CaTeC

M E E T I N S T R U M E N T A T I E

ROOM PRESSURE
SOLUTIONS FOR
HEALTHCARE FACILITIES

UNDERSTANDING, ACCELERATED

DESIGN YOUR
HEALTHCARE FACILITY
WITH CONFIDENCE

TSI-Proven Leader

For over 20 years, leading healthcare facilities have relied on TSI's PresSura™ Room Pressure Products for effective, 24/7 monitoring of isolation rooms, operating rooms, and other specialized spaces. Engineers across the globe have made TSI's PresSura Room Pressure Products "The Standard" for low pressure room monitoring applications. Over 50,000 TSI systems are used every day to ensure safety in leading healthcare facilities. Design your next healthcare facility with confidence when you choose PresSura Room Pressure Products.

Safety and Compliance

Whether designing or managing healthcare facilities, you understand that safety, compliance and infection prevention are crucial considerations. PresSura Room Pressure Products provide the confidence you need to comply with major industry guidelines and regulations in order to ensure and document safe environments. Specifically designed for hospital applications, PresSura Room Pressure Products offer:

+ Best-in-class measurement of low pressures to help monitor critical pressurized rooms
+ Simplified compliance with relevant parts of the following guidelines and regulations:
  - *ANSI/ASHRAE/ASHE Standard 170-2008, Ventilation of Health Care Facilities*
  - *The Facility Guidelines Institute (FGI), 2010 Guidelines for Design and Construction of Health Care Facilities*
  - *Centers for Disease Control (CDC), Guidelines for Environmental Infection Control in Health Care Facilities*
+ Seamless integration into Building Automations Systems (BAS) where data can be logged and tracked over long periods of time
+ Low maintenance and easy calibration

PRECISION MEASUREMENTS

In Hospital Isolation Rooms and Operating Rooms, it's all about safety. And when it comes to safety, you need reliable, accurate measurements for your applications. TSI's unique pressure sensor, based on thermal anemometry, provides the most accurate results at the required 0.01" H_2O (2.5 Pa) used in isolation rooms. HVAC pressure transducers simply can't measure up.

Initial Accuracy Comparison at 0.012 in. H_2O Differential		
TSI Through The Wall Sensor ± 10% of Actual Reading	Pressure Transducer A ± 0.05" WC Range ±0.5% Accuracy	Pressure Transducer B ± 0.1" WC Range ±0.8% Accuracy
± 10% of Actual Reading	± 15% of Actual Reading	± 18.3% of Actual Reading
± 0.0012" WC	± 0.0018" WC	± 0.0022" WC

Typical pressure transducers use a membrane which is far less accurate and is subject to drift. When compared with a stable, accurate TSI Pressure Sensor, drift from a pressure transducer can impact the integrity of pressure readings, bringing into question the long-term safety of specialized rooms in hospitals. Maintaining a pressure transducer's accuracy requires frequent calibrations using expensive, dedicated calibration systems.

|	Accuracy After One to Two Years		
	TSI Through The Wall Sensor ± 10% of Actual Reading	Pressure Transducer A ± 0.05" WC Range ±0.5% Accuracy	Pressure Transducer B ± 0.1" WC Range ±0.8% Accuracy
True Accuracy of the reading (Total Error X Full Scale) at calibration	± 0.0012 in. H_2O	± 0.0018 in. H_2O	± 0.0022 in. H_2O
True Accuracy of the reading at the end of year 1	± 0.0012 in. H_2O (±10% of Actual Reading)	± 0.0028 in. H_2O (±23.3% of Actual Reading)	± 0.0027 in. H_2O (±22.5% of Actual Reading)
True Accuracy of the reading at the end of year 2	± 0.0012 in. H_2O (±10% of Actual Reading)	± 0.0038 in. H_2O (±31.7% of Actual Reading)	± 0.0032 in. H_2O (±26.7% of Actual Reading)
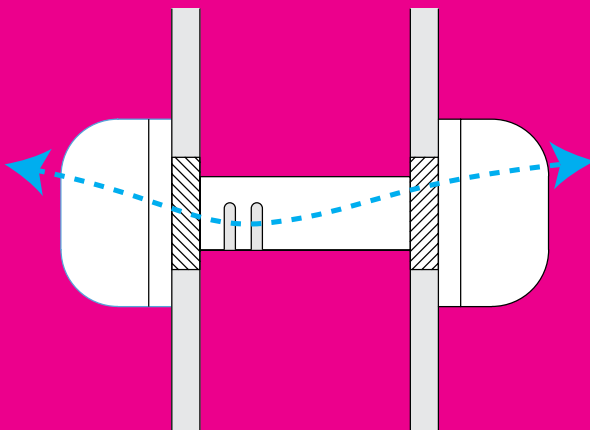
ACCURATE BY DESIGN

