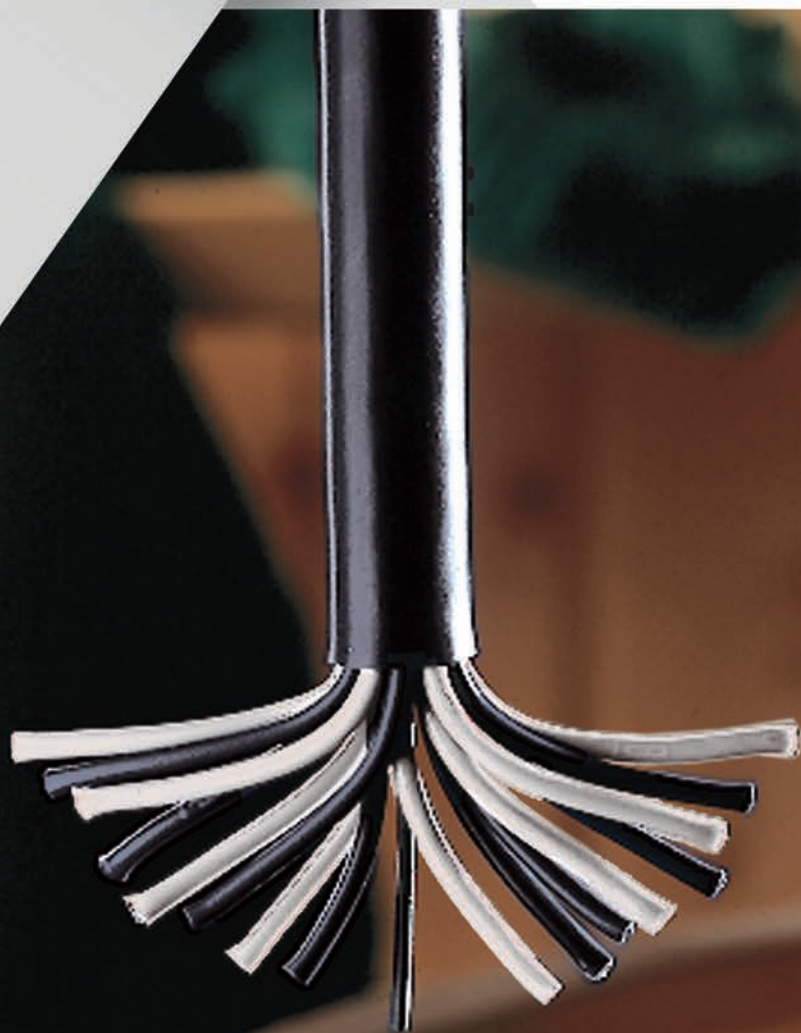
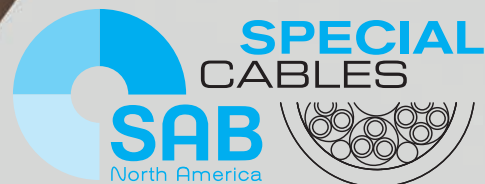


# COMPENSATING & EXTENSION CABLES FOR THERMOCOUPLES & RTD'S

MM



[www.sabcable.com](http://www.sabcable.com)  
866-722-2974 ■ [info@sabcable.com](mailto:info@sabcable.com)



# Compensation & Extension Cables

## Content

Applications	.....	page
Selection tables	.....	M/4-5
		M/6-7

### Compensating and extension cables for thermocouples

#### **NEW** PVC insulated compensating and extension cables

■ A 1 L twisted	..... up to +70°C	○ round	M/8
■ A 1 L single	..... up to +70°C	○ round	M/8
■ A 16 L	..... up to +70°C	○ oval	M/8
■ A 9 L	..... up to +70°C	○ round	M/9
■ A 9-100 L	..... up to +70°C	○ round	M/9
■ A 9-075 L	..... up to +70°C	○ round	M/9
■ A 9-050 L	..... up to +70°C	○ round	M/9
■ A 9-022 L	..... up to +70°C	○ round	M/9
■ A 12 L	..... up to +70°C	○ oval	M/10
■ A 12 D	..... up to +70°C	○ oval	M/10

#### **NEW** Shielded PVC insulated compensating and extension cables

■ A 5 L	with overall copper shield	..... up to +70°C	○ round	M/11
■ A 5-075 L	with overall copper shield	..... up to +70°C	○ round	M/11
■ A 5-050 L	with overall copper shield	..... up to +70°C	○ round	M/11
■ A 5-022 L	with overall copper shield	..... up to +70°C	○ round	M/11
■ A 20 L	with alu-foil shield	..... up to +70°C	○ round	M/12
■ A 20-022 L	with alu-foil shield	..... up to +70°C	○ round	M/12
■ A 20 D	with alu-foil shield	..... up to +70°C	○ round	M/12

#### **NEW** Multi-pair PVC insulated compensating and extension cables

■ A 9-L	..... up to +70°C	○ round	M/13	
■ A 9-LSY	with steel wire armoring	..... up to +70°C	○ round	M/13
■ Hybrid thermocouple cable JX	connection cable between hot runner control and hot runner system	..... up to +70°C	○ round	M/14

#### **NEW** Besilen® insulated compensating and extension cables

■ A 1 LB twisted	..... up to +180°C	○ round	M/15	
■ A 16 LB	..... up to +180°C	○ oval	M/15	
■ A 15 L	..... up to +180°C	○ round	M/16	
■ A 15-075 L	..... up to +180°C	○ round	M/16	
■ A 15-050 L	..... up to +180°C	○ round	M/16	
■ A 15-022 L	..... up to +180°C	○ round	M/16	
■ A 3 Ln	..... up to +180°C	○ oval	M/17	
■ A 4 Ln	with steel wire armoring	..... up to +180°C	○ oval	M/17
■ A 11 Lr	with fiber-glass braiding and steel wire armoring	..... up to +180°C	○ round	M/18
■ A 11-4 Lr	with fiber-glass braiding and steel wire armoring	..... up to +180°C	○ round	M/18
■ A 11 Dr	with fiber-glass braiding and steel wire armoring	..... up to +180°C	○ round	M/18
■ A 13 L	with fiber-glass braiding	..... up to +180°C	○ oval	M/19

