FlexiTEMP® 60
Flexible Sheath Resistance and Thermocouple Temperature Sensors

- Measuring resistor 1x / 2x Pt100, thermocouple 1x / 2x “J”, “K”, “N”
- Measuring range -200 to +700 °C (Pt100), -200 to +800 °C (“J”), -200 to +1300 °C (“K”, “N”)
- Accuracy class A, B according EN 60751, 1, 2 according EN 60584-1
- Sheath material stainless steel 1.4541, 1.4404, Inconel 600, Nicrobell/Pyrosil
- Sheath diameter from 1 to 6 mm
- Optional nominal length L: 0.1 to 50 m
- Fast response to temperature changes
- Flexible stem
- Optional version of cold junction, with flying leads, connected compensating cable, flat connector, flange and MA head
- Intrinsically safe version

Cold ends of sheath resistance sensors and thermocouples are supplied with flying leads, with connected connection wires (for or compensation wires for TC) with optional isolation material, with flat standard connector or mini connector (only for TC), small head MA (with or without connecting thread) or with 42 mm diameter flange with option to mount ceramic terminal block or transmitter (exchangeable measuring insert).

Application
Resistance and thermocouple temperature sensors FlexiTEMP® 60 without the protective fitting are intended for applications, where their advantages such as fast response to temperature changes, flexible stem, small dimensions and sheath resistance to corrosion become apparent.

High accuracy and stability of output signal are strong sides of resistance sensors. Thermoelectric sensors are very resistant to high pressure, usable in vacuum and have higher stability of output signal in comparison to wire thermocouples.

Standard thermocouple sensors with isolated measuring end are due to its electromagnetic shielding suitable for work together with measuring centers and control systems.

Resistance and thermocouple sensors can be used with or without fastening elements as for example fixing shift pipe unions etc. Version of sensor with flange is suitable as a part of sensor without protective fitting, into thermowell and with thermowell (e.g. ModuTEMP® 70).

Description
Flexible sheath resistance and thermocouple temperature sensors FlexiTEMP® 60 without protective tubes and thermowells are supplied in length from 100 mm up to several tens of meters with an outer diameter of the sheath 3 / 4.5 / 6 mm (Pt100) and 0.5 / 0.8 / 1 / 1.5 / 2 / 3 / 4.5 / 6 mm (TC “J”, “K”, “N”). These thermocouples are as standard supplied with the sheath made of stainless steel 1.4404 for resistance sensors, 1.4541 for thermocouple “J” or Inconel 600 (2.4816), Nicrobell/Pyrosil for thermocouple “K” and “N”. Resistance sensors are supplied with single or double sensor Pt100.

Measuring ends of thermocouple sensors are manufactured in insulated singe or dual sensor. After agreement the grounded or opened version or triple version can be supplied.

Technical specifications
Resistance sensors type T1060

- Measuring resistor (RTD): 1xPt100, accuracy class A, B according to EN 60751 inside wiring: two-wire, four-wire, outer diameter of stem 3 and 6 mm
  2xPt100, accuracy class A, B according to EN 60751, inside wiring: two-wire, three-wire, four-wire, outer diameter of stem 3 and 6 mm
- Measuring range: -200 to +700 °C (accuracy class B)
  -100 to +450 °C (accuracy class A)
- Measuring current: recommended 0.1 to 1.0 mA
  maximal 3 mA
- Output signal: resistance
- Electrical insulation resistance: min. 100 MΩ according to EN 60751, at temperature (20 ±15)°C, max. 80 % relative humidity
**Thermocouple sensors type T1560**

**Thermocouple (TC):**
- 1x / 2x "J", "K", "N",
- accuracy class 1 (not for type N with code KV), 2 according to EN 60584-1, EN 60584-3

**Measuring range:**
- -200 to +800 °C ("J")
- -200 to +1300 °C ("K", "N")

**Output signal:**
- voltage

**Electrical insulation resistance:***  
- min. 1000 MΩ according to EN 61515,  
- at temperature (20 ±15)°C, max. 80 % relative humidity

