



MOBILE MEASUREMENT TECHNOLOGY FOR HV COMPONENTS



**Also for AD and
PT measurement
modules!**

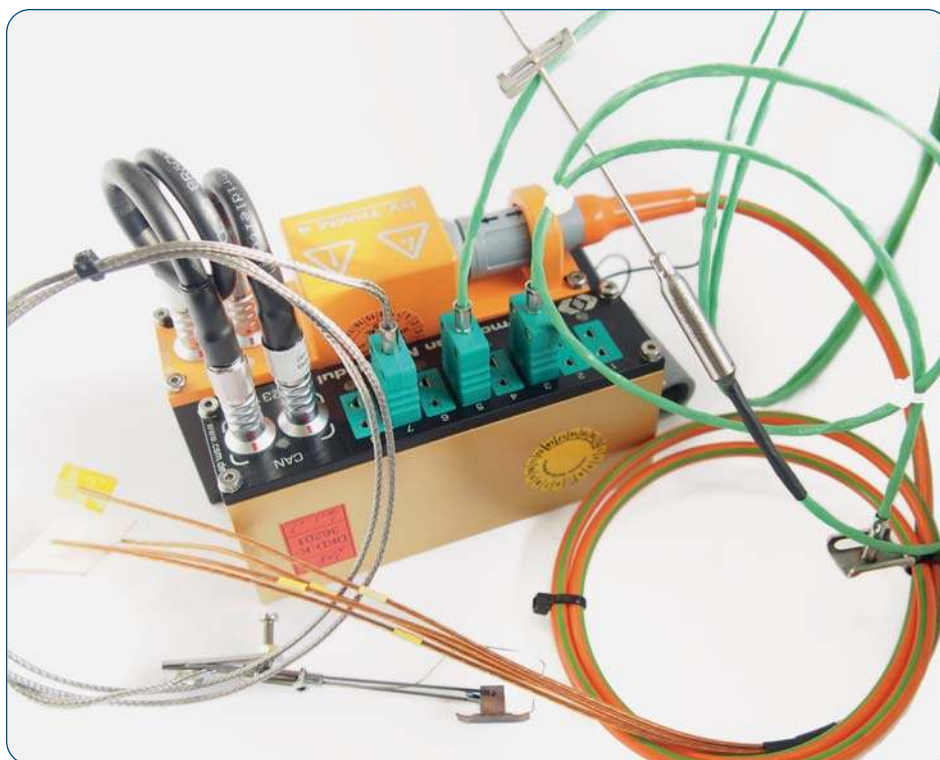


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THE COMPANIES



FOUNDED IN 1947

by Peter Bröckskes sen.
an independent,
middle sized company

CEO

Peter Bröckskes and Sabine Bröckskes-Wetten

PLANT/LOCATION

in Viersen (lower Rhine) 110.000m² company site
manufacturing from copper conductor to
outer sheath, thermocouples,
resistance thermometers, cable harnessing,
own VDE approved burning chamber and laboratory

STAFF

approx. 420 in Viersen, 500 worldwide

TURNOVER

approx. 95 million € worldwide

PRODUCTS

- special cables
- temperature measurement
- cable harnessing

CERTIFICATES AND APPROVALS

quality management system acc. to ISO 9001:2015
for all production fields, environmental management
system acc. to ISO 14001:2015, occupational health
and safety management acc. to NLF/ILO-OSH 2001
and OHSAS 18001:2007, energy management system
acc. to DIN EN ISO 50001:2011



FOUNDED IN 1983

by Iris Koch and Dr. Winfried Koch
as a privately held technology company

CEO

Iris Koch
Dr. Winfried Koch

PLANT/LOCATION

CSM Computer-Systeme-Messtechnik GmbH
Filderstadt near Stuttgart

STAFF

approx. 65 in Filderstadt, 70 worldwide

PRODUCT PORTFOLIO

CSM is a leading and independent supplier of:

- measurement technology and data logger for the
application in all kinds of vehicles and at test benches
- PC card drives, data loggers and storage media for
many industrial applications
- programming tools for control devices

CERTIFICATES AND APPROVALS

certified acc. to DIN EN ISO 9001 since 2002, certified
acc. to DIN EN ISO 14001 since 2004, own test
laboratory for EMC tests, laboratory for calibrations with
DAkkS approval (D-K-15214-01-00)

MOBILE MEASUREMENT TECHNOLOGY

SAFE TEMPERATURE MEASUREMENT ON HV COMPONENTS

The measurement system is especially designed for safe temperature measurement on HV components and is excellently suited for mobile and stationary use in the field of electric mobility: electric and hybrid vehicles.



