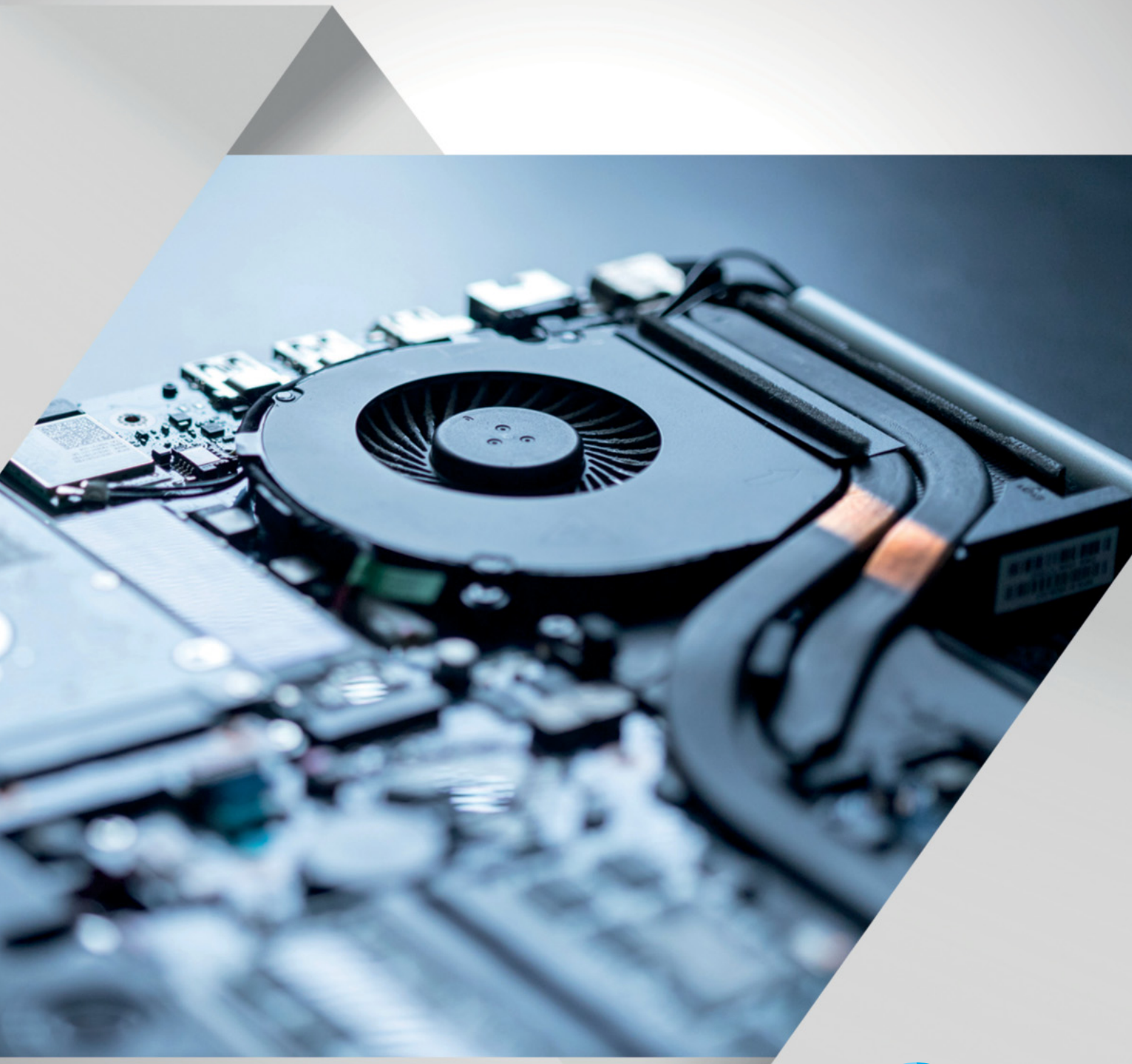
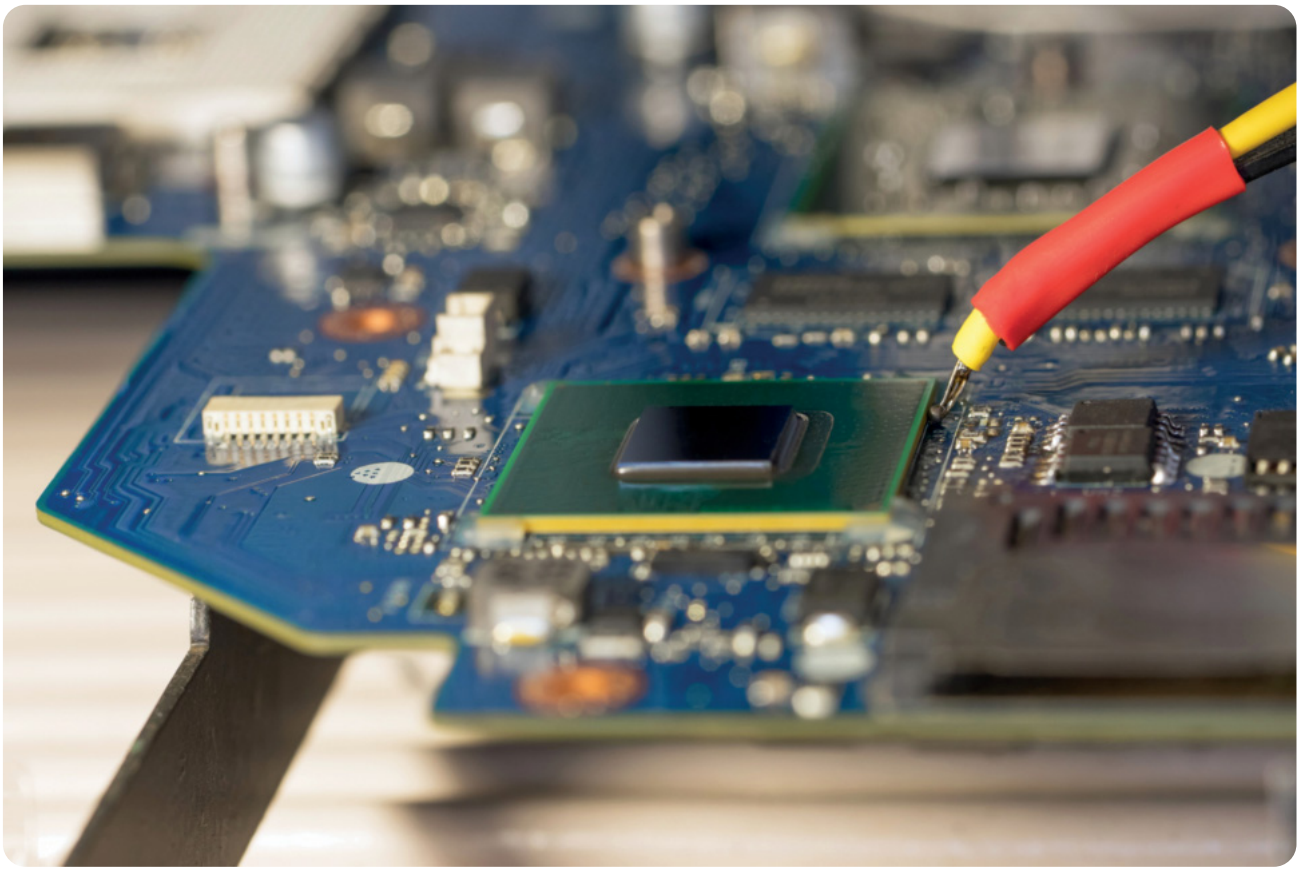
CONTACT TEMPERATURE MEASUREMENT FOR COMPUTER TECHNOLOGY



