

## EPIC® SENSORS

TEMPERATURE SENSOR FOR FOOD INDUSTRY  
TYPE T-106 / W-106  
DATA SHEET 19

## INSTALLATION INSTRUCTIONS AND USER MANUAL



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## Product description and intended use

Sensor types T-106 (thermocouple, TC) and W-106 (resistance, RTD) are temperature sensor probes for food industry.

Sensors are intended for measuring food materials. A sharp tip probe is manually inserted into material. Sensor element protection tube material is acid proof steel, and cable type / length can be chosen according to customer needs.

Measuring elements are rigid, non-bendable versions. Elements can be TC or RTD elements, standard versions are K-type thermocouple (for T-106) and 4-wire Pt100 (for W-106). Tailored versions are produced on request.

EPIC® SENSORS temperature sensors are measuring devices intended for professional use. They should be mounted by professionally capable installer who understands the installations surroundings. The worker should understand mechanical and electrical needs and safety instructions of the object installation. Suitable safety gear for each installation task must be used.

## Temperatures, measuring

Allowed measuring temperature range for sensor tip is:

- With Pt100 -200...+300 °C, depending on materials
- With TC -200...+300 °C, depending on materials

NOTE! The maximum temperature for plastic handle cover material is +110 °C.

## Temperatures, ambient

Allowed maximum ambient temperature for wires or cable, according to cable type, is:

- SIL = silicone, max. +180 °C
- FEP = fluoropolymer, max. +205 °C
- GGD = glass silk cable/metal braid jacket, max. +350 °C
- FDF = FEP wire insulation/braid shield/FEP jacket, max. +205 °C
- SDS = silicone wire insulation/braid shield/silicone jacket, only available as 2 wire cable, max. +180 °C
- TDT = fluoropolymer wire insulation/braid shield/ fluoropolymer jacket, max. +205 °C
- FDS = FEP wire insulation/braid shield/silicone jacket, max. +180 °C
- FS = FEP wire insulation/silicone jacket, max. +180 °C

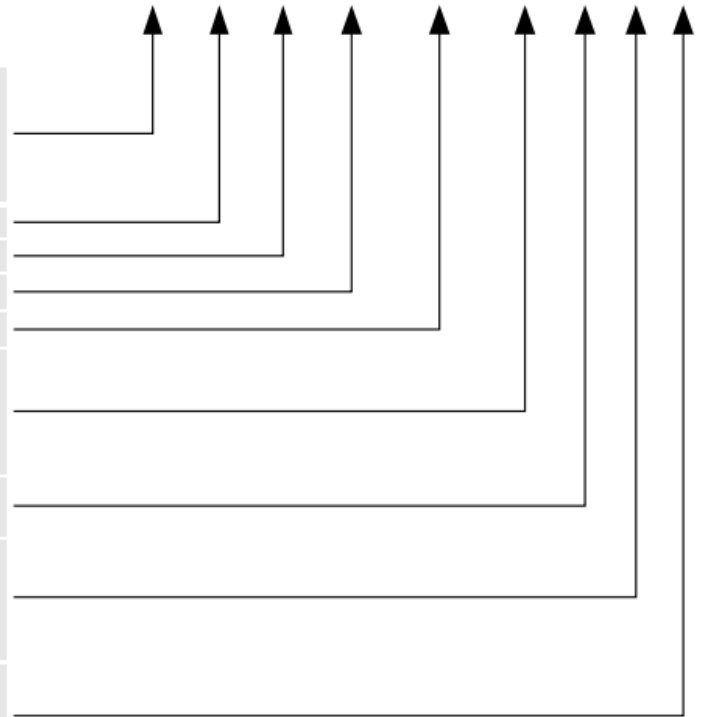
NOTE! The maximum temperature for plastic handle cover material is +110 °C.

Make sure the process temperature is not too much for the cable or plastic handle.