Tested safety from measuring point to data logging

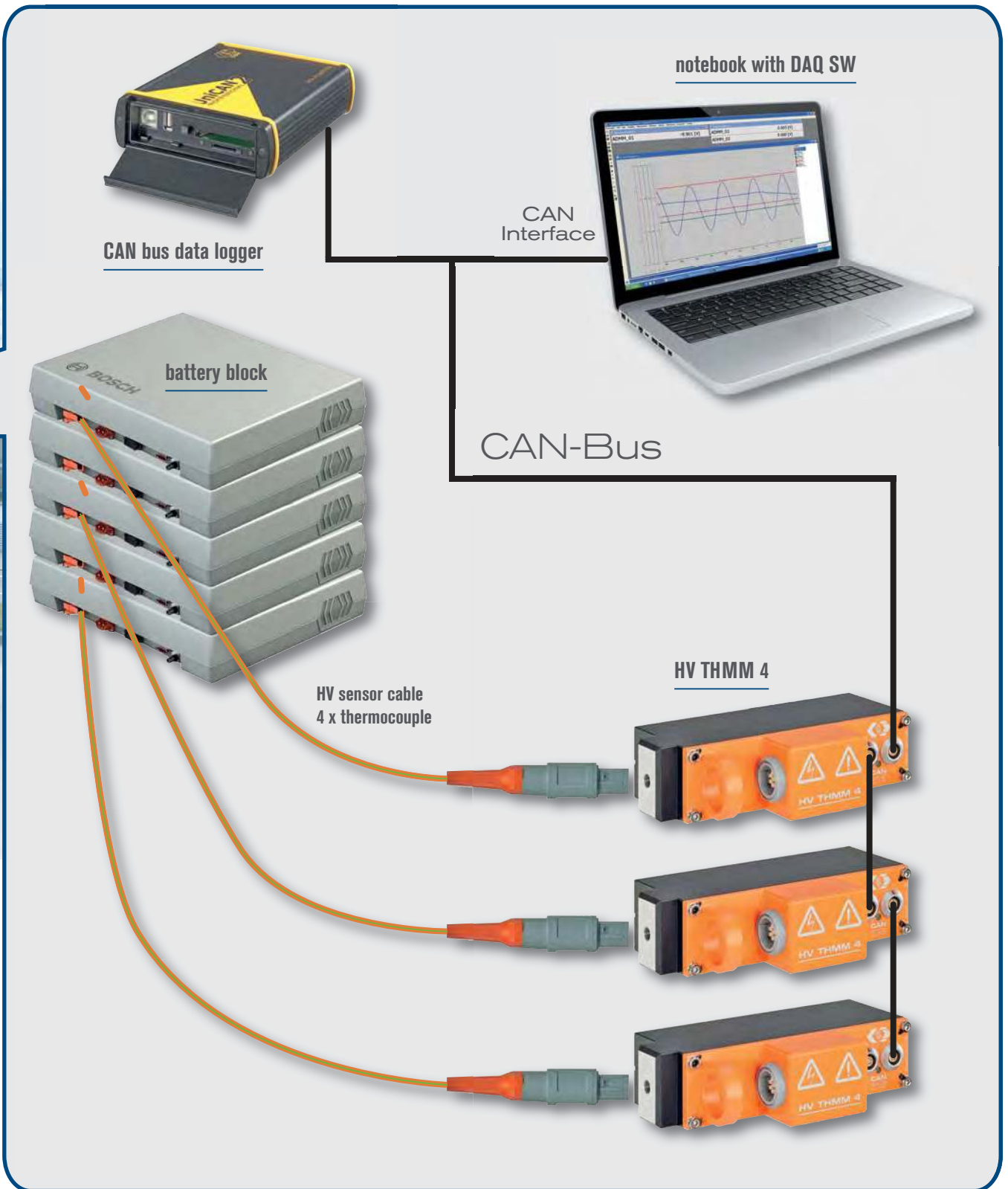
- ✓ temperature measurement on HV components
- ✓ suitable for mobile and stationary use in the field of e-mobility
- ✓ it can be used in close proximity to the measuring point
- ✓ type test of the complete system by an accredited laboratory



