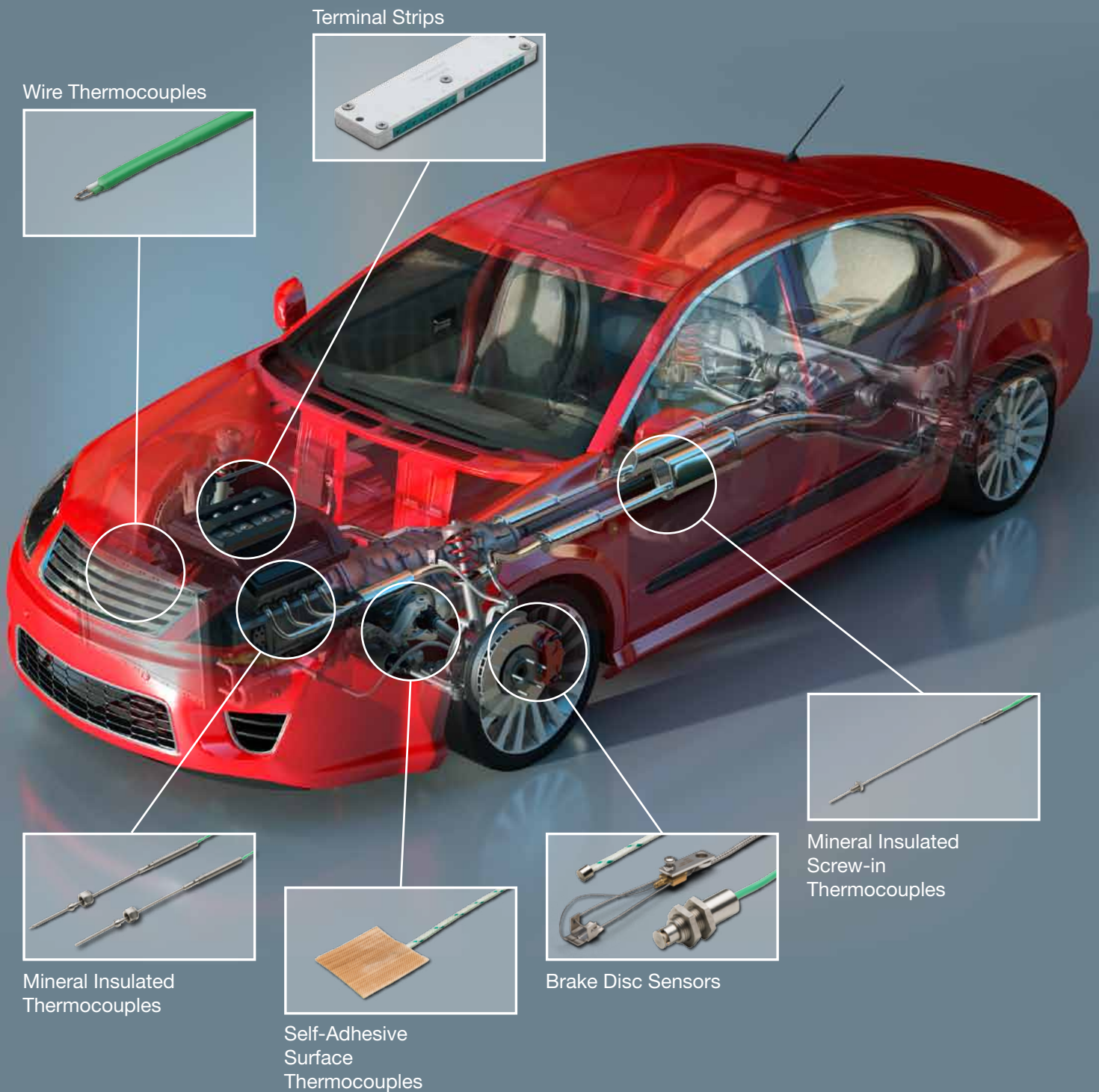


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Automotive Thermocouples – RTDs



Wire Thermocouples

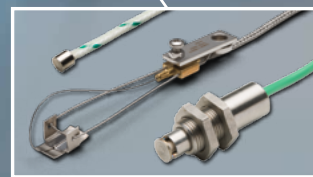
Terminal Strips



Mineral Insulated Thermocouples



Self-Adhesive Surface Thermocouples



Brake Disc Sensors



Mineral Insulated Screw-in Thermocouples

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Automotive
Thermocouples
RTDs

