SENSORS & SWITCHES FOR MEDICAL APPS



Honeywell Technologies

SENSORS & SWITCHES SOLUTIONS FOR MEDICAL DEVICES

Honeywell Technologies sensors and switches solutions provide high precision, durability and long-term reliability, to enhance the performance, capability and safety of medical devices.

VENTILATORS

- Pressure sensors monitor the patients breathing (inhalation and exhalation)
- Airflow sensors measure the flow of air and oxygen to the patient
- Oxygen sensors measure oxygen concentration level delivered to the patient
- Thermistors monitor and control air temperature
- Pressure sensors (heavy duty) measure inlet pressure from the hospitals air and oxygen supplies
- Basic switches detect doors and covers are properly closed before operation
- Magnetic sensors enable smooth motor control, reducing noise/vibration



ANESTHESIA DELIVERY MACHINES

- Pressure sensors monitor the patients breathing (inhalation and exhalation)
- Pressure sensors measure the level of anaesthesia gas delivered to the patient
- Airflow sensors measure air, oxygen and nitrous oxide flow
- Thermistors enable accurate air temperature control
- Magnetic sensors enable smooth motor control that reduces noise/vibration



OXYGEN CONCENTRATORS

- Pressure sensors monitor breathing to ensue efficient oxygen delivery
- Pressure sensors sense surge tank pressure to control compressor operation
- Airflow sensors detect ultra-low airflow levels that sense when the patient exhales for efficient oxygen delivery
- Oxygen sensors measure oxygen concentration level delivered to the patient
- Magnetic sensors enable smooth motor control, reducing noise/vibrationt

SLEEP APNEA MACHINES

- Pressure sensors monitor airflow pressure to keep the patiens airway open
- Airflow sensors monitor breathing and send an output to reduce airflow when the patient exhales
- Thermistors and pre-packaged temperature probes provide warm, moist air
- Magnetic sensors enable smooth motor control that reduces noise/vibration



SPIROMETERS

- Pressure sensors monitor the patients breathing (inhalation and exhalation)
- Pressure sensors monitor the peak airflow pressure



DENTAL EQUIPMENT

- Pressure sensors control the water and suction pressure during cleaning
- Magnetic sensors enable accurate motor control within handheld tools and precise motion control within dental seats



SURGICAL EQUIPMENT

- Pressure sensors control the water and suction pressure during cleaning
- Pressure sensors control the gas pressure used to inflate a cavity during keyhole surgery
- Pressure sensors sense joint site pressure during arthroscopic surgery
- Force sensors are used within robotically assisted surgery equipment control robotic arms
- Position sensors (SMART Arc) provide precise position control within medical robotics
- Magnetic sensors enable accurate motor control within handheld tools and precise motion control within surgical seats



HOSPITAL DIAGNOSTICS

- Pressure sensors used within analysis/pipetting equipment measure and control the amount of reagent dispensed into the test samples
- Pressure sensors used with gas chromatography equipment sense and control gas pressure to maintain a constant, precise flow
- Airflow sensors specifically designed for gas chromatography eliminate sensor outgassing
- Thermistors in blood analysers monitor chamber, diffusion lamp and motor temperature to prevent overheating
- Magnetic sensors enable precise position control of robotic and automation



HOSPITAL BEDS

- Pressure sensors are used within hospital bed mattress to improve patient comfort, stimulate blood flow to improve patient recovery times and help prevent patients from developing bedsores
- Basic switches are used to monitor different positions
- Magnetic sensors enable smooth motor control and function
- Magnetic sensors or basic switches in hospital beds determine bed adjustment beginning and end positions

HOSPITAL HARDWARE

- Pressure sensors measure pressure in blood pressure monitors
- Magnetic sensors enable locking/unlocking of medication dispensing cabinets
- Magnetic sensors in exercise equipment may be used as an emergency stop switch, to count RPM and to determine incline position
- Pressure switches in hospital gas distribution systems indicate to a control panel that the main pressure tank is empty and needs to be replaced
- Thermistors monitor the incubator system's temperature



HOSPITAL ROOMS

- Pressure sensors monitor the positive or negative air pressure within operating theatres, intensive care units and infectious wards to help prevent the spread of infections
- Pressure sensors are used to detect when filters are becoming clogged and need to be replaced to improve air quality
- CO_2 sensors monitor the level of CO_2 within hospital wards to improve air quality