Digatron test bench for electric vehicle batteries

MOBILE MEASUREMENT TECHNOLOGY

APPLICATION EXAMPLE



MOBILE MEASUREMENT TECHNOLOGY

HV THERMO SCAN MINI MODULE



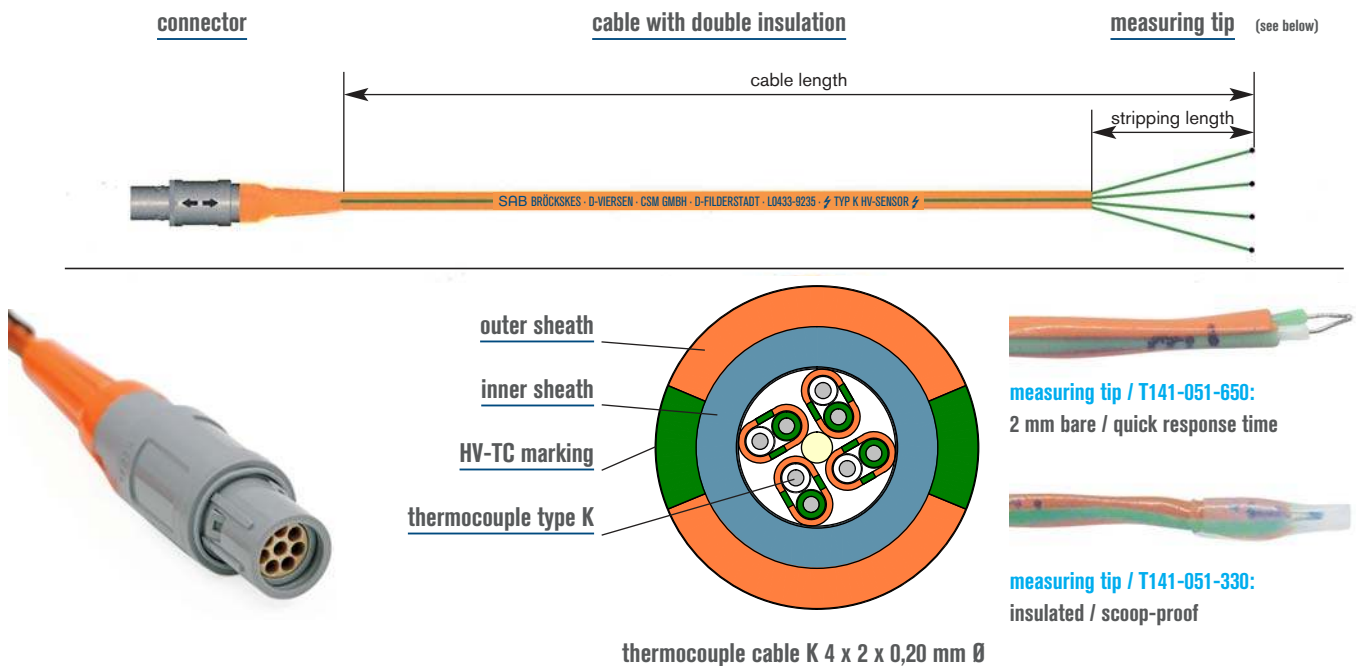
- ✓ 4 NiCr-Ni (type K) temperature input
- ✓ galvanic insulation: reinforced insulation up to 846 V unipolar
 - channel / channel
 - channel / CAN
 - channel / supply
 - channel / housing



- ✓ type and routine test according to device safety standard EN 61010
- ✓ outstanding measurement accuracy for all temperature ranges and environmental conditions
- ✓ internal cold junction compensation per channel
- ✓ very low power consumption typ. 1 W
- ✓ operating temperature -40 °C to +100 °C
- ✓ protection class IP67
- ✓ robust aluminium housing
- ✓ extremely compact CAN bus measurement module

MOBILE MEASUREMENT TECHNOLOGY

4-CHANNEL HV THERMOCOUPLE CABLE



- ✓ **diameter**
approx. 6,1 mm
- ✓ **min. bending radius**
12 x cable diameter
- ✓ **temperature range**

thermo cable	-40 °C up to +150 °C (3000 h)
	+125 °C constant use
FEP thermopairs	-40 °C up to +180 °C
plug	-50 °C up to +170 °C
- ✓ **dielectric strength**

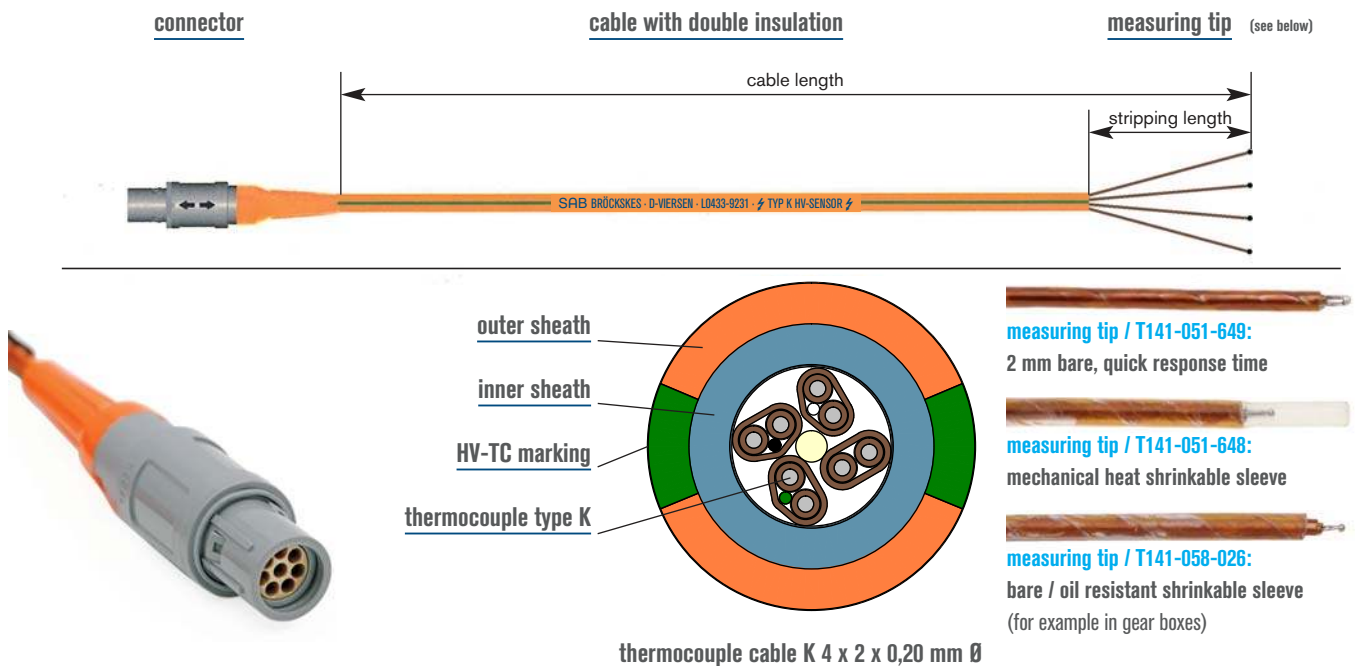
over sheathed pair	1000 V
plug	1000 V
- ✓ **routine test**
plug 3000 V / 1 minute
- ✓ **delivery with protecting cap**
- ✓ **serial number**
- ✓ **marking**
SAB BRÖCKSKES · D-VIERSEN · CSM GmbH · D-FILDERSTADT ·
L0433-9235 · ⚡ Typ K HV-SENSOR ⚡

