</u> key switch is in negative room pressure position or when <u>negative</u> is selected in ROOM MODE item.</p>				
POSITIVE LOW PRESSURE ALARM	POS LOW ALM	The POS LOW ALM item sets the positive low pressure alarm set point. A low alarm condition is defined as when the magnitude of the room pressure falls below or goes in the opposite direction of the POS LOW ALM set point.	OFF, 0 to -0.19500 "H <sub>2</sub> O	OFF
<p>This item is enabled when the <u>TSI</u> key switch is in positive room pressure position or when <u>positive</u> is selected in ROOM MODE item.</p>				
POSITIVE HIGH PRESSURE ALARM	POS HIGH ALM	The POS HIGH ALM item sets the positive high pressure alarm set point. A high alarm condition is defined as when the magnitude of the room pressure rises above the POS HIGH ALM set point.	OFF, 0 to -0.19500 "H <sub>2</sub> O	OFF
<p>This item is enabled when the <u>TSI</u> key switch is in positive room pressure position or when <u>positive</u> is selected in ROOM MODE item.</p>				

**ALARM MENU** (*continued*)

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
MINIMUM DUCT FLOW ALARM	MIN CFM ALM	The MIN CFM ALM item sets the duct's flow alarm set point. A minimum flow alarm is defined as when the duct flow is less than the MIN CFM ALM set point.	OFF, 0 to 2832 ft <sup>2</sup> /MIN times the duct area in square feet (ft <sup>2</sup> )	OFF
<i>Premium models only</i>				
SECOND SENSOR LOW ALARM	2 LOW ALM	The 2 LOW ALM item sets the second sensor's low alarm set point. A low alarm condition is defined as when the magnitude of the second sensor's room pressure falls below or goes in the opposite direction of the 2 LOW ALM set point. The alarm can be a negative or positive pressure alarm set point.	OFF, 0 to +0.19500 "H <sub>2</sub> O or 0 to -0.19500 "H <sub>2</sub> O	OFF
<i>Premium models only</i>				
<p>The second sensor low and high alarms must be programmed for the same pressure direction; positive or negative. In addition, the PRESSURA™ controller has a minimum dead band of 40 ft/min between the second sensor low and high alarms. The dead band helps prevent nuisance alarms.</p> <p>The second sensor monitors the room pressure of a second space (typically an ante room), and is not part of the primary sensor or control sequence. This alarm is on when the DIM is in positive or negative mode.</p> <p>This item is enabled when the second pressure sensor item is enabled (see menu item 2 SENSOR).</p>				

## ALARM MENU (continued)

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
SECOND SENSOR HIGH ALARM	2 HIGH ALM	The 2 HIGH ALM item sets the second sensor's high alarm set point. A high alarm condition is defined as when the magnitude of the second sensor's room pressure rises above the 2 HIGH ALM set point. The alarm can be a negative or positive pressure alarm set point.	OFF, 0 to +0.19500 "H <sub>2</sub> O or 0 to -0.19500 "H <sub>2</sub> O	OFF
<i>Premium models only</i>				
The second sensor low and high alarms must be programmed for the same pressure direction; positive or negative. In addition, the PRESSURA™ controller has a minimum dead band of 40 ft/min between the second sensor low and high alarms. The dead band helps prevent nuisance alarms.				
The second sensor monitors the room pressure of a second space (typically and ante room), and is not part of the primary sensor or control sequence. This alarm is on when the DIM is in positive or negative mode.				
This item is enabled when the second pressure sensor item is enabled (see menu item 2 SENSOR).				
ALARM RESET	ALARM RESET	The ALARM RESET item selects how the alarms terminate after the unit returns to the safe pressure range (pressure or flow). UNLATCHED (alarm follow) automatically resets the alarms when the unit reaches the safe pressure range. LATCHED requires the staff to press the <b>RESET</b> key after the unit returns to safe pressure range. The ALARM RESET affects the audible alarm, visual alarm, and relay output, which means all are latched or unlatched.	LATCHED OR UNLATCHED	UNLATCHED
AUDIBLE ALARM	AUDIBLE ALM	The AUDIBLE ALM item selects whether the audible alarm is turned ON or OFF. Selecting ON requires the staff to press the <b>MUTE</b> key to silence the audible alarm. Selecting OFF permanently mutes all audible alarms.	ON or OFF	ON

## ALARM MENU (continued)

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
ALARM DELAY	ALARM DELAY	The ALARM DELAY determines the length of time the alarm is delayed after an alarm condition has been detected. This delay affects the visual alarm, audible alarm, and relay outputs. An ALARM DELAY prevents nuisance alarms from staff opening and closing doors, etc.	20 to 600 SECONDS	20 SECONDS
MUTE TIMEOUT	MUTE TIMEOUT	The MUTE TIMEOUT determines the length of time the audible alarm is silenced after the <b>MUTE</b> key is pressed. This delay temporarily mutes the audible alarm.	5 to 30 MINUTES	5 MINUTES

**NOTE:** If the PRESSURA™ controller is in alarm when MUTE TIMEOUT expires, the audible alarm turns on. When the PRESSURA™ controller returns to the safe range, the MUTE TIMEOUT is canceled. If the room goes back into an alarm condition, the **MUTE** key must be pressed again to mute the audible alarm.

ACCESS CODE	ACCESS CODE	The ACCESS CODE item selects whether an access code (pass code) is required to enter the menu. The ACCESS CODE item prevents unauthorized access to a menu. If the ACCESS CODE is <u>ON</u> a code is required before the menu can be entered. Conversely if the ACCESS CODE is <u>OFF</u> no code is required to enter the menu.	ON or OFF	OFF
END OF MENU	END OF MENU	The END OF MENU item informs you that the end of a menu has been reached. You can either scroll back up the menu to make changes, or press the <b>SELECT</b> or <b>MENU</b> key to exit out of the menu.		

## ALARM CONSTRAINTS

There are a number of constraints built into the software that prevent users from programming conflicting alarm information. These are as follows:

1. Room mode. The positive pressure alarms are only active when positive pressure is enabled. Negative pressure alarms are only active when negative pressure is enabled. In no isolation mode all alarms are turned off.
2. The PRESSURA™ controller is programmed not to allow the pressure alarms to be programmed within 40 ft/min ( $\pm 0.00028$  "H<sub>2</sub>O at 0.001 "H<sub>2</sub>O) of each other.