# Compensation & Extension Cables

## Content

	temperature	shape	page
<b>NEW</b> Shielded Besilen® insulated compensating and extension cables			
■ A 6 L	with alu-foil shield ..... up to +180°C	○ round	M/20
■ A 6-022 L	with alu-foil shield ..... up to +180°C	○ round	M/20
■ A 6 D	with alu-foil shield ..... up to +180°C	○ round	M/20
■ A 15 LC	with overall copper shield ..... up to +180°C	○ round	M/21
■ A 15-075 LC	with overall copper shield ..... up to +180°C	○ round	M/21
■ A 15-050 LC	with overall copper shield ..... up to +180°C	○ round	M/21
■ A 15-022 LC	with overall copper shield ..... up to +180°C	○ round	M/21
<b>NEW</b> Fiber-glass insulated compensating and extension cables			
■ A 15-022	fiber-glass / Besilen® ..... up to +180°C	○ round	M/22
■ A 15-G 022	with outer fiber-glass braiding ..... up to +180°C	○ round	M/22
■ A 3 L	with SABtex braiding ..... up to +200°C	○ oval	M/23
■ A 4 L	with SABtex braiding and steel wire armoring ..... up to +200°C	○ oval	M/23
<b>NEW</b> FEP insulated compensating and extension cables			
■ A 18 L	..... up to +180°C	○ round	M/24
■ A 18-022 L	..... up to +180°C	○ round	M/24
■ A 19 L	with overall copper shield ..... up to +180°C	○ round	M/24
■ A 19-022 L	with overall copper shield ..... up to +180°C	○ round	M/24
<b>Extension cables for thermocouples FE-CuNi and NiCr-Ni</b>			
<b>NEW</b> Fiber-glass insulated extension cables			
■ Th LGS	with fiber-glass braiding and steel wire armoring ..... max. +250°C	○ round	M/25
■ Th LRS	with special fiber-glass braiding and steel wire armoring ..... max. +400°C	○ round	M/25
<b>NEW</b> PFA insulated extension cables			
■ Th LTS	with steel wire armoring ..... max. +250°C	○ round	M/26
■ Th LTV	with stainless steel wire armoring ..... max. +250°C	○ round	M/26
<b>Connection cables for resistance thermometers</b>			
<b>NEW</b> FEP, PFA or Besilen® insulated connection cables			
■ RTD sensor cable	 connection cables for RTD ..... +180°C/+250°C	○ round	M/27
<b>NEW</b> PFA insulated connection cables			
■ TGV	with fiber-glass braiding and stainless steel wire armoring ..... max. +250°C	○ round	M/28
<b>NEW</b> Connection cables for resistance thermometers, special and hybrid cables ..... M/29			
<b>NEW</b> Compensating and Extension Cables for the automotive industry ..... M/30-31			
<b>Color code and temperature range for compensating and extension cables</b>			
<b>NEW</b> ■ Overview ..... M/32			

**Besilen®** is a specially developed Silicone rubber-based material with good electrical characteristics and it is a registered trademark of SAB BRÖCKSKES GmbH & Co. KG.



# Compensation & Extension Cables

## Applications

### n General Information

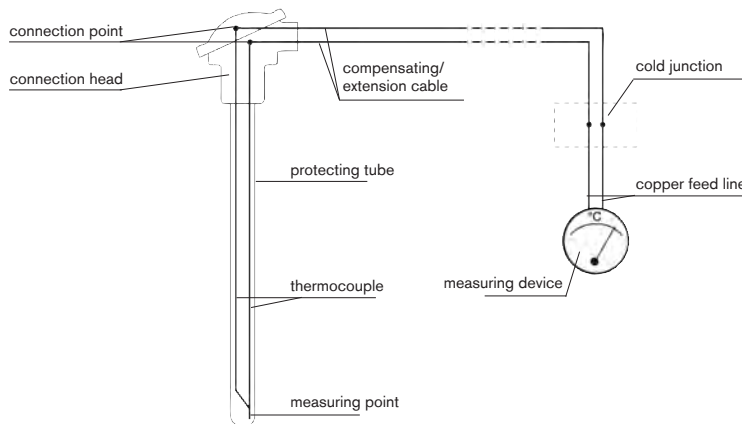
Temperature is an important factor in many areas concerning the environment, scientific research, and production. It is a thermo-dynamic variable that defines the heat content of a material. Material strength changes with alternating temperature. As a consequence, the characteristics of materials have to be examined at different temperatures. To obtain a temperature value, defined temperature parameters are used. Here the parameters can be defined, for example, as the freezing and boiling points of water.

For temperature measurement characteristics of materials have to be taken into account. These include such things as thermal expansion (expansion thermometer), the dependance of the electric resistance on metallic conductors (electrical thermometer) and electromotive force (thermocouple) etc. A temperature measuring device with a thermocouple as a data indicator tends to consist of the thermometer itself with a measuring point, an extension cable, a cold junction with a specified constant temperature and a voltmeter.

The value of the electromotive force (EMF) produced by the thermocouple is determined by the difference between the measuring temperature and the so-called free ends of the thermocouple which are mounted in the connection head. As the connection head is usually relatively close to the measuring point, it is frequently exposed to temperature fluctuations. For this reason, a connection cable with the same thermo-electric properties as the thermocouple is used between the thermocouple and the cold junction.

**This link-up provides the compensating/extension cable.**

### n Sketch



### n Materials

We differentiate between thermocouple cable and compensating cable. Cables made of original materials are called extension or thermocouple cables, whereas conductor materials made of substitutes are known as compensating cables.

### n Compensating cables

The compensating wires and strands are composed of alloys which do not have to be identical with the corresponding thermocouple. Substitute material means that the thermo-electric characteristics in the allowed temperature range (usually 0 up to +200°C) for the compensating cable must be the same as those of the corresponding thermocouple. They are identified with the letter "C" adapted to IEC 60584. The "C" appears behind the code letter identifying the thermocouple, for example "KC".

### n Extension cables

Extension cables are made of conductors with identical nominal structure to the corresponding thermocouple. They are identified with the letter "X" adapted to IEC 60584, which appears behind the code letter identifying the thermocouple, for example "JX". They are normally tested within a temperature range of 0 up to +200°C.

### n Thermocouple cables

Thermocouple cables consist of the same element material as the thermocouple and are tested for the same temperatures. These SAB special cables are manufactured on customer request. PVC, fiber-glass and SABtex insulated or jacketed compensating and extension cables are not suitable for outdoor use. Exception: PVC jacketed solid conductors can be used for underground laying.

# Compensation & Extension Cables

## Applications

### n Electrical characteristics

Material	Specific electric resistance at 20°C $\mu \Omega \times \text{cm}$	Resistance in $\Omega/\text{m}$	
		mm $\varnothing$ 0.20	mm $\varnothing$ 1.38
Cu Ni	49.0	15.60	0.328
So Ni	51.0	16.26	0.341
Ni Cr	72.0	22.90	0.481
Ni	27.0	8.59	0.180
So Pt	12.0	3.82	0.0802
E-Cu	1.7	0.54	0.011
Fe	12.0	3.82	0.080
BPX	12.5	3.98	0.084
Ni Cr Si	98.0	31.20	0.655
Ni Si	34.0	10.80	0.227
So Ni Si	52.0	16.55	0.347

n Because the thermal electromotive force values are decisive, the indicated specific resistance and meter resistance figures can only be considered as approximate values, tolerances have to be agreed between producer and customer. Limit deviations within the thermoelectric voltage range can only be guaranteed for positive and negative conductors bought together from SAB BRÖCKSKES GmbH & Co. KG.