CONFIGURATION EXAMPLES

item no.	cable length mm	stripping length mm	pairs	measuring tip
T141-051-650	2400	400	*not scoop-proof*	bare / quick response time *not scoop-proof*
T141-056-330	2400	400	*scoop-proof*	insulated / mechanical heat shrinkable sleeve *scoop-proof*

MOBILE MEASUREMENT TECHNOLOGY

4-CHANNEL HV THERMOCOUPLE CABLE



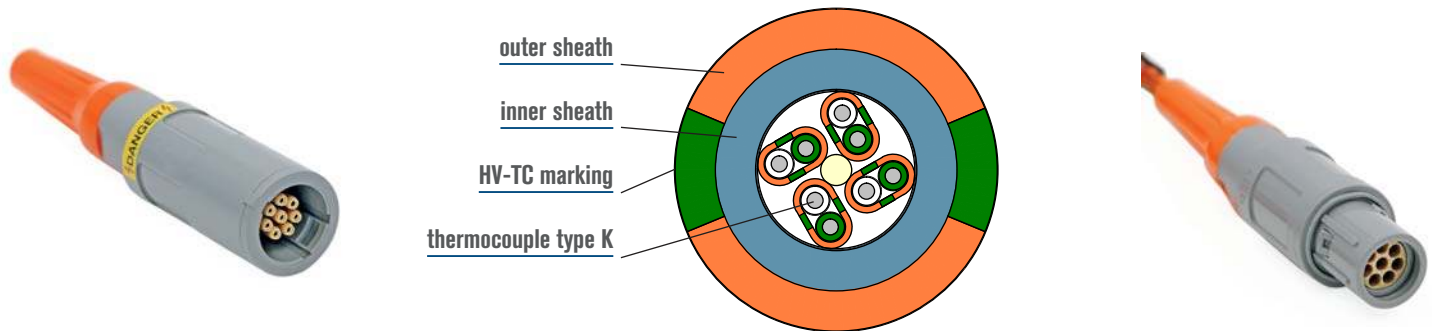
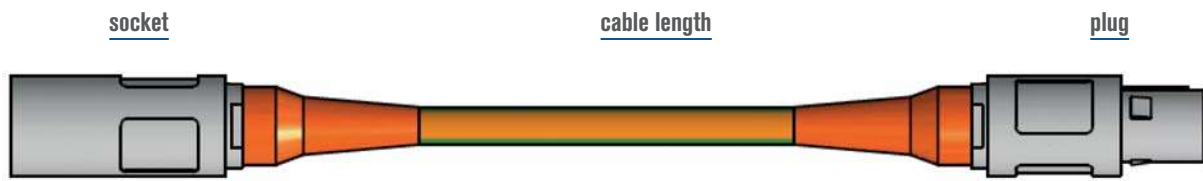
- ✓ **diameter**
approx. 4,5 mm
- ✓ **min. bending radius**
12 x cable diameter
- ✓ **temperature range**
thermo cable -40 °C up to +150 °C (3000 h)
 +125 °C constant use
Pi insulated thermopairs -40 °C up to +180 °C
plug -50 °C up to +170 °C
- ✓ **dielectric strength**
over inner sheath 1000 V
plug 1000 V
- ✓ **routine test**
plug 3000 V / 1 minute
- ✓ **delivery with protecting cap**
- ✓ **serial number**
- ✓ **marking**
SAB BRÜCKSKES · D-VIERSEN ·
L0433-9231 · ⚡ Typ K HV-SENSOR ⚡

CONFIGURATION EXAMPLES

item no.	cable length mm	stripping length mm	pairs	measuring tip
T141-051-647	2400	400	*not scoop-proof*	bare / quick response time *not scoop-proof*
T141-057-478	2500	200	*not scoop-proof*	insulated / mechanical heat shrinkable sleeve *not scoop-proof*
T141-058-907	2400	400	*not scoop-proof*	bare / oil resistant shrinkable sleeve *not scoop-proof*