www.sab-worldwide.com

SAB BRÖCKSKES

CONTENT



WHO WE ARE

A SURVEY

75 years of experience in cable and wire manufacturing as well as in temperature measurement technology turned a one-man business into a company with more than 550 employees. We prove our strength every year with more than 1500 special products according to customers' requirements. Each product is a new challenge for our creative technical team. We at SAB see ourselves as a manufacturer and a service provider – in the sense of true partnership and the greatest possible customer orientation.

Today, the quality of our products is known and appreciated in more than 80 countries around the world. In all product ranges, we are certified according to DIN EN ISO 9001. Furthermore, we have implemented an environmental management system for our company according to DIN EN ISO 14001, an occupational health and safety management system according to DIN EN ISO 14001 and DIN ISO 45001, and an energy management system according to DIN EN ISO 50001.

And also for the future, our slogan is: "WE CONTINUE!"

FOUNDED:	1947 by Peter Bröckskes sen. an independent, medium-sized company.
CEO:	Peter Bröckskes and Sabine Bröckskes-Wetten
PLANT/LOCATION:	In Viersen (Lower Rhine) 110.000 m² company site. Own manufacturing from copper conductor to outer sheath. VDE proved burnchamber and laboratory within the company.
EMPLOYEES/WORKERS:	Approx. 430 at the plant in Viersen, 550 worldwide
YEARLY SALES:	Approx. 95 Mio. € worldwide
PRODUCTS:	Special Cables Measurement Technology Cable Harnessing
CERTIFICATES AND APPROVALS:	Quality management system acc. to DIN EN ISO 9001 for every manufacturing field Environmental management system acc. to DIN EN ISO 14001 Occupational health and safety management acc. to NLF/ILO-OSH and DIN ISO 45001 Energy management system acc. to DIN EN ISO 50001

