

Sensors and Switches for Potential Medical Applications



Pressure Sensors - Board Mount



Pressure Sensors - Heavy Duty



Pressure Transducers - Heavy Duty



Force Sensors



Airflow Sensors



Magnetic Sensor ICs



Infrared Sensors



Position Sensors - SMART



Humidity Sensors



Temperature Sensors



Thermal Products



MICRO SWITCH™ Subminiature Basic Switches



Pressure Switches



Hour Meters



Pressure, Airflow and Force Sensor Ranges

Pressure Sensors - Board Mount (Low)	
TruStability® HSC, SSC, TSC, NSC Series	±60 mbar to ±10 bar ±6 kPa to ±1 MPa ±1 psi to ±150 psi
Basic TBP, NBP Series	60 mbar to 10 bar 6 kPa to 1 MPa 1 psi to 150 psi
24PC Series	0.5 psi to 250 psi (SIP, DIP), 1 psi to 15 psi (SMT)
26PC Series	1 psi to 250 psi (SIP, DIP), 1 psi to 15 psi (SMT)
26PC Flow-Through Series	1 psi to 150 psi
Pressure Sensors - Board Mount (Ultra Low)	
TruStability® HSC, SSC, NSC Series	±2.5 mbar to ±40 bar ±250 Pa to ±4 kPa ±1 inH ₂ O to ±30 inH ₂ O
Pressure Sensors - Heavy Duty	
13 mm Series	0 psi to 500 psi through 0 psi to 5000 psi
19 mm Series	0 psi to 3 psi through 0 psi to 500 psi
Pressure Transducers - Heavy Duty	
MLH Series	0 psi to 50 psi through 0 psi to 8000 psi
Airflow Sensors	
HAF Series-High Accuracy	±50 SCCM to ±750 SCCM, 10 SLPM to 300 SLPM
AWM40000 Series	±25.0 SCCM, 1.0 SLPM, 6.0 SLPM
AWM700 Series	300 SLPM
AWM90000 Series	±200 SCCM, ±5.0 mbar SCCM [2.0 inH ₂ O]
Force Sensors	
1865 Series	0 psi to 5 psi, 0 psi to 10 psi, 0 psi to 15 psi, 0 psi to 25 psi, 0 psi 30 psi
FS01/FS03 Series	0 kg to 0,68 kg [0 lb to 1.5 lb], 0 kg to 1,36 kg [0 lb to 3.0 lb]
FSG Series, FSS Series	0 N to 5 N, 0 N to 10 N, 0 N to 15 N, 0 N to 20 N

Value-Added Solutions



Custom Flexible Heater Assembly



Custom 1865 Series Force Sensor Assembly

Anesthesia Delivery Machines

- Airflow sensors measure air, oxygen, and nitrous oxide flow
- Pressure sensors may be used to meter and measure the anesthesia gas so that pressure doesn't exceed the desired level
- Magnetic sensor ICs enable smooth motor control that reduces noise and vibration
- Thermistors enable accurate air temperature control
- Value-added TruStability® board mount pressure sensor assembly transforms anesthesia liquid into a gas

Dental Equipment

- Pressure sensors (board mount) keep water flow constant in dental instruments, allowing smooth operation
- Infrared sensors obtain images in dental imaging systems
- Magnetic sensor ICs enable accurate motion control and positioning of the dental imaging system and promote energy efficiency in hand-held battery-operated dental equipment

Hospital Diagnostics

- Airflow sensors in gas chromatography equipment regulate the flow rate to eliminate outgasing
- Pressure sensors (board mount) in blood analyzer pump systems regulate pressure to draw/transport samples
- Pressure sensors (board mount) in gas chromatography equipment sense and control pressure of the gas stream to maintain a constant and precise flow
- Infrared sensors in hematology analyzers are used with an encoder wheel on the pump shaft to count shaft rotation
- Thermistors in blood analyzers monitor chamber, diffusion lamp, and motor temperature to prevent overheating
- Value-added flexible heater assembly for blood analyzers maintain blood samples at a pre-determined temperature level as set by the customer

Hospital Hardware

- Pressure sensors (board mount) control a hospital bed's air columns to help prevent patients from developing bedsores
- Pressure sensors (board mount) measure pressure in blood pressure monitors
- Flexible heaters in incubators prevent fogging
- Humidity sensors maintain temperature and humidity levels in incubators and microenvironments
- Magnetic sensor ICs enable locking/unlocking of medication dispensing cabinets
- Magnetic sensor ICs in hospital beds determine bed adjustment end and beginning positions
- Magnetic sensor ICs in exercise equipment may be used as an emergency stop switch, to count RPM, and to determine incline position
- MICRO SWITCH™ subminiature basic switches determine min/max position of electrically adjustable hospital beds
- Position sensors (SMART arc) in hospital beds monitor backrest elevation which helps ensure the proper angle is maintained
- Thermistors monitor the incubator system's temperature
- Thermostats in patient warmers control or limit temperature
- Pressure switches in hospital gas distribution systems indicate to a control panel that the main pressure tank is empty and needs to be replaced