MOBILE MEASUREMENT TECHNOLOGY

4-CHANNEL HV THERMO EXTENSION



thermocouple cable K 4 x 2 x 0,20 mm Ø

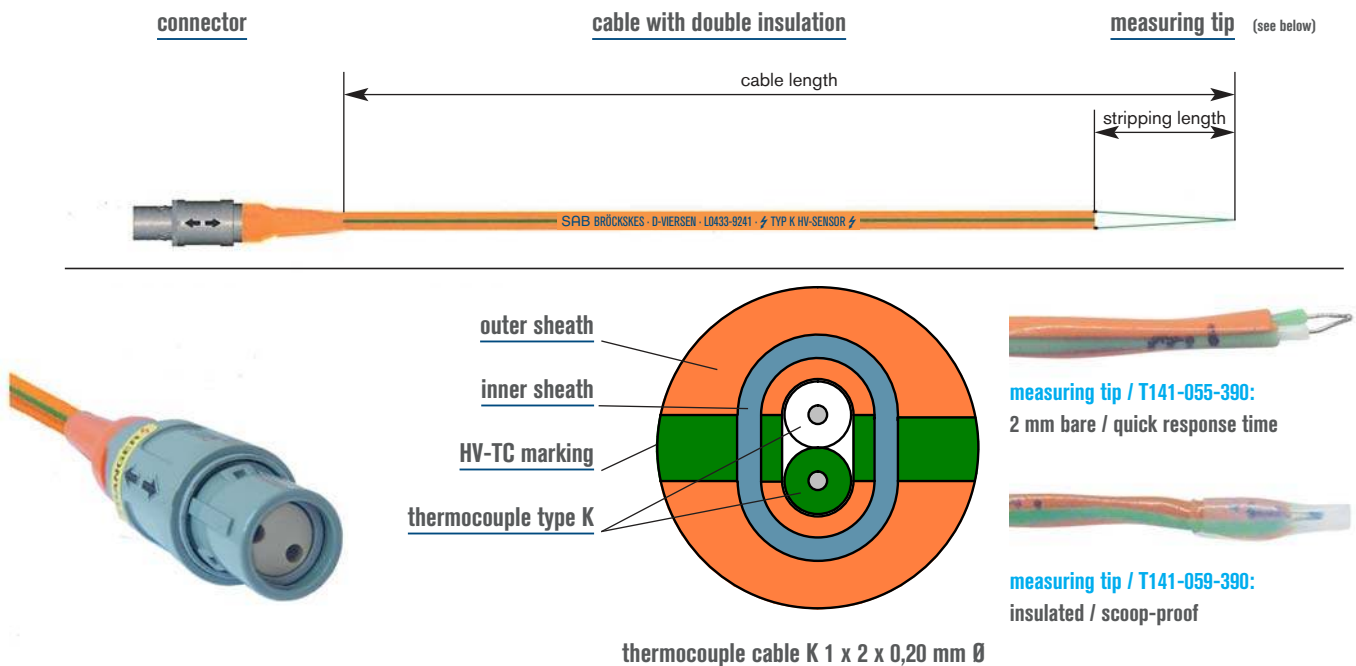
- ✓ **diameter**
approx. 6,1 mm
- ✓ **min. bending radius**
12 x cable diameter
- ✓ **temperature range**
thermo cable -40 °C up to +150 °C (3000 h)
 +125 °C constant use
plug/socket -50 °C up to +170 °C
- ✓ **dielectric strength**
over outer sheath 1000 V
plug/socket 1000 V
- ✓ **routine test**
plug 3000 V / 1 minute
- ✓ **delivery with protecting cap**
- ✓ **serial number**
- ✓ **marking**
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L0433-9231 · ⚡ Typ K HV-SENSOR ⚡

CONFIGURATION EXAMPLES

item no.	cable length mm
T141-054-030	1000
T141-058-575	3000
T141-058-576	5000

MOBILE MEASUREMENT TECHNOLOGY

1-CHANNEL HV THERMOCOUPLE CABLE



- ✓ **diameter**
approx. 6,1 mm
- ✓ **min. bending radius**
12 x cable diameter
- ✓ **temperature range**

thermo cable	-40 °C up to +150 °C (3000 h)
	+125 °C constant use
FEP thermopairs	-40 °C up to +180 °C
plug	-50 °C up to +170 °C
- ✓ **dielectric strength**

