SENSOR SOLUTIONS FOR APPLIANCES FROM TE CONNECTIVITY
TE Connectivity (TE) is a global technology leader, providing connectivity and sensor solutions essential in today’s increasingly connected world. TE is one of the largest sensor companies in the world. Our sensors are vital to the next generation of data-driven technology.

Today’s smart and green appliances are built using more efficient designs, meeting the latest regulations while saving energy, water and time. Customers rely on our sensor technologies to enable appliances to respond to human touch, sense vibration, adjust to loads, and operate more efficiently. We work to develop custom solutions that can monitor humidity, water levels, position and temperature. Our products contribute to new levels of convenience and productivity in a wide range of household appliances.

SENSOR SOLUTIONS

- PRESSURE
- HUMIDITY
- TEMPERATURE
- FORCE
- FLOW
- PIEZO FILM
- POSITION
- PHOTO OPTIC
- LIQUID LEVEL

QUALITY STATEMENTS

- AS/EN 9100
- EN 13980
- ESA 266
- ESCC266E
- ESCC 400C
- ISO 13485
- ISO 14001
- ISO 9001
- PART21G
- TS 16949
APPLIANCE APPLICATION SOLUTIONS

Clothes Dryer
- Humidity sensor monitors process humidity and stops the dryer when clothes are dry
- Thermopile measures clothing temperature to prevent overheating and fabric damage
- Force sensors measure payload weight at the beginning of the cycle

Cooktop
- Temperature sensor monitors glass surface temperature for cooking control and “hot” indication lights for user safety

Dishwasher
- Magneto-resistive (MR) sensor and magnet verifies spray arm rotation
- Temperature sensor measures water temperature and controls heating elements
- Liquid level sensor monitors water level and detergent dispenser level

Household Oven
- Temperature probe monitors cooking temperature
- Temperature sensor monitors pyrolytic cleaning temperature and controls door latch

Microwave Oven
- Humidity sensor monitors food moisture content during cooking
- Thermopile measures food temperature without the need to make physical contact
- Force sensor measures food weight on the turntable

Refrigerator
- Temperature sensors monitor the freezer and refrigerator cabinets as part of the control system
- Humidity sensor monitors humidity in produce drawers and compartments
- Humidity sensor monitors ambient room humidity to help manage frost prevention and doorframe condensation

Small Appliances
- Temperature sensors measure liquid and heating element temperatures in toaster ovens, coffee makers, popcorn poppers, etc.
- Humidity sensor monitors relative humidity and steam production for espresso machines, clothes steamers, etc.

Washing Machine
- Temperature sensor measures water temperature and controls heating elements
- Pressure sensor monitors water level
- Vibration sensor detects out-of-balance conditions during spin
- Proximity sensor verifies door closed and latched before start-up
- Force sensors measure payload weight at the beginning of the wash cycle

Water Heater
- Temperature sensor measures water temperature and controls heating element
- Flow switch detects “Flow on” condition
### SENSOR SOLUTIONS FOR APPLIANCES

#### FLOW SENSORS

<table>
<thead>
<tr>
<th>Package</th>
<th>MEAS FS Series</th>
<th>MEAS FCS Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>PPE or brass</td>
<td>PPE or PPS</td>
</tr>
<tr>
<td>Unique Features</td>
<td>Polymer or brass housing</td>
<td>Reed switch reliability</td>
</tr>
<tr>
<td></td>
<td>Minimum pressure drop</td>
<td>Minimum pressure drop</td>
</tr>
<tr>
<td></td>
<td>Vertical mount ±15°</td>
<td>Operates from small head of water</td>
</tr>
<tr>
<td></td>
<td>Suitable for water or air</td>
<td>Not subject to lead-die fatigue</td>
</tr>
<tr>
<td></td>
<td>Interface options available</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NO with no flow</td>
<td>NO with no flow</td>
</tr>
<tr>
<td>Max. Pressure</td>
<td>10 bar</td>
<td>10 bar</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-30°C to 85°C</td>
<td>0°C to 85°C</td>
</tr>
<tr>
<td>Switch Closure</td>
<td>1.0 L/min</td>
<td>0.6 ± 0.5 L/min</td>
</tr>
<tr>
<td>Flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>112 x 51 x 42</td>
<td>75 x 26 x 16</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Mains water control, central heating systems, flow sensing, circulating pump protection, cooling systems</td>
<td>Leak detection, mains water control, instant water heater control, central heating systems, flow sensing, circulating pump protection, cooling systems</td>
</tr>
</tbody>
</table>