### n SAB thermocouple code acc. to IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	SAB thermocouple code	
			strands	single wire
Type T	4.28	TX	...58	...88
Type J	5.27	JX	...52	...82
Type K	4.10	KCA	...95	...15
Type K	4.10	KCB	...99	...19
Type K	4.10	KX	...54	...84
Type E	6.32	EX	...53	...83
Type R/S	0.65	R/SCB	...97	...17
Type N	2.77	NC	...91	...11

### n SAB thermocouple code acc. to DIN 43710 / 4714

We continue to manufacture compensating and extension cables with colour code acc. to DIN 43714.

for thermocouple	EMK at 100°C in mV	cable type	SAB thermocouple code	
			strands	single wire
Type L	5.37	LX	...92	...12
Type K	4.10	KCA	...94	...14
Type R/S	0.65	R/SCB	...96	...16
Type U	4.25	UX	...98	...18
Type B	0.00	BC-100	...01	...21
Type B	0.033	BC-200	...02	...22

### n Example

Type A 12 D for thermocouple type J acc. to IEC 60584 = item no. 044512 **82**  
Type A 9-4 LSY for thermocouple type L acc. to DIN 43713 = item no. 046204 **92**

### n Note

In addition to our standard compensating cables featured on the following pages, we also produce special cables on customer request and according to practically every recognized foreign standard.

For special compensating cables we would request the following information:

Stranded or solid conductor, no. of conductors, cross-section, element-type, conductor insulation and jacket material, shielding or armor requirements and the temperature range. Minimum order quantity for special cables is 500 m or 1000 m.

n You will find further information about the safe application of cables in chapter O

# Compensation & Extension Cables

## Selection Table

		M/8	M/8	M/9	M/10	M/10	M/11	M/12	M/12	M/13	M/13	M/14	M/15	M/15	M/16	M/17	M/17	M/18	M/18	M/19	
		Cable Type																			
		A 1 L twisted A 1 L single	A 16 L	A 9 L A 9-100 L A 9-075 L A 9-050 L A 9-022 L	A 12 L	A 12 D	A 5 L A 5-075 L A 5-050 L A 5-022 L	A 20 L A 20-022 L	A 20 D	A 9-L	A 9-LSY	hybrid thermocouple cable JX	A 1 LB twisted	A 16 LB	A 15 L A 15-075 L A 15-050 L A 15-022 L	A 3 Ln	A 4 Ln	A 11-Lr A 11-4Lr	A 11 Dr	A 13 L	
Basic construction	Compensating and extension cables for thermocouples																				
	Extension cables for thermocouples FE-CuNi and NiCr-Ni																				
	Connection cables for resistance thermometers																				
	Fiber-glass braiding																				
	SABtex																				
	Shielded																				
Steel wire armoring																					
Temperature range fixed installation*	+400°C																				
	+300°C																				
	+250°C													●	●	●	●	●	●	●	
	+200°C													●	●	●	●	●	●	●	
	+180°C													●	●	●	●	●	●	●	
	+ 70°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	- 25°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	- 40°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	- 50°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	- 90°C	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Standards and approvals	Halogen-free acc. to IEC 60754-1 + VDE 0482-754-1																				
	Fire performance: flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2																				
	Fire performance: no flame propagation acc. to IEC 60332-3-24 + VDE 0482-332-3-24 resp. IEC 60332-3-25 + VDE 0482-332-3-25 Cat. C resp. D																				
	Fire performance: acc. to DIN EN 60332-1-2 + IEC 60332-1-2																				
	Corrosiveness of conflagration gases: in compliance with IEC 60754-2 +VDE 0482-754-2 - no development of corrosive conflagration gases																				
	Smoke density: low (low smoke emission)																				
Characteristics	Shape: round																				
	Shape: oval																				
	Conductor construction: strand																				
	Conductor construction: wire																				
	Min. bending radius	7.5	7.5	7.5	7.5	12	7.5	7.5	12	7.5	12	12	7.5	7.5	7.5	10	12	10	12	10	
	Insulation resistance: > 1MΩ x km																				
	Very good chemical resistance																				





 from  
 short-time use  
 to  
 max.

\*The temperature range for flexible application is mentioned on the corresponding catalog page

# Compensation & Extension Cables

## Selection Table

		M/20	M/20	M/21	M/22	M/22	M/23	M/23	M/24	M/24	M/25	M/25	M/26	M/26	M/27	M/27	M/27	M/28									
		Cable Type																									
		A 6 L	A 6-022 L	A 6 D	A 15 LC	A 15-075 LC	A 15-050 LC	A 15-022 LC	A 15-02	A 15-G 022	A 3 L	A 4 L	A 18 L	A 18-022 L	A 19 L	A 19-022 L	Th LGS	Th LRS	Th LTS	Th LTV	RTD sensor cable						
Basic construction	Compensating and extension cables for thermocouples																										
	Extension cables for thermocouples FE-CuNi and NiCr-Ni																										
	Connection cables for resistance thermometers																										
	Fiber-glass braiding																										
	SABtex																										
	Shielded																										
Temperature range fixed installation*	+400°C																										
	+300°C																										
	+250°C																										
	+200°C																										
	+180°C																										
	+ 70°C																										
	- 25°C																										
	- 40°C																										
	- 50°C																										
	- 90°C																										
Standards and approvals	Halogen-free acc. to IEC 60754-1 + VDE 0482-754-1																										
	Fire performance: flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2																										
	Fire performance: no flame propagation acc. to IEC 60332-3-24 + VDE 0482-332-3-24 resp. IEC 60332-3-25 + VDE 0482-332-3-25 Cat. C resp. D																										
	Fire performance: acc. to DIN EN 60332-1-2 + IEC 60332-1-2																										
	Corrosiveness of conflagration gases: in compliance with IEC 60754-2 +VDE 0482-754-2 - no development of corrosive conflagration gases																										
	Smoke density: low (low smoke emission)																										
Characteristics	Shape: round																										
	Shape: oval																										
	Conductor construction: strand																										
	Conductor construction: wire																										
	Min. bending radius	7.5	12	12	7.5	7.5	10	12	12	12	12	12	12	12	12	10	10	10	12								
	Insulation resistance: > 1MΩ x km																										
Very good chemical resistance																											

 from  
 short-time use  
 to  
 max.

\*The temperature range for flexible application is mentioned on the corresponding catalog page



# Compensation & Extension Cables

## PVC insulated cables

A 1 L twisted · A 1 L single · A 16 L



A1 L twisted



A1 L single



A16 L



Also available  
with cross-sections  
1.0 mm<sup>2</sup>, 0.75 mm<sup>2</sup>,  
0.5 mm<sup>2</sup> and 0.22 mm<sup>2</sup>

### Construction:

<b>Insulation:</b>	PVC, Tl2 acc. to EN 50363-3 + VDE 0207-363-3
<b>Stranding:</b>	<b>A 1 L:</b> 2 conductors together <b>A 1 L single:</b> 2 conductors separately <b>A 16 L:</b> 2 conductors parallel positive conductor with colored stripe
<b>Shape:</b>	<b>A 1 L:</b> round <b>A 16 L:</b> oval
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	7.5 x O.D.
<b>Radiation resistance:</b>	8 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	<i>static:</i> -40/+70°C <i>flexible:</i> +5/+70°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b> Conductor cross section: Outer diameter: Weight/100m:	<b>A 1 L twisted:</b> 1.5 mm <sup>2</sup> approx. 4.8 mm approx. 3.2 kg	<b>A 1 L single:</b> 1.5 mm <sup>2</sup> approx. 2.4 mm approx. 3.2 kg	<b>A 16 L:</b> 0.75 mm <sup>2</sup> approx. 1.9 x 3.8 mm approx. 1.8 kg
---	--	---	--