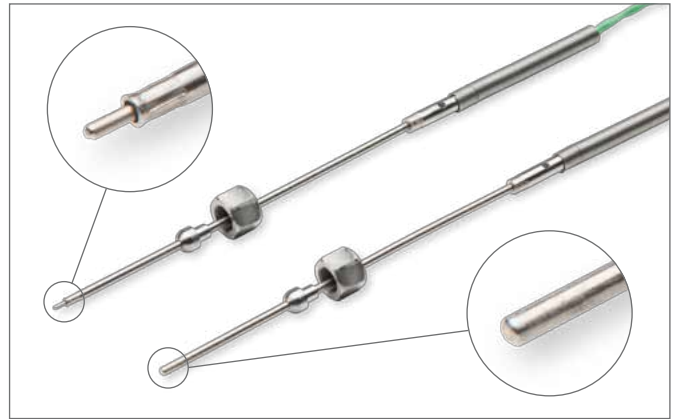
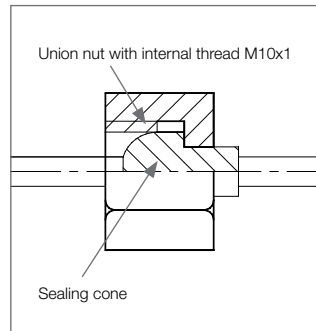
**Temperature Sensors for
Research and Development
in the Automotive Industry**

General information for all thermocouples and RTDs

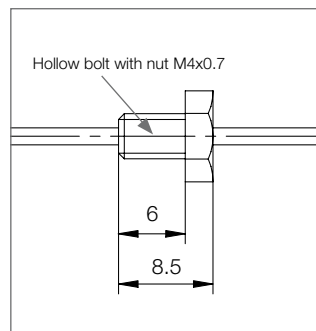
- All dimensions are subject to general tolerances according to DIN 2768-m.
Our tolerances in most cases exceed DIN 2768-m standards. Exact tolerances for your item are available on request.
- All thermocouples can be produced with ANSI color code. Other standards are available on request.
- All dimensions for mineral insulated thermocouples are subject to tolerances according to EN 61515.

**Mineral Insulated Thermocouple
Mineral Insulated RTD**
General applications

- Engine compartment
- Catalytic converter
- Exhaust pipe


**Mineral Insulated Screw-in Thermocouple
Mineral Insulated Screw-in RTD**
General applications

- Engine compartment
- Turbocharger
- Oil pan
- Exhaust pipe


Options

- Bend protection spring
- Protection tube
- Support pipe

Technical key features	Mineral Insulated Thermocouple	Mineral Insulated RTD
	Mineral Insulated Screw-in Thermocouple	Mineral Insulated Screw-in RTD
Lead cross-section	0.22 mm ²	0.22 mm ²
Minimum bending radius	5.0 x sheath diameter	5.0 x sheath diameter
Classification tolerance	Class 1 or 2 (DIN60584)	Class A or B
Wire circuit	–	2-wire-circuit: class B 3- and 4-wire-circuit: class A or B
Measuring point	Ungrounded or grounded (grounded just possible for MIT < 3.0 mm)	–

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Automotive Thermocouples – RTDs

Performance Range

Dia-meter [mm]	Types	Connection head [mm]	Lead Options	Number of thermo-couples
Thermocouple				
0.5	K	Ø 6 x 30	GLS/GLS/MB	1 x
0.75	K	Ø 6 x 30	GLS/GLS/MB	1 x
1.0	K	Ø 3.2 x 23	Kapton/Kapton GLS/Kapton GLS/GLS	1 x
1.0	K	Ø 4 x 22	any	1 x
1.5	K	Ø 3.2 x 23	Kapton/Kapton GLS/Kapton GLS/GLS	1 x
1.5	K	Ø 4 x 22	any	1 x
2.0	K	Ø 4 x 22	any	1 x
2.0	K	Ø 6 x 30	GLS/GLS/MB PFA/PFA	2 x

Dia-meter [mm]	Types	Connection head [mm]	Lead Options	Number of thermo-couples
Thermocouple				
3.0	K	Ø 6 x 30	any	1 x or 2 x
4.5	K	Ø 6 x 30	any	1 x or 2 x
6.0	K	Ø 8 x 50	GLS/GLS/MB	1 x or 2 x

