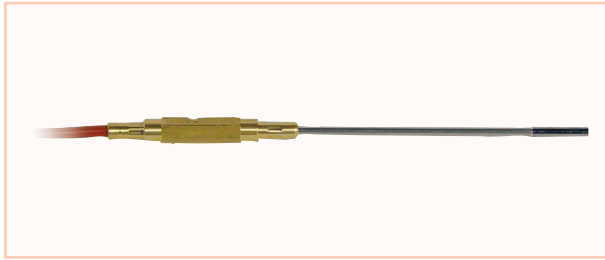


# TEMPERATURE

## Sheathed sensors



- ▶ These reasonably priced sensors are for universal use (-200 to +1100 °C) and suitable for immersion measurements in liquids, air, and gases. The sheathed line, depending on diameter, can be bent - within certain limits.
- ▶ Different connection variants :  
 With cable and ALMEMO® connector Order no. FxAxx, with LEMO socket (direct, without cable) Order no. FxLxx, with cable and free ends, Order no. Fx0xx.  
 Connector options :  
 With THERM circular connector : Option OT9020RS, with miniature Thermo flat connector : Option OT9020FS.

### Thermocouple sheathed sensors Txx

|                             |   |
|-----------------------------|---|
| Measuring element :         | NiCr-Ni thermocouple, type K, DIN class 1 (see 08.03)   |
| Sensor tip, sheathed line : | diameter, length, operating temperature; see table; material Inconel<br>Here the sensor tip and sheathed line are of the same diameter.<br>These types are therefore also suitable for mounting with clamped screw connections. |
| Cable sleeve :              | Brass, hexagonal, L = 65 mm, circumdiameter = 9 mm, operating temp. -40 to +160 °C  |
| Standard cable :            | <b>New</b> 1.5 meter Teflon / silicone thermal line (stranded wire)* Operating temp. -50 to +200°C<br>There is no adverse temperature effect at the juncture from measuring element to cable.                                   |
| Cable options :             | Compensation line, PVC / PVC, insulated, operating temperature -20 to +105 °C<br>The compensation line is also available, on request, with Teflon / Teflon, insulated.  |
| ALMEMO® connector           | NiCr-Ni, ZA9020FS, with resolution 0.1 K  |

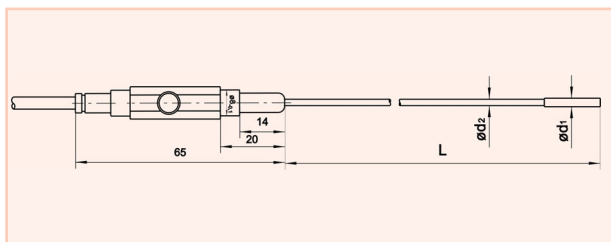
### Pt100 sheathed sensors Pxx

|                     |  |
|---------------------|--|
| Measuring element : | Pt100 4L, DIN class B (see 08.03)  |
| Options :           | DIN class A, 1/5 DIN class B (see 08.03)   |
| Sensor tip :        | diameter, length, operating temperature; see table; material stainless steel   |
| Sheathed line :     | diameter, length; see table; material stainless steel<br>On certain types the sensor tip and sheathed line are of different diameter; (i.e. the sensor tip is thicker). These types are therefore not suitable for mounting with clamped screw connections. Types suitable for clamped screw connections are available on request. |
| Cable sleeve :      | Brass, hexagonal, L = 65 mm, circumdiameter = 9 mm, operating temp. -40 to +160 °C   |
| Standard cable :    | 1.5 meters line, Teflon / silicone, insulated, operating temperature -50 to +200 °C  |
| Cable options :     | Line, PVC / PVC, insulated, operating temperature -20 to +105 °C<br>The line is also available, on request, with Teflon / Teflon, insulated.   |
| ALMEMO® connector   | Pt100, ZA9030FS1, with resolution 0.1 K<br>Option : Pt100 ZA9030FS2 with resolution 0.01 K (standard with 1/5 DIN class B)   |

### NTC sheathed sensors Nxx

|                     |  |
|---------------------|--|
| Measuring element : | NTC type N (see 08.03)   |
| Sensor tip :        | diameter, length, operating temperature; see table; material stainless steel   |
| Sheathed line :     | diameter, length; see table; material stainless steel<br>On certain types the sensor tip and sheathed line are of different diameter; (i.e. the sensor tip is thicker). These types are therefore not suitable for mounting with clamped screw connections. Types suitable for clamped screw connections are available on request. |
| Cable sleeve :      | Brass, hexagonal, L = 65 mm, circumdiameter = 9 mm, operating temp. -40 to +160 °C   |
| Standard cable :    | 1.5 meters line, PVC / PVC, insulated, operating temperature -20 to +105 °C  |
| Cable options :     | Line, Teflon / silicone, insulated, operating temperature -50 to +200 °C<br>The line is also available, on request, with Teflon / Teflon, insulated.   |
| ALMEMO® connector   | NTC, ZA9040FS, with resolution 0.01 K  |