**Version of measuring junction:**
- Grounded and opened version

**General**

**Response time:**

<table>
<thead>
<tr>
<th>Time response of resistance temperature sensors [s]</th>
<th>(reference values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTD Sheath diameter [mm]</td>
<td>in water v = 0.4 m/s</td>
</tr>
<tr>
<td>T0.5</td>
<td>T0.9</td>
</tr>
<tr>
<td>6</td>
<td>5.5</td>
</tr>
<tr>
<td>4.5</td>
<td>4.2</td>
</tr>
<tr>
<td>3</td>
<td>1.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time response of thermocouple temperature sensors [s]</th>
<th>(reference values for version with insulated measuring end)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC Sheath diameter [mm]</td>
<td>in water v = 0.4 m/s</td>
</tr>
<tr>
<td>T0.5</td>
<td>T0.9</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>4.5</td>
<td>2.5</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>1.5</td>
<td>0.4</td>
</tr>
<tr>
<td>1</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**Dielectric strength:***  
- 250 V eff (outer stem diameter 1.5 to 2 mm)
- 250 V eff (outer stem diameter 3 mm / four-wire)
- 500 V eff (outer stem diameter 4.5 to 6 mm)
- 500 V eff (outer stem diameter 3 mm / two-wire)  
- at temperature (20 ±15)°C

**Materials:**
- *sheath of resistance sensor:* stainless steel 1.4404
- *inside wiring of resistance sensor:* Cu, Ni
- *sheath of thermocouple:* stainless steel 1.4541 ("J")  
- alloy Inconel 600 (2.4816), Nicrobell/Pyrosil ("K", "N")

**Connection wires (RTD):**
- 2x0.22 mm², 4x0.22 mm² stranded wire  
- silicone outer insulation and teflon inner insulation, shield  
- teflon outer and inner insulation, shield  
- optional length AL from 0.5 to 50 m (2.5 m standard)

**Compensation wires (TC):**
- 2x0.22 mm², 4x0.22 mm² stranded wire  
- silicone outer and inner insulation  
- fibreglass insulation with steel wire braiding  
- teflon outer and inner insulation  
- optional length AL from 0.5 to 50 m (2.5 m standard)

**Flat connector (code KS, KM):**
- black ("J")
- green ("K")
- pink ("N")
- temperature resistance of connector -60 to +200 °C

**Connecting thread (code H1...):**
- G3/8" G1/2"

**Housing (according to EN 60529):**
- IP 67 (versions VV, KV)
- IP 50 (versions KS, KM)
- IP 64 (versions H1, H1G..)

**Operation conditions**

**Maximal temperature at the end of sheath cable:**  
Ambient temperature at the area of flying leads outcome, connection of connection or compensating wires, connection of connector or sensor head cannot exceed 100 °C (120 °C short-term).

**Technical features**

Flexible construction, variable dimensions and materials of flexible temperature sensor FlexiTEMP® 60 simplify its ordering and application. FlexiTEMP® 60 sensors also easily adapt to the individual demands of the customer..

**Versions for aggressive environment**

Base price of the product includes version of stem from stainless steel 1.4541 for thermocouples "J" and 2.4816 for thermocouples "K" and "N". In version with connected compensation wires it is possible after agreement to offer materials suitable for specific application.

**Quality**

Quality of FlexiTEMP® 60 sensors is ensured by multiple tests (verification of insulation resistance, electrical strength, metrological characteristics and quality of welding) performed on every manufactured sensor. The tests ensure, with reserve, meeting the limits of EN 61515, EN 60751 and EN 60584 standards.

* if TC, only for insulation version of measuring end
Calibration
FlexiTEMP® 60 sensors can be supplied with calibration at several temperature points in temperature range of -40 to +1100 °C according to customer requirements. Sensor to the transmitter can be also supplied with calibration including transmitter with current output signal of 4 to 20 mA. Every sensor is verified in one temperature point as standard.

Output 1x/2x 4 to 20 mA, HART, Profibus, Fieldbus
JSP sensors can be supplied with transmitter for a DIN rail or for wall mounting with output 4 to 20 mA, HART, Profibus, Fieldbus.