TSI's bidirectional pressure sensors have been the industry standard for over 20 years with thousands measuring rooms every day. TSI pressure sensors utilize thermal anemometry, the measurement of choice for low air velocities, to measure a small amount of air migrating from one pressure region to another. Air goes through a tube where temperature-compensated platinum RTD sensors measure the velocity, which is calibrated to a corresponding pressure. As-found data from RTD sensors indicate minimal drift and stable measurements.
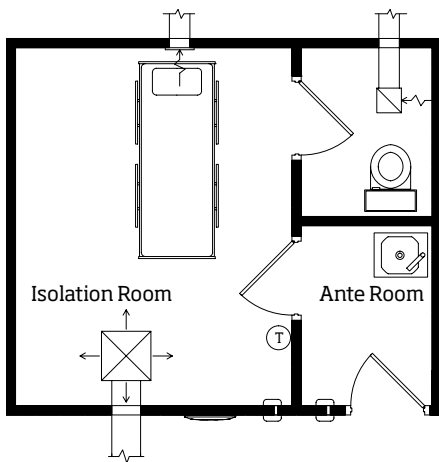
ISOLATION
ROOMS

Airborne Infection Isolation (AII) Rooms and Protective Environment (PE) Rooms require permanently installed devices to continuously measure and monitor room pressure. PresSura Room Pressure Monitors and Controllers provide the most accurate measurement at the point of interest (0.01" H_2O, 2.5 Pa), and provide a simple visual indication of room status.
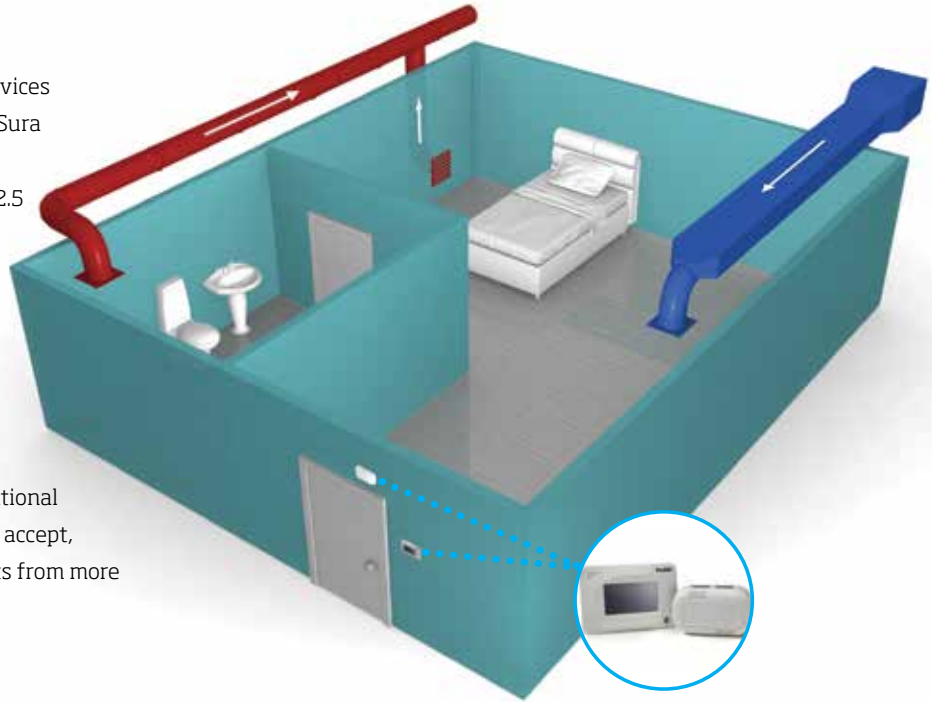
Multi-Room Monitoring

Many AII and PE isolation rooms utilize anterooms for additional protection. A single TSI PresSura Monitor or Controller can accept, label, and display room pressure differential measurements from more than one room, providing a comprehensive solution.

