Sensors and Accessories

Thermistors are another way of protecting or monitoring a device. Thermistors are thermally sensitive resistors and are grouped in two types: Negative Temperature Coefficient (NTC) and Positive Temperature Coefficient (PTC) and the resistance responses to the change in temperature.

Custom Made Thermistors

Hawco offer a huge range of made to order temperature sensors and thermistors. Be they thermocouples, RTD sensors or thermistors.

Thermistors are either NTC (negative temperature coefficient) or PTC (positive temperature coefficient). Generally they are described as a resistance at 25°C.

Custom Made NTC Thermistors

Custom made NTC Thermistors are designed to meet customer's specific requirement.

- Operating range -50 to 150°C
- Various material option
- Available in PM and IN series

Custom Thermistor Probes

Custom Thermistor Probes are designed to meet your specific application requirements

Custom probe designs have virtually unlimited options available.

For technical advice on designing a probe for your specific requirements, contact our expert consultants on +44 (0) 1483 869 070 or export@hawco.co.uk
Product Information

High quality IP68 hermetically sealed Pt100 resistance temperature detector.

This flexible multi-use sensor has been designed specifically to provide protection from corrosion in harsh or wet environments. It has a fast response time and can be easily wiped clean.

The impermeable FEP insulated wire houses the RTD element and provides excellent resistance to chemicals and oils including fluids and gases.

Termination options include a mini-plug connector for easy use with portable thermometers. Sockets, spade terminals and plain tails are also available with wire length made to customer specification on request.

Ideally suited for a wide range of applications including, but not limited to, refrigeration, laboratory, autoclaves, sterilisers, geothermal and food and drink.

Specification

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Hermetically Sealed Thermocouple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Type K or Type T</td>
</tr>
<tr>
<td>Max. Temp</td>
<td>250 °C</td>
</tr>
<tr>
<td>Wire Length</td>
<td>1m, 2m, 5m or as required</td>
</tr>
<tr>
<td>Wire Insulation</td>
<td>PFA</td>
</tr>
<tr>
<td>Wire Diameter</td>
<td>7/0.2mm</td>
</tr>
<tr>
<td>Termination</td>
<td>Plain tails, spade terminals, mini-plug or socket, standard plug or socket</td>
</tr>
<tr>
<td>Junction</td>
<td>Insulated</td>
</tr>
</tbody>
</table>
Hermetically Sealed Thermocouple Sensor

Product Information

High quality IP68 hermetically sealed wire thermocouple sensor available in type K or T.

This flexible multi-use sensor has been designed specifically to provide protection from corrosion in harsh or wet environments. It has a fast response time and can be easily wiped clean.

The impermeable PFA insulated thermocouple has excellent resistance to chemicals and oils including fluids and gases. The beaded sensing junction is housed in the thermocouple tip and weld-sealed providing an air and moisture tight environment.

Termination options include a mini-plug connector for easy use with portable thermometers. Sockets, spade terminals and plain tails are also available with wire length made to customer specification on request.

Ideally suited for a wide range of applications including, but not limited to: refrigeration, laboratories, autoclaves, sterilisers, geothermal and food and drink applications.

Specification

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Hermetically Sealed Thermocouple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Type K or Type T</td>
</tr>
<tr>
<td>Max. Temp</td>
<td>250 °C</td>
</tr>
<tr>
<td>Wire Length</td>
<td>1M, 2M, 5M or as required</td>
</tr>
<tr>
<td>Wire Insulation</td>
<td>PFA</td>
</tr>
<tr>
<td>Wire Diameter</td>
<td>7/0.2mm</td>
</tr>
<tr>
<td>Termination</td>
<td>Plain tails, spade terminals, mini-plug or socket, standard plug or socket</td>
</tr>
<tr>
<td>Junction</td>
<td>Insulated</td>
</tr>
</tbody>
</table>

hawco

Trusted Supplier  Technical Support  Global Export
APAQ-HRF is an analog, multirange 2-wire temperature transmitter for in-head mounting in DIN B or larger connection heads. The 4-20 mA output is temperature linearized.

Designed for highest reliability and cost-efficiently manufactured, APAQ-HRF combines attractive pricing with high quality and industrial performance.