**Example:** The LOW ALARM set point is -0.00072 "H<sub>2</sub>O. The HIGH ALARM set point cannot be set lower than -0.00128 "H<sub>2</sub>O.

3. Second sensor alarms can be programmed for positive or negative pressure. Both the second sensor low and high alarms must be programmed either positive or negative. The second sensor alarms ignore rule 1 above.
4. Alarms do not terminate until pressure exceeds the alarm set point. The set point must be slightly exceeded before alarm will terminate.
5. The **ALARM RESET** item selects how the alarms will terminate when monitor returns to the safe range. The pressure and flow alarms all terminate the same; they are either latched or unlatched. If unlatched is selected the alarms automatically turn off when the value slightly exceeds the alarm set point. If latched is selected the alarms will not terminate until the pressure exceeds the alarm set point *and* the **RESET** key is pressed.
6. There is a programmable **ALARM DELAY** that determines how long to delay before activating the alarms. This delay affects all alarms, pressure and flow.
7. The **MUTE TIMEOUT** item temporarily turns the audible alarm off for all pressure and flow alarms.
8. The display can only show one alarm message. Therefore, the monitor has an alarm priority system, with the highest priority alarm being displayed. If multiple alarms exist, the lower priority alarms will not display until after the highest priority alarm has been eliminated. The alarm priority is as follows:
  - Pressure sensor - low alarm
  - Pressure sensor - high alarm
  - Flow station - minimum exhaust flow
  - Flow station - minimum supply flow
  - Second pressure sensor - low alarm
  - Second pressure sensor - high alarm
  - Data error
9. The low and high alarms are absolute values. The chart below shows how the values must be programmed in order to operate correctly.

<b>-0.2 inches H<sub>2</sub>O (maximum negative)</b>	<b>0</b>	<b>+0.2 inches H<sub>2</sub>O (maximum positive)</b>
High Negative Alarm	Zero	High Positive Alarm
Low Negative Alarm	Zero	Low Positive Alarm

The value of each alarm is unimportant (except for small dead band) in graph above. It is important to understand that the negative (positive) low alarm must be between zero (0) pressure and the high alarm value.

## CONFIGURE MENU

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
ROOM MODE	ROOM MODE	The ROOM MODE item selects the room pressure direction. This item enables all related alarms for pressure direction selected. Selecting key switch enables a remote TSI key switch, which determines pressure direction.	KEY SWITCH, NEGATIVE, POSITIVE, NO ISOLATION	NEGATIVE
DISPLAY AVERAGE	DISPLAY AVG	The DISPLAY AVG item selects the display's averaging period. The display averaging period is the length of time the room pressure has been averaged before being displayed. The DISPLAY AVG item value may be set between 0.75 and 40 seconds. The higher the averaging value, the more stable the display.	0.75, 1, 2, 3, 5, 10, 20, or 40 seconds	20 seconds
UNITS	UNITS	The UNITS item selects the unit of measure that the controller displays all values (except calibration span). These units display for all menu items set points, alarms, flows, etc.	FT/MIN, m/s, "H <sub>2</sub> O Pa, mm H <sub>2</sub> O	"H <sub>2</sub> O
DUCT AREA	DUCT AREA	The DUCT AREA item is used to input the duct size. The duct size is needed to compute the flow in/out of the room. This item requires a TSI flow station to be mounted in the duct.  When a duct area is programmed, the display will automatically scroll the actual flow as part of the display sequence. If a zero value is entered, the flow value will not scroll on the display.  If the PRESSURA™ controller displays English units, area must be entered in square feet. If metric units are displayed area must be entered in square meters.	0 to 10 square feet (0 to 0.9500 square meters)  The PRESSURA™ controller does not compute area. The area must be first calculated and then entered into the unit.	0
ROOM VOLUME	ROOM VOLUME	The ROOM VOLUME item is used to input the volume of the room. The room volume is required to calculate air changes per hour.  Entering a value for the volume will add the air changes per hour value to the display's scrolling sequence. If a zero value is entered the air changes per hour will not scroll on the display.  If the PRESSURA™ controller displays English units, area must be entered in cubic feet. If metric units are displayed area must be entered in cubic meters.	0 to 20,000 cubic feet (0 to 550 cubic meters)  The PRESSURA™ controller does not compute volume. The volume must be first calculated and then entered into the unit.	0

**CONFIGURE MENU** (*continued*)

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
SECOND SENSOR ENABLE <i>Premium models only</i>	2 SENSOR	The 2 SENSOR item turns the second sensor on or off. This item requires a second TSI pressure sensor to be installed in order to function. Turning 2 SENSOR on adds the second sensor pressure value to the display's sequence, and enables the 2 LOW ALM and 2 HIGH ALM items.	ON or OFF	OFF
<p><b>NOTE:</b> The second sensor's communication address must be set to 2 in order to function. See Figure 9 to change second sensor address.</p>				
ACCESS CODE	ACCESS CODE	The ACCESS CODE item selects whether an access code (pass code) is required to enter the menu. The ACCESS CODE item prevents unauthorized access to a menu. If the ACCESS CODE is <u>ON</u> a code is required before the menu can be entered. Conversely if the ACCESS CODE is <u>OFF</u> no code is required to enter the menu.	ON or OFF	OFF
END OF MENU	END OF MENU	The END OF MENU item informs you that the end of a menu has been reached. You can either scroll back up the menu to make changes, or press the <b>SELECT</b> or <b>MENU</b> key to exit out of the menu.		

## CONFIGURE MENU (continued)

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
SENSOR SPAN	SENSOR SPAN	The SENSOR SPAN item is used to match or calibrate the PRESSURA™ velocity sensors to the average room pressure velocity as measured by a portable air velocity meter.  A sensor zero should be established prior to adjusting the sensor span (see <a href="#">Calibration</a> section following menu item listing).	NONE	Unit is factory calibrated. No initial adjustment should be necessary.
FLOW ZERO <i>Premium models only</i>	FLOW ZERO	The FLOW ZERO item is used to calibrate the PRESSURA™ flow station pressure transducer.  A zero or no flow point needs to be established prior to using the flow measurement (see <a href="#">Calibration</a> section following menu item listing).	NONE	Flow station pressure transducer zero must be done prior to making any flow measurements.
SECOND SENSOR ZERO <i>Premium models only</i>	2SENSOR ZERO	The 2SENSOR ZERO item is used to calibrate the second PRESSURA™ pressure sensor.  A second sensor zero should be established prior to adjusting the second sensor span. (see <a href="#">Calibration</a> section following menu item listing).  If menu item displays SEC SENS OFF, the second sensor must be turned on (menu item 2 SENSOR ) to activate the 2SENSOR ZERO.	NONE	Unit is factory calibrated. No initial adjustment should be necessary.