## Sheathed sensors



Sensor with :  
 Sensor tip, dimensions  $d_1$ ,  
 sheathed line, dimensions  $d_2$ ,  
 overall length (including sensor tip)  $L$ ,  
 Cable sleeve, Cable sleeve, dimensions length = 65 mm,  
 circumdiameter = 9 mm, Cable

## Operative ranges and dimensions

| Sensor tip Diameter<br>mm | Thermocouples<br>NiCr-Ni   |             |                                   | Resistor-based sensors<br>Pt100 4L                           |             |                                   | Resistor-based sensors<br>NTC                                |             |                                   |
|---------------------------|--|-------------|-----------------------------------|--|-------------|-----------------------------------|--|-------------|-----------------------------------|
|                           | Order no.<br>FTAxxLyxxx<br>$d_1 = x . x$ mm<br>$L = yyyy$ mm       | $d_2$<br>mm | Operat.<br>temp.<br>Sensor<br>tip | Order no.<br>FPAxxLyxxx<br>$d_1 = x . x$ mm<br>$L = yyyy$ mm | $d_2$<br>mm | Operat.<br>temp.<br>Sensor<br>tip | Order no.<br>FNAxxLyxxx<br>$d_1 = x . x$ mm<br>$L = yyyy$ mm | $d_2$<br>mm | Operat.<br>temp.<br>Sensor<br>tip |
| 0.5 to 1.0                | FTA05L0050<br>FTA05L0100<br>FTA05L0250<br>FTA05L0500<br>FTA05L1000 | 0.5         | -200 to<br>+900°C                 | FPA10L0100 **<br>FPA10L0250 **<br>FPA10L0500 **              | 1.0         | -200 to<br>+600°C                 |  |             |                                   |
| 1.5 to 2.2                | FTA15L0100<br>FTA15L0250<br>FTA15L0500<br>FTA15L1000               | 1.5         | -200 to<br>+1100°C                | FPA22L0100*<br>FPA22L0250*<br>FPA22L0500*                    | 2.0         | -70 to<br>+500°C                  | FNA20L0100<br>FNA20L0250<br>FNA20L0500                       | 2.0         | -20 to<br>+100°C                  |
| 3.0 to 3.2                | FTA30L0100<br>FTA30L0250<br>FTA30L0500<br>FTA30L1000               | 3.0         | -200 to<br>+1100°C                | FPA32L0100*<br>FPA32L0250*<br>FPA32L0500*                    | 2.8         | -70 to<br>+500°C                  | FNA32L0100*<br>FNA32L0250*<br>FNA32L0500*                    | 2.8         | -20 to<br>+100°C                  |

\* This sensor type (reinforced tip) is not suitable for damped screw connections.  
 Suitable types with same end-to-end diameter are available on request. FPA16L (Ø 1.6 mm), FPA20L (Ø 2.0 mm), FPA30L / FNA30L (Ø 3.0 mm).  
 \*\* The sensor type with diameter 1.0 mm incorporates a highly sensitive miniature Pt 100 ceramic precision resistor. When using this sensor it must not be subjected to even the slightest shock or vibration and its measuring tip must not be bent by even the slightest amount; this is critically important; there is a risk otherwise that the precision resistor may be damaged. If the user fails to heed this warning we cannot accept any liability under the terms of warranty.

## Options

|                                       | Thermocouples NiCr-Ni |                             | Resistor-based sensors Pt100 4L |   | Resistor-based sensors NTC |                    |
|---------------------------------------|-----------------------|-----------------------------|---------------------------------|---|----------------------------|--------------------|
|                                       | Order no.             |                             | Order no.                       |   | Order no.                  |                    |
| Standard-cable                        |                       | 1.5 m<br>Teflon/silicone    |                                 | 1.5 m<br>Teflon/silicone                          |                            | 1.5 m<br>PVC / PVC |
| Option cable                          | OTK01L0050            | 5 m<br>Teflon/silicone      | OPK01L0050                      | 5 m<br>Teflon/silicone                            |                            |                    |
| Option cable                          | OTK02L0015            | 1.5 m<br>PVC / PVC          | OPK02L0015                      | 1.5 m<br>PVC / PVC                                |                            |                    |
| Option cable                          | OTK02L0050            | 5 m<br>PVC / PVC            | OPK02L0050                      | 5 m<br>PVC / PVC                                  | OPK02L0050                 | 5 m<br>PVC / PVC   |
| Option cable*                         | OFS0017               | 1.4 m **<br>Teflon/silicone | OFS0017                         | 1.4 m **<br>PVC                                   | OFS0017                    | 1.4 m **<br>PVC    |
| Accuracy option                       |                       |                             | OPG2                            | DIN class A                                       |                            |                    |
| Accuracy option                       |                       |                             | OPG5                            | 1/5 DIN class B                                   |                            |                    |
| option<br>Ceramics measuring resistor |                       |                             | OPM1                            | Operating temperature probe tip<br>-200 to +600°C |                            |                    |

