EPIC SENSORS Silicone Patch Sensor with Cable Type T-SIL-PATCH/W-SIL-PATCH User Manual

EPIC® SENSORS
LAPP AUTOMAATIO

SILICONE PATCH SENSOR WITH CABLE
TYPE T-SIL-PATCH / W-SIL-PATCH
DATA SHEET 24
INSTALLATION INSTRUCTIONS
AND USER MANUAL

Contents

Product description and intended use

Sensor types T-SIL-PATCH (thermocouple, TC) and W-SIL-PATCH (resistance, RTD) are silicone patch sensors with cable for surface temperature measurement.
Sensors are intended for quick and easy installation in various surface measurement applications. The sensor element is covered with a flexible silicone patch which can be attached in many ways to the surface to be measured. As an option, the silicone patch can be delivered with 2-sided adhesive aluminum foil tape with good thermal conductivity on the measuring surface.
Elements can be TC or RTD elements, standard versions are K-type thermocouple (for T-SIL-PATCH) and 4wire Pt100 (for W-SIL-PATCH). Wire and cable length and materials can be chosen.
Tailored versions are produced on request.
EPIC® SENSORS temperature sensors are measuring devices intended for professional use. They should be mounted by a professionally capable installer who understands the installation's surroundings. The worker should understand mechanical and electrical needs and safety instructions for the object installation. Suitable safety gear for each installation task must be used.

Temperatures, measuring

Allowed measuring temperature range for sensor tip (silicone sensor head, patch) is:

- With Pt100 …….. -40…+180 °C
- With TC …… -40…+180 °C

NOTE! Model 40x15x3: The allowed maximum temperature for heat shrink tubing on the sensor end is +125 °C. Please see the Dimensional drawing.