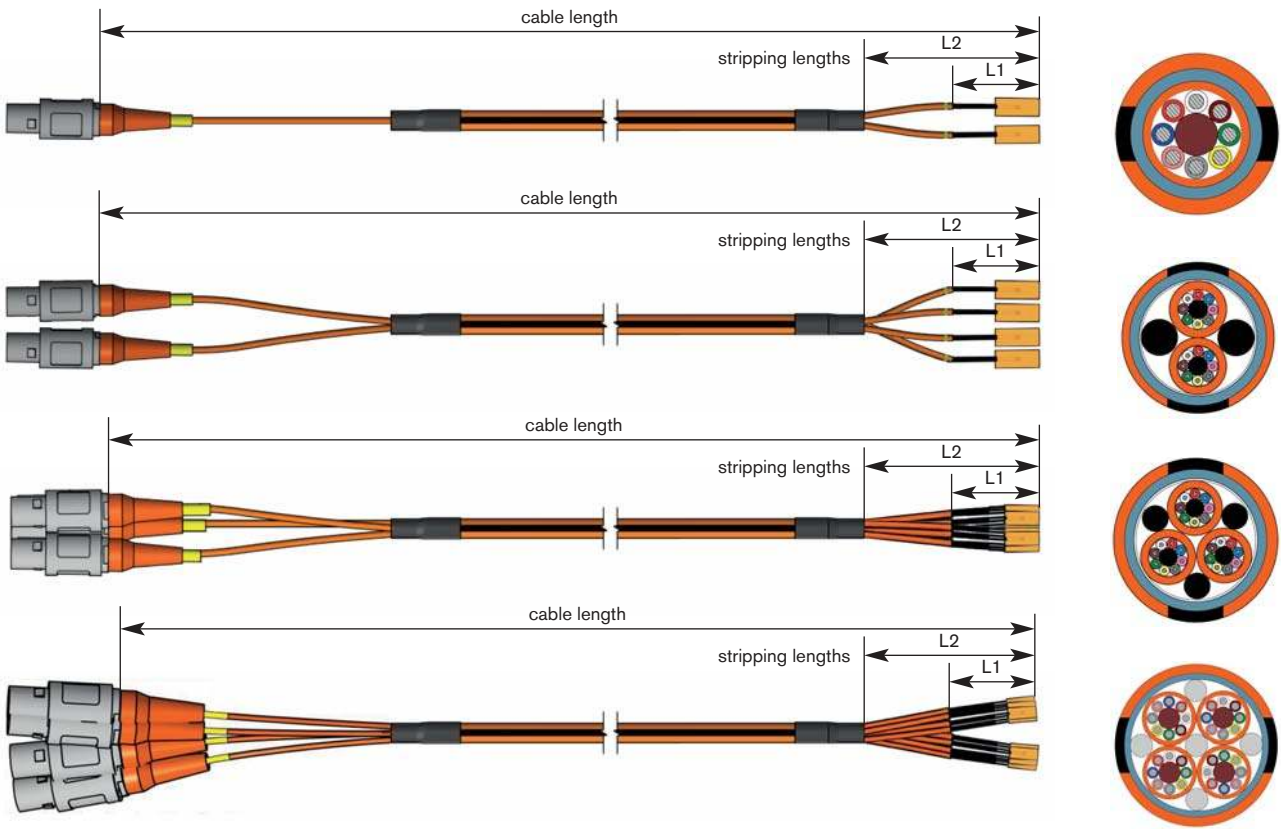
over sheathed pair	1000 V
plug	1000 V
- ✓ **routine test**
plug 3000 V / 1 minute
- ✓ **delivery with protecting cap**
- ✓ **serial number**
- ✓ **marking**
SAB BRÖCKSKES · D-VIERSEN ·
L0433-9241 · ⚡ Typ K HV-SENSOR ⚡

CONFIGURATION EXAMPLES

item no.	cable length mm	stripping length mm	pairs	measuring tip
T141-055-390	2400	400	*scoop-proof*	bare *not scoop-proof*
T141-059-052	2400	400	*scoop-proof*	insulated *scoop-proof*

HV PT100: 2, 4, 6 AND 8 CHANNELS IN 4-WIRE CIRCUIT

Reduced outer diameter and flat PT100 chip resistances for a comfortable installation



example measuring tip: 2 x PT100 class A in Pi foil



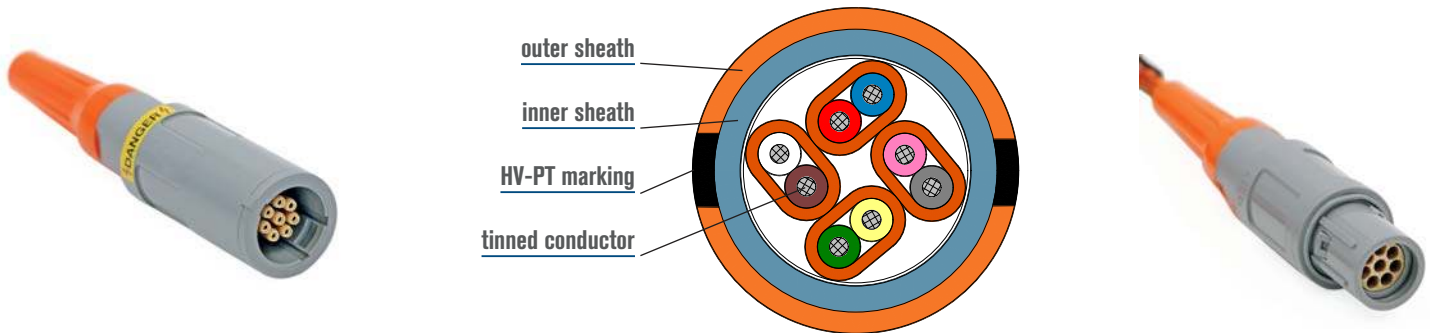
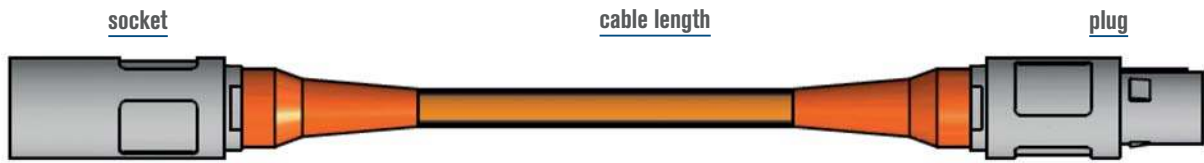
- ✓ **PT100**
length x width x height: 2,3 mm x 2 mm x 0,47 mm
accuracy class A
- ✓ **min. bending radius**
12 x cable diameter
- ✓ **temperature range**
connection cable -40 °C up to +150 °C (3000 h)
+125 °C constant use
sensor -200 °C up to +200 °C
FEP insulation -40 °C up to +180 °C
- ✓ **construction type**
PT100 sensors in Pi foil,
25 x 12,5 mm (length x width)
- ✓ **dielectric strength**
over outer sheath 1000 V
plug 1000 V
- ✓ **routine test**
plug 3000 V / 1 minute
- ✓ **delivery with protecting cap**
- ✓ **serial number**