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 1 L twisted item no.	A 1 L single item no.	A 16 L item no.
Type T	4.28	TX	4018958	4028958	4035958
Type J	5.27	JX	4018952	4028952	4035952
Type K	4.10	KCA	4018995	4028995	4035995
Type K	4.01	KCB	4018999	4028999	4035999
Type K	4.10	KX	4018954	4028954	4035954
Type E	6.32	EX	4018953	4028953	4035953
Type R/S	0.65	R/SCB	4018997	4028997	4035997
Type N	2.77	NC	4018991	4028991	4035991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 1 L twisted item no.	A 1 L single item no.	A 16 L item no.
Type L	5.37	LX	4018992	4028992	4035992
Type K	4.10	KCA	4018994	4028994	4035994
Type R/S	0.65	R/SCB	4018996	4028996	4035996
Type U	4.25	UX	4018998	4028998	4035998
Type B*	0.00	BC-100	4018901	4028901	4035901
Type B*	0.033	BC-200	4018902	4028902	4035902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables



# Compensation & Extension Cables

## PVC insulated cables

A 9 L · A 9-100 L · A 9-075 L · A 9-050 L · A 9-022 L

also available as  
halogen-free  
construction



A 9 L · A 9-100 L · A 9-075 L · A 9-050 L



A 9-022L

### Construction:

<b>Insulation:</b>	PVC, Tl2 acc. to EN 50363-3 + VDE 0207-363-3
<b>Stranding:</b>	2 conductors together
<b>Jacket material:</b>	PVC, TM2 acc. to EN 50363-4-1 + VDE 0207-363-4-1
<b>Shape:</b>	round
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	7.5 x O.D.
<b>Radiation resistance:</b>	8 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	static: -40/+70°C flexible: +5/+70°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b> Conductor cross section: Outer diameter: Weight/100m:	<b>A 9 L:</b> 1.5 mm <sup>2</sup> approx. 6.1 mm approx. 5.0 kg	<b>A 9-100 L:</b> 1.0 mm <sup>2</sup> approx. 5.1 mm approx. 4.4 kg	<b>A 9-075 L:</b> 0.75 mm <sup>2</sup> approx. 4.9 mm approx. 3.9 kg	<b>A 9-050 L:</b> 0.50 mm <sup>2</sup> approx. 4.3 mm approx. 2.9 kg	<b>A 9-022 L:</b> 0.22 mm <sup>2</sup> approx. 3.3 mm approx. 1.6 kg
---	--	--	---	---	---

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 9 L item no.	A 9-100 L item no.	A 9-075 L item no.	A 9-050 L item no.	A 9-022 L item no.
Type T	4.28	TX	4428958	4426958	4425958	4423958	4501958
Type J	5.27	JX	4428952	4426952	4425952	4423952	4501952
Type K	4.10	KCA	4428995	4426995	4425995	4423995	4501995
Type K	4.10	KCB	4428999	4426999	4425999	4423999	4501999
Type K	4.10	KX	4428954	4426954	4425954	4423954	4501954
Type E	6.32	EX	4428953	4426953	4425953	4423953	4501953
Type R/S	0.65	R/SCB	4428997	4426997	4425997	4423997	4501997
Type N	2.77	NC	4428991	4426991	4425991	4423991	4501991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 9 L item no.	A 9-100 L item no.	A 9-075 L item no.	A 9-050 L item no.	A 9-022 L item no.
Type L	5.37	LX	4428992	4426992	4425992	4423992	4501992
Type K	4.10	KCA	4428994	4426994	4425994	4423994	4501994
Type R/S	0.65	R/SCB	4428996	4426996	4425996	4423996	4501996
Type U	4.25	UX	4428993	4426993	4425993	4423993	4501993
Type B*	0.00	BC-100	4428901	4426901	4425901	4423901	4501901
Type B*	0.033	BC-200	4428902	4426902	4425902	4423902	4501902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables

# Compensation & Extension Cables

## PVC insulated cables

A 12 L · A 12 D



A 12 L



A 12 D



**A 12 L:**  
Also available  
with cross-sections  
1.0 mm<sup>2</sup>, 0.75 mm<sup>2</sup>,  
0.5 mm<sup>2</sup> and 0.22 mm<sup>2</sup>

### Construction:

<b>Insulation:</b>	PVC, T12 acc. to EN 50363-3 + VDE 0207-363-3
<b>Stranding:</b>	2 conductors parallel
<b>Jacket material:</b>	PVC, TM2 acc. to EN 50363-4-1 + VDE 0207-363-4-1
<b>Shape:</b>	oval
<b>Conductor construction:</b>	A 12 L: strand A 12 D: wire

### Technical data:

<b>Min. bending radius:</b>	A 12 L: 7.5 x O.D. A 12 D: 12 x O.D.
<b>Radiation resistance:</b>	8 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	static: -40/+70°C flexible: +5/+70°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 12 L:</b>	<b>A 12 D</b>
Conductor cross section:	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>
Outer diameter:	approx. 3.7 x 6.1 mm	approx. 3.2 x 5.3 mm
Weight/100m:	approx. 4.2 kg	approx. 4.3 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 12 L item no.	A 12 D item no.
Type T	4.28	TX	4448958	4458988
Type J	5.27	JX	4448952	4458982
Type K	4.10	KCA	4448995	4458915
Type K	4.10	KCB	4448999	4458919
Type K	4.10	KX	4448954	4458984
Type E	6.32	EX	4448953	4458983
Type R/S	0.65	R/SCB	4448997	4458917
Type N	2.77	NC	4448991	4458911

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 12 L item no.	A 12 D item no.
Type L	5.37	LX	4448992	4458912
Type K	4.10	KCA	4448994	4458914
Type R/S	0.65	R/SCB	4448996	4458916
Type U	4.25	UX	4448998	4458918
Type B*	0.00	BC-100	4448901	4458921
Type B*	0.033	BC-200	4448902	4458922

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables

M  
10

# Compensation & Extension Cables

## PVC insulated cables

A 5 L · A 5-075 L · A 5-050 L · A 5-022 L

also available as halogen-free construction  
with overall copper shield



A 5 L · A 5-075 L · A 5-050 L · A 5-022 L



4, 8, or 16 pairs  
on request

### Construction:

<b>Insulation:</b>	PVC, T12 acc. to EN 50363-3 + VDE 0207-363-3
<b>Stranding:</b>	2 conductors together
<b>Wrapping:</b>	PETP foil
<b>Shielding:</b>	tinned copper braiding
<b>Jacket material:</b>	PVC, TM2 acc. to EN 50363-4-1 + VDE 0207-363-4-1
<b>Shape:</b>	round
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	7.5 x O.D.
<b>Radiation resistance:</b>	8 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	static: -40/+70°C flexible: +5/+70°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