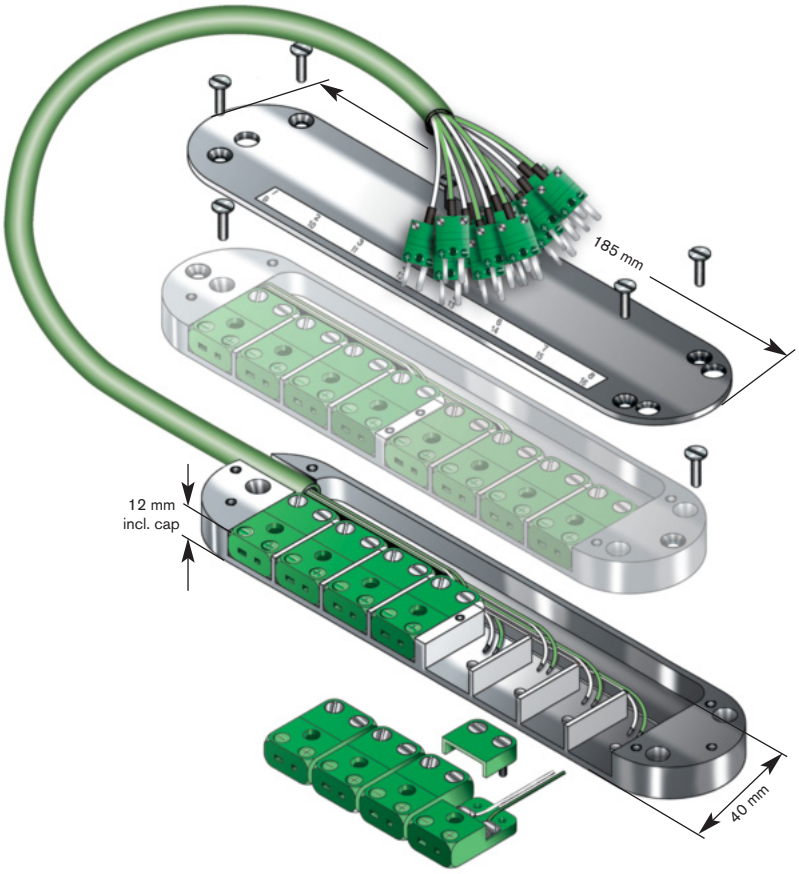
HAR EN IEC ISO

8-PLUG AND 16-PLUG ALUMINUM CONNECTOR T065

Also available in type J + T

This item is used, for example in automobile industry in test vehicles. Thermocouples can be easily connected. In case of failure, the faulty element can be exchanged without much effort. Test engines require temperature measurements at the most different points, e.g. in oilpans, cooling tubes and combustion gases, etc. Cables coming from the different measuring points can be plugged into the connector conveniently. Advantage: Reduced wiring effort.

In general the application makes sense, whenever there are many measuring points and far distances that have to be overcome.



NUMBER OF CONNECTORS:

- ❑ 8 miniature sockets
- ❑ 16 miniature sockets

On request also in the version
with miniature connectors in aluminum housing!

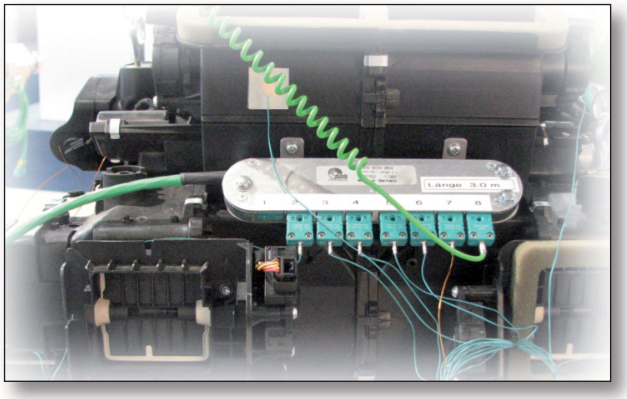
CABLE VERSION:

- ❑ strands / FEP / FEP
- ❑ strands / FEP / overall copper shield / FEP

CABLE LENGTH: _____

CONNECTION ENDS:

- ❑ miniature thermoplug
- ❑ miniature socket
- ❑ standard plug
- ❑ Lemo plug type _____
- ❑ Lemo socket type _____
- ❑ bare ends
- ❑ other cable ends _____



The photo shows an 8-plug connector used in automobile industry for example in test vehicles. Thermocouples can be easily connected.

DETAILS OF THE CONNECTION CABLES

■ **THL KX acc. to DIN EN 60584**

strands/FEP/FEP	+180°C
8 x 2 x 0,22 mm²	Ø 6,4 mm
16 x 2 x 0,22 mm²	Ø 7,7 mm

■ **THL KX acc. to DIN EN 60584**

strands/FEP/overall copper shield/FEP	+180°C
8 x 2 x 0,22 mm²	Ø 6,9 mm
16 x 2 x 0,22 mm²	Ø 8,3 mm

MINERAL INSULATED THERMOCOUPLE with connector T302 / T303, with bare cable ends T301

General Information

Type J class 1 and 2	-40°C / +750°C
Type K class 1 class 2	-40°C / +1000°C -40°C / +1100°C
Material 1.4541	+800°C
Material 2.4816	+1100°C
Please note that the temperature stability of the sensor is determined by the weakest parameters.	

Especially appropriate to collect temperatures in test vehicles in the vehicle interior.

THERMOCOUPLE:

- ❑ 1 x type J
- ❑ 1 x type K
- ❑ 2 x type J
- ❑ 2 x type K
- ❑ other thermocouples _____

SHEATH-Ø:

- ❑ 0,5 mm
- ❑ 2,0 mm
- ❑ 4,5 mm
- ❑ 1,0 mm
- ❑ 3,0 mm
- ❑ 6,0 mm
- ❑ 1,5 mm
- ❑ other sheath-Ø _____

SHEATH MATERIAL:

- ❑ 1.4541 (+800°C)
- ❑ 2.4816 (+1100°C)
- ❑ other sheath materials _____

CONNECTION ELEMENTS:

- ❑ miniature thermoplug
- ❑ Lemo plug type _____
- ❑ standard plug
- ❑ Lemo socket type _____
- ❑ miniature socket
- ❑ free ends _____ mm
- ❑ other cable ends _____

TYPE OF MEASURING TIP:

- ❑ class 1, form A, insulated measuring tip
- ❑ class 1, form B, welded measuring tip
- ❑ class 2, form A, insulated measuring tip
- ❑ class 2, form B, welded measuring tip