CONFIGURATION EXAMPLES

item no.	channels	cable diameter mm	cable length mm	stripping length L1 mm	stripping length L2 mm
T641-059-530	2 x PT100	4,6	2500	100	200
T641-059-531	4 x PT100	7,5	2500	100	200
T641-059-532	6 x PT100	8,3	2500	100	200
T641-059-534	8 x PT100	8,6	2500	100	200

MOBILE MEASUREMENT TECHNOLOGY

2-CHANNEL HV PT EXTENSION



PT100 connection cable 4 x 2 x AWG 28

- ✓ **diameter**
approx. 7,1 mm
- ✓ **min. bending radius**
12 x cable diameter
- ✓ **temperature range**
thermo cable -40 °C up to +150 °C (3000 h)
 +125 °C constant use
plug/socket -50 °C up to +170 °C
- ✓ **dielectric strength**
over outer sheath 1000 V
plug/socket 1000 V
- ✓ **routine test**
plug 3000 V / 1 minute
- ✓ **delivery with protecting cap**
- ✓ **serial number**
- ✓ **marking**
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CSM GmbH · D-FILDERSTADT ·
L3801-9192 · ⚡ HV-ANALOG ⚡



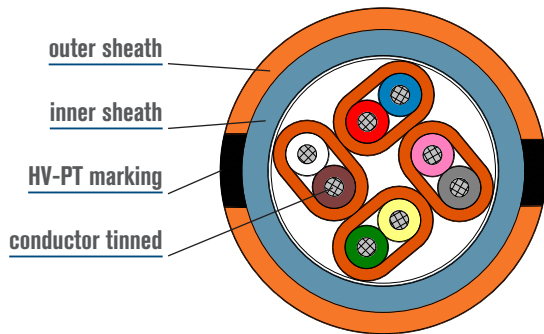
CONFIGURATION EXAMPLES

item no.	cable length mm
T641-056-497	1000
T641-058-117	3000
T641-058-574	5000

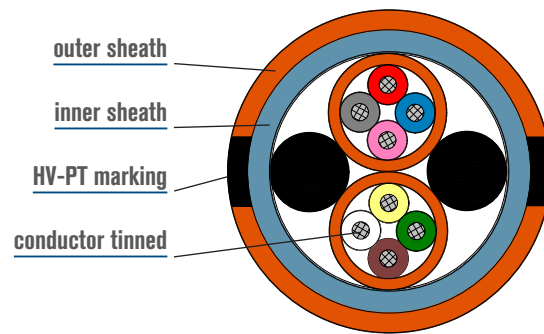
MOBILE MEASUREMENT TECHNOLOGY

HV ANALOGUE SENSOR CABLES

Item no. L3801-9192 / Item no. L3801-9196



outer diameter 4 x 2 x AWG 28



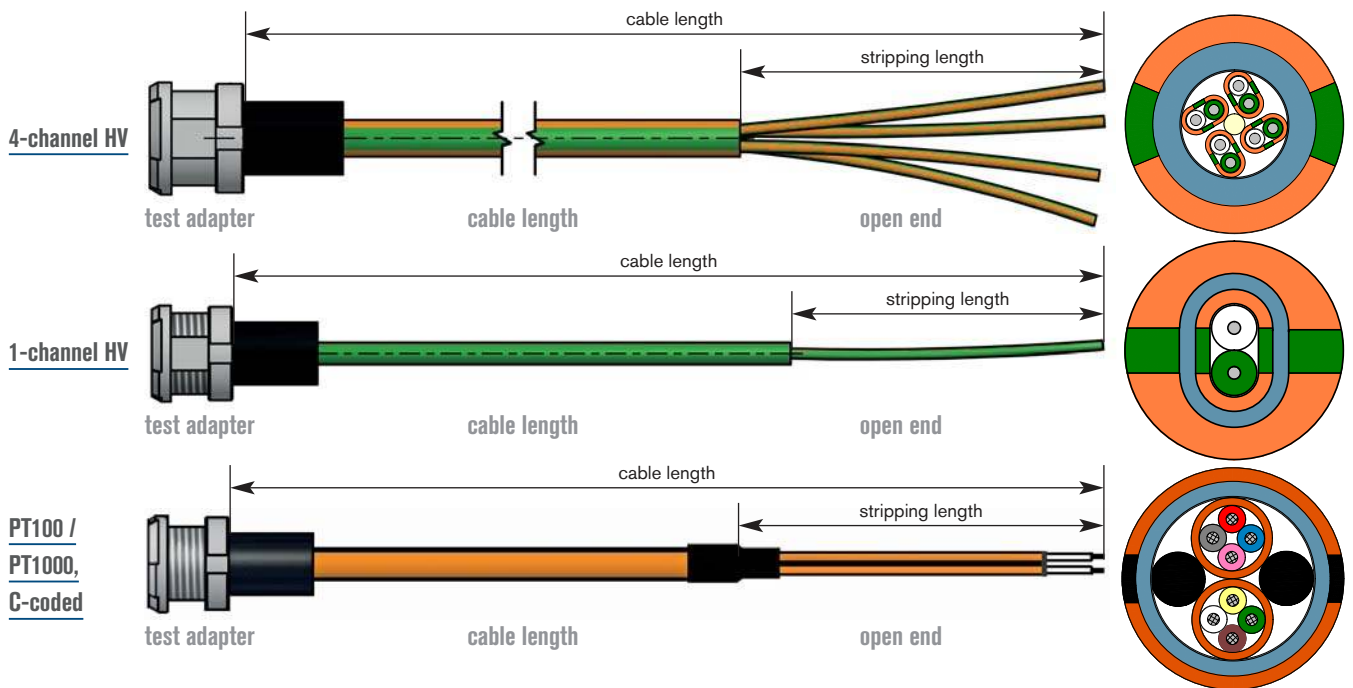
outer diameter 2 x 4 x AWG 28

- ✓ **diameter**
approx. 7,1 mm
- ✓ **min. bending radius**
12 x cable diameter
- ✓ **operating temperature**
fixed laying -40 °C to +150 °C (3000 h)
- ✓ **voltage**
max. 100 V
- ✓ **marking**
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CSM GmbH · D-FILDERSTADT ·
L3801-9192 · ⚡ HV-ANALOG ⚡

- ✓ **diameter**
approx. 7,2 mm
- ✓ **min. bending radius**
12 x cable diameter
- ✓ **operating temperature**
fixed laying -40 °C to +150 °C (3000 h)
- ✓ **voltage**
max. 100 V
- ✓ **marking**
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CSM GmbH · D-FILDERSTADT ·
L3801-9196 · ⚡ HV-ANALOG ⚡

MOBILE MEASUREMENT TECHNOLOGY

TEST ADAPTER AND ACCESSORIES FOR HV SENSORS



test adapter HV

CONFIGURATION EXAMPLES

item no.	configuration	cable length mm	stripping length mm
T141-056-583	4-channel type K	115	100
T141-055-568	1-channel type K	200	50
T641-057-773	PT100	150	120/5

dual shrinkable sleeve natural PTFE/FEP

dimension D(min) 1,65mm, d(max) 0,00mm, shrinking temp. 380°C, application temp. -190°C/+200°C

CONFIGURATION EXAMPLE

Art.-Nr.	Menge mm
T020-024-319	1000



HV cap for plugs

CONFIGURATION EXAMPLES

item no.	configuration