Diameter [mm]	Types	Connection head [mm]	Lead Options	Number of RTDs
RTD				
2.0	Pt 100 Pt 1000	Ø 6 x 30	any	1 x
3.0				
4.5		Ø 8 x 50		
6.0				

Type Specifications

Type	Material	Standard	Lead Colors [+/-]	Sheath Material**	Measurement Range
Thermocouple					
K	NiCr-Ni	IEC 60584	green/white	2.4816/Alloy600	-40 to +1100 °C -40 to 2010 °F
K*	NiCr-Ni	DIN 43710*	red/green	2.4816	-40 to +1100 °C -40 to 2010 °F
K	NiCr-Ni	ANSI MC 96.1	yellow/red	2.4816	-40 to +1100 °C -40 to 2010 °F
RTD					
Pt 100	Platinum	DIN EN 60751	red/white	1.4404	-50 to +600 °C -50 to 1120 °F
Pt 1000	Platinum	DIN EN 60751	red/white	1.4404	-50 to +600 °C -50 to 1120 °F

* obsolete standard, usually for existing installations, ** Other materials on request

Lead Types Thermocouple

Lead Types	Max. Temperature
PFA/PFA	260 °C 500 °F
GLS/GLS (MB*)	400 °C 750 °F
Kapton/Kapton	350 °C 660 °F
GLS/Kapton	350 °C 660 °F
PFA/Kapton	260 °C 500 °F
PFA/PFA/MB	260 °C 500 °F

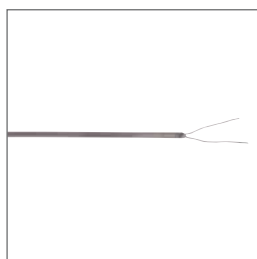
Material information from the inside to the outside.
Duplex MIT available with MB/GLS/GLS and PFA/PFA.
* Glass silk insulated leads with glass silk insulated casing and metal braided protection sleeve.

Lead Types RTD

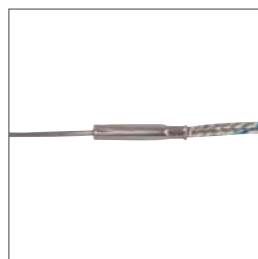
Lead Types	Max. Temperature
PFA/PFA	260 °C 500 °F
GLS/GLS (MB*)	400 °C 750 °F
Silicone/Silicone	180 °C 356 °F

Material information from the inside to the outside.
* Glass silk insulated leads with glass silk insulated casing and metal braided protection sleeve.

Connection Type Range



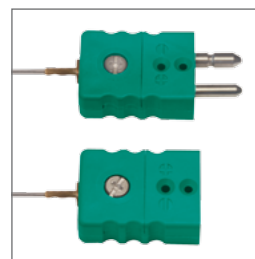
BLANK
Open ends



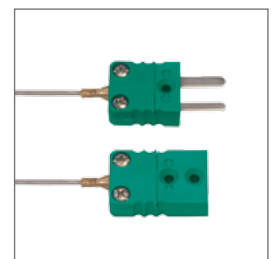
LEAD
Connection head
(260 or 400 °C / 500 or 750 °F) and cable



LEMO
LEMO connector (female)
max. 250 °C / 480 °F



Standard
male/female connector
max. 200 °C / 390 °F



Mini
male/female connector
max. 200 °C / 390 °F

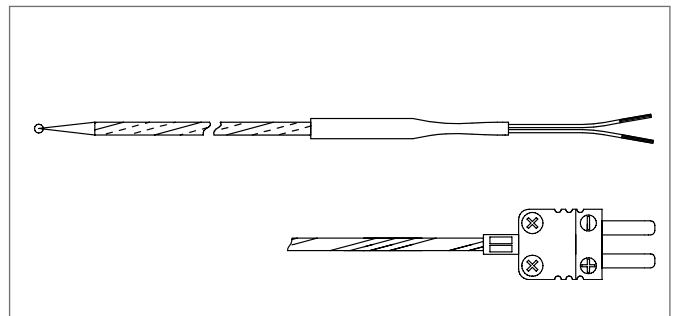
Wire Thermocouple

Technical key features

Temperature range	0 to 260 °C / 32 to 500 °F
Sensor structure	Insulated thermo wires joined by welding
Sensor type	Type K
Lead structure	PFA/PFA
Conductor cross section	2 x 0.07 mm ²
Connection	See "Connection Type Range" on preceding pages
Classification tolerance	Class 1