#### FORCE SENSORS

<table>
<thead>
<tr>
<th>Package</th>
<th>MEAS FX19</th>
<th>MEAS FS20</th>
<th>MEAS FC22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Low profile “coin cell” design</td>
<td>Miniature, drop in replacement for industry standard</td>
<td>Plastic housing, button, flange mounting</td>
</tr>
<tr>
<td>Unique Features</td>
<td>Ultra low cost, low strain design</td>
<td>Load cell design operates at very low strains</td>
<td>Low cost button shape</td>
</tr>
<tr>
<td></td>
<td>Essentially unlimited cycle life</td>
<td>Not subject to lead-die fatigue</td>
<td>Essentially unlimited cycle life</td>
</tr>
<tr>
<td>Ranges (Lbf)</td>
<td>10, 25, 50, 100</td>
<td>1.5, 3</td>
<td>25, 50, 100</td>
</tr>
<tr>
<td>Max. Over-range</td>
<td>2.5X</td>
<td>10 lbf</td>
<td>2.5X</td>
</tr>
<tr>
<td>Output / Span</td>
<td>100 mV</td>
<td>1.0 to 4.0 V</td>
<td>100 mV, 0.5 to 4.5 VDC</td>
</tr>
<tr>
<td>Combined Linearity &amp; Hysteresis</td>
<td>±1.0% FSO</td>
<td>±1.0% FSO</td>
<td>±1.0% FSO</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-40°C to 85°C</td>
<td>0°C to 70°C</td>
<td>-40°C to 85°C</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>Ø25.00 x 29.50 x 8.00</td>
<td>30.708 x 17.272 x 8.255</td>
<td>Ø26.00 x 42.00 x 19.50</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Consumer OEM, exercise machines, physical therapy, vending machines, appliances, pumps, medical devices</td>
<td>Infusion pumps, contact sensing, medical devices, consumer appliances</td>
<td>Infusion pumps, robotics end-effectors, exercise machines, contact sensing, appliances</td>
</tr>
</tbody>
</table>
### HUMIDITY SENSORS

**MEAS HS1101LF**
- **Package:** Through hole TO39 with side opening plastic cap
- **Type:** Capacitive humidity
- **Operating RH Range:** 0 to 100% RH
- **Operating Temp.:** -60°C to 140°C
- **Unique Features:**
  - Robust and recognized component
  - Suitable for most humidity applications
  - Cost effective solution
- **Accuracy:** 180 pF, ±3 pF at 55% RH
- **Dimensions (mm):** 10 x 11.9 x 19
- **Typical Applications:** Applications requiring a robust humidity sensor in automotive, home appliance, outdoor, HVACR, consumer, printer, medical, meteorology.

**MEAS HTU2X Series**
- **Type:** Digital RH and NTC temperature
- **Operating RH Range:** 0 to 100% RH
- **Operating Temp.:** -40°C to 125°C
- **Unique Features:**
  - Low power consumption
  - Fast response time
  - Very low temperature coefficient
  - I²C interface or PWM interface or SDM interface
- **Accuracy:** ±0.3% RH at 25°C (10 to 95% RH)
- **Dimensions (mm):** 3.0 x 3.0 x 1.0
- **Typical Applications:** Humidity and temperature plug and play transducers for OEM demanding applications in automotive, home appliance, medical, humidifier.

**MEAS HTU2XF Series**
- **Type:** Digital RH and NTC temperature
- **Operating RH Range:** 0 to 100% RH
- **Operating Temp.:** -40°C to 125°C
- **Unique Features:**
  - Low power consumption
  - Fast response time
  - Very low temperature coefficient
  - I²C interface or PWM interface or SDM interface
  - Optional filter
- **Accuracy:** ±3% RH at 25°C (10 to 95% RH)
- **Dimensions (mm):** 3.0 x 3.0 x 1.0
- **Typical Applications:** Humidity and temperature plug and play transducers for OEM demanding applications in automotive, home appliance, medical, humidifier.

**MEAS HTU3535PVBM/Wire**
- **Package:** Cost effective, small size mini-module
- **Type:** Analog voltage RH and NTC temperature
- **Operating RH Range:** 0 to 100% RH
- **Operating Temp.:** -40°C to 110°C
- **Unique Features:**
  - PTFE filter (Optional)
  - Multiple connector choices (JST, Samtec board to board through hole)
- **Calibration:** ±3% RH at 55% RH; ±0.25°C at 25°C
- **Dimensions (mm):** 27 x 11.9 x 19 (Depending on the connector, from 6 to 10.8 mm length)
- **Typical Applications:** Humidity and temperature plug and play transducers for OEM demanding applications in HVACR, home appliance, printer, medical, and outdoor.

**MEAS HTU383X/Wire**
- **Package:** Cost effective, small size mini-module
- **Type:** Digital RH and NTC temperature
- **Operating RH Range:** 0 to 100% RH
- **Operating Temp.:** -40°C to 110°C
- **Unique Features:**
  - PTFE filter (Optional)
  - Multiple connector choices (JST, Samtec board to board through hole)
  - Based on HTU21
- **Calibration:** ±3% RH at 55% RH; ±0.25°C at 25°C
- **Dimensions (mm):** 27 x 11.9 x 19 (Depending on the connector, from 6 to 10.8 mm length)
- **Typical Applications:** Humidity and temperature plug and play transducers for OEM demanding applications in HVACR, home appliance, printer, medical, and outdoor.