T021-050-281	4-channel type K
T021-054-558	PT100

HV cap for sockets

CONFIGURATION EXAMPLES

item no.	configuration
T021-053-127	4-channel type K
T021-055-802	PT100



cable clamp screwing for HV sensors made of nickel plated brass with FPM sealing temperature -40°C/+200°C

CONFIGURATION EXAMPLE

item no.	thread	no. of holes	for cable Ø mm
T025-059-232	M32 x 1,5	2	6,1



spare pads

CONFIGURATION EXAMPLES

item no.	material	packaging unit
T095-044-258	glass cloth tape	100 pcs
T095-056-403	Pi foil	100 pcs

MOBILE MEASUREMENT TECHNOLOGY

HIGH VOLTAGE MEASURING CABLE

HV measuring cable with increased contact protection



Marking for HV measuring cable 38339800:

SAB BRÖCKSKES · D-VIERSEN · ⚡ HV-Messleitung (2x0,25mm²) ⚡ CE

Application: measurement and testing technology for HV application.

Construction:

Conductor:	tinned copper strands, extra fine wires
Insulation:	FEP
Colour code:	black and red
Stranding:	in layers with tinned copper drain wire, AWG 24
Screen:	alu foil and tinned copper braiding
Inner sheath:	FEP, colour: sky blue
Sheath material:	PUR
Sheath colour:	orange with black vertical stripes

Outstanding features:

- temperature resistance up to +150 °C (up to 3000 hours)
- high flexibility
- high abrasion resistance
- easy harnessing

Technical data:

Contact protection:	1000 V DC over the blue inner sheath
Testing voltage:	5000 V AC over the blue inner sheath
Operating voltage:	1000 V DC
Testing voltage:	core/core 5000 V AC core/screen 5000 V AC
Min. bending radius	
<i>fixed laying</i>	5 x d
<i>flexible application:</i>	10 x d
Temperature range	
<i>fixed laying:</i>	-50/+125 °C
<i>flexible application:</i>	-40/+125 °C +150 °C (up to 3000 h)
Temperature range of cores:	up to +180 °C (short time use up to +205 °C)
Oil resistance:	very good - TMPU acc. to EN 50363-10-2 + VDE 0207-363-10-2
Absence of harmful substances:	acc. to RoHS directive of the European Union

item no.	no. of cores x cross section n x mm ²	largest single wire ø mm	outer-ø ± 5% mm	copper figure kg/km	cable weight ≈ kg/km
38339800	2 x 0,25	0,11	6,5	21,3	61
38339801	2 x 0,50	0,16	7,1	28,1	74
38339802	2 x 1,00	0,16	7,8	42,5	94
38339803	2 x 1,50	0,16	8,4	55,8	113

Other dimensions and colours are possible on request.



Possible on request:

- also possible as harnessed measuring cable with connected lab plugs to collect the tension at HV components.



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