

# MEDICAL DEVICES

*Designed with Sensors from*

**measurement**  
SPECIALTIES



**Proven in the medical marketplace, Measurement Specialties has partnered with many OEMs to pioneer the use of sensor technology in commercially successful medical devices and disposables.**

*See the other side for medical application details.*

# Medical Devices and Disposables

*Designed with Sensors from Measurement Specialties*

## Cardiovascular Monitoring and Diagnosis

**Arterial Tonometry** – Silicon MEMS pressure sensor measures heartbeat and blood pressure at the wrist.

**Blood Pressure Cuff** – Silicon MEMS pressure sensor measures inflated cuff pressure

**Heart Monitor Patch** – Piezoelectric film vibration sensor monitors heart rhythms and signals 911 call through telemetry for emergency care

**Disposable Blood Pressure Sensor** – Very low-cost miniature silicon MEMS pressure sensor used in line with IV to monitor patient blood pressure

**Electronic Stethoscope** – Piezoelectric film used as a contact microphone to receive heartbeat and breathing sounds

**Pulse Oximetry** – Photo-optic sensors used to measure blood oxygen saturation (SpO<sub>2</sub>) and pulse

**Thermo Dilution Sensor** – Measures blood volume coming out of the heart by using invasive NTC thermistors to measure changes in blood temperature

## Cardiovascular Treatment

**Ablation Catheter** – Force transducer measures precise location of catheter tip during heart ablation to correct arrhythmia

**Ablation Catheter** – Temperature Sensor measure/controls RF energy used for ablation

**Angioplasty Balloon Inflating Pump** – Silicon MEMS pressure sensor measures inflation of angioplasty balloon

**Angioplasty Die Infusion** – Disposable blood pressure sensor (Si MEMS) controls injection of contrast media during surgery

**Blood Transfusion** – Si MEMS-based stainless steel pressure sensor used in a blood separation device

**Cryogenic Angioplasty** – Silicon MEMS stainless steel pressure sensor measures pressure of cryogenic gas used to decrease clogged arteries

**Myocardial Needle Probes** – As the heart is cooled during surgery, hypodermic needles are inserted into myocardial muscles to monitor temperature

**Oxygen Conserver** – Piezoelectric film or Silicon MEMS pressure sensor detects inhalation and opens oxygen flow valve

**Oxygen Tanks** – Microfused™ load cells measure remaining oxygen level in tank

**Pacemaker** – Piezoelectric film sensor used as an activity monitor (vibration sensor) detecting patient movement requiring increased blood flow by increasing the heart rate

**Pacemaker** – An NTC thermistor measures blood temperature to determine patient activity level

**Ventilator and Respirator** – Silicon MEMS pressure sensor measure air flow in breathing machine

## Patient Monitoring and Diagnosis

**Bone Density** – Piezoelectric film used as an ultrasound transducer to measure bone density

**Body Weight** – Microfused™ load cell used on a scale for patient weighing

**Hospital Bed Vital Signs** – Piezoelectric film used to measure breathing patterns and heart rate

**Oral/Esophageal/Rectal Thermometers** – To measure body temperature

**Parkinson's Study** – Miniature vibration sensors used to monitor patient movement

**Respiration Monitors** – Temperature sensors near the mouth and nose monitor breathing patterns

**Skin Temperature** – Reusable or disposable skin sensors for continuous monitoring of patient temperature

**Sleep Apnea** – Piezoelectric film used as a dynamic strain gage to sense chest movement, or as a contact microphone to sense snoring, or as a pyroelectric sensor to monitor breathing exhalation.

**Spinal Column Testing** – Silicon MEMS pressure sensor used for spinal column die testing

## Patient Treatment

**Ambulatory Infusion Pumps** – Si MEMS pressure sensors or Microfused™ load cells used to detect presence and/or rate of flow

**Blood Dialysis** – After filtration, temperature sensors control reheating of blood prior to re-injection into the body

**Bubble and Level Detection** – Ultrasonic sensors detect bubbles or medication levels during infusion

**Hospital Gas Monitoring** – Si MEMS pressure sensors detect gas flow for hospital medical gas systems

**Infusion Pump** – Piezoresistive diaphragm used to drive fluid at very slow rates

**Kidney Dialysis** – Microfused™ strain gage pressure sensor used to measure liquid flow pressure

**Sleep Apnea** – Silicon MEMS low pressure sensor maintains positive airflow to breathing mask; humidity sensor maintains high humidity for comfort

**Premature Newborn Cabinet** – Humidity and temperature control of air flow for optimized, safe ambiance

**Syringe Pump** – Magnetic encoder determines medication flow rate through piston position

**Syringe Pump and Infusion Pump** – Si MEMS force sensor and Microfused™ strain gage detects blockage of medication flow

## Surgical/Delivery

**Baby Delivery System** – Silicon MEMS pressure sensor used to monitor pressure on vacuum-assist baby delivery system

**Blood Tumor Hypodermic Needle Probes** – Miniature temperature sensors at needle tip monitor freezing or warming of the brain during procedure to kills cancerous cells

**Body Heat Exchange** – Si MEMS very low pressure sensor measures partial vacuum used to expand the blood vessels for quick heat exchange

**Disposable Digital Display** – Low-cost Silicon MEMS pressure sensor with display measures knee pressure during surgery

**Kidney Transportation** – Disposable blood pressure sensors enable flow through organs during transport to extend organ life.

**Intra-Uterine Pressure Sensor** – Low-cost miniature Silicon MEMS pressure sensor monitors contraction frequency and amplitude during labor

**Ocular Surgery** – Si MEMS pressure sensor maintains fluid pressures in the eyeball during surgery

## Keypads and Assemblies

**Device Subassembly** – Low cost subassembly done in our offshore manufacturing facility

**Medical Keypad** – Elastomer keypad and membrane switch used to control portable and stationary medical devices

## Measurement Specialties Sensor Technologies

### Pressure

Piezoresistive silicon MEMS board level  
Piezoresistive silicon MEMS stainless steel oil-filled  
Microfused™ silicon bonded strain gage  
Foil bonded strain gage

### Force

Microfused™ silicon bonded strain gage  
Piezoelectric polymer (impact)

### Position (Linear & Rotary)

Electromagnetic sensors  
Magnetic and optical encoders  
Piezoelectric polymer – ultrasound  
Tilt – capacitive fluid

### Vibration / Acceleration

Piezoresistive silicon MEMS  
Piezoelectric polymer  
Piezoelectric ceramic

### Humidity

Capacitive thin film

### Pulse Oximetry

Photo optic sensors

### Temperature

NTC thermistors  
IR thermopiles (non-contacting)



# Distribuidor

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## CONTATO

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