**MEAS HTM2500LF**
- **Type:** Probe RH and temperature
- **Operating RH Range:** 0 to 100% RH
- **Operating Temp.:** -40°C to 85°C
- **Unique Features:**
  - Electronics fully protected with potting material
  - Optional wiring length and connectors
- **Calibration:** ±3% RH at 55% RH; ±0.25°C at 25°C
- **Dimensions (mm):** 86 x 11.5 x 11.5 (Standard wire length of 200 mm)
- **Typical Applications:** Hygrostat, data loggers, baby cabinets.
## LIQUID LEVEL SENSORS

### MEAS EVS722-51
- **Package**: Brass stem with polypropylene float
- **Type**: Level sensor
- **Unique Features**:
  - Internal or external fitting
  - Suitable for a wide range of chemicals
  - 2-position, high and low level switching
  - Repeatability of operation
  - Reed switch reliability
- **Max. Pressure**: 4.7 bar
- **Operating Temp.**: -30°C to 80°C
- **Dimensions (mm)**: Stem: 223.5, Float Dia.: 22
- **Typical Applications**: Waste water level, sump level, water high or low level, coolant level indication, boiler heating element protection

### MEAS LS509-31
- **Package**: Glass filled PPS
- **Type**: Level Sensor
- **Unique Features**:
  - High or low level sensing
  - Reed switch reliability
  - Low cost
  - NO or NC switch by rotating 180°
  - Suitable for wide range of liquids
  - Interface options available
- **Max. Pressure**: 4.7 bar
- **Operating Temp.**: -30°C to 110°C
- **Dimensions (mm)**: 103 x 29 x 29
- **Typical Applications**: Coolant level indication, water high or low level, boiler heating element protection, potable water level, boiling water level

### MEAS LS Series Horizontal Level Sensors
- **Package**: Glass filled PPS, nylon, or polypropylene
- **Type**: Level sensor
- **Unique Features**:
  - High or low level sensing
  - Reed switch reliability
  - Low cost
  - NO or NC switch by rotating 180°
  - Suitable for wide range of liquids
  - Interface options available
- **Max. Pressure**: 4.7 bar
- **Operating Temp.**: -30°C to 130°C
- **Dimensions (mm)**: 103 x 29 x 29
- **Typical Applications**: Coolant level indication, chemical high or low level, diesel fuel low level, sump switch, alcohols, water (Potable, waste, boiling), low oil detection

### MEAS LDS Series Horizontal Level Sensors
- **Package**: Glass filled PPS, nylon, or polypropylene
- **Type**: Level sensor
- **Unique Features**:
  - High or low level sensing
  - Reed switch reliability
  - Low cost
  - Central float pivot minimizes travel
  - NO or NC switch by rotating 180°
  - Suitable for wide range of liquids
  - Interface options available
- **Max. Pressure**: 4.7 bar
- **Operating Temp.**: -30°C to 130°C
- **Dimensions (mm)**: 98 x 29 x 29
- **Typical Applications**: Coolant level indication, chemical high or low level, diesel fuel low level, sump switch, alcohols, water (Potable, waste, boiling), low oil detection

### MEAS VS Series Vertical Level Sensors
- **Package**: Glass filled Nylon or Polypropylene
- **Type**: Level Sensor
- **Unique Features**:
  - High or low level sensing
  - Reed switch reliability
  - Low cost
  - NO or NC switching by reversing float on stem
  - Suitable for wide range of liquids
  - Interface options available
- **Max. Pressure**: 4.7 bar
- **Operating Temp.**: -30°C to 130°C
- **Dimensions (mm)**: 87 x 29 x 29
- **Typical Applications**: Coolant level indication, chemical high or low level, diesel fuel low level, sump switch, alcohols, water (Potable, waste, boiling), low oil detection
# SENSOR SOLUTIONS FOR APPLIANCES

## PHOTO OPTIC SENSORS

<table>
<thead>
<tr>
<th>MEAS ELM-4000</th>
<th>MEAS EPM-4001</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Package</strong></td>
<td>Lead frame</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Emitter assembly</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>660 nm / 880-940 nm</td>
</tr>
<tr>
<td><strong>Unique Features</strong></td>
<td>• Low cost</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>Sensor dependent</td>
</tr>
<tr>
<td><strong>Operating Temp.</strong></td>
<td>-55°C to 70°C</td>
</tr>
<tr>
<td><strong>Dimensions (mm)</strong></td>
<td>4.4 x 5.1 x 1.9</td>
</tr>
<tr>
<td><strong>Typical Applications</strong></td>
<td>Pulse oximetry, finger and ear probes, disposable</td>
</tr>
</tbody>
</table>