INFUSION, INSULIN, SYRINGE PUMPS

- Force sensors perform a non-invasive pressure measurement to monitor the flow of fluids to a patient
- Liquid flow (disposable) sensors provide high-accuracy measurements, enhancing the performance and safety
- Magnetic sensors enable smooth motor control that reduces noise and vibration (infusion, insulin pumps only)
- Subminiature load cells monitor the weight of the IV bag



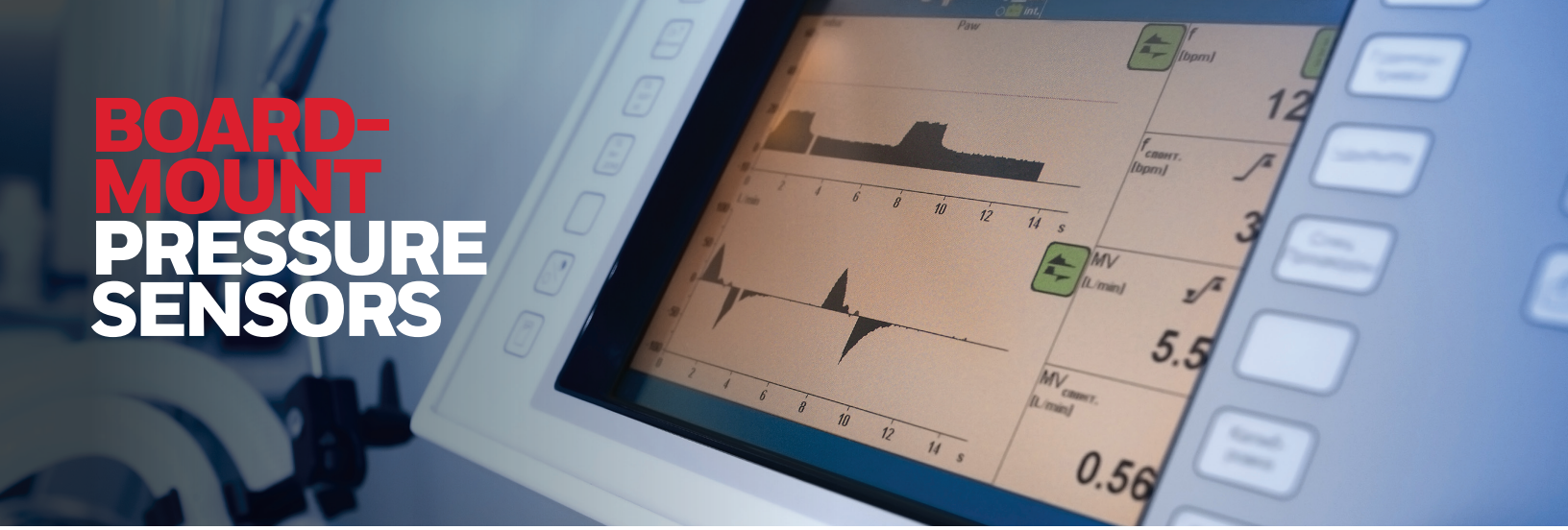
KIDNEY DIALYSIS MACHINES

- Pressure sensors precisely monitor the venous and arteria blood pressure as it leave the body and enters the body after cleaning
- Pressure sensors monitor the dialysate pressure to ensure the blood is being cleaned
- Force sensors detect the presence/absence/weight of a dialysate cartridge and monitor flexible tubing pressure
- Thermistors provide enhanced temperature control of the permeation rate across the dialysis membrane
- Thermostats in peritoneal dialysis machines may be used for heater tray control
- Magnetic sensors enable smooth motor control that reduces noise/vibration
- Basic switches detect presence of covers, doors and cassettes to ensure safety



CONSUMER MEDICAL (PRESSURE SENSORS)

- Measure pressure in non-invasive blood pressure monitoring
- Monitor pressure applied to the wound via the suction system in negative pressure wound therapy
- Measure partial vacuum on the suction side of miniature pumps, such as breast pumps, to provide continuous suction pressure monitoring
- Monitor water level in CPAP water tanks



BOARD-MOUNT PRESSURE SENSORS

PRESSURE SENSORS - BOARD MOUNT



TruStability™ RSC Series

- ±1.6 mbar to ±10 bar
- Temp comp: -40°C to 85°C
- Temp oper: -40°C to 85°C
- TEB*: ±0.25 %FSS
- Digital SPI (24-bit)
- Best for calibration equip