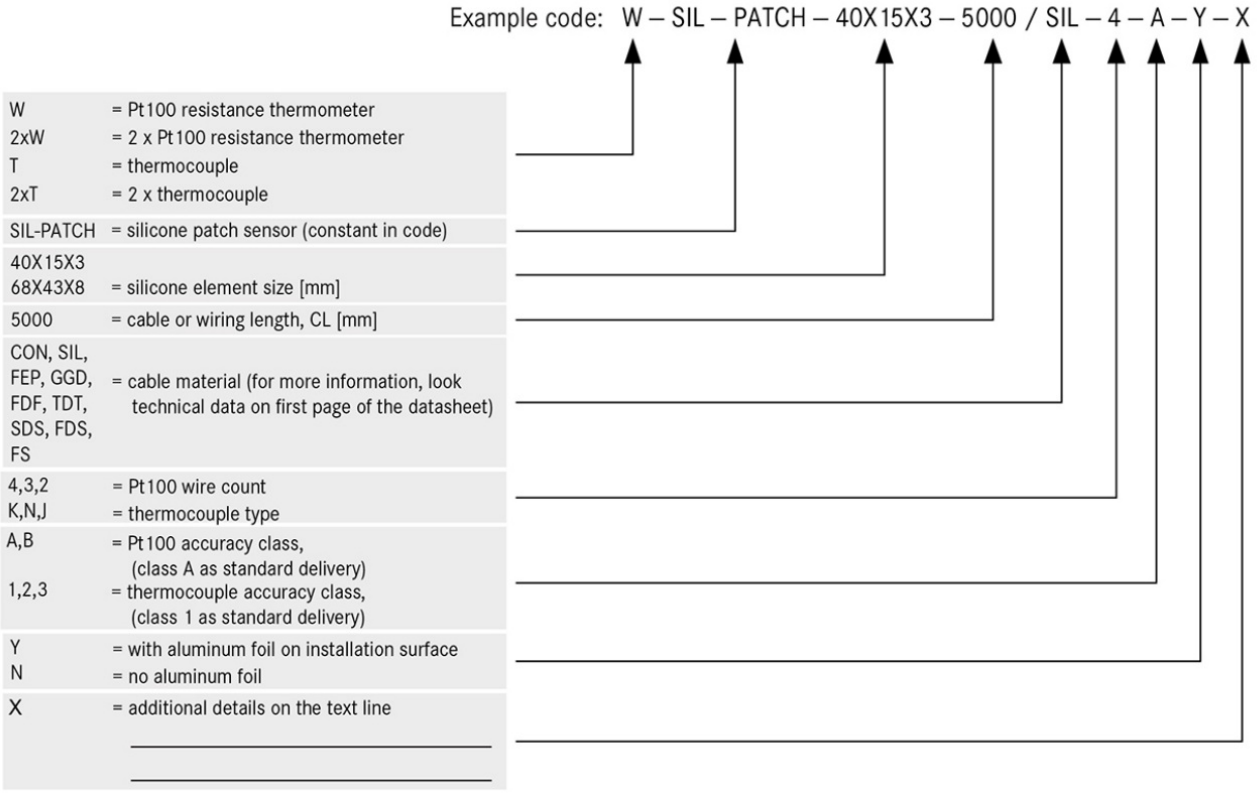
Temperatures, ambient

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
- PDF = 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
- CON = no cable, individual single wires, FEP wire insulation, max. +205 °C

NOTE! Model 40x15x3: The allowed maximum temperature for heat shrink tubing on the sensor end is +125 °C. Please see the Dimensional drawing.
Make sure the process temperature is not too much for the cable or heat shrink tube.

Code key



Technical data

Tolerances Pt 100 (IEC 60751)	A tolerance ±0.15 + 0.002 x t, operating temperature -100…+450 ‘C B tolerance ±0.3 + 0.005 x t, operating temperature -196…+600 `C B 1/3 DIN, tolerance ±1/3 x (0.3 + 0.005 x t), operating temperature -196…+600 ‘ C B 1/10 DIN. tolerance ±1/10 x (0.3 + 0.005 x t), operating temperature -196… +600 °C
Tolerances thermocouple (IEC 60584)	Type tolerance class1 = -40… 375 : C ±1,5 C, 375…750 OC ±0,004 x t Types K and N tolerance class 1 = -40…375 “C ±1,5 °C, 375…1000’C ±0,004 x t
Cable materials	SIL = silicone, max. +180’C FEP = fluoropolymer, max. +205 ‘C GGD = glass silk cable/metal braid jacket, max. +350 `C PDF = 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 t FS = FEP wire insulation/silicone jacket, max. +180 `C CON = no cable. individual single wires. FEP wire insulation, max. +205 -PC

Wire materials	2 wires = FEP insulated twisted wires ZxO,22/+205°C 3 wires = FEP insulated twisted wires 3×0,22/+205°C 4 wires = FEP insulated twisted wires 4×0,22/+205°C
Temperature range	-40…+180º C (Note: the range is for silicone sensor head, cable range according to selection)
Approvals	METROLOGICAL PATTERN APPROVAL
Quality certificate	ISO 9001:2015 and ISO 14001:2015 issued by DNV
IP rating	IP65, higher IP rating on request

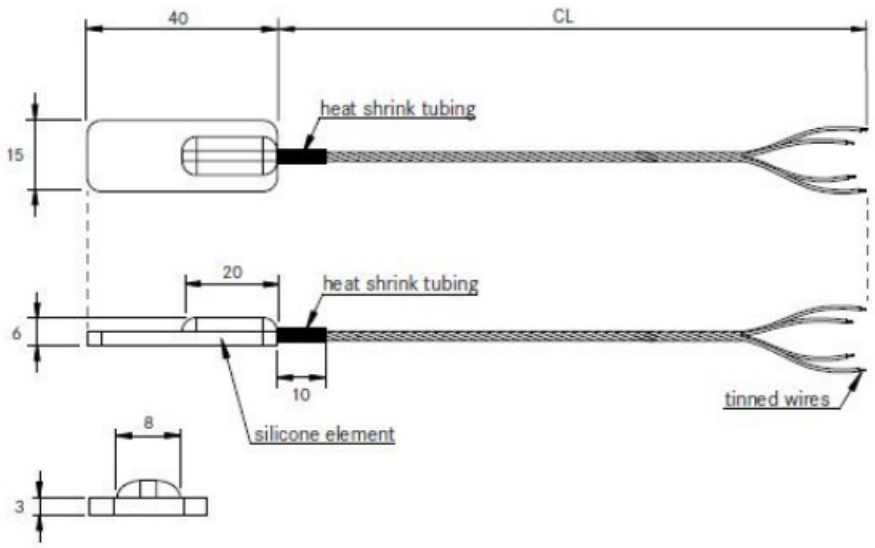
Materials

Cable/wires	please see the Technical data
Heat shrink tube	Irradiated Modified Polyolefin (max. +125 °C), on wire end only on request, not used a s standard
Sensing patch	Silicone ELASTOSIL® RT 607 A/B
Installation surface	Adhesive Aluminum Foil (option)