## PIEZO FILM SENSORS

<table>
<thead>
<tr>
<th>MEAS 40 kHz Transducers</th>
<th>MEAS 80 kHz Transducers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Package</strong></td>
<td>Plastic cage with mounting tabs</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Air ultrasound transducer</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>40 kHz</td>
</tr>
<tr>
<td><strong>Unique Features</strong></td>
<td>• Wide horizontal beam angle</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>Application dependent</td>
</tr>
<tr>
<td><strong>Operating Temp.</strong></td>
<td>5°C to 60°C</td>
</tr>
<tr>
<td><strong>Dimensions (mm)</strong></td>
<td>Ø15 x 31.4</td>
</tr>
<tr>
<td><strong>Typical Applications</strong></td>
<td>2D position detection, digitizer, distance measurement, object detection</td>
</tr>
</tbody>
</table>

## PIEZO FILM SENSORS

<table>
<thead>
<tr>
<th>MEAS DT1, SDT1</th>
<th>MEAS Piezo Cable</th>
<th>MEAS MiniSense 100</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Package</strong></td>
<td>Unshielded element with twisted pair or shielded element with shielded cable</td>
<td>Shielded coaxial 20 gage piezo cable</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>Flexible film, adhesive mount</td>
<td>Polymer jacketing; armored jacketing</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>15 mV/με up to 1% strain</td>
<td>μPa sensitivity</td>
</tr>
<tr>
<td><strong>Unique Features</strong></td>
<td>• Thin, flexible, robust</td>
<td>• Continuous lengths of up to 1 km</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>±20% (Typical)</td>
<td>• Shielded construction</td>
</tr>
<tr>
<td><strong>Operating Temp.</strong></td>
<td>-40°C to 70°C (Higher available custom)</td>
<td>±20% (Typical)</td>
</tr>
<tr>
<td><strong>Dimensions (mm)</strong></td>
<td>Application dependent</td>
<td>-40°C to 70°C</td>
</tr>
<tr>
<td><strong>Typical Applications</strong></td>
<td>Dynamic strain gage, contact microphone, acoustic pickup</td>
<td>Ø3 continuous lengths</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Perimeter and fence security; geophone, impact sensors, intrusion detection, seat occupancy (e.g. airbag), patient bed vital signs monitor</td>
</tr>
</tbody>
</table>

|                  |                   | Wake-up switch, load imbalance, anti-theft devices, impact sensing, vital signs monitoring |
## Position Sensors

### MEAS KMY, KMZ

<table>
<thead>
<tr>
<th>Package</th>
<th>SOT-223, E-line 4 pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Linear low field sensor</td>
</tr>
<tr>
<td>Range</td>
<td>-2 to 2 kA/m magnetic field</td>
</tr>
<tr>
<td>Unique Features</td>
<td>- High sensitivity</td>
</tr>
<tr>
<td></td>
<td>- Low hysteresis</td>
</tr>
<tr>
<td></td>
<td>- Linear to uniaxial field strength</td>
</tr>
<tr>
<td>Output</td>
<td>Ratiometric with output voltage range 20 mV/V</td>
</tr>
<tr>
<td>Resolution</td>
<td>Typ. 0.1% of range</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Typ. 1.0% of range</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-40°C to 150°C</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>SOT: 6.6 x 7.0 x 1.6</td>
</tr>
<tr>
<td></td>
<td>E-line: 16 x 4.2 x 2.4</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Non-destructive material testing, spray arm detection in dish washers, magnetic imaging, brake pedal position</td>
</tr>
</tbody>
</table>

### MEAS M532

<table>
<thead>
<tr>
<th>Type</th>
<th>TDFN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>Low field switch sensor</td>
</tr>
<tr>
<td></td>
<td>1 to 3 kA/m magnetic switching field</td>
</tr>
<tr>
<td>Unique Features</td>
<td>- Linearized ratiometric output</td>
</tr>
<tr>
<td></td>
<td>- Temperature compensated switching point</td>
</tr>
<tr>
<td>Output</td>
<td>Ratiometric with output voltage range 10 mV/V</td>
</tr>
<tr>
<td>Resolution</td>
<td>Typ. 0.1 kA/m</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Typ. 0.1 kA/m</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-25°C to 85°C</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>TDFN: 2.5 x 2.5 x 0.8</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Piston position switch, reed switch replacement</td>
</tr>
</tbody>
</table>

### MEAS KMT36H

<table>
<thead>
<tr>
<th>Package</th>
<th>TDFN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Angle sensor</td>
</tr>
<tr>
<td>Range</td>
<td>360° angle</td>
</tr>
<tr>
<td>Unique Features</td>
<td>- High accuracy</td>
</tr>
<tr>
<td></td>
<td>- High resolution</td>
</tr>
<tr>
<td></td>
<td>- 360° full turn</td>
</tr>
<tr>
<td>Output</td>
<td>Three 120° phase shifted output signals with output voltage range 20 mV/V</td>
</tr>
<tr>
<td>Resolution</td>
<td>Typ. 0.01° to 0.1°</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Typ. 0.1° to 1°</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-40°C to 150°C</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>TDFN: 2.5 x 2.5 x 0.8</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Steering position, gage readings, rotary encoders</td>
</tr>
</tbody>
</table>