**CONFIGURE MENU** (*continued*)

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
SECOND SENSOR SPAN	2SENSOR SPAN	The 2SENSOR SPAN item is used to match or calibrate the second PRESSURA™ velocity sensors to the average room pressure velocity as measured by a portable air velocity meter.  A second sensor span should be established prior to adjusting the second sensor span. (see <a href="#">Calibration</a> section following menu item listing).	NONE	Unit is factory calibrated. No initial adjustment should be necessary.
<i>Premium models only</i>				
		If menu item displays SEC SENS OFF, the second sensor must be turned on (menu item 2 SENSOR) to activate the 2SENSOR SPAN.		
ELEVATION	ELEVATION	The ELEVATION item is used to enter the elevation of the hospital above sea level. This item has a range of 0 to 10,000 feet in 1,000 foot increments. The pressure value needs to be corrected due to changes in air density at different elevations.	0 to 10,000 feet above sea level	0
ACCESS CODE	ACCESS CODE	The ACCESS CODE item selects whether an access code (pass code) is required to enter the menu. The ACCESS CODE item prevents unauthorized access to a menu. If the ACCESS CODE is <u>ON</u> a code is required before the menu can be entered. Conversely if the ACCESS CODE is <u>OFF</u> no code is required to enter the menu.	ON or OFF	ON
END OF MENU	END OF MENU	The END OF MENU item informs you that the end of a menu has been reached. You can either scroll back up the menu to make changes, or press the <b>SELECT</b> or <b>MENU</b> key to exit out of the menu.		

## INTERFACE MENU

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
NETWORK PROTOCOL	NET PROTOCOL	The NET PROTOCOL item selects the communications protocol used to interface with the building management system.	MODBUS or CIMETRICS	MODBUS
<i>Premium models only</i>				
NETWORK ADDRESS	NET ADDRESS	The NET ADDRESS item is used to select the main network address of the individual room pressure device. Each unit on the network must have its own unique address. The values range from 1 to 247. If RS-485 communications are being used, then a unique NET ADDRESS must be entered into the unit.	1 to 247	1
<i>Premium models only</i>				
<p>There is no priority between the RS-485 and keypad. The most recent signal by either RS-485 or keypad will initiate a change.</p> <p>RS-485 communications allows you access to all menu items except calibration items. The RS-485 network can initiate a change at any time. The RS-485 cannot override the TSI key switch when ROOM MODE selection is key switch.</p>				
<p><b>TSI key switch</b></p> <p>A keylock switch mounted on the wall changes the pressure between negative pressure, positive pressure, or no isolation (if 3 position switch installed).</p>				
OUTPUT RANGE	OUTPUT RANGE	The OUTPUT RANGE item selects the resolution range of the analog pressure signal output. There are two choices:	LOW or HIGH	HIGH
		<p>LOW     -0.01000 to +0.01000 "H<sub>2</sub>O.</p> <p>HIGH    -0.10000 to +0.10000 "H<sub>2</sub>O.</p>		
<p>0 volt / 4 mA represents maximum negative pressure differential.            5 volts / 12 mA represents a 0 room pressure differential.            10 volts / 20 mA represents maximum positive pressure differential.            If the actual pressure exceeds the range, the output remains at maximum or minimum depending on direction of flow.</p>				

## INTERFACE MENU (continued)

MENU ITEM	SOFTWARE NAME	ITEM DESCRIPTION	ITEM RANGE	DEFAULT VALUE
OUTPUT RANGE	OUTPUT RANGE (continued)	The PRESURA™ controller updates the analog output every 0.1 second. This signal outputs a linear 0 to 10 volt direct current (VDC) or 4 to 20 mA DC analog output which corresponds to the measured room pressure.	LOW or HIGH	HIGH
OUTPUT SIGNAL	OUTPUT SIG	The OUTPUT SIG item selects the type of analog pressure signal output. The analog output signal can either be 0 to 10 VDC or 4 to 20 mA.	0 to 10 VDC or 4 to 20 mA	0 to 10 VDC
ACCESS CODE	ACCESS CODE	The ACCESS CODE item selects whether an access code (pass code) is required to enter the menu. The ACCESS CODE item prevents unauthorized access to a menu. If the ACCESS CODE is <u>ON</u> a code is required before the menu can be entered. Conversely if the ACCESS CODE is <u>OFF</u> no code is required to enter the menu.	ON or OFF	OFF
END OF MENU	END OF MENU	The END OF MENU item informs you that the end of a menu has been reached. You can either scroll back up the menu to make changes, or press the <b>SELECT</b> or <b>MENU</b> key to exit out of the menu.		

## Calibration

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The calibration section explains how to calibrate the PRESSURA™ pressure sensor, including setting the proper elevation, and how to zero a TSI flow station pressure transducer.

**NOTE:** The PRESSURA™ pressure sensor is factory calibrated and normally does not need to be adjusted. However, inaccurate readings may be detected if pressure sensor is not installed correctly or problems with the sensor exist. First, check that the sensor is installed correctly (usually only a problem on initial set up). Second, go into **DIAGNOSTICS** menu, **SENSOR STAT** item. If normal is displayed calibration can be adjusted. If an error code is displayed, eliminate error code and then verify pressure sensor needs adjustment.

Adjusting the PRESSURA™ controller calibration may be required to eliminate errors due to convection currents, HVAC configuration, or equipment used to make the measurement. TSI recommends always taking the comparison measurement in the exact same location (i.e., under the door, middle of door, edge of door, etc.). A thermal air velocity meter is needed to make the comparison measurement. Normally the velocity is checked at the crack under the doorway, or the door is opened 1” to allow alignment of the air velocity probe making the measurement. If the crack under the door is not large enough, use the 1” open door technique.

### Calibrating pressure sensor - primary sensor or second sensor

Enter calibration menu (see [Software Programming](#) if not familiar with key stroke procedure). Access code is turned on so enter proper access code. All menu items described below are found in **CALIBRATION** menu.