Isolation Room

Ante Room

One PresSura display unit monitoring isolation room and ante room simultaneously.

NURSES STATION MONITOR

Depending on the facility layout, it may be difficult for the nursing staff to see the status of all the AII and PE rooms. TSI's Nurses Station Monitor provides a central location to view the room status with audible and visual alarms for up to eight rooms (simultaneously), without using the BAS. In addition, the Nurses Station Monitor can be configured to allow the nursing staff to change the room mode of an individual room.

OPERATING ROOMS

Operating Rooms (OR) have unique environment monitoring and control requirements. TSI's PresSura products meets these demands.

Room Pressure: Monitors slight positive pressure (+0.01" H_2O, +2.5 Pa) to keep airborne bacteria and other contaminants out.

Air Changes per Hour (ACH): With multiple flow input options, the pressure monitor calculates and provides the ACH rate ensuring proper air quantity is being flushed through the room.

Temperature and Relative Humidity (RH): These important parameters need to be monitored during medical procedures. The pressure monitors and controllers accept inputs from both and provide a local indication.
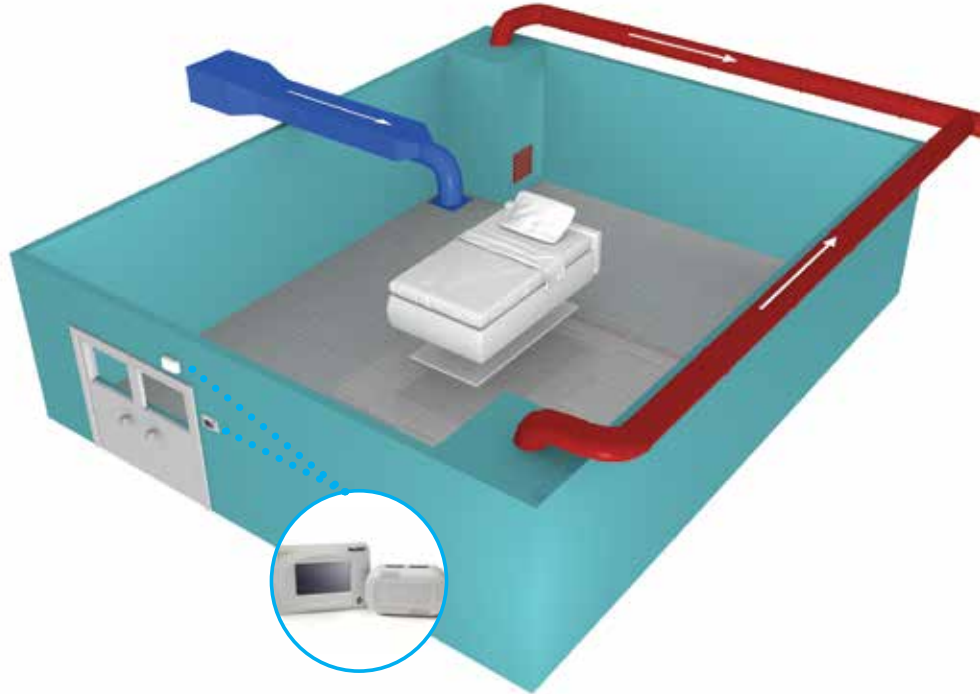
Additional Applications

+ Compounding Pharmacies
+ Pandemic Preparedness Rooms
+ Intensive Care Units
+ Laboratories and Vivariums
+ Clean Rooms
+ Burn Units
+ Bronchoscopy Suites
+ Laundry areas, Food Prep, Construction