### MEAS KMT32B, KMT37

<table>
<thead>
<tr>
<th>Type</th>
<th>TDFN, SO-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>Angle sensor</td>
</tr>
<tr>
<td></td>
<td>180° angle</td>
</tr>
<tr>
<td>Unique Features</td>
<td>- High accuracy</td>
</tr>
<tr>
<td></td>
<td>- High resolution</td>
</tr>
<tr>
<td>Output</td>
<td>Sine and cosine signals with output voltage range 20 mV/V</td>
</tr>
<tr>
<td>Resolution</td>
<td>Typ. 0.01° to 0.1°</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Typ. 0.1° to 1°</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-40°C to 150°C</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>TDFN: 2.5 x 2.5 x 0.8</td>
</tr>
<tr>
<td></td>
<td>SO-8: 5 x 4 x 1.75</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Steering position, flow meters, rpm meters, rotary encoders</td>
</tr>
</tbody>
</table>
### SENSOR SOLUTIONS FOR APPLIANCES

#### POSITION SENSORS

<table>
<thead>
<tr>
<th>Package</th>
<th>MEAS KMA36</th>
<th>MEAS DPL, DPN-Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>TSSOP PCB board</td>
<td>PCB board</td>
</tr>
<tr>
<td>Range</td>
<td>360° angle</td>
<td>±2° to ±30°</td>
</tr>
<tr>
<td>Unique Features</td>
<td>Low cost MR encoder for rotational and incremental measurements</td>
<td>High resolution</td>
</tr>
<tr>
<td>Output</td>
<td>Voltage 0 - 5 V DC, Customer specific</td>
<td>Minimal temperature drift</td>
</tr>
<tr>
<td>Resolution</td>
<td>Typ. 0.1°</td>
<td>User configurable</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Typ. 0.3°</td>
<td>Voltage / RS 232 / SPI</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-25°C to 85°C</td>
<td>±0.05° to ±0.8°</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>TSSOP20: 6.5 x 6.4 x 1.2</td>
<td>-40°C to 85°C</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Knobs, small robotics, angular / linear position</td>
<td>45 x 45 x 20 Laser leveling, weighing systems, mobile and stationary cranes, hydraulic leveling, building monitoring, wind power</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Package</th>
<th>PS-1, PS-2</th>
<th>PM Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Glass filled nylon 6.6</td>
<td>Glass filled nylon 6/6</td>
</tr>
<tr>
<td>Range</td>
<td>Proximity sensor</td>
<td>Proximity sensor</td>
</tr>
<tr>
<td>Unique Features</td>
<td>Low cost</td>
<td>Low cost</td>
</tr>
<tr>
<td>Output</td>
<td>Max. switching 250 VAC, 10A, 15 watts</td>
<td>Repeatability</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Application dependent</td>
<td>Repeatability</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-30°C to 105°C</td>
<td>Direct magnet or shunt operation</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>28.5 x 19.5 x 6.4</td>
<td>Robust, fully encapsulated</td>
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<tr>
<td>Typical Applications</td>
<td>Door interlocks, hook switches, security systems, safety interlocks, position indication</td>
<td>High quality magnet</td>
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<tr>
<td></td>
<td></td>
<td>Matched to operate with PS1 and PS2 series proximity sensors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Application dependent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-30°C to 105°C</td>
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<tr>
<td></td>
<td></td>
<td>28.5 x 19.5 x 6.4</td>
</tr>
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</table>
## PRESSURE SENSORS

### MEAS MS5525DSO
- **Package**: SOIC-14
- **Type**: Gage, absolute, differential, compound
- **Output / Span**: 24-bit ADC, SPI or I²C protocol
- **Unique Features**:
  - 24-bit digital small outline sensor
  - Pressure and temperature measurement
  - Single supply of 1.8 or 3.6 VDC
  - Top straight / barb, flat top, o-ring seal
- **Pressure Range**: 0 - 0.07 to 20 bar / 0 - 1 to 300 psi
- **Linearity/Accuracy**: 0.25% / 2.5% TEB
- **Dimensions (mm)**: Ø15.82 x 9.3
- **Applications**: Medical respirators, ventilators

### MEAS MS1451, MS1471
- **Type**: Gage, absolute, differential, compound
- **Output / Span**: 24-bit ADC, SPI or I²C protocol
- **Unique Features**: 24-bit digital small outline sensor
- **Pressure Range**: 0 - 1 to 150 psi / 0 - 5 to 500 psi
- **Linearity/Accuracy**: 0.25% / 2.5% TEB
- **Overpressure**: 3X range
- **Operating Temp.**: -40°C to 125°C
- **Dimensions (mm)**: 12.5 x 7.9
- **Applications**: Medical respirators, ventilators