General applications

- Difficult accessible areas with limited space and/or if fast response times are necessary, e. g. engine compartment



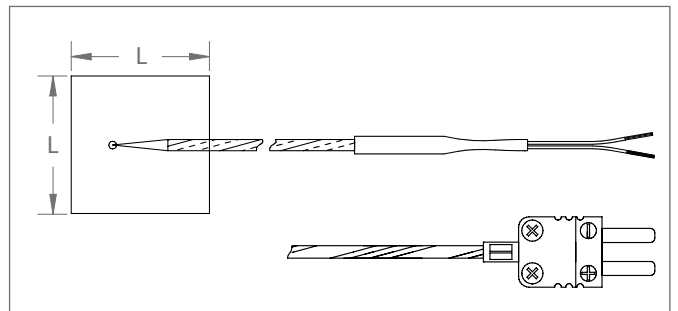
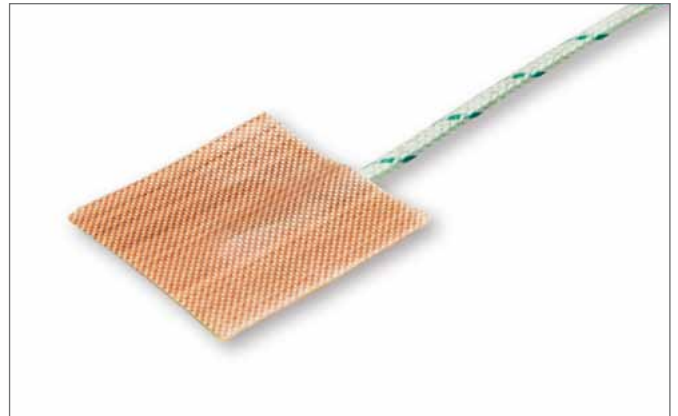
Self-Adhesive Surface Thermocouple

Technical key features

Temperature range	0 to 260 °C / 32 to 500 °F
Sensor structure	Insulated thermo wires joined by welding
Sensor type	Type K
Lead structure	FEP/FEP, GLS/GLS and Kapton/Kapton
Conductor cross section	2 x 0.2 mm ²
Connection	See "Connection Type Range" on preceding pages
Classification tolerance	Class 1
Adhesive pad	PTFE impregnated fiberglass pad, L: 25 mm Temperature resistance 180 °C / 255 °F (Short time load 260 °C / 500 °F)

General applications

- Quick, space-saving and uncomplicated temperature measurement on surfaces, e. g. on auto interior and boots



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Automotive Thermocouples – RTDs

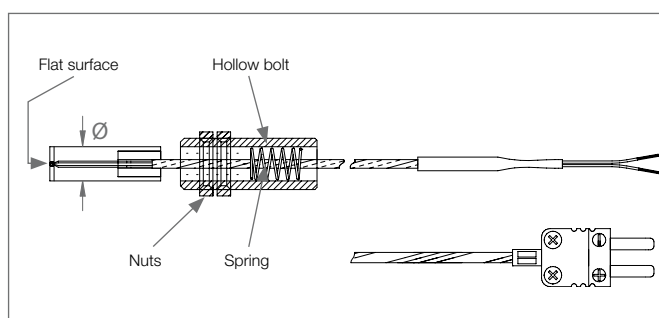
Spring Thermocouple (Brake Disc)

Technical key features

Temperature range	0 to 850 °C / 32 to 1560 °F (at the flat surface)
Diameter	8 mm
Sensor structure	Spring loaded measuring point, fixed on a flat surface M12x1
Sensor type	Type K
Lead structure	PFA/PFA, Silicone/Silicone
Conductor cross section	2 x 0.22 mm ²
Connection	See "Connection Type Range" on preceding pages
Measuring point	At bottom, grounded
Classification tolerance	Class 2