NOMINAL LENGTH: _____ mm

- ❑ with batch certificate and identification
- ❑ accessories (fix) _____

SELF-ADHESIVE SURFACE THERMOCOUPLE T130

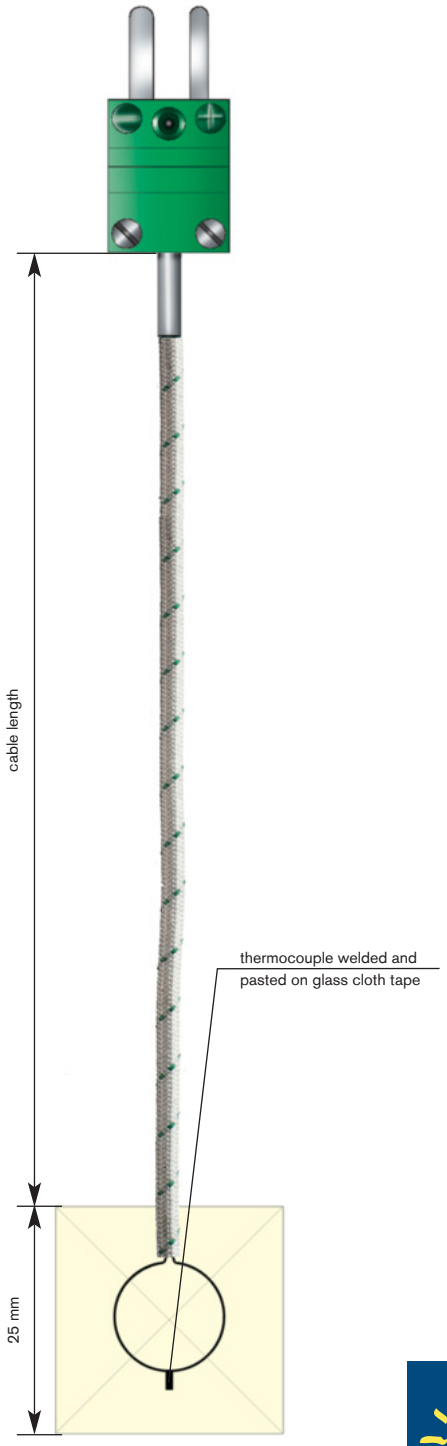
General Information

Temperature range of the sensor is dependent of the temperature resistance of the cable e.g. FEP +180°C	
Limit deviation	Class 1
Please note that the temperature stability of the sensor is determined by the weakest parameters.	

Also available as Pt100 resistance thermometer!

Also available in type J + T

This item is used, for example in automobile industry, especially whereever a quick and uncomplicated temperature measurement is needed. Advantage: No special preparation necessary at the measuring points. It only has to be paid attention to the fact that the surface is free of dust, grease and oil.



THERMOCOUPLE:

- ❑ 1 x type J
- ❑ 1 x type K
- ❑ other thermocouples _____

PAD SIZE:

- ❑ 25 x 25 mm (standard type) double
- ❑ other pad size _____

CONNECTION CABLE:

(see also survey of connecting cables for thermocouples page 33 and 34)

- ❑ single wire / fibre-glass / fibre-glass
- ❑ single wire / FEP / FEP
- ❑ single wire / Polyimid / Polyimid
- ❑ other connection cable _____

CABLE LENGTH: _____ m

CONNECTION ENDS:

- ❑ miniature thermoplug
- ❑ standard plug
- ❑ miniature socket
- ❑ other cable ends _____
- ❑ bare ends
- ❑ Lemo plug type _____
- ❑ Lemo socket type _____

- ❑ with batch certificate and identification

SPARE PADS are available with item no. T095-044-258, cut-outs 25 x 25 mm and a packaging unit of 100 pads on a roll!

Self-adhesive thermocouple in practical application

Self-adhesive thermocouples to measure the temperature at the sleeves of the drive shaft.

The data transmission is done by a telemetric device. Several self-adhesive thermocouples can be mounted in a space saving way without any problem.

■ Temperature resistance of the adhesive pad +230°C

SURFACE THERMOCOUPLE T100 with welding bead (form A)

For an extended temperature range

This surface thermocouple with Polyimid cable is also called miniature thermocouple. It is used for example in coil windings, electronic parts and narrow spaces. Batch certificate and identification can be delivered on request.

Miniature welding bead with covering

THERMOCOUPLE:

- ❑ 1 x type K
- ❑ other thermocouples _____

CONNECTION CABLE:

(see also survey of connecting cables for thermocouples page 33 and 34)

- ❑ Thermocouple cable 2 x 0,20 mmØ / Polyimid +300°C
- ❑ other connection cable _____

CABLE LENGTH: _____ m

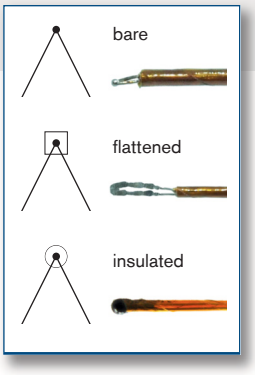
CONNECTION ENDS:

- ❑ miniature thermoplug
- ❑ miniature socket
- ❑ other cable ends _____

- ❑ with batch certificate and identification

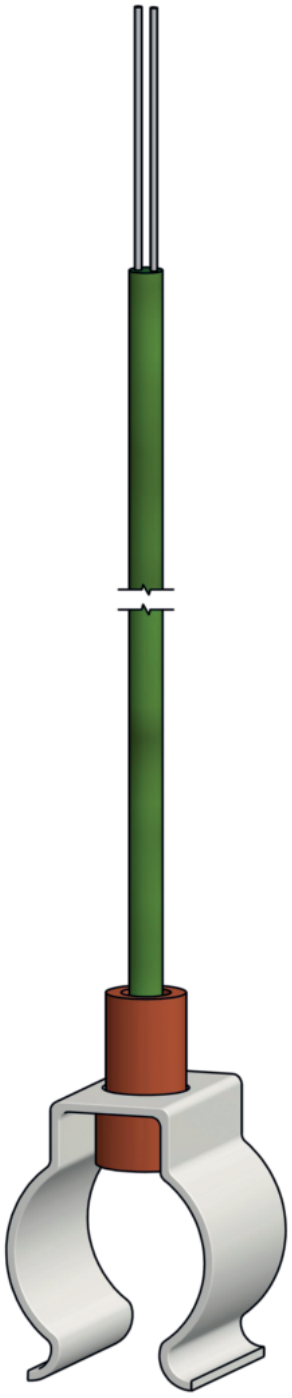
Response time in water - immersion depth 50 mm:	Average value taken from 3 measurements t 0,5 = 2,7 sec. t 0,9 = 4,7 sec.
Response time in air:	Average value taken from 3 measurements t 0,5 = 5,6 sec. t 0,9 = 12,0 sec.