#### Elevation

The **ELEVATION** item eliminates pressure sensor error due to elevation of hospital. (See **ELEVATION** item in [Menu and Menu Items](#) section for further information).

Enter the **ELEVATION** menu item. Scroll through the elevation list and select the one closest to the hospital's elevation

Press the **SELECT** key to save the data and exit back to the calibration menu.

#### Sensor zero

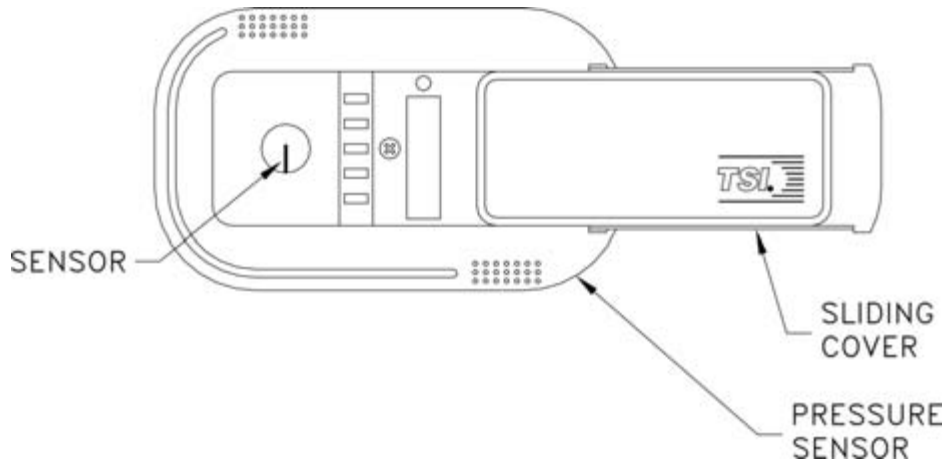
Slide open pressure sensor door and tape over 1/2 inch sensor orifice (see Figure 7). Make sure pressure sensor orifice is taped over. Sensor is located about 3/4” into housing.

Select **SENSOR ZERO** item (2 **SENSOR ZERO** item if second sensor).

Press **SELECT** key. Sensor zero procedure, which takes 120 seconds, is automatic.

Press **SELECT** key to save the data.

Remove tape from sensor orifice and close pressure sensor door.



**Figure 7: Pressure sensor door slid open.**

Sensor span

**NOTE:** Always take a sensor zero prior to adjusting the sensor span. A smoke test and a comparison measurement by an air velocity meter are required to calibrate the pressure sensor. The air velocity meter only gives a velocity reading, so a smoke test must be performed to determine pressure direction.

**WARNING:** The span can only be adjusted in the same pressure direction. Adjusting span cannot cross zero pressure. Example: If unit displays +0.0001 and actual pressure is -0.0001 do not make any adjustments. Manually change the air balance, close or open dampers, or open door slightly to get both unit and actual pressure to read in same direction (both reads positive or negative). This problem can only occur at very low pressures so slightly changing the balance should eliminate the problem.

Perform a smoke test to determine pressure direction.  
 Select **SENSOR SPAN** item (2**SENSOR SPAN** item if second sensor).  
 Position the thermal air velocity meter in door opening to obtain velocity reading. Press **▲/▼** keys until pressure direction ( $\pm$ ) and sensor span match thermal air velocity meter, and smoke test.  
 Press **SELECT** key to save sensor span.  
 Exit menu, calibration is complete.

**Flow station pressure transducer zero (Premium units only)**

Disconnect tubing between pressure transducer and flow station.  
 Enter calibration menu. Access code is required.  
 Select **FLOW ZERO** to take flow zero.  
 Press **SELECT** key. Flow zero procedure, which takes 10 seconds, is automatic.  
 Press **SELECT** key to save data.  
 Connect tubing between pressure transducer and flow station.

## Maintenance and Repair Parts

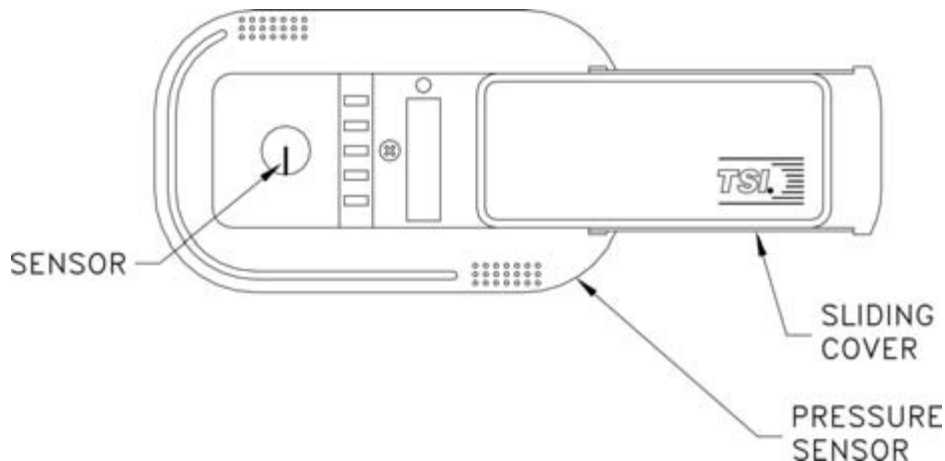
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The Model 8630 PRESSURA™ Room Pressure Monitor requires minimal maintenance. Periodic inspection of the system components, as well as an occasional pressure sensor cleaning, are all that are needed to ensure that the Model 8630 is operating properly.

### System Component Inspection

It is recommended that the pressure sensor be periodically inspected for accumulation of contaminants. The frequency of these inspections is dependent upon the quality of the air being drawn across the sensor. Quite simply, if the air is dirty, the sensors will require more frequent inspection and cleaning.

Visually inspect the pressure sensor by sliding open the sensor housing door (Figure 8). The air flow orifice should be free of obstructions. The small ceramic coated sensors protruding from the orifice wall should be white and free of accumulated debris.



**Figure 8: Pressure sensor door slid open**

Periodically inspect the other system components for proper performance and physical signs of excessive wear.

### Pressure Sensor Cleaning

Accumulations of dust or dirt can be removed with a dry soft-bristled brush (such as an artist's brush). If necessary, water, alcohol, acetone, or trichlorethane may be used as a solvent to remove other contaminants.

Use extreme care when cleaning the velocity sensors. The ceramic sensor may break if excessive pressure is applied, if sensor is scraped to remove contaminants, or if the cleaning apparatus abruptly impacts the sensor.