Hospital Rooms

- Pressure sensors (board mount) monitor airflow rates to provide continuous positive or negative air pressure to prevent contamination

Infusion, Insulin, Syringe Pumps

- Pressure sensors (board mount) monitor and control the flow of fluid
- Flexible heaters conform to the pump's surface so that specific temperature levels may be maintained (infusion pumps only)
- Force sensors detect blockage in the pump's tube that delivers medication
- Infrared sensors are used with an encoder wheel on the pump shaft to count shaft rotation
- Magnetic sensor ICs detect when the cartridge is in position (infusion pumps only)
- Magnetic sensor ICs enable smooth motor control that reduces noise and vibration (infusion, insulin pumps only)

Kidney Dialysis Machines

- Pressure sensors (board mount) obtain dialysate and venous pressure measurements without interrupting flow
- Flexible heaters warm the blood or dialysate to body temperature prior to re-entry into the body
- Force sensors detect the presence/absence/weight of a dialysate cartridge and monitor flexible tubing pressure

- Infrared sensors are used with an encoder wheel on the pump shaft to count shaft rotation
- Magnetic sensor ICs enable smooth motor control that reduces noise and vibration
- Pressure sensors (heavy duty) monitor pressure in the cartridge's flexible tubing
- Thermistors provide enhanced temperature control of the permeation rate across the dialysis membrane
- Thermostats control or limit temperature
- Thermostats in peritoneal dialysis machines may be used for dialysate heater tray control

Oxygen Concentrators

- Airflow sensors detect ultra-low airflow levels that sense when the patient exhales for efficient oxygen delivery
- Pressure sensors (board mount) detect when the patient begins to inhale for efficient oxygen delivery
- Hour meters track machine usage
- Pressure sensors (heavy duty) sense surge tank pressure for accurate compressor pressure levels
- Pressure switches alert the user when the pressure exceeds a specified limit

Patient Monitoring Systems

- Pressure sensors (board mount) in blood glucose monitoring equipment control the pumps used to extract and return blood so that the pressure doesn't rupture the veins
- Pressure sensors (board mount) in blood pressure equipment monitor blood pressure
- Pressure sensors (board mount) in nebulizers carefully monitor airflow rates so that the specified amount of medicine, amid a humid environment, is delivered to the patient
- Pressure sensors (board mount) in spirometers measure airflow in and out of the patient
- Thermistors in temperature monitoring equipment monitor the patient's temperature

Pneumatic Circuit Control

- Pressure sensors (board mount) control pneumatic flow and system pressure for efficient performance in respiratory breathing circuits (nebulizers, spirometers, patient monitoring), flow/pressure control (therapeutic hospital beds), gas collection/delivery (hospital gas supply, oxygen concentrators) and sampling/gas flow (blood analysis, gas chromatography, analytical instrument sampling systems)

Sleep Apnea Machines

- Airflow sensors monitor breathing and send an output to reduce airflow when the patient exhales
- Bimetallic commercial thermostats on-board (stand-alone) devices on flexible heaters control temperature without adding associated software or electronics
- Pressure sensors (board mount) monitor the air pressure delivered to the patient
- Flexible heaters vaporize water to provide a comfortable breathing environment
- Humidity sensors monitor the air to provide adequate moisture
- Magnetic sensor ICs enable smooth motor control that reduces noise and vibration
- Thermistors and pre-packaged temperature probes provide warm, moist air

Spirometers

- Airflow sensors measure the airflow from the patient upon exhalation
- Pressure sensors (board mount) measure airflow in and out of the patient

Surgical Equipment

- Pressure sensors (board mount) in surgical fluid management systems sense joint site pressure during arthroscopic surgery
- Force sensors regulate a fluid management system's pump head pressure
- Position sensors (SMART Arc) in robotically assisted surgery equipment control robotic arms that hold the articulated instrument tips

Ventilators

- Airflow sensors measure air and oxygen flow so the correct amount is delivered to the patient
- Pressure sensors (board mount) detect when the breath changes from inhalation to exhalation in order to measure the airflow to and from the patient
- Flexible heaters heat water to a vapor and introduce it to the air stream
- Humidity sensors deliver warm and moist air to the patient
- Magnetic sensor ICs enable smooth motor control that reduces noise and vibration
- Pressure sensors (heavy duty) provide a sensing solution in corrosive media
- Thermistors monitor and control air temperature

While Honeywell provides application assistance personally, through its literature and the Honeywell Web site, it is up to the customer to determine the suitability of the product in the application.

Sensing and Control

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000720-7-EN IL50

May 2014

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