General applications

- Temperature recording on the brake disc or other rotating surfaces



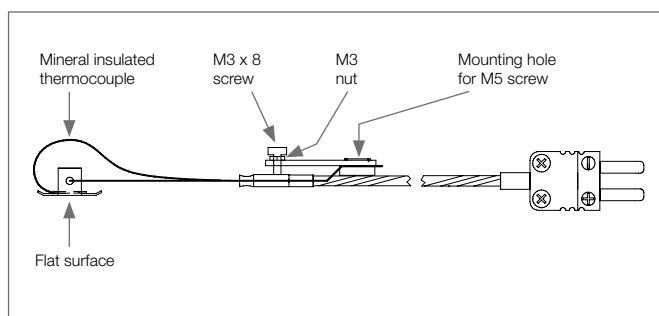
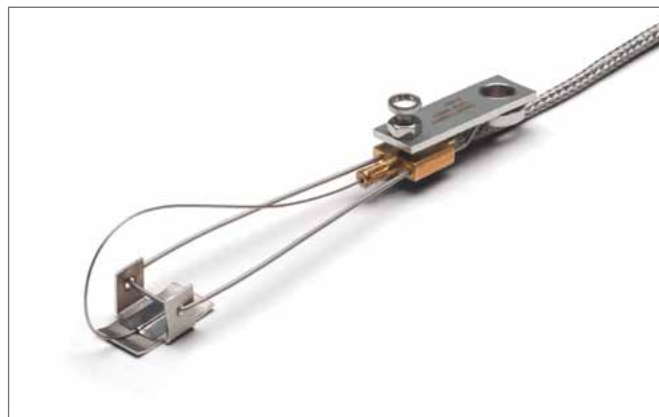
Friction Thermocouple (Brake Disc)

Technical key features

Temperature range	0 to 850 °C / 32 to 1560 °F (at the flat surface)
Sensor structure	Bent mineral insulated thermocouple, Ø 0.5 mm, fixed on the flat surface
Sensor type	Type K
Lead structure	Mineral insulated thermocouple with free ends and metal braided sleeving
Contact pressure	Variably adjustable
Connection	Compensation connector or mini compensation connector
Measuring point	At bottom, ungrounded
Classification tolerance	Class 1

General applications

- Temperature recording on the brake disc or other rotating surfaces



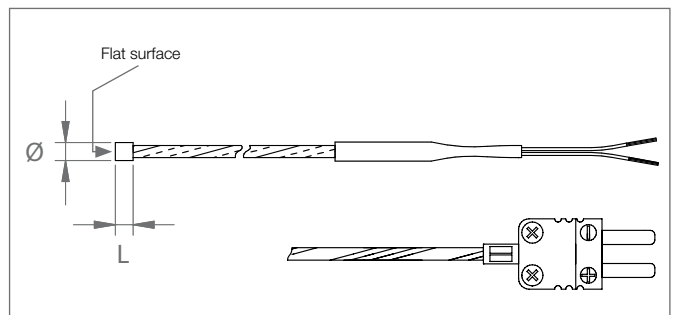
Insert Thermocouple (Brake Disc)

Technical key features

Temperature range	0 to 850 °C / 32 to 1560 °F (at the flat surface)
Diameter	3 mm
Length L	3 mm
Sensor type	Type K
Lead structure	GLS/GLS (high temperature resistant, max. Temp. 600 °C / 1110 °F)
Conductor cross section	2 x 0.2 mm ²
Connection	See “Connection Type Range” on preceding pages
Measuring point	At bottom, grounded
Classification tolerance	Class 2


General applications

- Temperature recording in the brake disc
(For installation into the brake disc)



Terminal Strip

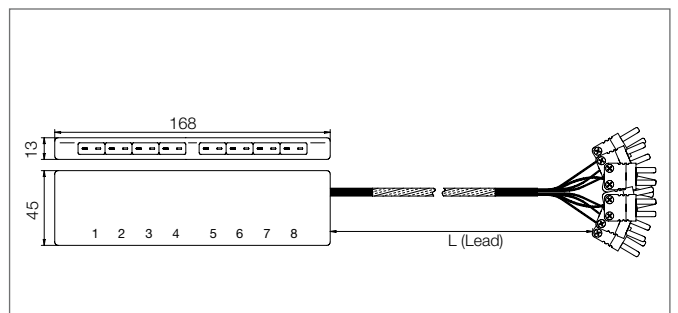
Technical key features

Temperature range of the female connectors	0 to 200 °C / 32 to 390 °F
Housing material	Aluminum
Number of female connectors	4 (2 or 4 pins) 8 (2 or 4 pins) 16 (2 pins)
Sensor types	Thermocouples: Type J, K RTDs: all types
Lead structure	FEP/FEP, FEP/MB*/FEP, PFA/PFA, PFA/MB*/PFA
Lead cross-section	0.22 mm ²
Connection	See “Connection Type Range” on preceding pages

* metal braided

General applications

- Consolidates several connection leads
to reduce wiring effort and save space



*** Dimensions on request ***