**WARNING:** If you are using a liquid to clean the sensor, turn off power to the Model 8630.

Do **not** use compressed air to clean the velocity sensors.

Do **not** attempt to scrape contaminants from the velocity sensors. The velocity sensors are quite durable; however, scraping may cause mechanical damage and possibly break the sensor. Mechanical damage due to scraping voids the pressure sensor warranty.

**Replacement Parts**

All components of the room pressure monitor are field replaceable. Contact TSI HVAC Control Products at (800) 874-2811 (U.S. and Canada) or (001 651) 490-2811 (other countries) or your nearest TSI Manufacturer's Representative for replacement part pricing and delivery.

<b>Part Number</b>	<b>Description</b>
800244	Model 8630- SM Pressure Monitor
800245	Model 8630- PM Pressure Monitor
800243	Pressure Sensor
800248	Sensor Cable
800414	Transformer Cable
800420	Transformer

## Troubleshooting Section

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The PRESSURA™ Room Pressure Monitor is designed to be trouble free. However, installation problems or interaction with other HVAC components may cause system problems. The PRESSURA™ system is easy to troubleshoot if an organized approach to evaluate the system is taken. Troubleshooting is broken down into hardware and software problems. Hardware problems deal with the physical installation of the device. Hardware problems include wiring problems, incorrectly installed equipment, and add-ons or non-TSI equipment. Software problems include configuration problems and interaction problems with the HVAC system.

The hardware test described in this section determines that all TSI mechanical components are functioning correctly. The hardware test requires the diagnostics menu items to be accessed. If you are unfamiliar with the PRESSURA™ menus, see [Software Programming](#) for keystroke procedure. Troubleshooting the majority of problems is usually quick if the hardware test is followed.

Software and hardware problems are covered in the troubleshooting chart. Pick the problem that most closely resembles your problem and review the possible symptoms and corrective action. Software or system performance problems can and are affected by the supply air system, exhaust air system, or physical configuration of the room. Separating TSI system problems from the hospital HVAC system can sometimes be difficult. TSI recommends confirming all hardware is operating correctly before troubleshooting software problems.

### Hardware Test

Three tests need to be performed in order to determine all hardware is functioning correctly. The tests are broken down into:

- Confirming wiring is correct.
- Confirming physical installation is correct.
- Verifying mechanical components.

#### Confirming wiring is correct.

The most common problem with installed hardware equipment is incorrect wiring. This problem usually exists on initial installation, or when modifications to the system take place. The wiring should be very closely checked to verify it *exactly* matches the wiring diagram. The TSI cables are all color coded to ensure proper wiring. A wiring diagram is located in [Appendix B](#) of this manual. Wiring associated with non TSI components should be closely checked for correct installation. If non TSI components are installed, consider disconnecting them for testing purposes.

#### Confirming physical installation is correct

All of the hardware components need to be installed properly. Review the installation instructions and verify components are installed properly at the correct location. This is easily done when the wiring is checked.

#### Verifying mechanical components

Verifying all TSI components are operating correctly requires following a simple procedure. The fastest procedure to confirm all equipment is operating is to first test the DIM, and then go into the diagnostic menu to test each component.

**NOTE:** These tests require power to the units, so if unit has no power, refer to hardware troubleshooting chart to eliminate power problem.

### TEST - DIM

Press **TEST** key to verify Digital Interface Module (DIM) electronics are functioning correctly. At the end of the self test, the display will show **SELF TEST - PASSED** if all DIM electronics are good. If unit displays **DATA ERROR** at the end of the test, the electronics may be corrupted. Check all software items to determine cause of **DATA ERROR**.

If **SELF TEST - PASSED** is displayed proceed to test individual components. Enter **Diagnostics menu** and check the following:

- Sensor input
- Sensor status
- Analog output
- Key input

These diagnostic menu items are explained in detail in the next section ([Diagnostics Menu](#)) of the manual, so their function is not reviewed here. If the PRESSURA™ system passes each of the tests, the mechanical piece parts are all functioning correctly.

### TEST - Sensor input

Enter **SENSOR INPUT** menu item in diagnostics menu. A voltage between 0 and 10 volts DC will be displayed. It is not important what the exact voltage is to pass this test. Tape over the pressure sensor (slide pressure sensor door open) and voltage should read approximately 5 volts (zero pressure). Remove tape and blow on sensor. Displayed value should change. If voltage changes, the unit passes. If voltage doesn't change, proceed to Sensor status test.

### TEST - Sensor status

Enter **SENSOR STAT** menu item in diagnostics menu. If **NORMAL** is displayed, the unit passes test. If an error message is displayed, go to diagnostic menu section of the manual, **SENSOR STAT** menu item for explanation of error message.

### TEST - Analog output

**NOTE:** This test is only performed if analog output feature is being used.

Enter **ANALOG OUT** menu item in diagnostics menu. A value between 0 and 255 will be displayed. Hook up a DC voltmeter to pins 9 and 10. Press the ▲/▼ keys to change output from 0 to 255. Voltage should change from 10 volts to zero volts (20 mA to 0 mA if current output).

### TEST - Key input

**NOTE:** This test is only performed if system has a TSI key switch installed.

Enter **ROOM MODE** item in control menu. Verify **KEY SWITCH** option is selected. Exit menu item and enter **KEY INPUT** item in diagnostics menu. Note the position of the key switch. Verify that key switch position and key input match. Rotate key switch to verify key input works for all positions.

If unit passed all tests, the mechanical components are physically working. If problems still exist, go to troubleshooting chart for additional information on both hardware and software symptoms.

### **Diagnostics menu**

The items in the diagnostic menu (listed below) aid in identifying problems the staff may encounter. The items in this menu temporarily change the function by pressing the ▲/▼ keys. No

permanent change occurs with these menu items. Items are exited by pressing the **MENU** key. When an item is exited, the PRESSURA™ controller returns to its normal state.

#### Sensor Input

##### Menu item - SENSOR INPUT / 2SENSOR IN

The SENSOR INPUT (2SENSOR IN) item is used to verify that the DIM or monitor electronics is receiving a signal from the sensor. When this item is entered, a voltage will be indicated on the display. The exact voltage displayed is relatively unimportant. It is more important that the voltage is changing which indicates the sensor is working correctly.

0 volts represents a negative pressure of -0.2 inches H<sub>2</sub>O.