TruStability™ HSC Series

- ±1.6 mbar to ±10 bar
- Temp comp: 0°C to 50°C
- Temp oper: -40°C to 85°C
- TEB*: ±1.0 %FSS
- Analogue & digital (I²C/SPI)
- Best for critical care equip



TruStability™ SSC Series

- ±1.6 mbar to ±10 bar
- Temp comp: -20°C to 85°C
- Temp oper: -40°C to 85°C
- TEB*: ±2.0 %FSS
- Analogue & Digital (I²C/SPI)
- Best for critical care equip



TruStability™ TSC Series

- ±60 mbar to ±10 bar
- Temp comp: 0°C to 85°C
- Temp oper: -40°C to 85°C
- Accuracy: ±0.25 %FSS
- Analogue (mV)
- Best for custom solutions



Basic ABP2 Series

- ±2.5 mbar to ±12 bar
- Temp comp: -40°C to 110°C
- Temp operating: -40°C to 110°C
- TEB*: ±1.5%digital (I²C/SPI)
- Best for homecare equip



MicroPressure MPR Series

- Amplified
- 60 mbar to 2.5 bar
- 6 kPa to 250 kPa
- 1 psi to 30 psi
- Digital output
- ±0.25 %FSS BFSL accuracy



PRESSURE TRANSDUCERS AIRFLOW & LIQUID FLOW SENSORS

LIQUID FLOW SENSORS



Liquid Flow Evaluation Model

- Flow rate 0 to 400ml/hr
- Digital output
- Thermopile die technology
- Operating/calibrated temp 10°C to 40°C

AIRFLOW SENSORS



AWM40000 Series

- Unamplified or amplified
- ±25 SCCM, 1.0 SLPM, 6.0 SLPM
- Analog output
- 60 mW/75 mW power



AWM700 Series

- Amplified
- 200 SLPM
- Analog output
- 60 mW max. power
- Silicon die technology



AWM90000 Series

- Uncompensated
- ±200 SCCM, ±5.0 mbar
- Analog output
- 50 mW power
- Silicon die technology

PRESSURE TRANSDUCERS - HEAVY DUTY



13V Series

- 500 psia
- Wetted material: SEMI-F20 UHP compliant
- Analog output: 30 mV/V to 60 mV/V
- Excellent non-linearity (±0.1 %FSS)



13 mm Series

- Absolute, sealed gage
- 0 psi to 500 psi to 0 psi to 5000 psi
- 0 mV to 100 mV output (nominal)
- Unamplified
- ±0.25 %BFSL max. accuracy



19 mm Series

- Absolute, gage, vacuum gage
- 0 psi to 3 psi to 0 psi to 500 psi
- 0 mV to 100 mV output (nominal)
- Unamplified
- ±0.25 %BFSL max. accuracy



MLH Series

- Sealed gage, vented gage (relative)
- 6 bar to 550 bar
- 50 psi to 8000 psi
- Ratiometric, regulated, and current output
- Amplified
- ±0.25 %FSS accuracy



FP5000 Series

- Absolute, gage
- Various pressure ranges
- 4 mA to 20 mA, 0 Vdc to 5 Vdc, 0 Vdc to 10 Vdc output
- Amplified
- ±0.2 %FSS BFSL accuracy

SANITARY PRESSURE TRANSDUCERS



CIP (Clean in Place) Series

- Absolute, gage
- 10 psi to 600 psi
- 4 mA to 20 mA output
- 500 s response time
- Amplification option
- Accuracy to 0.1 %



FORCE SENSORS & LOAD CELLS

FORCE SENSORS AND LOAD CELLS



MicroForce FMA Series

- Amplified
- SPI or I²C-compatible digital output
- N: 15, 25 force range
- 3X force range overforce
- Very small size



FSA Series

- Amplified
- Ratiometric analog or SPI/ I²C-compatible digital output
- Various force ranges
- 6804 g overforce
- Calibrated/temp. comp.