### MEAS 86BSD
- **Package**: 6 mm diaphragm diameter
- **Type**: Gage, absolute
- **Pressure Range**: 0 - 0.07 to 20 bar / 0 - 1 to 300 psi
- **Output / Span**: 14-bit ADC, I²C or SPI protocol
- **Unique Features**: Pressure and temperature read-out
- **Linearity/Accuracy**: ±0.25% span
- **Operating Temp.**: -40°C to 125°C
- **Dimensions (mm)**: Ø15.82 x 9.3
- **Applications**: Level controls, tank level measurement, corrosive fluids and gas measurement systems, sealed systems, manifold pressure measurement, submersible depth monitoring

### MEAS M7100, U7100
- **Type**: Gage, no vent gage (M7100)
- **Output / Span**: 0.5 - 4.5 VDC [Ratiometric output]
- **Unique Features**: ±1% FSO TEB (-20°C to 85°C)
- **Linearity/Accuracy**: ±0.25% non-linearity
- **Overpressure**: 3X range
- **Operating Temp.**: -40°C to 125°C
- **Dimensions (mm)**: 26.7 x 26.7 x 50.0
- **Applications**: HVACR refrigeration controls, off road vehicles engine control, compressors, hydraulic, energy and water management

### Agency Approvals
- **CE (EMC)**
- **UL 508**
## PRESSURE SENSORS

<table>
<thead>
<tr>
<th>Package</th>
<th>MEAS MS4515DO, MS4525DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Gage, compound (MS4515DO) Gage, absolute, differential, compound (MS4525DO)</td>
</tr>
<tr>
<td>Pressure Range</td>
<td>0 - 2 to 30” H2O (MS4515DO) 0 - 1 to 150 psi (MS4525DO)</td>
</tr>
<tr>
<td>Output / Span</td>
<td>14-bit ADC SPI or I2C 24-bit digital word SPI or I2C protocol</td>
</tr>
<tr>
<td>Unique Features</td>
<td>• Optional gel coat, low power • Pressure and temperature measurement • Single supply of 3.3 or 5.0 VDC • Top, side barbed or manifold o-ring port • J lead or thru hole pins • 24-bit digital sensor • Pressure and temperature measurement • Single supply of 1.8 or 3.6 VDC • Top, side barbed or manifold o-ring port • J lead or thru hole pins • Fast conversion up to 0.54 ms • Ultra-low power consumption 0.25% / 1% TEB</td>
</tr>
<tr>
<td>Linearity/Absolute Accuracy</td>
<td>0.25% / 1% TEB 0.25% / 1% TEB</td>
</tr>
<tr>
<td>Overpressure</td>
<td>300 psi 0.69 bar / 10 psi (MS4515HRD), 3X range (MS4525HRD)</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-10°C to 85°C (MS4515DO), -25°C to 125°C (MS4525DO) -25°C to 125°C</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>12.5 x 9.9 12.5 x 9.9</td>
</tr>
<tr>
<td>Typical Applications</td>
<td>Medical instruments, air flow measurements, process control, leak detection Medical instruments, air flow measurements, process control, leak detection</td>
</tr>
</tbody>
</table>
## SENSOR SOLUTIONS FOR APPLIANCES

### TEMPERATURE SENSORS

**NTC**
- **Package**: Leadless Chips, SMD 0402, 0603, 0805
- **Type**: Gold or silver electrodes, surface mounted
- **Resistance Range**: Chip: 100 to 1MΩ / SMD: 40 to 500KΩ
- **Unique Features**:
  - Wire bonding compatible
  - End band SMD
- **Accuracy**: ±% to 10%
- **Operating Temp.**: -40°C to 125°C
- **Dimensions (mm)**:
  - Chip: 0.6 - 1.0 square
  - SMD 0402: 1 x 0.5 x 0.7
  - SMD 0603: 1.6 x 0.8 x 1
  - SMD 0805: 2 x 1.25 x 1.2
- **Typical Applications**: Temperature compensation, communication (DWDM), infrared sensing systems, PCB mounting temperature measurement

**MEAS Thermistor Chips**
- **NTC Radial Leaded Thermistors**
  - **Type**: Epoxy or glass coated
  - **Resistance Range**: 100 to 1MΩ
  - **Unique Features**:
    - Interchangeable
    - Moisture resistant
    - Stability
  - **Accuracy**: 0.25% to 20%
  - **Operating Temp.**: -55°C to 280°C
  - **Dimensions (mm)**: 0.4 to 4.9
  - **Typical Applications**: Temperature sensing for OEM, automotive, medical, HVAC

