

Sensor Solutions

for Medical Appliances

Medical technology is one of the most challenging markets for electronics. Very high demands are placed on the precision, reliability and long-term stability of electronic systems. The same also applies to the electronic components and sensors.

EPCOS offers a broad range of piezoresistive pressure and NTC temperature sensors that satisfy the tough requirements of the medical sector. Some examples:

- Pressure sensor transmitters used in anesthesia and respiration apparatus are designed to be reliable and very precise.
- Special skin probes for long-term body temperature monitoring can with-stand at least 100 sterilization cycles at 134 °C.

A wide range of pressure sensor dies, pressure transducers and pressure transmitters is available

for pressure measurement in the most diverse applications.

The range of NTC thermistors extends from SMD and leaded types via epoxy and glass encapsulated NTCs to ready-to-incorporate probes.

New additions to the range are electrocardiogram electrodes and humidity sensors from TDK.

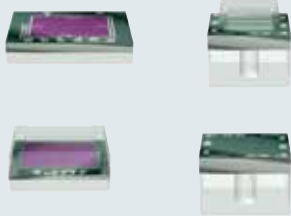
Specimen application areas for our sensor solutions are:

- Anesthesia and respiration apparatus
- Cleaning equipment
- Clinical thermometers
- Dialysis apparatus
- Endoscopy devices
- Glucose meters
- Incubators
- Infusion pumps
- Patient monitoring

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Pressure sensors and transmitters

Pressure sensor dies



Description

- Pressure sensor dies consist of a piezoresistive silicon element on a glue-free glass base
- Pressure measurement from the front and/or back
- Absolute, relative or differential pressure measurements
- Media-protected pressure dies for harsh environments
- Minimized die dimensions

Technical data

- Typical output: 120 mV
- Pressure range: 0.025 ... 40 bar

SMD pressure sensors

SMD



Description

- Compact packaged sensor
- SMD suitable design
- Gel protected

Technical data

- Dimensions of 3 x 3 x 1.7 mm³
- Absolute pressure measurement: 300 ... 1200 mbar

Pressure transmitters



Description

- Calibrated and temperature compensated
- For PCB mounting or with industrial casing
- Compact design, high reliability, high accuracy

Technical data

- Pressure ranges: 1.0 ... 25 bar absolute, 0.1 ... 25 bar relative, 0.1 ... 1.0 bar symmetrical
- Output signal: 0.5 ... 4.5 V, 4 ... 20 mA
- Interface: I²C

Pressure transmitters, media-separated



Description

- Pressure element and signal conditioner mounted in a ceramic housing filled with oil
- High media resistance due to high-alloy steel
- Absolute, relative or differential pressure measurements
- Various flange geometries possible

Technical data

- Ratiometric analog output signal: 0.5 ... 4.5 V
- Broad range of operating temperatures up to 140 °C
- Small dimensions < 3 cm³
- 0.3% FS temperature error

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NTC thermistor based temperature sensors

Glass encapsulated NTCs with insulation



Description

- Thermistor for precise and fast temperature measurement, especially in the body temperature range
- Excellent long-term stability
- Temperature measurement with media contact
- Simplified handling due to insulation of glass body and leads

Technical data

- Small dimensions – head diameter: 1.4 mm
- Tolerance: ± 0.1 K between 25 and 45 °C
- Rated resistance at 25 °C: 10 and 22.52 k Ω
- High electric strength – insulation voltage 500 V DC (1s)
- Temperature range: -40 ... 150 °C

Disposable temperature foil sensors



Description

- Thermistor suitable for oral and axillary measurements
- High accuracy in the body temperature range
- Very fast response time (~7s)
- Flexible polypropylene foil – bendable

Technical data

- Tolerance: ± 0.1 K between 37 and 39 °C
- Length: 100 mm, thickness: 0.45 mm (1.3 mm with NTC – sensor head), breadth: 6 mm
- Temperature range: -40 ... 75 °C

Highly robust reusable skin probes



Description

- NTC element in stainless steel housing
- Highly resistant to disinfectants and chemicals
- Withstands at least 100 autoclave sterilization cycles
- Connected cable with double insulation
- Encapsulated by injection molding

Technical data

- Temperature tolerance: ± 0.2 K between 25 and 45 °C
- Temperature range: 0 ... 80 °C

Potted in stainless steel cases



Description

- NTC thermistor potted in a compact stainless steel case
- Suitable for use in corrosive environments, e.g. purifiers
- UL approval (E69802)
- RAST 2.5-plug and 5-plug terminals available
- VDE protection class II
- Various R/T characteristics and tolerances available

Technical data

- Typical R25 values: 4.8, 12 and 20 k Ω
- Insulation voltage: 3750 V AC
- Temperature range: -10 ... 125 °C

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Additional sensors – TDK

Electrocardiogram electrodes (ECG)



- ECG electrode satisfies the electrical standard for pre-gelled ECG disposable electrodes (ANSI-AAMI-EC-12)
- High reliability due to an electrode based on a conductive ceramic with silver plating
- Reliable signal transmission as a result of optimized electrode geometry that fits to the ring-shaped contact area of the magnetic catch
- Easy to use and excellent patient comfort

Humidity sensors



- Wide measuring range
5 ... 95% RH
- High nominal accuracy
within $\pm 3\%$ RH
- Stable characteristics over a wide temperature range
- Low current consumption
- All-in-one construction with integrated circuitry available
- Compact and easy to apply

Important information: Some parts of this publication contain statements about the suitability of our products for certain areas of application. These statements are based on our knowledge of typical requirements that are often placed on our products. We expressly point out that these statements cannot be regarded as binding statements about the suitability of our products for a particular customer application. It is incumbent on the customer to check and decide whether a product is suitable for use in a particular application. This publication is only a brief product survey which may be changed from time to time. Our products are described in detail in our data sheets. The Important Notes (www.epcos.com/ImportantNotes) and the product-specific warnings and cautions must be observed. All relevant information is available through our sales offices.