Type:	A 5 L:	A 5-075 L:	A 5-050 L:	A 5-022 L:
Conductor cross section:	1.5 mm <sup>2</sup>	0.75 mm <sup>2</sup>	0.50 mm <sup>2</sup>	0.22 mm <sup>2</sup>
Outer diameter:	approx. 6.6 mm	approx. 5.4 mm	approx. 4.8 mm	approx. 3.8 mm
Weight/100m:	approx. 6.6 kg	approx. 4.3 kg	approx. 3.5 kg	approx. 2.2 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 5 L item no.	A 5-075 L item no.	A 5-050 L item no.	A 5-022 L item no.
Type T	4.28	TX	4568958	4565958	4563958	4561958
Type J	5.27	JX	4568952	4565952	4563952	4561952
Type K	4.10	KCA	4568995	4565995	4563995	4561995
Type K	4.10	KCB	4568999	4565999	4563999	4561999
Type K	4.10	KX	4568954	4565954	4563954	4561954
Type E	6.32	EX	4568953	4565953	4563953	4561953
Type R/S	0.65	R/SCB	4568997	4565997	4563997	4561997
Type N	2.77	NC	4568991	4565991	4563991	4561991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 5 L item no.	A 5-075 L item no.	A 5-050 L item no.	A 5-022 L item no.
Type L	5.37	LX	4568992	4565992	4563992	4561992
Type K	4.10	KCA	4568994	4565994	4563994	4561994
Type R/S	0.65	R/SCB	4568996	4565996	4563996	4561996
Type U	4.25	UX	4568998	4565998	4563998	4561998
Type B*	0.00	BC-100	4568901	4565901	4563901	4561901
Type B*	0.033	BC-200	4568902	4565902	4563902	4561902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.

C = compensating cables · X = extension cables

# Compensation & Extension Cables

## PVC insulated cables

A 20 L · A 20-022 L · A 20 D

with  
alu-foil shield



A 20 L · A 20-022 L



A 20 D

### Construction:

<b>Insulation:</b>	PVC, T12 acc. to EN 50363-3 + VDE 0207-363-3
<b>Stranding:</b>	2 conductors together
<b>Wrapping:</b>	PETP foil bare copper ground wire 0.5mm ø
<b>Shielding:</b>	alu foil
<b>Jacket material:</b>	PVC, TM2 acc. to EN 50363-4-1 + VDE 0207-363-4-1
<b>Shape:</b>	round
<b>Conductor construction:</b>	A 20 L, A 20-022 L: strand A 20 D: wire

### Technical data:

<b>Min. bending radius:</b>	A 20 L, A 20-022 L: 7.5 x O.D. A 20 D: 12 x O.D.
<b>Radiation resistance:</b>	8 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	static: -40/+70°C flexible: +5/+70°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 20 L:</b>	<b>A 20-022 L</b>	<b>A 20 D:</b>
Conductor cross section:	1.5 mm <sup>2</sup>	0.22 mm <sup>2</sup>	1.5 mm <sup>2</sup>
Outer diameter:	approx. 6.6 mm	approx. 3.9 mm	approx. 6.4 mm
Weight/100m:	approx. 5.5 kg	approx. 1.9 kg	approx. 5.5 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 20 L item no.	A 20-022 L item no.	A 20 D item no.
Type T	4.28	TX	4548958	4541958	4648988
Type J	5.27	JX	4548952	4541952	4648982
Type K	4.10	KCA	4548995	4541995	4648915
Type K	4.10	KCB	4548999	4541999	4648919
Type K	4.10	KX	4548954	4541954	4648984
Type E	6.32	EX	4548953	4541953	4648983
Type R/S	0.65	R/SCB	4548997	4541997	4648917
Type N	2.77	NC	4548991	4541991	4648911

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 20 L item no.	A 20-022 L item no.	A 20 D item no.
Type L	5.37	LX	4548992	4541992	4648912
Type K	4.10	KCA	4548994	4541994	4648914
Type R/S	0.65	R/SCB	4548996	4541996	4648916
Type U	4.25	UX	4548998	4541998	4648918
Type B*	0.00	BC-100	4548901	4541901	4648921
Type B*	0.033	BC-200	4548902	4541902	4648922

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables

# Compensation & Extension Cables

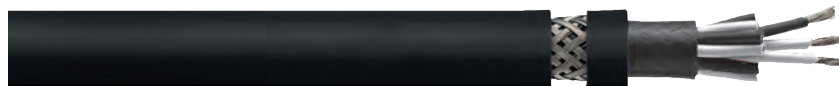
## PVC insulated cables

A 9 - L · A 9 - LSY with steel wire armoring

multi-paired



A 9 - L



A 9 - LSY



Also available  
with cross-sections  
1.0 mm<sup>2</sup>, 0.75 mm<sup>2</sup>,  
0.5 mm<sup>2</sup> and 0.22 mm<sup>2</sup>

### Construction:

Insulation:	PVC, T12 acc. to EN 50363-3 + VDE 0207-363-3
Color code:	4 conductors pair-wise numbered
Stranding:	conductors together in layers
Jacket material:	PVC, TM2 acc. to EN 50363-4-1 + VDE 0207-363-4-1
Armoring:	<b>A 9- LSY:</b> galvanized steel wire armoring
Shape:	round
Conductor construction:	strand

### Technical data:

Min. bending radius:	A 9 - L: 7.5 x O.D. A 9- LSY: 12 x O.D.
Radiation resistance:	8 x 10 <sup>7</sup> cJ/kg
Temperature range of insulation:	static: -40/+70°C flexible: +5/+70°C
Insulation resistance:	> 1MΩ x km
Burning characteristics:	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
Absence of harmful substances:	acc. to RoHS directive of the European Union see page O/30

Type:	A 9 - L:	A 9 - LSY
Conductor cross section:	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>

no. of conductors	for thermocouples	outer ø approx. in mm	weight approx. kg/100 m	cable type	A 9 - L	outer ø approx. in mm	weight approx. kg/100 m	cable type	A 9 - LSY
2	1	6.1	6.4	A 9 L	44289...	8.5	11.3	A 9-2 LSY	046289...
4	2	7.1	9.8	A 9-4 L	44204...	9.5	15.0	A 9-4 LSY	046204...
6	3	8.7	14.1	A 9-6 L	44206...	11.3	21.4	A 9-6 LSY	046206...
12	6	11.9	25.8	A 9-12 L	44212...	14.7	36.0	A 9-12 LSY	046212...
16	8	13.2	33.2	A 9-16 L	44216...	16.4	46.9	A 9-16 LSY	046216...
20	10	15.0	42.2	A 9-20 L	44220...	18.0	57.2	A 9-20 LSY	046220...
24	12	16.7	49.2	A 9-24 L	44224...	19.7	64.0	A 9-24 LSY	046224...
32	16	18.8	65.4	A 9-32 L	44232...	21.4	80.5	A 9-32 LSY	046232...
36	18	19.5	72.6	A 9-36 L	44236...	22.1	88.6	A 9-36 LSY	046236...
40	20	20.9	80.6	A 9-40 L	44240...	24.1	100.1	A 9-40 LSY	046240...

In case of order, please indicate the corresponding thermocouple. (please see SAB thermocouple code page M/5)

Example: Type A 9 - 16 L for thermocouple type R/S acc. to DIN 43713 = item no. 4421696

The type A 9-L can also be manufactured with solid conductors 1.38 mm ø.

The type identification for solid types is: type A 9 - D (item group 0463...).

If no stock material is available, the min. order quantity is 500 m.

The types of multi-paired compensating cables can also be delivered pair-wise twisted and pairs totally twisted for additional charge.