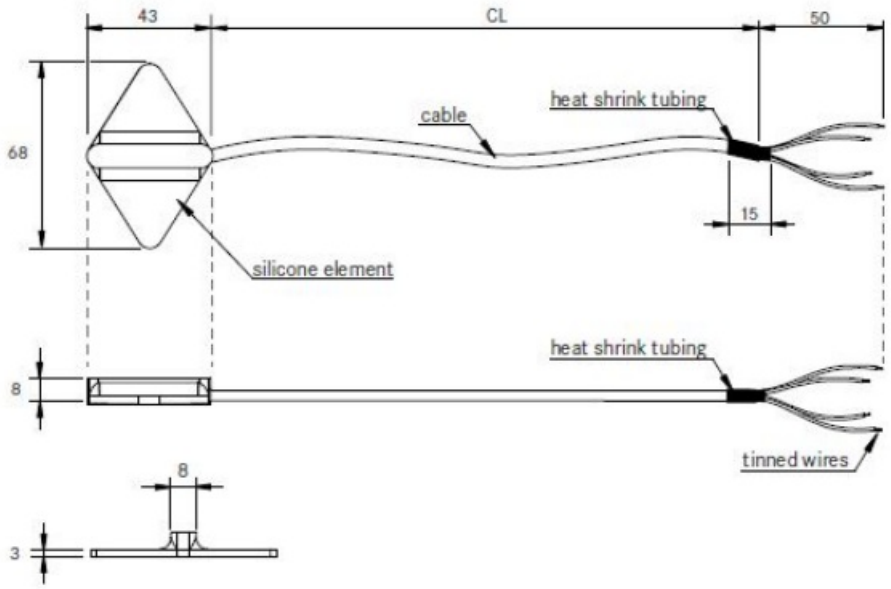
Other materials can be used on request.

Dimensional drawing

Model 40x15x3



Model 68x43x8

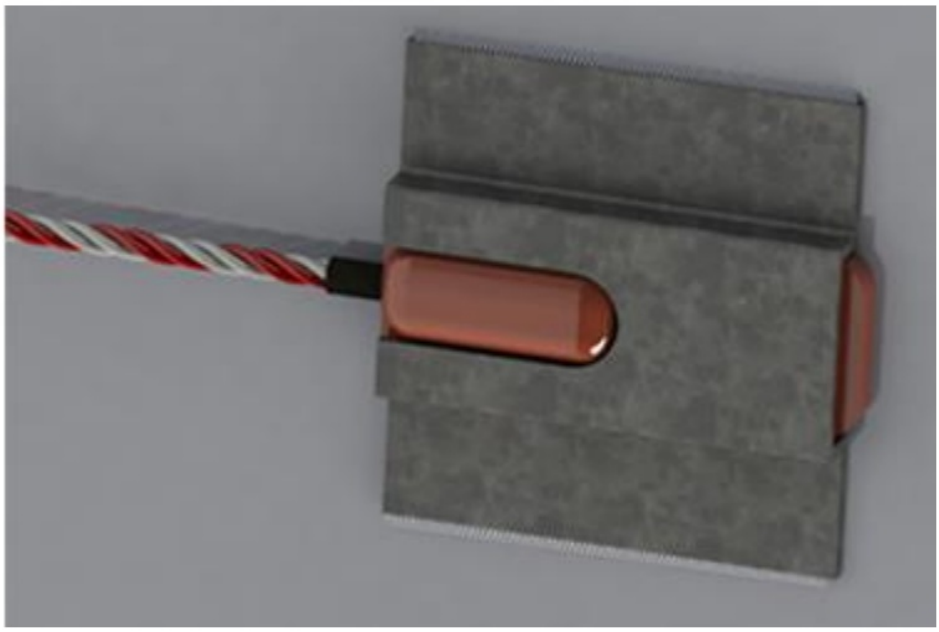


Installation instructions

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:

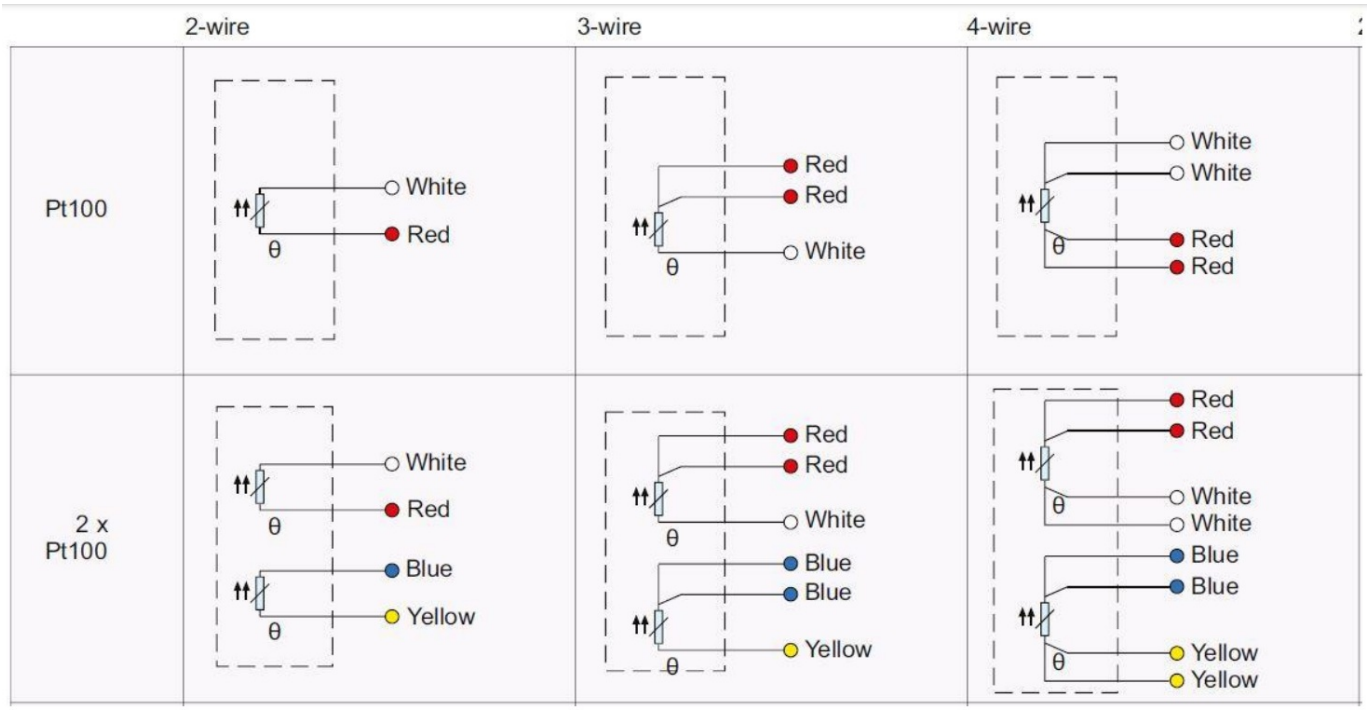
- Apply the silicone patch on a surface to the measured.
- Use a pipe clamp or cable tie or similar, to fix the patch closely to the surface.
- Or apply the patch with 2-sided adhesive aluminum foil (delivery option)
- Or, depending on the surface material, the patch can be screwed or nailed down through the patch’s outer ends.
- Or weld a special fixing part on the measured surface, then insert the sensor patch in.
- Make sure there is no excess bending force loading the cable.
- Mount extra strain relief, e.g. cable tie, for cable, if necessary.

The image below: this example shows a sensor installed with a pipe clamp, and with a welded fixing accessory.



Pt100; connection wiring

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



Other connections on request.