Following measuring tips:



TUBE PROBE WITH SPRING CLAMP T999

For easy and quick mounting of measuring points on metallic pipes or flexible hoses. The spring clamps are available for different pipe diameters.



THERMOCOUPLE:

- ❑ 1 x type K
- ❑ other thermocouples on request.

FOR PIPE-Ø:

- ❑ 6-7 mm
- ❑ 10-12 mm
- ❑ 13-14 mm
- ❑ other pipe diameters on request.

CONNECTION CABLE:

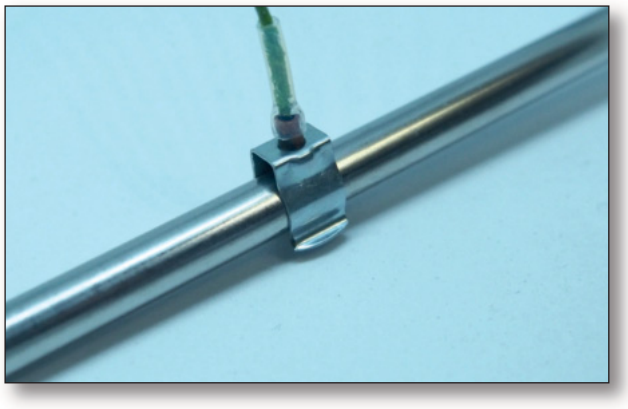
- ❑ single wire / fibre-glass / fibre-glass
- ❑ single wire / polyimid / polyimid
- ❑ single wire / polyimid / polyimid / PFA

CABLE LENGTH: _____ m

CONNECTION END:

- ❑ miniature thermoplug
- ❑ standard plug
- ❑ miniature socket
- ❑ other cable ends _____
- ❑ bare ends
- ❑ Lemo plug type _____
- ❑ Lemo socket type _____

❑ with batch certificate and identification



SPRING LOADED PRESSURE PROBE FOR CONTACT MEASUREMENT ON SURFACES T999

General Information

Temperature range of probe	-30°C / +150°C
Limit deviation	Class 1
Measuring point	bare in the sleeve base

Please note that the temperature stability of the sensor is determined by the weakest parameters.

Sensor design suitable for the measurement of surface temperature on moving parts, e.g. in automatic tests.

THERMOCOUPLE:

- ❑ 1 x type K
- ❑ other thermocouples on request.

CONNECTION CABLE:

- ❑ extension cable strands / FEP / FEP
- ❑ extension cable strands / FEP / overall copper screen / FEP

CABLE LENGTH: _____ m

CONNECTION END:

- ❑ miniature thermoplug
- ❑ bare ends
- ❑ Lemo plug type _____

Also available as Pt100 sensor!

FUEL THERMOCOUPLE T850

General Information

Temperature range of probe	-40°C / +300°C
Limit deviation	Class 1
Measuring point	Form A, insulated

Please note that the temperature stability of the sensor is determined by the weakest parameters.

Especially appropriate to measure the temperature in the fuel line. The small diameter of the thermocouple situated in the middle of the T-tube connector, guarantees a quick response time. Another advantage offers the small diameter of the mineral insulated thermocouple so that neither the flow velocity nor the flow quantity are affected. The screening of the cable offers at the same time mechanical protection as well as protection against electromagnetic interference.

THERMOCOUPLE:

❑ 1 x type J ❑ 1 x type K ❑ other thermocouples _____

SHEATH-Ø:

❑ 0,5 mm (1.4404)

❑ other sheath-Ø (on request) _____

INNER TUBE-Ø:

❑ 4 - 5 mm (tube connector NW 3)

❑ 5 - 6 mm (tube connector NW 4)

❑ 7 - 8 mm (tube connector NW 6)

❑ 9 - 10 mm (tube connector NW 8)

❑ 11 - 12 mm (tube connector NW 10)

❑ 13 - 14 mm (tube connector NW 12)

❑ other tube inner-Ø (on request) _____

CONNECTION CABLE:

(see also survey of connecting cables for thermocouples page 33 and 34)

❑ extension cable strands / FEP / FEP

❑ extension cable strands / FEP / overall copper shield / FEP

❑ other connection cable _____

CABLE LENGTH: _____ m

CONNECTION ENDS:

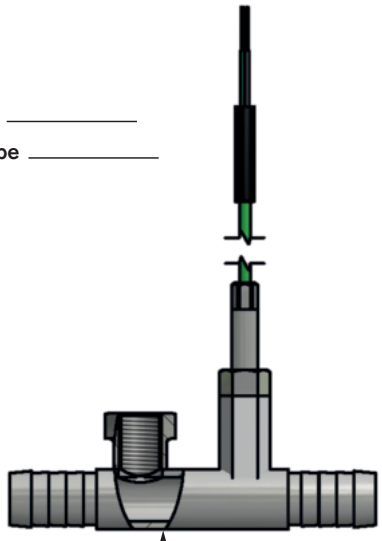
❑ miniature thermoplug ❑ bare ends

❑ standard plug ❑ Lemo plug type _____

❑ miniature socket ❑ Lemo socket type _____

❑ other cable ends _____

❑ with batch certificate and identification



Also available as combined element with connection for pressure sensors!