Business advantages
Easy ordering
Instead of searching for appropriate version in large number of catalogues, there is available general diagram of FlexiTEMP® 60 sensors and one ordering table with codes. The sensors may be ordered even by free word description.

Extended guarantee
There is especially low occurrence of operating failures at all JSP products. Thanks to this it is provided the extended guarantee for FlexiTEMP® 60.

Electrical connection

RTD cable sensors
RD - red
WH - white
BK - black
YE - yellow

1x Pt100/2-wire
1x Pt100/4-wire
2x Pt100/2-wire
2x Pt100/3-wire

RTD with head MA
RD - red

1x Pt100/2-wire
1x Pt100/4-wire
2x Pt100/2-wire

TC cable sensors
WH - white
BK - black
GN - green
PK - pink

1xJ
1xK
1xN
2xJ
2xK
2xN

TC with head MA
BK - black
GN - green
PK - pink

1xJ
2xJ
1xK
2xK
1xN
2xN
**Dimensional drawings**

Note: Marking of zones for potentially explosive atmosphere (applies for EI version)

Zone 0, 1, 2, 20, 21, 22 (EPL Ga, Gb, Gc, Da, Db, Dc)

Zone 1, 2, 21, 22 (EPL Gb, Gc, Db, Dc)

Zone 0, 1, 2, 20, 21, 22 (EPL Ga, Gb, Gc, Da, Db, Dc)

Zone 1, 2, 21, 22 (EPL Gb, Gc, Db, Dc)

Zone 0, 1, 2, 20, 21, 22 (EPL Ga, Gb, Gc, Da, Db, Dc)

L = length of sheath cable

- VV: flying leads
- KM: mini connector
- KS: standard connector
- KV: extension wire

Parameters of cover version according to requirements of installed transmitter

- H1: head
- H1...: connecting pipe union
- S1: terminal block
- S2, S3, S4: transmitter
- SS: terminal block with embedded pins according to NAMUR

PB, PS, PT: terminal block with embedded pins
### Flexible Sheath Resistance and Thermocouple Temperature Sensors FlexiTEMP® 60

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1060</td>
<td>Sheath resistance temperature sensor</td>
</tr>
<tr>
<td>T1560</td>
<td>Sheath thermocouple temperature sensor</td>
</tr>
</tbody>
</table>

#### Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Temperature sensor</th>
<th>Sheath material</th>
<th>Max. temperature of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>04</td>
<td>1xPt100, two-wire inside wiring</td>
<td>1.4404</td>
<td>up to 500 °C</td>
</tr>
<tr>
<td>06</td>
<td>1xPt100, four-wire inside wiring</td>
<td>1.4404</td>
<td>up to 600 °C</td>
</tr>
<tr>
<td>06HT</td>
<td>1xPt100, four-wire inside wiring</td>
<td>Inconel 600</td>
<td>up to 700 °C</td>
</tr>
<tr>
<td>07</td>
<td>2xPt100, three-wire inside wiring</td>
<td>1.4404</td>
<td>up to 600 °C</td>
</tr>
<tr>
<td>08</td>
<td>2xPt100, two-wire inside wiring</td>
<td>1.4404</td>
<td>up to 500 °C</td>
</tr>
<tr>
<td>09</td>
<td>2xPt100, four-wire inside wiring</td>
<td>1.4404</td>
<td>up to 500 °C</td>
</tr>
</tbody>
</table>