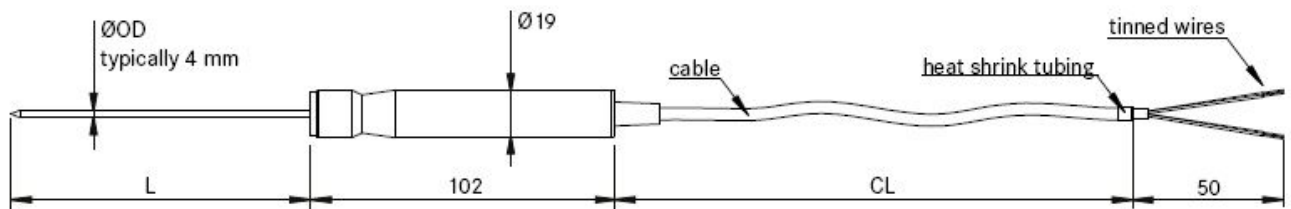
## Code key

Example code: W – 106 – 4 / 100 – 5000 / SIL – 4 – A – X

W	= Pt100 resistance thermometer
2xW	= 2 x Pt100 resistance thermometer
T	= thermocouple
2xT	= 2 x thermocouple
106	= sensor for food industry (constant in code)
3, 4, 6	= outer diameter of sensor element (ØOD) [mm]
100	= sensor element length, L [mm]
5000	= cable length, CL [mm]
SIL, FEP, GGD, FDF, TDT, SDS, FDS, FS	= cable material (for more information, look technical data on first page of the datasheet)
4,3,2	= Pt100 wire count
K,N,J	= thermocouple type
A,B	= Pt100 accuracy class, (class A as standard delivery)
1,2,3	= thermocouple accuracy class, (class 1 as standard delivery)
X	= additional details on the text line



## Dimensional drawing





## Installation instructions and example

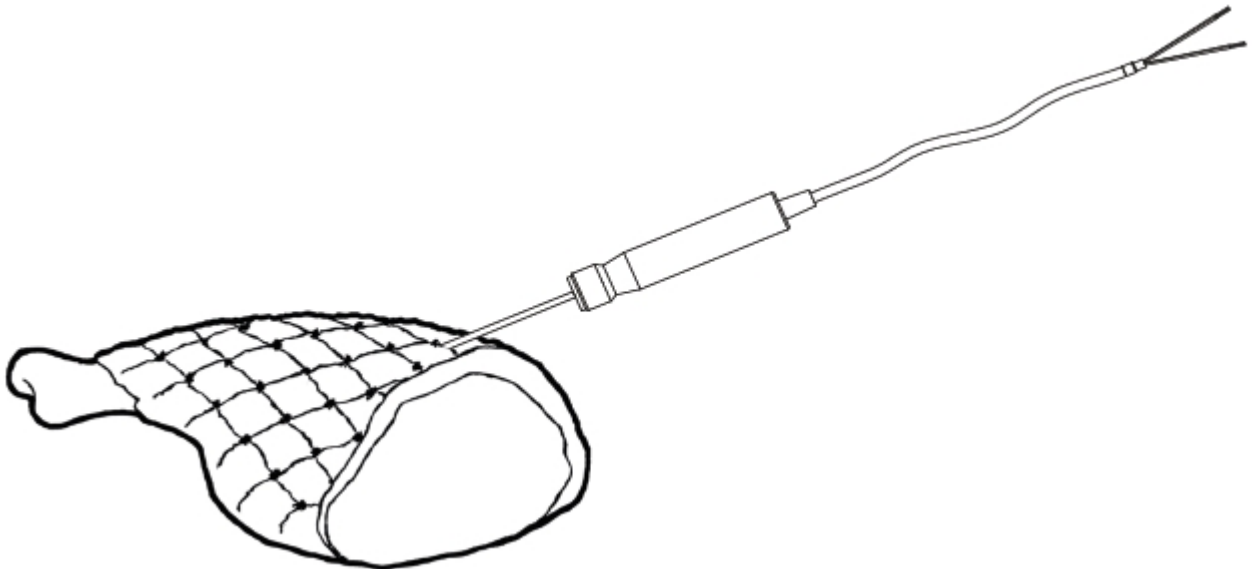
Before any installation, make sure the target process/machinery and site are safe to work!

Make sure the cable type matches the temperature and chemical requirements of the site.