FSG Series

- Unamplified
- 360 mV typ. output
- 0 N to 20 N (ranges)
- 60 N max. overforce
- Extremely low deflection



FSS Series

- Unamplified
- 360 mV typ. output
- 0 N to 20 N (ranges)
- 60 N max. overforce
- Low deflection & voltage



Basic TBF Series

- Unamplified
- mV output
- 1 bar to 10 bar
- 100 kPa to 1 MPa
- 15 psi to 150 psi
- Extremely small size



1865 Series

- Unamplified
- 100 mV or 40 mV output
- 0 psi to 30 psi (ranges)
- 60 psi max. overforce
- 8-pin DIP electrical connection



Model 11

- Subminiature
- 150 g to 1,000 lb range
- Tension/compression
- ±0.80 %FS accuracy



Model 31

- Miniature
- 50 g to 250 lb, 500 lb to 10,000 lb ranges
- Tension/compression
- ±0.25 % to ±0.30 %FS accuracies



MAGNETIC SENSORS AND BASIC SWITCHES

MAGNETIC SENSORS



SOT-23

- 2,9 mm × 2,8 mm × 1,4 mm
- Bi-polar, latching, unipolar, and omnipolar magnetics
- Surface mount: bulk pack or pocket tape and reel
- Various outputs and functionalities



Flat TO-92 Style

- 4,06 mm × 3 mm × 1,57 mm
- Bi-polar, latching, unipolar, and omnipolar magnetics
- Straight standard leads: bulk pack, ammopack tape-in-box
- Various outputs and functionalities



SOT-89B

- 4,5 mm × 4,2 mm × 1,3 mm
- Bi-polar, latching, unipolar, and omnipolar magnetics
- Surface mount: bulk pack or pocket tape and reel
- Various outputs and functionalities



SR16/SR17 Series

- Value-added packaged magnetics
- Hall-effect vane sensors
- Plastic dual tower
- Plastic side-mount wire exit packages
- Digital sinking output

BASIC SWITCHES



DM Series

- Specialty switch
- 10 A, 16 A
- SPDT, DPDT
- 4,17 N [15 oz] max. operating force
- Bullet nose, concave, pull-to-cheat plungers
- Quick connect termination
- UL, CSA



V7 Series

- Premium miniature (unsealed)
- 0.1 A to 25 A
- SPDT, SPNO, SPNC
- 0.7 oz max. to 14.6 oz max. operating force
- Various levers and terminations
- UL, CSA, CE, UKCA, ENEC



V15W Series

- Miniature sealed
- 0.1 A, 5 A, 10 A
- SPDT, SPNO, SPNC
- 15 g, 25 g, 50 g, 100 g, 200 g operating force
- Various levers and terminations
- UL, cUL, CE, UKCA, ENEC



ZD Series

- Submin sealed
- 0.1 A, 3 A
- SPDT
- 130 gf to 195 gf operating force
- Various levers and terminations
- UL, cUL, CE, UKCA, ENEC



ZM Series

- Submin with coil internal spring
- 0.1 A, 5 A, 10.1 A
- SPST, SPDT, SPNO
- 0.18 oz to 8.78 oz operating force
- Various levers and terminations
- UL, cUL



ZM1 Series

- Submin with flat internal spring
- 0.1 A, 3 A, 6 A, 10.1 A, 16 A
- SPDT, SPNO, SPNC
- 12 gf to 355 gf operating force
- Various levers and terminations
- UL, cUL, CE, UKCA, ENEC



ZW Series

- Submin sealed
- 0.1 A, 6 A
- SPDT, SPNO, SPNC
- 1.4 oz to 7.16 oz operating force
- Various levers and terminations
- UL, cUL, CE, UKCA, ENEC



ZX Series

- Submin standard
- 0.1 A, 3 A
- SPDT
- 0.53 oz to 5.3 oz operating force
- Various levers and terminations
- UL, CSA, CE, UKCA, ENEC



GAS SENSORS

GAS SENSORS



Oxygen Sensors, OOMLF Series

- Lead-free
- Various measurement principles, ranges and electrical interfaces
- Built-in NTC compensation
- Repeatability: < 1 % volume



Oxygen Sensors, iSeries iO2 M Gas sensors

- Lead-free O_2 electrochemical sensors
- Operating life: 3 years
- Range 10 % to 100 % vol. O_2
- Accuracy ±(2.5 % +2.5 % of gas level)
- T90 Response time <30 sec (in specific conditions)
- Operating temp: 0°C to 50°C



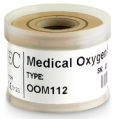
Nitric Oxide Sensors, iSeries iNO M Gas sensors