5 volts represents 0 pressure.

10 volts represents a positive pressure of +0.2 inches H<sub>2</sub>O.

#### Sensor Communications

##### Menu Item - SENSOR STAT / 2SENSOR STAT

The SENSOR STAT (2SENSOR STAT) item verifies that the RS-485 communications between the pressure sensor and DIM is working correctly. Sensor error messages do not display on DIM except when SENSOR STAT item is selected. The item will display NORMAL if communications are established correctly. If problems exist, one of four error messages will display:

- COMM ERROR - DIM cannot communicate with sensor. Check all wiring and the pressure sensor address. Address must be 1 or 2 (figure 9).
- SENS ERROR - Problem with sensor bridge. Physical damage to pressure sensor or sensor circuitry. Unit is not field repairable. Send to TSI for repair.
- CAL ERROR - Calibration data lost. Sensor must be returned to TSI to be calibrated.
- DATA ERROR - Problem with EEPROM, field calibration, or analog output. Check all data programmed and confirm unit is functioning correctly.

#### Analog Output

##### Menu Item - ANALOG OUT

The ANALOG OUT item is used to vary the analog output from the PRESSURA™ unit. When this item is entered, a number will be shown on the display indicating the last analog output value. The value displayed ranges from 0 to 255. The value 255 corresponds to the lowest voltage (current) output and 0 corresponds to the highest voltage (current) output. Pressing the ▼ key will decrease the analog output and increase the value displayed. Pressing the ▲ key will increase the analog output and decrease the value displayed.

The ANALOG OUT function can be used in conjunction with a volt meter to verify the analog output is correct.

### Key Switch Input

#### Menu Item - KEY INPUT

The KEY INPUT item reads the position of the TSI key switch. When this item is entered, the display will indicate either POSITIVE, NEGATIVE, or NO ISOLATION. If the display indicates POSITIVE, the TSI key switch has the PRESSURA™ controller in positive pressure mode. If the display indicates NEGATIVE, the TSI key switch has the PRESSURA™ controller in the negative pressure mode. If the display indicates NO ISOLATION, the TSI key switch has the PRESSURA™ controller in no isolation mode.

In normal operation, the key switch is not enabled unless ROOM MODE item has KEY SWITCH selected.

### Flow Input (Premium models only)

#### Menu Item - FLOW INPUT

The FLOW INPUT item is used to read the input from the flow station. When this item is entered, a voltage will be indicated on the display. The exact voltage displayed is relatively unimportant. It is more important that the voltage is changing which indicates the flow station is working correctly.

0 volts displayed equals zero flow.

5 volts displayed equals 2832 ft/min x duct area (ft)<sup>2</sup>

### Low Alarm Relay

#### Menu Item - LOW ALM REL

The LOW ALM REL item is used to change the state of the low alarm relay. When this item is entered, the display will indicate either OPEN or CLOSED. The ▲/▼ keys are used to toggle the state of the relay. The ▲ key is used to OPEN the alarm contact. The ▼ key is used to CLOSE the alarm contact. When the contact is closed, the LOW ALM REL should be in an alarm condition.

### High Alarm Relay (premium models only)

#### Menu Item - HIGH ALM REL

The HIGH ALM REL item is used to change the state of the high alarm relay. When this item is entered, the display will indicate either OPEN or CLOSED. The ▲/▼ keys are used to toggle the state of the relay. The ▲ key is used to OPEN the alarm contact. The ▼ key is used to CLOSE the alarm contact. When the contact is closed, the HIGH ALM REL should be in an alarm condition.

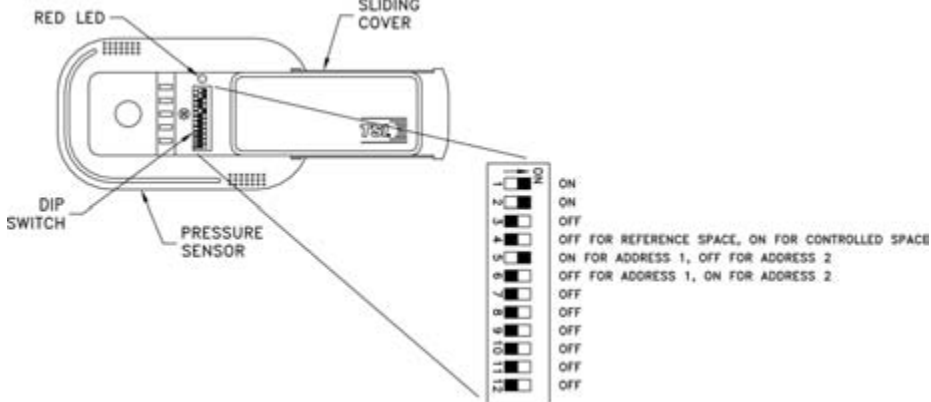
### Access Code

#### Menu Item - ACCESS CODE

The ACCESS CODE item selects whether an access code (pass code) is required to enter the menu. The ACCESS CODE item prevents unauthorized access to a menu. If the ACCESS CODE is ON, a code is required before the menu can be entered. Conversely, if the ACCESS CODE is OFF, no code is required to enter the menu.