#### Thermocouple (TC)

<table>
<thead>
<tr>
<th>Code</th>
<th>Sheath material</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Cu</td>
<td>-200 to +800 °C</td>
</tr>
<tr>
<td>61</td>
<td>Ni</td>
<td>-200 to +800 °C</td>
</tr>
<tr>
<td>62</td>
<td>Ni</td>
<td>-200 to +1100 °C</td>
</tr>
<tr>
<td>23</td>
<td>Inconel 600</td>
<td>-200 to +1100 °C</td>
</tr>
<tr>
<td>63</td>
<td>Inconel 600</td>
<td>-200 to +1100 °C</td>
</tr>
<tr>
<td>22HT</td>
<td>Ni</td>
<td>-200 to +1300 °C</td>
</tr>
<tr>
<td>62HT</td>
<td>Ni</td>
<td>-200 to +1300 °C</td>
</tr>
<tr>
<td>23HT</td>
<td>Ni</td>
<td>-200 to +1300 °C</td>
</tr>
<tr>
<td>63HT</td>
<td>Ni</td>
<td>-200 to +1300 °C</td>
</tr>
</tbody>
</table>

#### Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Accuracy class</th>
<th>Inside wiring material</th>
<th>Measuring range</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>B</td>
<td>Cu</td>
<td>-50 to +300 °C</td>
</tr>
<tr>
<td>F2</td>
<td>B</td>
<td>Ni</td>
<td>-70 to +500 °C</td>
</tr>
<tr>
<td>F3</td>
<td>B</td>
<td>Ni</td>
<td>-200 to +600 °C</td>
</tr>
<tr>
<td>F7</td>
<td>B</td>
<td>Ni</td>
<td>-200 to +700 °C</td>
</tr>
<tr>
<td>F4</td>
<td>A</td>
<td>Cu</td>
<td>-30 to +300 °C</td>
</tr>
<tr>
<td>F5</td>
<td>A</td>
<td>Cu</td>
<td>-100 to +450 °C</td>
</tr>
</tbody>
</table>

#### Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S01</td>
<td>0.5</td>
</tr>
<tr>
<td>S11</td>
<td>0.8</td>
</tr>
<tr>
<td>S21</td>
<td>1</td>
</tr>
<tr>
<td>S31</td>
<td>1.5</td>
</tr>
<tr>
<td>S41</td>
<td>2</td>
</tr>
<tr>
<td>S51</td>
<td>3</td>
</tr>
<tr>
<td>S61</td>
<td>4</td>
</tr>
<tr>
<td>S71</td>
<td>6</td>
</tr>
</tbody>
</table>

#### Nominal length of stem L [mm]

<table>
<thead>
<tr>
<th>Code</th>
<th>Fill length in mm (min. length 100 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VV</td>
<td>Flying leads (standard length V=10 mm for stem diameter 1 to 2 mm and V=25 mm for stem diameter 3 to 6 mm)</td>
</tr>
<tr>
<td>KS1</td>
<td>Flat single connector (plug), standard version</td>
</tr>
<tr>
<td>KS2</td>
<td>Flat double connector (plug), standard version</td>
</tr>
<tr>
<td>KM</td>
<td>Flat single connector (plug), mini version</td>
</tr>
<tr>
<td>H1</td>
<td>Aluminium head type MA with ceramic terminal block, housing IP 64 4)</td>
</tr>
<tr>
<td>H1G3/B</td>
<td>Aluminium head type MA with ceramic terminal block, process connection G3/B, PN16, IP 64 4)</td>
</tr>
<tr>
<td>H1G1/2</td>
<td>Aluminium head type MA with ceramic terminal block, process connection G1/2, PN16, IP 64 4)</td>
</tr>
</tbody>
</table>

#### Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Connection or compensation cable</th>
<th>Length of cable AL [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>200</td>
<td>4) Not for double RTD, code 07.</td>
</tr>
<tr>
<td>1000</td>
<td>1000</td>
<td>4) Not for double RTD, code 07.</td>
</tr>
<tr>
<td>2500</td>
<td>2500</td>
<td>4) Not for double RTD, code 07.</td>
</tr>
<tr>
<td>5000</td>
<td>5000</td>
<td>4) Not for double RTD, code 07.</td>
</tr>
</tbody>
</table>