# Compensation & Extension Cables

## Hybrid thermocouple cable JX

Connection cable between hot runner control and hot runner system



Marking for Hybrid thermocouple cable JX 4573652:

SAB BRÜCKSKES · D-VIERSEN · Hybrid-Thermoleitung (6 x 2 x 0.5 mm² JX) + 13 G 1.5 mm² CE

### Construction:

<b>Insulation:</b>	thermo strands Fe-CuNi for type J bare copper strands acc. to IEC 60228 class 5
<b>Insulation:</b>	PVC
<b>Color code:</b>	black and white acc. to IEC 60584 type JX black with white numbers 1 to -4, -8, -12, -16 and a green/yellow ground (control conductors)
<b>Wrapping:</b>	foil
<b>Shielding:</b>	twisted JX element braided with tinned copper wires (optical coverage approx. 80%)
<b>Wrapping:</b>	banding
<b>Stranding:</b>	together
<b>Jacket material:</b>	PVC
<b>Jacket color:</b>	black

### Technical data:

<b>Nominal voltage:</b>	300/500 V control conductors - (1.5mm²)
<b>Testing voltage:</b>	2000 V - control conductors - (1.5 mm²) / 600 V (0.5 mm²)
<b>Thermoelectric voltage:</b>	acc. to IEC 60584 - (0.5 mm²)
<b>Min. bending radius:</b>	
<i>fixed installation:</i>	5 x O.D.
<i>flexible:</i>	12 x O.D.
<b>Temperature range:</b>	
<i>static:</i>	-25/+70°C
<i>flexible:</i>	+5/+70°C
<b>Oil resistance:</b>	good - acc. to internal standard, see page O/29
<b>Burning characteristics:</b>	acc. to DIN EN 60332-1-2 and IEC 60332-1-2
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

### Outstanding features:



- high flexibility
- wear resistant
- smallest bending radii

item no.	dimensions mm²	for thermocouples	nominal outer-ø inch	mm	cable weight ≈lbs/mft
▶ 4573252	(2 x 2 x 0.5 JX) C + 5 G 1.5	Fe-CuNi	0.449	11.4	133
▶ 4573452	(4 x 2 x 0.5 JX) C + 9 G 1.5	Fe-CuNi	0.583	14.8	226
▶ 4573652	(6 x 2 x 0.5 JX) C + 13 G 1.5	Fe-CuNi	0.622	15.8	296
▶ 4573852	(8 x 2 x 0.5 JX) C + 17 G 1.5	Fe-CuNi	0.760	19.3	425

Other dimensions and colors are available on request



### Possible on request:

- ready-made lengths  
from 1 m to 15 m
- thermocouples type J
- thermo cable type KX  
and thermocouples type K

# Compensation & Extension Cables

## Besilen® insulated cables

A 1 LB twisted · A 16 LB



A 1 LB twisted



A 16 LB



Also available with cross-sections  
1.0 mm<sup>2</sup>, 0.75 mm<sup>2</sup>,  
0.5 mm<sup>2</sup> and 0.22 mm<sup>2</sup>

### Construction:

<b>Insulation:</b>	Besilen® EI2 acc. to EN 50363-1 + VDE 0207-363-1
<b>Stranding:</b>	<b>A 1 LB:</b> 2 conductors together <b>A 16 LB:</b> 2 conductors parallel
<b>Shape:</b>	<b>A 1 LB:</b> round <b>A 16 LB:</b> oval
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	7.5 x O.D.
<b>Radiation resistance:</b>	2 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	<i>static:</i> -40/+180°C <i>flexible:</i> -25/+180°C <i>short time use:</i> +250°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b> Conductor cross section: Outer diameter: Weight/100m:	<b>A 1 LB twisted:</b> 1.5 mm <sup>2</sup> approx. 5.0 mm approx. 3.3 kg	<b>A 16 LB:</b> 1.5 mm <sup>2</sup> approx. 2.5 x 5.0 mm approx. 3.2 kg
---	---	--

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 1 LB twisted item no.	A 16 LB item no.
Type T	4.28	TX	4048958	4068958
Type J	5.27	JX	4048952	4068952
Type K	4.10	KCA	4048995	4068995
Type K	4.10	KCB	4048999	4068999
Type K	4.10	KX	4048954	4068954
Type E	6.32	EX	4048953	4068953
Type R/S	0.65	R/SCB	4048997	4068997
Type N	2.77	NC	4048991	4068911

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 1 LB twisted item no.	A 16 LB item no.
Type L	5.37	LX	4048992	4068992
Type K	4.10	KCA	4048994	4068994
Type R/S	0.65	R/SCB	4048996	4068996
Type U	4.25	UX	4048998	4068998
Type B*	0.00	BC-100	4048901	4068901
Type B*	0.033	BC-200	4048902	4068902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables



# Compensation & Extension Cables

## Besilen® insulated cables

A 15 L · A 15-075 L · A15-050 L · A15-022 L



A 15 L · A 15-075 L · A15-050 L · A15-022 L

### Construction:

<b>Insulation:</b>	Besilen® EI2 acc. to En 50363-1 + VDE 0207-363-1
<b>Stranding:</b>	2 conductors together
<b>Jacket material:</b>	Besilen® EM9 acc. to EN 50363-2-1 + VDE 0207-363-2-1
<b>Shape:</b>	round
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	7.5 x O.D.
<b>Radiation resistance:</b>	2 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	<i>static:</i> -40/+70°C <i>flexible:</i> -25/+70°C <i>short-time use:</i> +250°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 15 L:</b>	<b>A 15-075 L:</b>	<b>A 15-050 L:</b>	<b>A 15-022 L:</b>
Conductor cross section:	1.5 mm <sup>2</sup>	0.75 mm <sup>2</sup>	0.50 mm <sup>2</sup>	0.22 mm <sup>2</sup>
Outer diameter:	approx. 6.2 mm	approx. 5.0 mm	approx. 4.4 mm	approx. 3.8 mm
Weight/100m:	approx. 5.8 kg	approx. 3.6 kg	approx. 2.6 kg	approx. 1.7 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 15 L item no.	A 15-075 L item no.	A 15-050 L item no.	A 15-022 L item no.
Type T	4.28	TX	4268958	4265958	4263958	4261958
Type J	5.27	JX	4268952	4265952	4263952	4261952
Type K	4.10	KCA	4268995	4265995	4263995	4261995
Type K	4.10	KCB	4268999	4265999	4263999	4261999
Type K	4.10	KX	4268954	4265954	4263954	4261954
Type E	6.32	EX	4268953	4265953	4263953	4261953
Type R/S	0.65	R/SCB	4268997	4265997	4263997	4261997
Type N	2.77	NC	4268991	4265991	4263991	4261991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 15 L item no.	A 15-075 L item no.	A 15-050 L item no.	A 15-022 L item no.
Type L	5.37	LX	4268992	4265992	4263992	4261992
Type K	4.10	KCA	4268994	4265994	4263994	4261994
Type R/S	0.65	R/SCB	4268996	4265996	4263996	4261996
Type U	4.25	UX	4268993	4265993	4263993	4261993
Type B*	0.00	BC-100	4268901	4265901	4263901	4261901
Type B*	0.033	BC-200	4268902	4265902	4263902	4261902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.