A SOLUTION FOR
EVERY APPLICATION

Control Solutions

PresSura Room Pressure Products are great for meeting compliance requirements and providing alarms to unsafe conditions. TSI's PresSura Room Pressure Controller Model RPC30 goes even further by automatically adjusting air flows in response to changing conditions. Tighter controls provide an added level of assurance in critical areas.
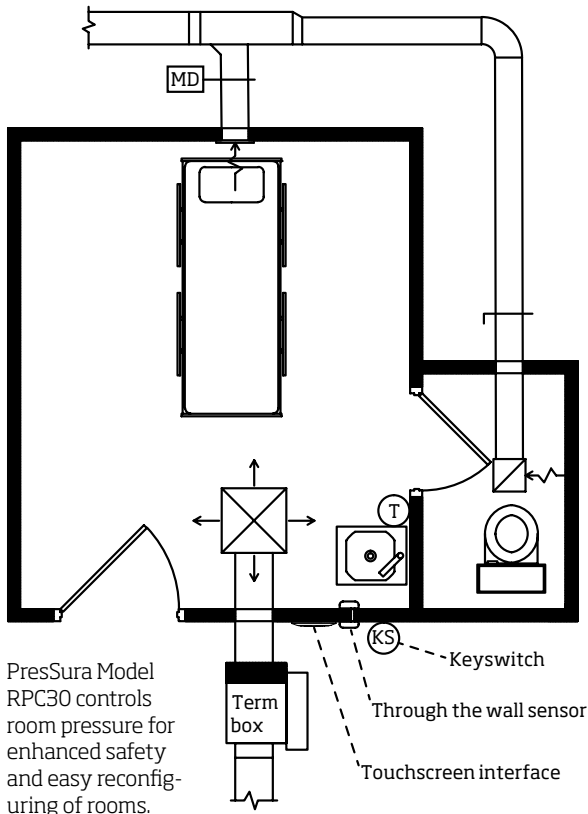
Flexible Options for your Application

TSI's worldwide network of qualified representatives is available to help you apply PresSura Products to meet your specific needs.

TSI's Room Pressure Products provide a complete solution by easily integrating many standard products including:
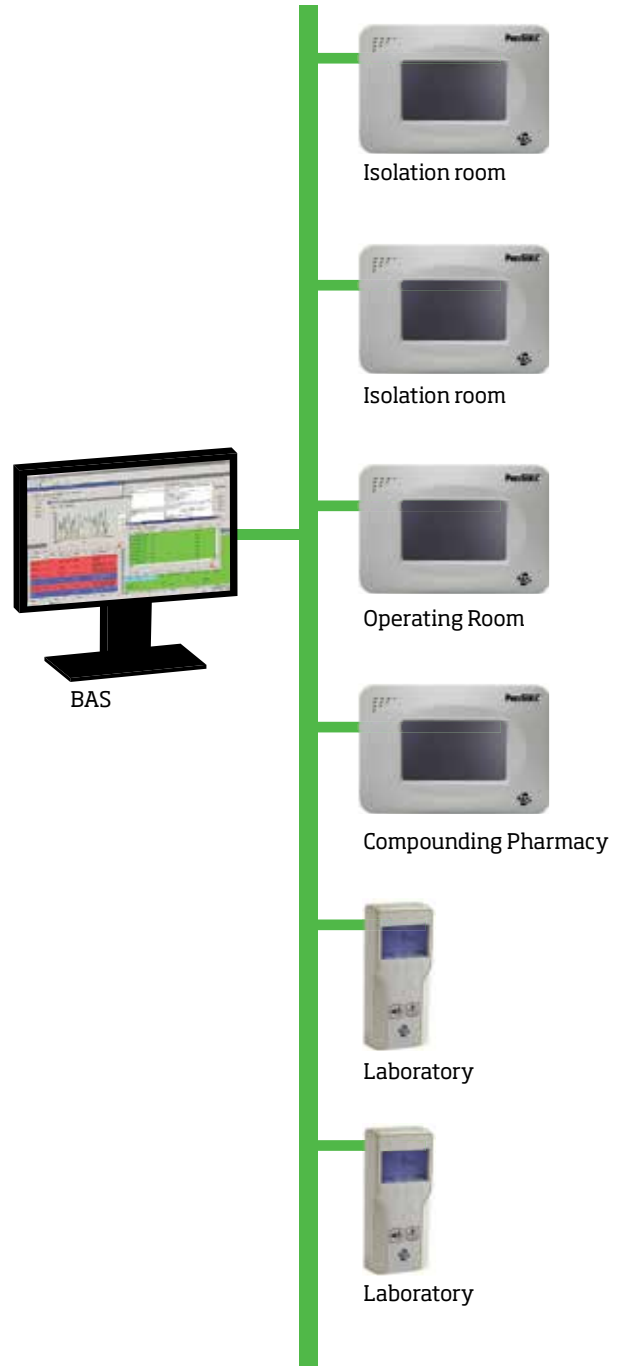
+ Venturi valves
+ Dampers
+ Actuators
+ VAV boxes, including accepting a measurement from a flow grid
+ Pitot-based flow stations to monitor ACH
+ Thermal, linear-based flow stations
+ Door switches to avoid nuisance alarms when doors open
+ Occupancy sensors
+ Keyswitches (to switch rooms from AII Rooms to Normal Patient rooms)
+ Temperature sensors
+ Relative Humidity sensors
+ Pressure transducers