## Troubleshooting Chart

Symptom	Possible Cause	Corrective Action
Display is blank.	<p>Fuse is blown.</p> <p>No power to DIM.</p> <p>DIM is defective.</p>	<p>Measure voltage at pins 1 and 2 on DIM. The voltage should nominally be 24 - 30 VAC.</p> <p>If correct voltage is measured, internal DIM fuse is probably blown. Unplug 14-pin connector from DIM for 2 minutes. The internal fuse will automatically reset. Plug unit back in and check display. If display is still blank, check all wiring, etc. If no problems are found, replace DIM.</p> <p>If zero volts are measured, see <i>No power to DIM</i>.</p> <p>Wiring is incorrect. Check all wiring. If separate transformer is not installed for each system, double check polarity and for ground loops.</p> <p>Verify circuit breaker is on. Verify transformer primary measures 110 VAC. Verify transformer secondary measures 24 to 30 VAC. Verify voltage on pins 1 and 2 of DIM is 24 to 30 VAC.</p> <p>If proper voltage is found between pins 1 and 2 of the DIM, all wiring has been checked, fuses have been reset, and screen is still blank, the DIM is probably defective. Replace DIM.</p>
Pressure sensor red LED is blinking (Figure 9).	<p>Problem with sensor (slow uniform blink).</p> <p>Communication (fast burst of non-uniform blinking).</p> <p>Red LED is on constantly.</p> <p>Sensor communications not working.</p>	<p>Check SENSOR STAT and confirm NORMAL is displayed. If ERROR is displayed, correct error.</p> <p>Unit is communicating with DIM. This is normal.</p> <p>This is normal when no problems exist or when communication is occurring.</p> <p>Check SENSOR STAT item in diagnostics menu. If NORMAL is displayed, sensor is okay, if COMM ERROR is displayed, check wiring, pressure sensor address, and that DIP switch 1 &amp; 2 are ON (Figure 9).</p>
DIM always displays 0.200 inches H <sub>2</sub> O.	Incorrect pressure sensor output.	Pressure sensor must be set for 0 to 10 volt output, not 4 to 20 mA. (do not confuse this output with DIM analog output). Check pressure sensor DIP switch 3 and make sure it is OFF. (See Figure 9).
DIM displays opposite pressure signal.	Sensor direction is incorrect.	Pressure sensor must have DIP switch correctly set for proper sign display. Verify DIP switch 4 is ON when sensor is mounted in isolation room (controlled space), and OFF when mounted in reference space (see Figure 9).

Symptom	Possible Cause	Corrective Action
Sensor does not calibrate.	Incorrect pressure sensor address.	<p>Primary pressure sensor must have address of 1. Second sensor must have address of 2. Check pressure sensor DIP switches 5 &amp; 6 and verify address is correct (7 to 12 must be OFF).</p>  <p><b>Figure 9: Pressure sensor DIP switch</b></p>
Positive/ negative/ neutral key switch doesn't work.	<p>Incorrect wiring.</p> <p>Room mode is incorrect.</p> <p>Defective switch / defective DIM.</p>	<p>Verify wiring is correct between key switch and DIM.</p> <p>Go into CONFIGURE menu, ROOM MODE item. Verify ROOM MODE is in <u>key switch</u> position.</p> <p>Verify ROOM MODE is in <u>key switch</u> position. Go into DIAGNOSTICS menu, KEY INPUT item. Display should read negative in negative position, positive in positive position, and no isolation in neutral position. If display changes correctly, switch and switch input is good. If display does not change:</p> <p>Disconnect key switch wires from DIM pins 11 and 12. Measure the resistance of the switch:          Negative position should be open (infinite).          Neutral position should read approximately 273 K Ohms.          Positive position should be closed (short).</p> <p>If room mode is correct and resistance check is good, DIM key input is probably defective. Replace DIM.</p>
Key switch in neutral but alarms still function.	<p>Key switch is not selected in ROOM MODE menu item.</p> <p>Key switch is defective.</p>	<p>Change ROOM MODE to key switch.</p> <p>Replace key switch (unlikely cause of problem).</p>

Symptom	Possible Cause	Corrective Action
DIM does not respond to RS-485 communications.	<p>Network protocol is incorrect.</p> <p>Incorrect network address.</p> <p>Incompatible software.</p>	<p>Go into INTERFACE menu, NET PROTOCOL item. The protocol must match host system. Select correct interface.</p> <p>The network address at the building automation system and at the DIM must match. The network address must be unique for each DIM.</p> <p>Data sent to DIM may be in form that the PRESSURA™ controller cannot recognize.</p>
Red alarm light is on, alarm is sounding.	Room pressure is below low alarm pressure / Room pressure is above high alarm pressure.	Change room balance or change alarm values.
Alarms don't turn off after returning to normal operation (green and red lights are on).	Alarm is set for latched operation (see <a href="#">ALARM RESET</a> ).	Set ALARM RESET to unlatch
Alarm relays don't work.	<p>Alarms are turned off.</p> <p>Incorrect wiring.</p> <p>Alarm is from second sensor. Alarm is from flow station.</p> <p>Relay may be defective.</p>	<p>Press <b>TEST</b> key. The individual alarm set points will display. If all alarm set points are zero, alarm relay is not active, so relay will not be required to change state.</p> <p>Check the wiring from PRESSURA™ controller relay's output to the device that is connected to the relays.</p> <p>The relay contacts only work for primary pressure alarms. The relays do not activate when a second sensor or flow alarm condition occurs (DIM light and audible do activate). This is because the primary pressure alarms are the most important or have the highest priority.</p> <p>Disconnect the wiring from relay contact pins 13 and 14 for low alarm relay and pins 25 and 26 for high alarm relay. Go into DIAGNOSTICS menu, LOW ALM REL or HIGH ALM REL. Connect an ohmmeter to relay terminals to verify contact open and closes. Press the ▲/▼ key to manually trip the relay. If relay responds (contact opens and closes), the device connected is incompatible or defective. If relay doesn't respond, relay is defective (may be caused by incompatible device). Replace DIM.</p>
"DATA ERROR" flashing on display.	DIM was hit by electrical disturbance.	All data may be lost or changed. Review all configuration parameters. DATA ERROR is removed by pressing the <b>RESET</b> key.

<b>Symptom</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
<p>Displayed pressure wildly fluctuating.</p>	<p>Exhaust or supply system is unstable.</p> <p>Supply or exhaust air is affecting the sensor.</p>	<p>Check supply and exhaust flow for stability. Verify reference pressure is not fluctuating.</p> <p>Check location of supply air diffusers and exhaust grilles. They should be as far from pressure sensor as is realistic, 6 feet preferred, 2½ feet minimum. Supply diffuser terminal throw velocity must be less than 10 ft/min at the sensor. Relocate supply or exhaust as needed.</p>
<p>Electric actuator “chatters” or excessively hunts at set point.</p>	<p>Ground loop present.</p>	<p>This symptom occurs when multiple devices are being ran off one transformer. Each system must be powered by its own transformer or have an isolation transformer installed.</p> <p><b>NOTE:</b> Unit may hunt due to speed of system and may not be tied to ground loop problem.</p>

## Appendix A

### Specifications

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#### **Room Pressure Module**

##### **Display**

Range .....	-0.20000 to +0.20000 inches H <sub>2</sub> O
Resolution .....	5% of reading
Display Update.....	0.5 sec

##### **Inputs**

Switch in .....	SPST (N.O.) Switch. Closing switch initiates condition.
Flow in .....	SPST (N.O.) Switch. Closing switch initiates condition.