C = compensating cables · X = extension cables

# Compensation & Extension Cables

## Besilen® insulated cables

A 3 Ln · A 4 Ln with steel wire armoring



A 3 Ln



A 4 Ln



Also available  
with cross-sections  
1.0 mm<sup>2</sup>, 0.75 mm<sup>2</sup>,  
0.5 mm<sup>2</sup> and 0.22 mm<sup>2</sup>

### Construction:

<b>Insulation:</b>	Besilen® EI2 acc. to EN 50363-1 + VDE 0207-363-1
<b>Stranding:</b>	2 conductors parallel
<b>Jacket material:</b>	Besilen® EM9 acc. to EN 50363-2-1 + VDE 0207-363-2-1
<b>Armoring:</b>	<b>A 4 Ln:</b> tinned steel wire armoring with tracer
<b>Shape:</b>	oval
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	<b>A 3 Ln:</b> 10 x O.D. <b>A 4 Ln:</b> 12 x O.D.
<b>Radiation resistance:</b>	2 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	<i>static:</i> -40/+180°C <i>flexible:</i> -25/+180°C <i>short time use:</i> +250°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 3 Ln:</b>	<b>A 4 Ln</b>
Conductor cross section:	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>
Outer diameter:	approx. 3.7 x 6.2 mm	approx. 4.5 x 7.0 mm
Weight/100m:	approx. 4.6 kg	approx. 7.5 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	<b>A 3 Ln</b> item no.	<b>A 4 Ln</b> item no.
Type T	4.28	TX	4138958	4168958
Type J	5.27	JX	4138952	4168952
Type K	4.10	KCA	4138995	4168995
Type K	4.10	KCB	4138999	4168999
Type K	4.10	KX	4138954	4168954
Type E	6.32	EX	4138953	4168953
Type R/S	0.65	R/SCB	4138997	4168997
Type N	2.77	NC	4138991	4168991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	<b>A 3 Ln</b> item no.	<b>A 4 Ln</b> item no.
Type L	5.37	LX	4138992	4168992
Type K	4.10	KCA	4138994	4168994
Type R/S	0.65	R/SCB	4138996	4168996
Type U	4.25	UX	4138998	4168998
Type B*	0.00	BC-100	4138901	4168901
Type B*	0.033	BC-200	4138902	4168902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables

# Compensation & Extension Cables

## Besilen® insulated cables

A 11 Lr · A 11-4 Lr · A 11 Dr with fiber-glass braiding and steel wire armoring



A 11 Lr · A 11-4 Lr



A 11 Dr



Also available with cross-sections 1.0 mm<sup>2</sup>, 0.75 mm<sup>2</sup>, 0.5 mm<sup>2</sup> and 0.22 mm<sup>2</sup>

### Construction:

<b>Insulation:</b>	Besilen® EI2 acc. to EN 50363-1 + VDE 0207-363-1
<b>Stranding:</b>	2 resp. 4 conductors together
<b>Braiding:</b>	fiber-glass with tracer
<b>Armoring:</b>	tinned steel wire armoring with tracer
<b>Shape:</b>	round
<b>Conductor construction:</b>	A 11 LR, A 11-4 Lr: strand A 11 DR: wire

### Technical data:

<b>Min. bending radius:</b>	A 11 Lr, A 11-4 Lr: 10 x O.D. A 11 Dr: 12 x O.D.
<b>Temperature range of insulation:</b>	<i>static:</i> -40/+180°C <i>flexible:</i> -25/+180°C <i>short-time use:</i> +250°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 11 Lr:</b>	<b>A 11-4 Lr</b>	<b>A 11 Dr:</b>
Conductor cross section:	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>
Outer diameter:	approx. 6.3 mm	approx. 7.3 mm	approx. 5.5 mm
Weight/100m:	approx. 5.9 kg	approx. 9.6 kg	approx. 6.4 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 11 Lr item no.	A 11-4 Lr item no.	A 11 Dr item no.
Type T	4.28	TX	4218958	4210458	4238988
Type J	5.27	JX	4218952	4210452	4238982
Type K	4.10	KCA	4218995	4210495	4238915
Type K	4.10	KCB	4218999	4210499	4238919
Type K	4.10	KX	4218954	4210454	4238984
Type E	6.32	EX	4218953	4210453	4238983
Type R/S	0.65	R/SCB	4218997	4210497	4238917
Type N	2.77	NC	4218991	4210491	4238911

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 11 Lr item no.	A 11-4 Lr item no.	A 11 Dr item no.
Type L	5.37	LX	4218992	4210492	4238912
Type K	4.10	KCA	4218994	4210494	4238914
Type R/S	0.65	R/SCB	4218996	4210496	4238916
Type U	4.25	UX	4218998	4210498	4238918
Type B*	0.00	BC-100	4218901	4210401	4238921
Type B*	0.033	BC-200	4218902	4210402	4238922

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.

C = compensating cables · X = extension cables

# Compensation & Extension Cables

## Besilen® insulated cables

A 13 L with fiber-glass braiding



A 13 L



Also available  
with cross-sections  
1,0 mm<sup>2</sup>, 0,75 mm<sup>2</sup>,  
0,5 mm<sup>2</sup> and 0,22 mm<sup>2</sup>

### Construction:

<b>Insulation:</b>	Besilen® EI2 acc. to EN 50363-1 + VDE 0207-363-1
<b>Stranding:</b>	parallel
<b>Braiding:</b>	fiber-glass with tracer
<b>Shape:</b>	oval
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	10 x O.D.
<b>Temperature range of insulation:</b>	<i>static:</i> -40/+180°C <i>flexible:</i> -25/+180°C <i>short time use:</i> +250°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 13 L:</b>
Conductor cross section:	1.5 mm <sup>2</sup>
Outer diameter:	approx. 3.0 x 5.5 mm
Weight/100m:	approx. 3.8 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 13 L item no.
Type T	4.28	TX	4248958
Type J	5.27	JX	4248952
Type K	4.10	KCA	4248995
Type K	4.10	KCB	4248999
Type K	4.10	KX	4248954
Type E	6.32	EX	4248953
Type R/S	0.65	R/SCB	4248997
Type N	2.77	NC	4248991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 13 L item no.
Type L	5.37	LX	4248992
Type K	4.10	KCA	4248994
Type R/S	0.65	R/SCB	4248996
Type U	4.25	UX	4248998
Type B*	0.00	BC-100	4248901
Type B*	0.033	BC-200	4248902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables

# Compensation & Extension Cables

## Besilen® insulated cables

A 6 L · A 6-022 L · A 6 D

with  
alu-foil shield



A 6 L · A 6-022 L



A 6 D

### Construction:

<b>Insulation:</b>	Besilen® EI2 acc. to EN 50363-1 + VDE 0207-363-1
<b>Stranding:</b>	2 conductors together
<b>Wrapping:</b>	PETP foil, bare copper ground wire 0.5 mm ø
<b>Shielding:</b>	alu foil
<b>Jacket material:</b>	Besilen® EM9 acc. to EN 50363-2-1 + VDE 0207-363-2-1
<b>Shape:</b>	round
<b>Conductor construction:</b>	A 6 L: A 6-022 L: strand A 6 D: wire