Pt100; measuring current

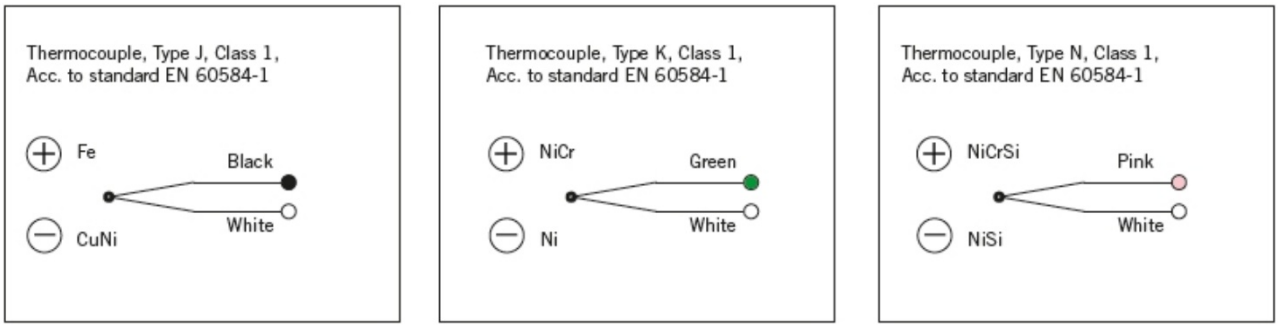
The highest allowed measuring current for Pt100 measuring resistors depends on resistor type and brand. Normally the recommended maximum values are:

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

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

TC; connection wiring

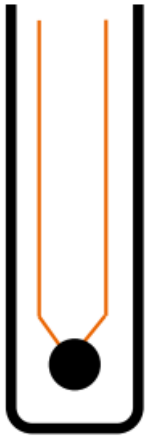
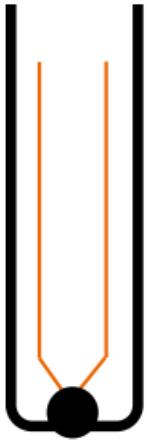
The image below: These are the connection colors of TC types J, K, and N.



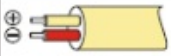
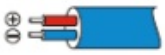
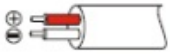
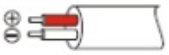
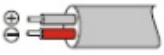
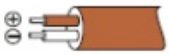
Other types on request.

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 the same circuits, make sure you are using the right type.
The image below: Non-grounded and grounded structures in comparison.

Non-grounded TC	**Grounded TC**
	
Thermo material hot junction and protective tube / MI cable sheaths are galvanically isolated from each other.	Thermo material hot junction has a galvanic connection with a 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

The 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 a white label. This label has printed information as presented below.
The image below is an Example of a standard sensor type label.

Lapp Automatic Oy Martinkyläntie 52 FI-01720 Vantaa Finland +358 (0) 20 764 6410 EPIC® SENSORS www.epicsensors.com	EPIC® SENSORS W-SIL-PATCH-40X15X3-5000/SIL-4-A-Y-X Prod: xxxxxxx CE S/N: 210131-1234567-1 **210131-1234567-1**
Manufacturer contact information. For some sensor types, this part may also be printed on a separate label for practical re asons.	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 a 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:

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

Production site and logistics:

Street address Postal address	Lapp Automatic Oy Varastokatu 10 FI-05800 Hyvinkää, Finland

Phone (sales): +358 20 764 6410
Email: epicsensors.fi.lav@lapp.com
Https: www.epicsensors.com

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20220822	LAPP/JuPi	Telephone number update
20220815	LAPP/JuPi	Material name text corrections
20220401	LAPP/JuPi	Original version

User Manual – Type T-SIL-PATCH / W-SIL-PATCH
Lapp Automatic Oy
Martinkyläntie 52
FI-01720 Vantaa, Finland
lappautomaatio.fi
Technical sales:
P: +358 (0)20 764 6410
Open orders:
P: +358 (0)20 764 6420
Kotipaikka/Domicile
Vantaa
Y-tunnus: 1107293-1
VAT: FI11072931
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Documents / Resources

	EPIC SENSORS Silicone Patch Sensor with Cable Type T-SIL-PATCH/W-SIL-PATCH [pdf] User Manual Silicone Patch Sensor with Cable Type, T-SIL-PATCH, W-SIL-PATCH, Silicone Patch Sensor, Patch Sensor

References

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