\* Cable with spray-coated ALMEMO® connector (protection against damp)  
 \*\* No other cable types or cable lengths are available.

01/2011 We reserve the right to make technical changes.

# TEMPERATURE

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## Sheathed thermocouple sensor NiCroSil-NiSil type N

Measuring element Thermocouple NiCroSil-NiSil type N  
DIN class 1  
Sheathed line Material : "Inconel"  
Application Especially good long-term stability  
at high temperatures  
Cable **New** 1.5 meter Teflon / silicone thermal line  
(stranded wire)  
Operating temp. -50 to +200 °C  
There is no adverse temperature effect at the  
juncture from measuring element to cable.

ALMEMO® connector NiCroSil-NiSil ZA9021FSN  
Other data / image / dimensional drawing see page 08.06/08.07

## Sheathed thermocouple sensor Cu-CuNi type T

Measuring element Thermocouple Cu-CuNi type T,  
DIN class 1  
Sheathed line Material : Stainless steel  
Application up to 400 °C  
Cable **New** 1.5 meter Teflon / silicone thermal line  
(stranded wire)  
Operating temperature -50 to +200 °C  
There is no adverse temperature effect at the  
juncture from measuring element to cable.

ALMEMO® connector Cu-CuNi ZA9021FSTT  
Other data / image / dimensional drawing see page 08.06/08.07

### Operative ranges and dimensions

Sheathed thermocouple sensor NiCroSil-NiSil

| Sensor tip,<br>diameter<br>mm | Order. No.<br>FTANxxLyyyy<br>d <sub>1</sub> = x, x mm<br>L = yyyy mm | d <sub>2</sub><br>mm | Operating temp.<br>Sensor tip |
|-------------------------------|--|----------------------|-------------------------------|
| 1,5                           | FTAN15L0500<br>FTAN15L0750<br>FTAN15L1000                            | 1,5                  | -200 bis +1150°C              |
| 3,0                           | FTAN30L0500<br>FTAN30L0750<br>FTAN30L1000                            | 3,0                  | -200 bis +1150°C              |
| 6,0                           | FTAN60L0500<br>FTAN60L0750<br>FTAN60L1000                            | 6,0                  | -200 bis +1150°C              |

### Option

Cable 5 meters Teflon / silicone thermal line Order no. OTNK01L0050

### Operative ranges and dimensions

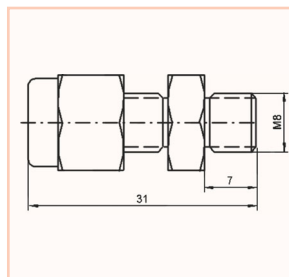
Sheathed thermocouple sensor Cu-CuNi

| Sensor tip,<br>diameter<br>mm | Order. No.<br>FTATxxLyyyy<br>d <sub>1</sub> = x, x mm<br>L = yyyy mm | d <sub>2</sub><br>mm | Operating temp.<br>Sensor tip |
|-------------------------------|--|----------------------|-------------------------------|
| 1,5                           | FTAT15L0100<br>FTAT15L0250<br>FTAT15L0500<br>FTAT15L1000             | 1,5                  | -200 bis +400°C               |

### Option

Cable 5 meters Teflon / silicone thermal line Order no. OTNK01L0050

## Clamp screw connection ZT 943 xKV



### Operative range

For sheath elements

### Option:

Notched steel ring  
(once fitted, cannot be removed),  
T<sub>max</sub> = 800 °C

For ZT9431KV  
Order no. OT9431ST  
For ZT9432KV  
Order no. OT9432ST

### Variants (with Teflon clamping ring)

For types  
FTA15Lxxxx, FPA16Lxxxx Order no. ZT9431KV  
For types  
FTA30Lxxxx, FPA30Lxxxx, and FNA30Lxxxx  
Order no. ZT9432KV