Installation phases:

- First, connect the wires to measuring instrument.
- Insert the sensor tip into the material to be measured.
- Make sure there is no excess bending force loading the cable.
- Mount extra strain relief, e.g. cable tie, for cable, if necessary.

Image below: this example shows sensor inserted into a meat product.



## Installation of accessories

### Connectors:

For TC versions there are thermocouple connectors available, as components.

These connectors have male or female contacts, made of alloys suitable for a certain thermocouple type. The connector body is also colored depending on the TC type, e.g. type K connector body is green, because type K cable sheath is green, according to standard IEC 60584.

The maximum temperature for these connectors is +200 °C, if not specified otherwise.

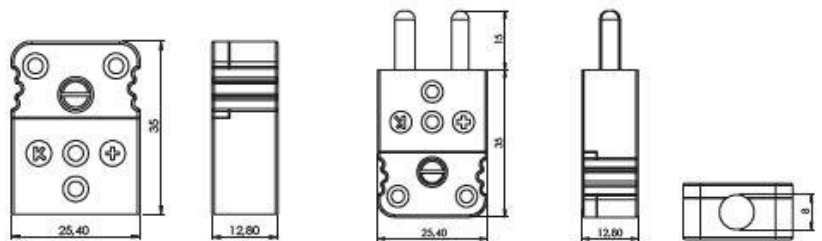
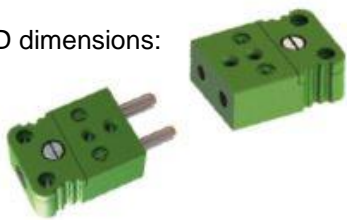
There are two sizes of TC connectors: standard (STD) and miniature (MINI).

TC connectors available are: (Other types are quoted upon request.)

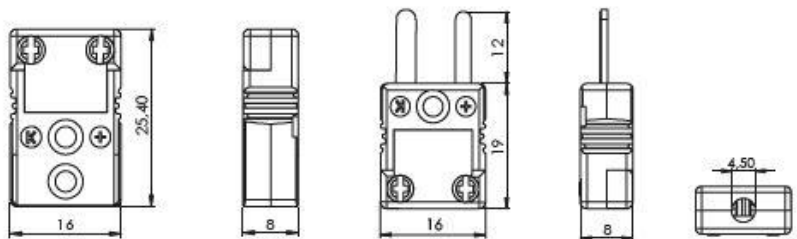
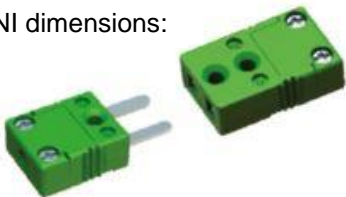
<b>Product number</b>	<b>Type</b>
911476	J-STD-Female
911475	J-STD-Male
911477	J-MINI-Female
911478	J-MINI-Male
911440	K-STD-Female
911439	K-STD-Male
911442	K-MINI-Female
911441	K-MINI-Male
1089977	N-STD-Female
1089978	N-STD-Male
1023763	S-STD-Female
1083322	S-STD-Female 350°C
1023764	S-STD-Male
1083323	S-STD-Male 350°C
1017789	Cable clamps for STD connectors



STD dimensions:

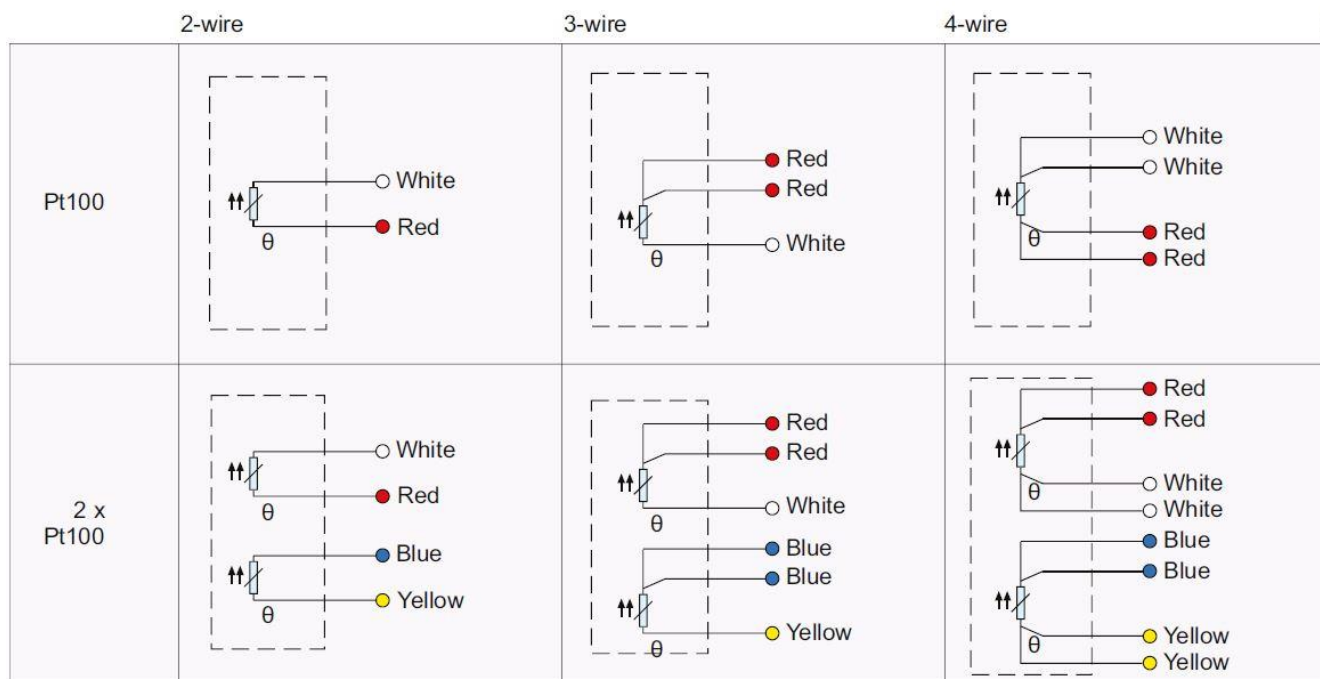


MINI dimensions:



## Pt100; connection wiring

Image below: These are the connection colors of Pt100 resistor connections, according to standard EN 60751.



Other connections on request.

## Pt100; measuring current

The highest allowed measuring current for Pt100 measuring resistors depends on resistor type and brand.

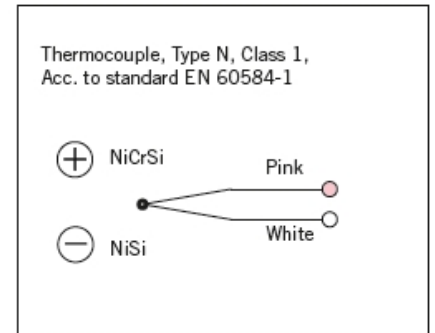
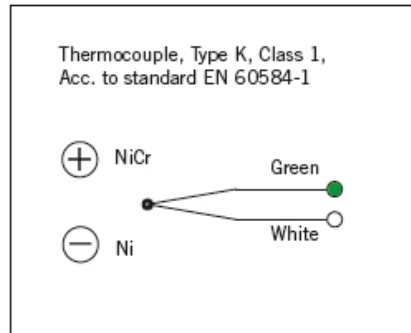
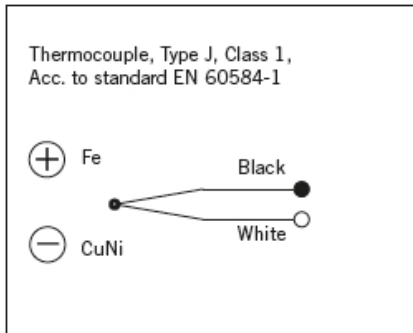
Normally the recommended maximum values are:

- Pt100            1 mA
- Pt500            0,5 mA
- Pt1000          0,3 mA.

Do not use higher measuring current. It will lead to false measurement values and might even destroy the resistor.

## TC; connection wiring

Image below: These are the connection colors of TC types J, K and N.



Other types on request.