PresSura Model RPC30 controls room pressure for enhanced safety and easy reconfig-uring of rooms.

MD

Term box

Keyswitch

Through the wall sensor

Touchscreen interface

SEAMLESS INTEGRATION INTO YOUR BUILDING AUTOMATION SYSTEM

TSI's PresSura Room Pressure Products seamlessly integrate into your building automation systems (BAS). Once communicating, the facility's BAS System can monitor, data log, and trend room pressures, flow rates, ACH, temperature, humidity, alarms, and much more. Without using gateways, the PresSura products interface with the following standard protocols:

+ BACnet®
+ Modbus™
+ LonWorks®

Isolation room

Isolation room

Operating Room

Compounding Pharmacy

BAS

Laboratory

Laboratory

PARAMETERS AND FEATURES CHART

THE CHART BELOW IS A GUIDE FOR SELECTING THE PRODUCT(S) THAT BEST FIT YOUR NEEDS.

	Model	RPM10	RPM20	RPC30
Room Pressure Sensors	Includes TSI's Low Pressure Sensor (0.00001" Resolution)	+	+	+
	Pressure Transducer	C	C	C
Configuration	Maximum # Rooms	1	2 + anteroom	1 + anteroom
	Room modes (Pos, Neg, No Isolation)	+	+	+
	Remote Keyswitch Option	+	+	+
Alarms	Visual and Audible Alarms	+	+	+
	Alarm Delays	+	+	+
Controls	Controls Exhaust Damper/Valve (Room Pressure)			+
	Controls Supply Damper/Valve (Ventilation)			O
	Controls Room Temperature (Heat)			O
	Accepts Flow Input/ACH	O	O	O
	Door Switch Input	O	O	O
	Accecpts Temperature Input		O	O
	Accepts RH Input		O	O
Communications	Modbus, BACnet MS/TP Native	+	+	+
	LonWorks Native		O	O
	Analog Output	+	+	+
	Alarm Relay Contacts	+	+	+
	Compatible with TSI Nurses' Station Monitor	+	+	+
	Compatible with Configuration Software	+	+	+

+ = Feature of Instrument   O = Optional accessories available   C = Compatible

Modbus, LonWorks, and BACnet are registered trademarks of Modicon Inc., Echelon Corp., and ASHRAE respectively.

TSI's Customers

Thousands of healthcare facilities around the globe rely on PresSura Room Pressure Products each and every day to verify safety in isolation rooms, operating rooms, and other specialized spaces. A sample of customers utilizing TSI includes:

+ Mayo Clinics

+ Kaiser Healthcare System

+ VA Medical Centers

+ Walter Reed Army Medical Center

+ UCLA Medical Center

+ University of Texas Hospitals

+ Brigham's and Women's Hospital, Boston

+ University of Minnesota Hospital

+ Mount Sinai Medical Center, New York

+ U.S. Navy Hospitals

+ Johns Hopkins

+ Jeroen Bosch Hospital, Netherlands

+ Cleveland Clinics

+ St. Jude Children's Hospital

+ Baylor Medical Centers

+ Duke Hospital

+ NYU Medical Center

+ Queen Elizabeth Hospital, Hong Kong