### Technical data

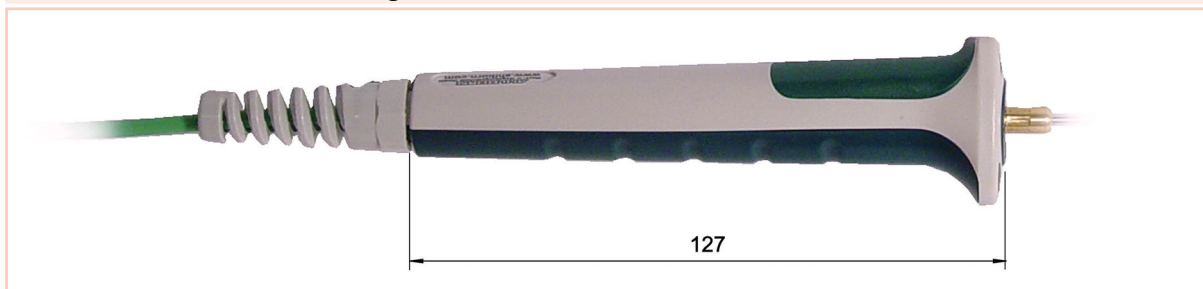
|                       |  |
|-----------------------|--|
| Operating temperature | up to maximum 250 °C<br>with option up to 800 °C |
| Thread                | M8x1, 14 AF                                      |

## Heat-conducting paste ZB 9000 WP

For surface measurement, operative range -30 to +200 °C, heat-conducting paste, tube, 12 ml

Order no. ZB9000WP

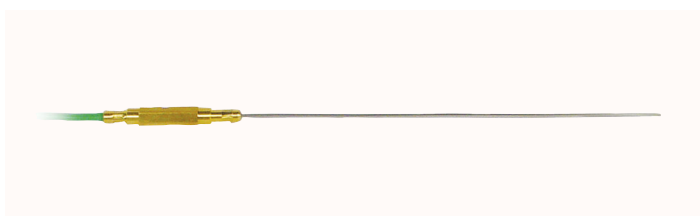
## Handle for sensors with hexagonal cable sleeve



Option Handle including fitting

**Order no. OFH**

## NiCr-Ni-sensor FTA 15 P

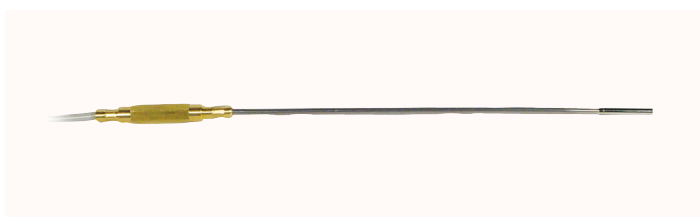


For immersion measurement

Meas. element: NiCr-Ni class 1 \*  
 Measuring tip: Operative range -200...+1100 °C  
 200x1.5 mm, sheathed line, Inconel  
 T<sub>90</sub>: \* 1.5 s  
 Cable: approx. 1.4 m Teflon / silicone  
 with spray-coated ALMEMO® connector

L = 200 mm **Order no FTA15P**  
 Sensor with handle **Order no FTA15PH**  
 (No variants available)

## Pt100 sensor FPA 32 P

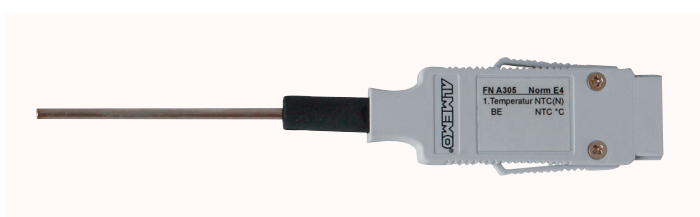


For immersion measurement

Meas. element: Pt100, class B \*  
 Measuring tip: Operative range -70...+500 °C  
 200 x 2.8/3.2 mm, sheathed line  
 T<sub>90</sub>: \* 10 s  
 Cable: approx. 1.4 m PVC  
 with spray-coated ALMEMO® connector

L = 200 mm **Order no FPA32P**  
 Sensor with handle **Order no FPA32PH**  
 (No variants available)

## NTC sensor FNA 305



for Indoor air measurements

Meas. element NTC\*  
 Measuring tip Operative range -10 to +60 °C  
 (non-condensing)  
 Protective tube in stainless steel  
 Diameter = 2.4mm, length = 50 mm  
 mounted directly on ALMEMO®  
 connector

T<sub>90</sub> 8 s

L = 50 mm **Order no FNA305**  
 (No variants available)

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