COOLING WATER TUBE THERMOCOUPLE T843 / T844

General Information

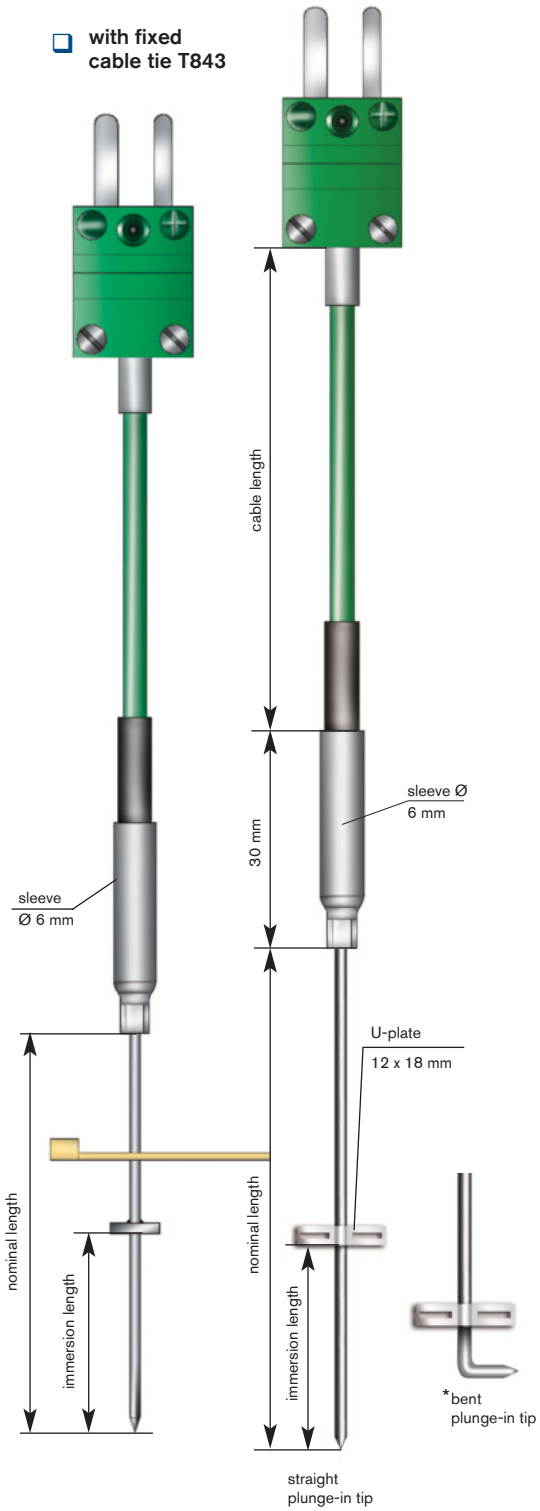
Temperature range of probe	-40°C / +150°C due to cable tie
Limit deviation	Class 1

Please note that the temperature stability of the sensor is determined by the weakest parameters.

Especially appropriate to collect the temperature of the cooling liquid in the cooling tubes at the engine. If temperature collection is no longer required, the sheath can be simply cut behind the high temperature cable tie. Considerable advantage is the achieved time saving, as it is no longer necessary to let off the cooling liquid. The system of cooling tubes remains tight.

❑ with U-plate for two cable ties T844

❑ with fixed cable tie T843



THERMOCOUPLE:

❑ 1 x type J ❑ 1 x type K

❑ other thermocouples _____

TYPE OF MEASURING TIP:

❑ form A, insulated measuring tip ❑ form B, welded measuring tip

❑ with kink protection at the sleeve ❑ without kink protection

SHEATH-Ø:

❑ 1,5 mm

PLUNGE-IN TIP:

❑ without ❑ straight

❑ with ❑ bent*

SHEATH MATERIAL:

❑ 1.4541 ❑ 2.4816 ❑ other sheath materials _____

NOMINAL LENGTH: _____ mm

IMMERSION LENGTH: _____ mm

CONNECTION CABLE:

(see also survey of connecting cables for thermocouples page 33 and 34)

❑ extension cable strands / FEP / FEP

❑ extension cable strands / FEP / overall copper shield / FEP

❑ other connection cable _____

CABLE LENGTH: _____ m

CONNECTION ENDS:

❑ miniature thermoplug ❑ bare ends

❑ standard plug ❑ Lemo plug type _____

❑ miniature socket ❑ Lemo socket type _____

❑ other cable ends _____

❑ with batch certificate and identification

In order to reuse the cooling water tube sensor, the opening can be closed permanently by the blind plug.

▶ Item no.: T061-041-908

USB 2.0 cable flexible at low temperatures

appropriate for the application at extremely low temperatures

THE SPECIALIST
FOR LOW TEMPERATURES

The requirements on automobiles of tomorrow are growing more and more and are highly specialised. In order to fulfil those requirements the applications outside are intensifying especially in the range of test vehicles. The test runs take place under harsh ambient conditions for example in arctic areas. As a consequence the requirements on the harnesses are also becoming harder. On this basis SAB has developed a USB 2.0 cable that is appropriate for permanent flexible use at -25°C.