- Lead-free NO electrochemical sensors
- Operating life: 3 years @ 35°C & 35 %RH
- Range 0 to 100 ppm
- Accuracy ±10 % of actual ±0.5 ppm (above 20 ppm)
- T90 response time <30 sec
- Operating temp: 10°C to 45°C



Nitrogen Dioxide Sensors, iSeries iNO_2 M Gas sensors

- Lead-free NO_2 electrochemical sensors
- Operating life: 3 years @ 35°C & 35 %RH
- Range 0 to 10 ppm
- Accuracy ±20 % of actual ± 0.5 ppm
- T90 response time <50 sec @ 20 ppm exposure
- Operating temp: 10°C to 45°C



OOM (EnviteC) Gas sensors

- Range of lead O_2 electrochemical sensors
- Flexible response time options
- Linearity of sensor signal between 0 % to 100 % oxygen better than 3 % relative
- Low signal drift (<1% volume O_2/month)
- Industry-leading lifespan
- Compatibility with multiple respiratory applications



MediceL® (MOX) sensors

- Range of lead O_2 electrochemical sensors
- T90 response time < 15 s (air to 100 % O_2)
- Linear output from 0 % to 100 % Oxygen
- 13-month warranty
- Operating temp: -20°C to 50°C
- Compatibility with multiple respiratory applications



PRESSURE SWITCHES AND SENSORS

PRESSURE SWITCHES



LE Series

- Low pressure
- 3.5 psi to 150 psi
- Gold-plated contacts
- 1250 psi burst pressure
- Up to 1 million life cycle rating



5000 Series

- Low pressure
- 75 psi to 150 psi
- Silver-plated copper contacts
- 4000 psi burst pressure
- UL approvals, 100,000 life cycle

POSITION SENSORS - SMART



SPS Linear Series

- Three ranges: 0 mm to 35 mm, 0 mm to 75 mm, 0 mm to 225 mm
- Uses a patented combination of an ASIC and an array of MR sensors to accurately and reliably determine the position of a magnet attached to a moving object

TEMPERATURE SENSORS



500 Series Packaged Temperature Probes

- Air-gas/immersion-liquid level/surface types
- NTC thermistor
- 200 Ohm to 1M Ohm nominal resistance
- Wide selection of connectors, lead types, housings, resistances, and terminations



192 Series Thermistors

- Uni-curve with insulated leads and epoxy
- -60°C to 150°C [-76°F to 302°F]
- 0.75 mW/°C dissipation constant in still air
- Termination: tinned copper



194 Series Thermistors

- Uni-curve with insulated leads and epoxy
- -60°C to 150°C [-76°F to 302°F]
- 0.75 mW/°C dissipation constant in still air
- Termination: solid nickel



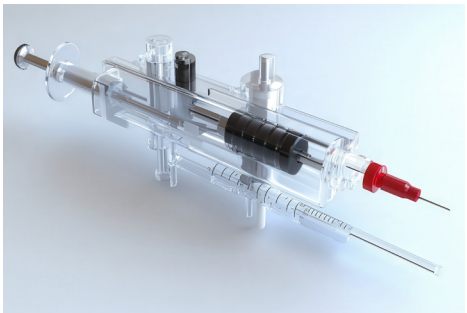
2455R Series Thermostats

- High current thermostat
- Automatic reset
- Phenolic housing
- Open or close in rise
- 15 A/10 A
- Rivet sleeve construction

LIQUID FLOW SENSING TESTING SIMPLIFIED









Honeywell liquid flow sensors can streamline testing and calibration of pumps. This enables real-time data calibrations for pump testing with a smaller, more accurate footprint.

Honeywell disposable liquid flow sensor utilizes thermopile sensing technology to measure the flow rate for the liquid. The Evaluation Module kit includes the reusable base station, disposable liquid flow sensors, 3/16' ID soft tubing, PC application, and cable connector.

The sensing system is fully calibrated, and temperature compensated over the specified flow range. The sensor has a linear flow output over the temperature range of 10°C to 40°C [50°F to 104°F] and is calibrated with distilled water.

DESIGN FEATURES

- High resolution measurements
- Plug and play USB-C interface
- Easy-to-use PC application
- Flexible mounting options

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this writing. However, Honeywell assumes no responsibility for its use.

For more information

Honeywell Sensing Solutions services its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or the nearest Authorized Distributor, visit our website or call:

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