The Intrinsically Safe version, APAQ-HRFX, is available with ATEX and FM approval.

**Multirange design**
- Adjustable for different Pt100 ranges in both °C and °F.
- Adjustments are made with solder pads and potentiometers.

**Temperature linear output**
- Fully temperature linear 4-20 mA output offers accurate Pt100 measurements.

**Adjustments APAQ-HRF/-HRFX**

<table>
<thead>
<tr>
<th>Zero adjustment</th>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>-50 to +50</td>
<td>-60 to +120</td>
<td></td>
</tr>
</tbody>
</table>

**Span selection**

<table>
<thead>
<tr>
<th>°C</th>
<th>50</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>°F</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>600</td>
<td>800</td>
<td>1000</td>
</tr>
</tbody>
</table>

**Easy mounting and access**
- Flat design gives easy access to terminals and adjustments.
- Large center hole lets the lead wires or an insert tube pass easily.

**Safety**
- Genuine sensor break detection with selectable upscale or downscale action.
- Excellent EMC performance.

**High load capacity**
- Only 6.5 V voltage drop over the transmitter allows for high loads in the 4-20 mA output loop.

**Industrial design**
- The “Low Profile” housing, with its protected electronics, is extremely durable.

**Cost-optimized**
- High volumes combined with cost-effective design and production contributes to a very attractive pricing.
Speciﬁcations : APAQ-HRF/-HRFX

Input

Pt100 (α = 0.00385), 3-wire connection

Sensor current

Max. sensor wire resistance

Monitoring

Sensor break detection, selectable

Adjustments

Zero

Span, selectable

Span, fine adjustment

Output

Current

Linearity

Current limitation

Permissible load

Temperature

Ambient, storage

Ambient, operating

General data

Response time 10-90%

Humidity (non-condensing)

Intrinsic safety

Power supply, polarity protected

Supply voltage

Permissible ripple

Accuracy

Linearity

Calibration

Temperature influence

Sensor wire influence

RFI influence, 0.15-1000MHz, 10 V or V/m

Supply voltage influence

Supply ripple influence, 50/60 Hz

Long term stability

Housing

Material / Flammability(UL)

Mounting

Connection, single/stranded wires

Weight

Protection, housing with cover/terminals

1) Per wire, with equal resistance

Output connections

Ordering information

APAQ-HRF

APAQ-HRFX (ATEX)

APAQ-HRFX (FM)

Head mounting kit

Rail mounting kit

Configuration

Output load diagram

Permissible RLOAD at 25 mA output

Supply voltage U (VDC)

RLOAD=(U-6.5)/0.025 (APAQ-HRF)

RLOAD=(U-8.5)/0.025 (APAQ-HRFX)

Dimensions

All information subject to change without notice.
APAQ-HCF is an analog, multirange 2-wire temperature transmitter for in-head mounting in DIN B or larger connection heads.

APAQ-HCF covers 5 different thermocouple types, is continuously adjustable and provides a voltage linear output.

Designed for highest reliability and cost-efficiently manufactured, APAQ-HCF combines attractive pricing with high quality and industrial performance.

The Intrinsically Safe version, APAQ-HCFX, is available with ATEX and FM approval.

Multirange design
- Adjustable for thermocouple type J, L, T, K and N inputs with continuous range settings.
- Adjustments are made with solder pads and potentiometers.

Adjustments APAQ-HCF/-HCFX

<table>
<thead>
<tr>
<th>Zero adjustment</th>
<th>Adjustable ±10 % of span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span selection</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td>T/C J *</td>
</tr>
<tr>
<td>10 to 50</td>
<td>186 - 870°C</td>
</tr>
<tr>
<td>(no gap)</td>
<td>335 - 1566°F</td>
</tr>
<tr>
<td></td>
<td>T/C L *</td>
</tr>
<tr>
<td>183 - 855°C</td>
<td>329 - 1540°F</td>
</tr>
<tr>
<td></td>
<td>T/C T *</td>
</tr>
<tr>
<td>213 - &gt;400°C</td>
<td>383 - &gt;720°F</td>
</tr>
<tr>
<td></td>
<td>T/C K *</td>
</tr>
<tr>
<td>246 - 1232°C</td>
<td>443 - 2218°F</td>
</tr>
<tr>
<td></td>
<td>T/C N *</td>
</tr>
<tr>
<td>319 - &gt;1300°C</td>
<td>574 - &gt;2340°F</td>
</tr>
</tbody>
</table>

*The temperature spans correspond to the mV spans with zero adjustment = 0 % of span

Cold Junction Compensation
- Automatic compensation for the terminal temperature.