CABLE CONSTRUCTION

conductor:	tinned copper strands / silver-plated copper strands
core insulation:	polymer
screen:	alu foil / tinned copper braiding
outer sheath:	Besilen®
sheath colour:	black (RAL 9011)
dimension:	(2 x 0,22 mm²)ST + 2 x 0,50 mm²

TECHNICAL DATA

temperature range	
flexible application:	-25°C/+180°C
fixed laying:	-40°C/+180°C
special feature:	flexible at low temperatures
outer diameter:	approx. 6,0 mm

Further cable types are possible on request for example with regard to:

- ✓ further dimensions
- ✓ other sheath colours and marking
- ✓ different cable lengths

Free choice of cable harness:

- ❑ USB-A-plug
- ❑ USB-A-socket
- ❑ USB-B-plug
- ❑ USB-B-socket

RG 316 - Multiple coaxial cable with total screen

for easy cabling of 8 or 16 measuring channels

BUNDLED SOLUTIONS

FOR VARIOUS SENSOR CABLING

Measuring tasks are becoming more and more complex and the number of measuring points to be evaluated is increasing. This causes a bigger cabling effort. In order to simplify this task, SAB BRÖCKSKES has developed two new cable types. Both cables are highly flexible and robust at the same time. With the used PUR outer sheath temperatures of up to + 125 ° C (2500h) can be achieved. For long distances the cables can be mounted on cable drums which are easy to handle.

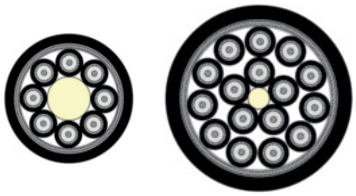
CABLE CONSTRUCTION

conductor:	tinned copper strands
core insulation:	FEP
screen:	tinned copper braiding
inner sheath:	TPE, black numbered
total screen:	tinned copper braiding
outer sheath:	PUR
sheath colour:	black (RAL 9005)

TECHNICAL DATA

voltage:	900 V
temperature range	
flexible application:	-40°C/+90°C
fixed laying:	-50°C/+90°C
short-time use:	+125°C (2500h)
characteristic impedance:	50 Ω ± 5 Ω
frequency range:	max. 3 GHz

Item no.	nominal cross-section mm²	outer-ø mm	copper figure kg/km	cable weight kg/km
3600-9025	8 x 26 AWG	11,6	132,0	189
3600-9026	16 x 26 AWG	15,0	253,2	339

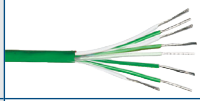
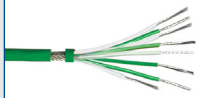
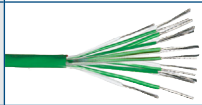
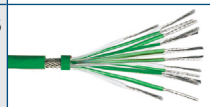


Available as plug and measure solution with harnessed BNC connector assemblies resp. SUB-D connectors.

SURVEY COMPENSATING AND EXTENSION CABLES AS WELL AS CONNECTION CABLES FOR RESISTANCE THERMOMETERS

SAB item no.	Picture	Cable type	T/C type	Insu-lation	Section	Cond.	Form	Outer-Ø	Temp.-range of insulation	thermoelectric voltage
fibre-glass insulated thermo-cables (wire)										
0489-9002		thermo-cable	type K	GL/GL	2 x 0,2 mm	wire	oval	approx. 0,8 x 1,3 mm	flexible: -25°C up to +200°C fixed: -25°C up to +200°C	DIN IEC 584 class 1, tolerance +/- 1,5°C
0489-2144		thermo-couple-cable	type K	GL/GL	2 x 0,5 mm	wire	oval	approx. 1,9 x 1,1 mm	flexible: -40°C up to +250°C fixed: -40°C up to +250°C	DIN IEC 584 class 1
0489-9003		thermo-cable	type K	GL/GL	2 x 0,8 mm	wire	oval	approx. 2,5 x 1,4 mm	flexible: -25°C up to +200°C fixed: -25°C up to +200°C	DIN IEC 584 class 1
0490-9016		thermo-couple-cable	type K	GL/GL	2 x 0,5 mm	wire	oval	approx. 2,0 x 1,2 mm	flexible: max. +400°C fixed: max. +400°C	DIN IEC 584 class 1
polyimide insulated thermo-cables (wire)										
0433-9138		thermo-couple-cable	type K	KN-Polyimid KP-blank/ Polyimid	2 x 0,2 mm	wire	oval	approx. 0,9 x 0,5 mm	flexible: -40°C up to +250°C fixed: -40°C up to +250°C	DIN IEC 584 class 1, tolerance +/- 1,5°C
0433-9186		thermo-couple-cable	type K	KN-Polyimid KP-blank/ Polyimid	2 x 0,2 mm	wire	oval	approx. 0,7 x 0,5 mm	flexible: -40°C up to +250°C fixed: -40°C up to +250°C	DIN IEC 584 class 1, tolerance +/- 1,5°C
0433-9149		thermo-couple-cable	type K	Polyimid + PTFE/ Polyimid	2 x 0,3 mm	wire	oval	approx. 0,9 x 1,7 mm	flexible: -40°C up to +250°C fixedt: -40°C up to +250°C	DIN IEC 584 class 1, tolerance +/- 1,5°C
0433-9168		thermo-couple-cable	type K	KN-Polyimid KP-PTFE/ Polyimid	2 x 0,2 mm	wire	oval	approx. 1,0 x 0,8 mm	flexible: -40°C up to +250°C fixed: -40°C up to +250°C	DIN IEC 584 class 1
polyimide/PFA insulated thermo-cables (wire)										
0433-9196		thermo-couple-cable	type K	KN-Polyimid KP blank/ Polyimid/ PFA	2 x 0,2 mm	wire	round	max. 1,0 mm	flexible: -40°C up to +250°C fixed: -40°C up to +250°C	DIN IEC 584 class 1
FEP insulated thermo-cables (wire)										
0433-9152		thermo-couple-cable	type K	FEP/FEP	2 x 0,2 mm	wire	oval	approx. 1,7 x 1,1 mm	flexible: -40°C up to +180°C fixed: -40°C up to +180°C	DIN IEC 584 class 1
TPE insulated thermo-cable (strands)										
0433-9177		thermo-couple-cable	type K	TPE/TPE	2 x 0,2 mm²	strands	round	approx. 3,0 mm	flexible: -40°C up to +90°C fixed: -40°C up to +90°C	DIN IEC 584 class 1
FEP/Besilen® insulated thermo-cables (strands)										
0433-9193		thermo-cable	type K	FEP/FEP/ Bi	2 x 0,2 mm²	strands	round	approx. 3,8 mm	flexible: -25°C up to +180°C fixed: -40°C up to +180°C	DIN IEC 584 class 2