**MEAS Axial Leaded Thermistors**
- **Type**: Glass coated
- **Resistance Range**: 5KΩ to 100KΩ
- **Unique Features**:
  - Tight tolerance (±%)
  - Max. stability using high density (HD) chip
  - Hermetically sealed
  - Tinned and Nickel plated leads
- **Accuracy**: ±% to ±3%
- **Operating Temp.**: -40°C to 300°C
- **Dimensions (mm)**: 2.0 x 4.0 body
- **Typical Applications**: Refrigeration including cabinet sensing and evaporator coil, white goods, fire detection units, air-conditioning systems, PCB temp sensing

**MEAS TSYS Series**
- **Package**: QFN16, TDFN8
- **Type**: I²C, SPI, PWM, SDM (Convertible to analog voltage)
- **Resistance Range**: —
- **Unique Features**:
  - Low power
  - Small size
  - Calibrated and ready to use
  - 16-bit resolution
- **Accuracy**: Up to ±0.1°C at -5°C to 50°C
- **Operating Temp.**: -40°C to 125°C
- **Dimensions (mm)**:
  - QFN16: 4 x 4 x 0.85
  - TDFN8: 2.5 x 2.5 x 0.75
- **Typical Applications**: Industrial control, replacement of precision RTDs, thermistors and NTCs, heating and cooling systems, HVAC

**MEAS Platinum Thin Film Sensors**
- **Type**: Wired component
- **Resistance Range**: 100Ω, 1000Ω (Other values on request)
- **Unique Features**:
  - Thin film platinum deposited on ceramic substrate, glass coated
  - Tube outline available
  - Connection via radial leads
- **Accuracy**: ±0.1°C at -5°C to 50°C
- **Operating Temp.**: -50°C to 600°C (Standard) down to -200 °C or up to 1,000 °C (On request)
- **Dimensions (mm)**:
  - 2.0 x 2.3 x 1.1 (Standard)
  - 1.2 x 4.0 x 1.1 (Standard)
  - Other dimensions (On request)
- **Typical Applications**: White goods, automotive, industrial, aerospace, medical, test and measurement

## TE Connectivity
### Temperature Sensors

#### MEAS Oven Sensors
- **Package:** Stainless steel housing
- **Type:**
  - Pt element encapsulated into ceramic tube, with rigid stainless steel housing
  - High temperature cable
- **Sensor Range:**
  - Pt100, Pt500, Pt1000 sensor
- **Unique Features:**
  - High temperature
  - Easy integration / installation
  - Higher dielectric strength according to type
- **Accuracy:**
  - Class B, C according to IEC60751
- **Operating Temp.:** -20°C to 750°C (According to version)
- **Dimensions (mm):**
  - OD Ø4 mm to Ø6 mm
  - Immersion length 35 mm to 100 mm
  - Custom mechanical interface and cable length
- **Typical Applications:** Drying oven, domestic oven

#### MEAS Refrigeration Molded Probes
- **PVC or TPE**
- **Type:**
  - Overmolded
  - NTC
  - RTD: Pt
- **Unique Features:**
  - Mounting clips available
- **Accuracy:**
  - NTC: Custom tolerances available
  - Pt RTD: Class AA, A, B according to IEC60751
- **Operating Temp.:** -40°C to 125°C
- **Dimensions (mm):**
  - 8 x 30, 6.5 x 25, 6 x 50, 6 x 5 x 15
  - Ø12 x 64
- **Typical Applications:** HVACR, industrial processes control

#### MEAS Air Sensor
- **Metal housing with PVC sun shield with or without weatherproof box**
- **Type:**
  - Fully potted subassembly
  - NTC
- **Unique Features:**
  - Easy installation – just threads into mounting hole or standard handy box
  - Fully potted housing protects sensing element and provides fast, accurate response
- **Accuracy:**
  - ±0.2°C at 0°C to 70°C
- **Operating Temp.:** -40°C to 105°C
- **Dimensions (mm):**
  - Ø12 x 64
- **Typical Applications:** Residential and commercial building controls, energy management systems

#### MEAS Surface Sensors
- **Package:** Silicone rubber or polyimide laminated element
  - SP683
- **Type:**
  - Flat, flexible, rectangular sensor
  - Variety of designs available
- **Sensor Range:**
  - RTD: Pt, Ni, Cu
  - Thermocouple: Type J, K, T, E
- **Unique Features:**
  - Surface sensing for curved or uneven surfaces
  - Noninvasive, simple installation
  - Adhesive backing option
- **Accuracy:**
  - RTD: Class A, B according to IEC60751
- **Operating Temp.:** Varies: -50°C to 200°C (Available up to 220°C)
- **Dimensions (mm):** Custom dimensions available
- **Typical Applications:** Chemical and pharmaceutical industry, process industry, laboratory, aerospace, motor end windings of stator coils, generators