##### **Outputs**

Low Alarm Range .....	-0.19500 to +0.19500 inches H <sub>2</sub> O
High Alarm Range .....	-0.19500 to +0.19500 inches H <sub>2</sub> O
Alarm Contacts .....	SPST (N.O.) Max current 5A, max voltage 150 VDC, 250 VAC. Minimum switch load 10 mA, 5 VDC. Contacts close in alarm condition.

##### **Analog Output**

Type.....	0 to 10 VDC or 4 to 20 mA
Range.....	High -0.100 to +0.100 inches H <sub>2</sub> O Low -0.0100 to +0.0100 inches H <sub>2</sub> O
Resolution.....	1.0% of range for 0-10 VDC 1.2% of range for 4-20 mA
RS-485 .....	Premium model only

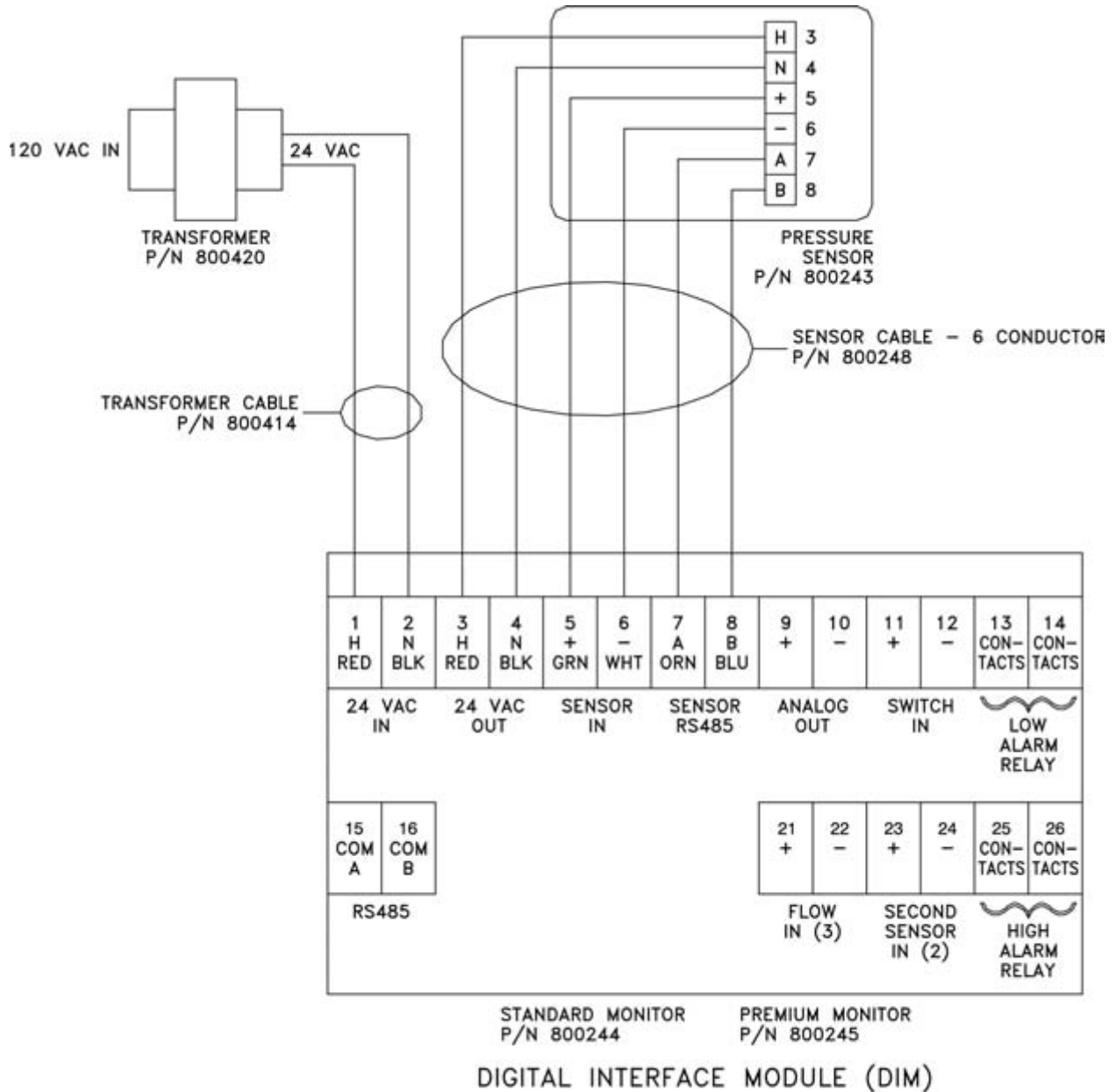
Operating Temperature .....	32 to 120°F
Input Power .....	24 VAC, 5 watts max
Dimensions.....	4.9 in. x 4.9 in. x 1.35 in.
Weight.....	0.7 lb.

#### **Pressure Sensor**

Temperature Compensation Range .....	55 to 95°F
Power Dissipation .....	0.16 watts at 0 inches H <sub>2</sub> O, 0.20 watts at 0.00088 inches H <sub>2</sub> O
Dimensions (DxH).....	5.58 in. x 3.34 in. x 1.94 in.
Weight.....	0.2 lb.

# Appendix B

## Wiring Diagram



NOTE: PINS 15, 16, 21-26 FUNCTION  
ON PREMIUM MODEL ONLY

Figure 10: Wiring Diagram

## Appendix C

### **Access Codes**

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These are the access codes to the different menus of the PRESSURA™ Room Pressure Controller. When an access code is required, pressing the following key sequence will provide access to the required menu.

<b><u>Key #</u></b>	<b><u>Setpoints</u></b>	<b><u>Alarm</u></b>	<b><u>Configure</u></b>	<b><u>Calibration</u></b>	<b><u>Control</u></b>
1	EMERGENCY	TEST	EMERGENCY	AUX	MENU
2	MUTE	TEST	MENU	MENU	MUTE
3	MUTE	MUTE	AUX	MUTE	RESET
4	MENU	EMERGENCY	MENU	MENU	EMERGENCY
5	AUX	MENU	MENU	AUX	AUX
	<b><u>Interface</u></b>	<b><u>Diagnostics</u></b>			
1	TEST	TEST			
2	EMERGENCY	MUTE			
3	AUX	AUX			
4	MUTE	AUX			
5	MENU	MENU			



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