SURVEY COMPENSATING AND EXTENSION CABLES AS WELL AS CONNECTION CABLES FOR RESISTANCE THERMOMETERS

SAB item no.	Picture	Cable type	T/C type	Insu-lation	Section	Cond.	Form	Outer-Ø	Temp.-range of insulation	thermoelectric voltage
FEP/Besilen® connection cables for resistance thermometers (strands)										
0470-9224		connection cable	tinned copper strand. copper figure: 2,7 kg/km	FEP/Bi	2 x 0,14 mm²	strands	round	approx. 2,8 mm	flexible: -25°C up to +180°C fixed: -40°C up to +180°C	
0470-0423		connection cable	tinned copper strand. copper figure: 8,4 kg/km	FEP/Bi	4 x 0,22 mm²	strands	round	approx. 3,9 mm	flexible: -25°C up to +180°C fixed: -40°C up to +180°C	
3833-9132		connection cable	tinned copper strand. copper figure: 19,3 kg/km	FEP/C/ FEP	4 x 0,22 mm²	strands	round	approx. 3,0 mm	flexible: -55°C up to +180°C fixed: -90°C up to +180°C	
FEP insulated thermo-cables (strands)										
0433-9240		thermo-couple-cable	type K	FEP	2 x 0,20 mm	wire	round	approx. 1,0 mm	flexible: -25°C up to +180°C fixed: -25°C up to +180°C	DIN IEC 584, class 1
0433-9157		thermo-cable	type K	FEP/FEP	2 x 0,22 mm²	strands	flat	approx. 2,5 x 1,5 mm	flexible: -25°C up to +180°C fixed: -25°C up to +180°C	DIN IEC 584, tolerance +/- 1°C
0433-9223		thermo-cable	type K	FEP/FEP	2 x 0,22 mm²	strands	oval	approx. 2,5 mm	flexible: -25°C up to +180°C fixed: -25°C up to +180°C	DIN IEC 584, tolerance +/- 1°C
0433-9154		thermo-cable	type K	FEP/FEP	8 x 2 x 0,22 mm² twisted pair	strands	round	approx. 6,4 mm	flexible: -25°C up to +180°C fixed: -25°C up to +180°C	DIN IEC 584 class 2
0435-9129		thermo-cable	type K	FEP/C/ FEP	8 x 2 x 0,22 mm² twisted pair	strands	round	approx. 6,9 mm	flexible: -25°C up to +180°C fixed: -25°C up to +180°C	DIN IEC 584 class 2
0433-9135		thermo-cable	type K	FEP/FEP	16 x 2 x 0,22 mm² twisted pair	strands	round	approx. 7,7 mm	flexible: -25°C up to +180°C fixed: -25°C up to +180°C	DIN IEC 584 class 2
0435-9135		thermo-cable	type K	FEP/C/ FEP	16 x 2 x 0,22 mm² twisted pair	strands	round	approx. 8,3 mm	flexible: -25°C up to +180°C fixed: -25°C up to +180°C	DIN IEC 584 class 2
0435-9085		thermo-couple-cable	type K	FEP-F-ZF-D(B)-FEP/F-C (B)-FEP	8 x (2 x 0,5 mm)D	strands	round	approx. 11,0 mm	flexible: -55°C up to +180°C fixed: -90°C up to +180°C	DIN IEC 584 class 1
FEP insulated thermo-cables with screening (strands)										
0435-9037		thermo-cable	type K	FEP/C/ FEP	2 x 0,22 mm²	strands	round	approx. 2,6 mm	flexible: -25°C up to +180°C fixed: -25°C up to +180°C	DIN IEC 584, tolerance +/- 1,5°C
Besilen® insulated thermo-cables (strands)										
0451-9019		thermo-cable	type K	GL/ Silicone	2 x 0,22 mm²	strands	round	approx. 3,2 mm	flexible: -25°C up to +200°C fixed: -25°C up to +200°C	DIN IEC 584 class 1

SAB BRÖCKSKES GMBH & CO. KG
GREFRATHER STR. 204 - 212 B
41749 VIERSEN · GERMANY
TEL.: +49/2162/898-0
FAX: +49/2162/898-101
WWW.SAB-WORLDWIDE.COM
INFO@SAB-BROECKSKES.DE

09/2021