Easy mounting and access
- Flat design gives easy access to terminals and adjustments.
- Large center hole lets the lead wires or an insert tube pass easily.

Safety
- Genuine sensor break detection with selectable upscale or downscale action.
- Excellent EMC performance.

High load capacity
- Only 6.5 V voltage drop over the transmitter allows for high loads in the 4-20 mA output loop.

Industrial design
- The “Low Profile” housing, with its protected electronics, is extremely durable.

Cost-optimized
- High volumes combined with cost-effective design and production contributes to a very attractive pricing.
## Specifications: APAQ-HCF/-HCFX

### Input
- **Thermocouples**: Selectable, type J, L, T, K and N with ranges within -5 to +55 mV
- **Input impedance**: >5 MΩ
- **Max. sensor wire resistance**: 500 Ω (total loop)

### Monitoring
- **Sensor break detection, selectable**: Upscale ~25 mA, downscale ~3 mA

### Adjustments
- **Zero**: ±10 % of span
- **Span, selectable**: 10 to 50 mV
- **Span, fine adjustment**: ±10 %

### Output
- **Current**: 4 - 20 mA
- **Linearity**: Voltage linear
- **Current limitation**: ~25 mA
- **Permissible load**: APAQ-HCF 700 Ω @ 24 VDC, 25 mA
  - APAQ-HCFX 620 Ω @ 24 VDC, 25 mA

### Temperature
- **Ambient, storage**: -40 to +100 °C / -40 to +212 °F
- **Ambient, operating APAQ-HCF**: -40 to +85 °C / -40 to +185 °F

### General data
- **Response time 10-90%**: ≤0.2 s
- **Humidity (non-condensing)**: 0 to 95 %RH
- **Intrinsic safety**: APAQ-HCFX ATEX: II 1 G Ex ia IIB T4, T5, T6
  - FM: Class I, Div.1, Group A-D

### Power supply, polarity protected
- **Supply voltage APAQ-HCF**: 6.5 to 32 VDC
  - APAQ-HCFX: 8.5 to 30 VDC
- **Permissible ripple**: 4 Vp-p @ 50/60 Hz

### Accuracy
- **Linearity (mA output to mV input)**: ±0.1 % of mV span
- **Calibration**: ±0.1 % of span
- **Cold Junction Compensation (CJC)**: ±1.0 °C/±1.8 °F
- **Temperature influence**: ±0.6 % of span/25 °C, ±0.7 % of span/50 °F
- **Temperature influence CJC**: ±1.25 °C/25 °C, ±2.5 °F/50 °F
- **Sensor wire influence**: 0.4 µV/Ω
- **RFI influence, 0.15-1000MHz, 10 V or V/m**: ±0.2 % of span (typical)
- **Supply voltage influence**: ±0.02 % of span/V
- **Supply ripple influence, 50/60 Hz, 4 Vp-p**: ±0.05 % of span
- **Long term stability**: ±0.1 % of span/year

### Housing
- **Material / Flammability(UL)**: Zinc alloy + ABS / V0
- **Mounting**: DIN B-head or larger
- **Connection, single/stranded wires**: ≤2.5 mm², AWG 14
- **Weight**: 40 g
- **Protection, housing with cover/terminals**: IP 20 / IP 10

### Ordering information
- **APAQ-HCF**: 70APHCF001
- **APAQ-HCFX (ATEX)**: 70APHCFX01
- **APAQ-HCFX (FM)**: 70APHCFX11
- **Head mounting kit**: 70ADA00011
- **Rail mounting kit**: 70ADA00013
- **Configuration**: 70CAL00001

All information subject to change without notice.