#### MEAS Pointed Food Probe
- **Stainless steel housing**
- **Type:**
  - Silicone overmolded handles
  - High temperature FDA silicone
  - Audio jack plug type
  - NTC
- **Unique Features:**
  - Single or multiple sensitive elements
  - Cable length and handle shape on demand
- **Accuracy:**
  - ±2%
- **Operating Temp.:** -40°C to 250°C
- **Dimensions (mm):** Custom dimensions available
- **Typical Applications:** Home appliance (Oven, microwave oven)
## TEMPERATURE SENSORS

### MEAS TS Series

**Package**
- TO-18, TO-5

**Type**
- Thermopile sensor components

**Temp. Range**
- Depends on applied electronics and calibration, filter types optimal for object temperature range: -40°C to 300°C (Extended range: -60°C to 1,000°C)

**Unique Features**
- High signal output
- Accurate reference sensors

**Accuracy**
- Depends on applied electronics and calibration

**Operating Temp.**
- Ambient temperature range: -20°C to 85°C

**Dimensions (mm)**
- Ø9.15 x 4.4 (body)

**Typical Applications**
- Medical thermometer (ear, forehead), pyrometer

### MEAS TSEV

**Single Pixel Series**

**Package**
- OEM-module

**Type**
- Single-pixel thermopile module

**Temp. Range**
- Object temperature range: 0°C to 300°C (Other temperature ranges available upon request)

**Unique Features**
- Calibrated, interfaces: I²C, SPI
- Different field of views: 5° at 50%, 10° at 50%, 90° at 50%, others on request

**Accuracy**
- Depends on temperature range, typical 1% full scale, max. accuracy 0.1°C

**Operating Temp.**
- Ambient temperature range: 0°C to 85°C

**Dimensions (mm)**
- 35 x 25 x 13 to 31

**Typical Applications**
- Contactless temperature measurement, e.g. on moving parts or heated rolls, laminators, people detection, microwave oven, air conditioner

### MEAS TPT Series

**Multi Pixel Series**

**Package**
- OEM-module IP65 stainless steel tube

**Type**
- 8-pixels-linear array thermopile module Thermopile system for industrial use

**Temp. Range**
- Object temperature range: -20°C to 120°C
- Object temperature range: 0°C to 300°C

**Unique Features**
- Calibrated and ready to use
- Digital output
- Small field of view

**Accuracy**
- Depends on temperature range, typical 2% full scale
- Depends on temperature range, typical 1% full scale

**Operating Temp.**
- Ambient temperature range: -20°C to 85°C

**Dimensions (mm)**
- 25 x 35 x 15.2

**Typical Applications**
- Contactless temperature measurement, e.g. on moving parts or heated rolls, laminators, people detection, microwave oven, air conditioner

### MEAS TPT Series

**Single Pixel Series**

**Package**
- TPT300V

**Type**
- IP65 stainless steel tube

**Temp. Range**
- Object temperature range: 0°C to 300°C

**Unique Features**
- Calibrated and ready to use
- Digital or analog outputs
- Small field of view

**Accuracy**
- Depends on temperature range, typical 1% full scale

**Operating Temp.**
- Ambient temperature range: 0°C to 85°C

**Dimensions (mm)**
- Ø18 x 111

**Typical Applications**
- Contactless temperature measurement, e.g. on moving parts or heated rolls, control of assembly lines, paper fabrication, drying applications
## VIBRATION SENSORS

### MEAS 3022/3028

- **Package**: Pins or pads
- **Type**: Board level
- **FS Range (g)**: ±2, 5, 10, 20, 50, 100, 200
- **Unique Features**:
  - mV output
  - Gas damping
  - Pin or pad option
- **Accuracy**: ±0.5% non-linearity
- **Operating Temp.**: -40°C to 125°C
- **Dimensions (mm)**: 22.86 x 15.24 x 5.33
- **Typical Applications**: Vibration and shock monitoring, tilt applications, motion control, impact testing

### MEAS LDTC Family

- **Type**: Piezo Film elements with or without mass and pins
- **Type**: Cantilever beam with vertical or horizontal pins
- **FS Range (g)**: ±10 (Typical)
  - Very low cost
  - High sensitivity (1 V/g)
  - Ultra-low power (Self generating)
- **Accuracy**: ±20.0% (Typical)
- **Operating Temp.**: -40°C to 70°C
- **Dimensions (mm)**: 19.05 x 6.35 x 6.35
- **Typical Applications**: Wake-up switch, load imbalance, anti-theft devices, impact sensing, vital signs monitoring
<table>
<thead>
<tr>
<th>PRODUCT AND APPLICATION MATRIX</th>
<th>Flow</th>
<th>Force</th>
<th>Liquid Level</th>
<th>Humidity</th>
<th>Photo Optic</th>
<th>Piezo Film</th>
<th>Position</th>
<th>Pressure</th>
<th>Temperature</th>
<th>Vibration</th>
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<tbody>
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<td>Cooktop</td>
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<td>Washing Machine</td>
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