---

1. Marked version can be dispatched up to 5 working days (with calibration up to two weeks)
2. Not allowed to use two-wire connection because of nickel inner wiring.
3. Ambient temperature at the end of cable sheath (at flying leads outcome, connection of connection or compensation cables, connection of connector or sensor head) cannot exceed 100 °C (120 °C short-term).
4. Tolerance of stem length and connection or compensation cables length is equal to the greater value of ±2 % of length or ±20 mm; accuracy class for TC wires according to EN 60584-3.
5. Not for double RTD, code 07.
6. In option with code KS or KM, the beginning of compensation wires is with flat connector (female) of specified type, specified connector has to be added in ordering code (see optional accessories – code Z2, Z3 or Z4).
Flexible Sheath Resistance and Thermocouple Temperature Sensors FlexiTEMP® 60

- Flexible Sheath Resistance and Thermocouple Temperature Sensors
- FlexiTEMP® 60
- Transmitters for mounting on flange
- Counterpart of connector (rectangular panel plug), standard version, for single sensor, ceramic up to 650 °C - only for TC 1x°K°
- Transmitters for mounting on rail
- Thermocouple temperature sensor calibration in four points in range -40 to +660 °C
- Resistance temperature sensor calibration in three points in range -40 to +600 °C
- Ambient temperature of cable for double sensor, up to 180 °C
- Example of order: T1560 22 T7 S51 L100 K V 1000 I1 02 Z2 KTE32AB (-40, 500, 1000 °C) PS P1
- ° Plug connector is possible to connect to standard or mini male connector.
- It is suitable only for non-flowing gas medium, free of mechanical stress including impacts and vibrations, where adjustable nominal length is required and is impossible to use fixing pipe unions PT because of high temperature.
## Flexible Sheath Resistance and Thermocouple Temperature Sensors FlexiTEMP® 60

### Optional Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Code</th>
<th>Connector thread Z</th>
<th>Outer diameter of stem sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Fixing shift pipe union for sheath temperature sensor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>With stainless steel cutting ring, pipe union of stainless steel material</td>
<td>S</td>
<td>M01 M8x1</td>
<td>D15 1.5 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S</td>
<td>M02 M12x1.5</td>
<td>D20 2 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S</td>
<td>M03 M16x1.5</td>
<td>D30 3 mm</td>
</tr>
<tr>
<td>T</td>
<td>With PTFE sealing ring, pipe union of stainless steel material</td>
<td>T</td>
<td>M04 M20x1.5</td>
<td>D45 4.5 mm</td>
</tr>
<tr>
<td>B</td>
<td>With bayonet adaptor, supporting cap and spring, material nickled brass</td>
<td>B</td>
<td>M05 M12</td>
<td>D60 6 mm</td>
</tr>
</tbody>
</table>

### Connection thread Z:

- **M01 M8x1**: - only for sensors with diameter sheath 1 to 3 mm
- **M02 M12x1.5**: - only for sensors with diameter sheath 3 to 6 mm (not for shift pipe union PB)
- **M03 M16x1.5**: - only for sensors with diameter sheath 3 to 6 mm
- **M04 M20x1.5**: - only for sensors with diameter sheath 3 to 6 mm (only for shift pipe union PB)
- **M05 M12**: - only for sensors with diameter sheath 3 to 6 mm (only for shift pipe union PB)
- **G01 G1/8”**: - only for sensors with diameter sheath 1 to 3 mm
- **G02 G1/4”**: - only for sensors with diameter sheath 3 to 6 mm
- **G03 G3/8”**: - only for sensors with diameter sheath 3 to 6 mm
- **G04 G1/2”**: - only for sensors with diameter sheath 3 to 6 mm
- **N01 1/8” NPT**: - only for sensors with diameter sheath 1 to 3 mm
- **N02 1/4” NPT**: - only for sensors with diameter sheath 3 to 6 mm
- **N03 3/8” NPT**: - only for sensors with diameter sheath 3 to 6 mm
- **N04 1/2” NPT**: - only for sensors with diameter sheath 3 to 6 mm

### Example of order:

- PS M04 D60

### Notes:

- Ex stock version
- Adjustable nominal length only for first time of mounting.
- Always adjustable nominal length.
- If bayonet connection including sensor is ordered, dimension K [mm] has to be specified.

*For other accessories see data sheet No. 0126.*