## TC; non-grounded or grounded types

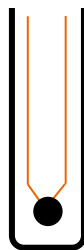
Normally the thermocouple sensors are non-grounded, which means the protective tube / MI cable sheath is not connected to the thermo material hot junction, where two materials are welded together.

In special applications also grounded types are used.

NOTE! Non-grounded and grounded sensors cannot be connected to same circuits, make sure you are using the right type.

Image below: Non-grounded and grounded structures in comparison.

### Non-grounded TC



Thermo material hot junction and protective tube / MI cable sheath are galvanically isolated with each other.


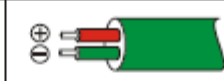

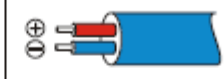


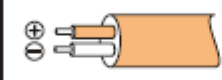
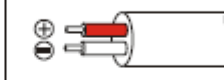


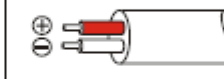




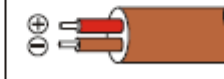
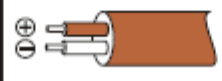

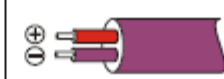
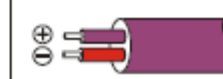
### Grounded TC



Thermo material hot junction has galvanic connection with protective tube / MI cable sheath.



TC; thermocouple cable standards (color table)

New standards:	IEC 60584-3	DIN EN 60584	ISA MC 96.1
Thermo Type	IEC 584	DIN 43714	ANSI MC 96.1
NiCr-Ni / K KCA: Fe-CuNi	 + green/ - white Jacket: green	 + red/ - green Jacket: green	 + yellow/ - red Jacket: yellow
Fe-CuNi / L		 + red/ - blue Jacket: blue	
Fe-CuNi / J	 + black/ - white Jacket: black		 + white/ - red Jacket: black
Pt10Rh-Pt / S SCA: E-Cu/A-Cu	 + orange/ - white Jacket: orange	 + red/ - white Jacket: white	 + black/ - red Jacket: green
Pt13Rh-Pt / R RCA: E-Cu/A-Cu	 + orange/ - white Jacket: orange	 + red/ - white Jacket: white	 + black/ - red Jacket: green
Pt30Rh-Pt6Rh / B BC: S-Cu/E-Cu	 + grey/ - white Jacket: grey		 + grey/ - red Jacket: grey
NiCrosil-Nisil / N NC: Cu-CuNi	 + pink/ - white Jacket: pink		
Cu-CuNi / U		 + red/ - brown Jacket: brown	
Cu-CuNi / T	 + brown/ - white Jacket: brown		
NiCr-CuNi / E	 + purple/ - white Jacket: purple	 + red/ - purple Jacket: purple	 + purple/ - red Jacket: purple

## Type label of standard versions

Each sensor has a type label attached to it. It is a moisture and wear proof industrial grade sticker, with black text on white label. This label has printed information as presented below.

Image below: Example of a non-Ex sensor type label.



Manufacturer contact information.  
For some sensor types, this part  
may also be printed on a separate  
label for practical reasons.

Trade name  
Type code  
Product number  
Serial number with production date  
CE-mark (RoHS) | Serial number  
as QR code

## Serial number information

Serial number S/N is always printed on type label in the following form: yymmdd-xxxxxxx-x:

- yymmdd production date, e.g. "210131" = 31.1.2021
- -xxxxxxx production order, e.g. "1234567"
- -x sequential ID number within this production order, e.g. "1"

## EU Declaration of Conformity

The EU Declaration of Conformity, declaring products' conformance to the European Directives, is delivered with products or sent on request.

## Manufacturer contact information

### Manufacturer HQ main office:

**Lapp Automaatio Oy**  
Street address Martinkyläntie 52  
Postal address FI-01720 Vantaa, Finland

### Production site and logistics:

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Phone (sales) +358 20 764 6410

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## Document history

Version / date	Author(s)	Description
20230707	LAPP/VeTe	Text corrections.
20220822	LAPP/JuPi	Telephone number update
20220815	LAPP/JuPi	Material name text corrections
20220401	LAPP/JuPi	Original version

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