### Technical data:

<b>Min. bending radius:</b>	A 6 L, A 6-022 L: 7.5 x O.D. A 6 D: 12 x O.D.
<b>Radiation resistance:</b>	2 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	static: -40/+180°C flexible: -25/+180°C short-time use: +250°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

Type:	A 6 L:	A 6-022 L:	A 6 D:
Conductor cross section:	1.5 mm <sup>2</sup>	0.22 mm <sup>2</sup>	1.5 mm <sup>2</sup>
Outer diameter:	approx. 7.0 mm	approx. 4.4 mm	approx. 6.4 mm
Weight/100m:	approx. 6.1 kg	approx. 2.0 kg	approx. 5.7 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 6 L item no.	A 6-022 L item no.	A 6 D item no.
Type T	4.28	TX	4288958	4281958	4288988
Type J	5.27	JX	4288952	4281952	4288982
Type K	4.10	KCA	4288995	4281995	4288915
Type K	4.10	KCB	4288999	4281999	4288919
Type K	4.10	KX	4288954	4281954	4288984
Type E	6.32	EX	4288953	4281953	4288983
Type R/S	0.65	R/SCB	4288997	4281997	4288917
Type N	2.77	NC	4288991	4281991	4288911

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 6 L item no.	A 6-022 L item no.	A 6 D item no.
Type L	5.37	LX	4288992	4281992	4288912
Type K	4.10	KCA	4288994	4281994	4288914
Type R/S	0.65	R/SCB	4288996	4281996	4288916
Type U	4.25	UX	4288998	4281998	4288918
Type B*	0.00	BC-100	4288901	4281901	4288921
Type B*	0.033	BC-200	4288902	4281902	4288922

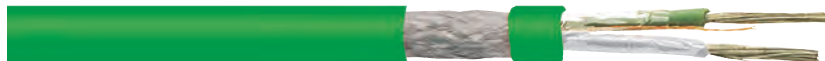
\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables

# Compensation & Extension Cables

## Besilen® insulated cables

A 15 LC · A 15-075 LC · A 15-050 LC · A 15-022 LC

with overall  
copper shield



A 15 LC · A 15-075 LC · A 15-050 LC · A 15-022 LC

### Construction:

<b>Insulation:</b>	Besilen® EI2 acc. to EN 50363-1 + VDE 0207-363-1
<b>Stranding:</b>	2 conductors together
<b>Wrapping:</b>	PETP foil
<b>Shielding:</b>	tinned copper braiding
<b>Jacket material:</b>	Besilen® EM9 acc. to EN 50363-2-1 + VDE 0207-363-2-1
<b>Shape:</b>	round
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	12 x O.D.
<b>Radiation resistance:</b>	2 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	<i>static:</i> -40/+180°C <i>flexible:</i> -25/+180°C <i>short time use:</i> +250°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 15 LC:</b>	<b>A 15-075 LC:</b>	<b>A 15-050 LC:</b>	<b>A 15-022 L:</b>
Conductor cross section:	1.5 mm <sup>2</sup>	0.75 mm <sup>2</sup>	0.50 mm <sup>2</sup>	0.22 mm <sup>2</sup>
Outer diameter:	approx. 6.8 mm	approx. 5.7 mm	approx. 5.2 mm	approx. 4.3 mm
Weight/100m:	approx. 7.0 kg	approx. 4.6 kg	approx. 3.9 kg	approx. 2.5 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 15 LC item no.	A 15-075 LC item no.	A 15-050 LC item no.	A 15-022 LC item no.
Type T	4.28	TX	4308958	4305958	4303958	4301958
Type J	5.27	JX	4308952	4305952	4303952	4301952
Type K	4.10	KCA	4308995	4305995	4303995	4301995
Type K	4.10	KCB	4308999	4305999	4303999	4301999
Type K	4.10	KX	4308954	4305954	4303954	4301954
Type E	6.32	EX	4308953	4305953	4303953	4301953
Type R/S	0.65	R/SCB	4308997	4305997	4303997	4301997
Type N	2.77	NC	4308991	4305991	4303991	4301991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 15 LC item no.	A 15-075 LC item no.	A 15-050 LC item no.	A 15-022 LC item no.
Type L	5.37	LX	4308992	4305992	4303992	4301992
Type K	4.10	KCA	4308994	4305994	4303994	4301994
Type R/S	0.65	R/SCB	4308996	4305996	4303996	4301996
Type U	4.25	UX	4308998	4305998	4303998	4301998
Type B*	0.00	BC-100	4308901	4305901	4303901	4301901
Type B*	0.033	BC-200	4308902	4305902	4303902	4301902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.

C = compensating cables · X = extension cables

# Compensation & Extension Cables

## Fiber-glass insulated cables

A 15-022 · A 15-G 022 with outer fiber-glass braiding



A 15-022



A 15-G 022

### Construction:

<b>Insulation:</b>	fiber-glass
<b>Stranding:</b>	2 conductors together
<b>Jacket material:</b>	Besilen® EM9 acc. to EN 50363-2-1 + VDE 0207-363-2-1
<b>Braiding:</b>	<b>A 15-G 022:</b> fiber glass with tracer
<b>Shape:</b>	round
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	7,5 x O.D.
<b>Temperature range of insulation:</b>	<i>static:</i> -40/+180°C <i>flexible:</i> -25/+180°C <i>short-time use:</i> +250°C
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 15-022:</b>	<b>A 15-G 022</b>
Conductor cross section:	0.22 mm <sup>2</sup>	0.22 mm <sup>2</sup>
Outer diameter:	approx. 2.9 mm	approx. 3.4 mm
Weight/100m:	approx. 1.1 kg	approx. 1.7 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	<b>A 15-022</b> item no.	<b>A 15-G 022</b> item no.
Type T	4.28	TX	4511958	4521958
Type J	5.27	JX	4511952	4521952
Type K	4.10	KCA	4511995	4521995
Type K	4.10	KCB	4511999	4521999
Type K	4.10	KX	4511954	4521954
Type E	6.32	EX	4511953	4521953
Type R/S	0.65	R/SCB	4511997	4521997
Type N	2.77	NC	4511991	4521991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	<b>A 15-022</b> item no.	<b>A 15-G 022</b> item no.
Type L	5.37	LX	4511992	4521992
Type K	4.10	KCA	4511994	4521994
Type R/S	0.65	R/SCB	4511996	4521996
Type U	4.25	UX	4511998	4521998
Type B*	0.00	BC-100	4511901	4521901
Type B*	0.033	BC-200	4511902	4521902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables



# Compensation & Extension Cables

## Fiber-glass insulated cables

A 3 L · A 4 L with steel wire armoring

with  
SABtex braiding



A 3 L



A 4 L

### Construction:

<b>Insulation:</b>	fiber-glass
<b>Stranding:</b>	2 conductors parallel
<b>Braiding:</b>	SABtex with tracer
<b>Armoring:</b>	A 4 L: tinned steel wire armoring with tracer
<b>Shape:</b>	oval
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	<b>A 3 L:</b> 10 x O.D. <b>A 4 L:</b> 12 x O.D.
<b>Temperature range of insulation:</b>	<i>static:</i> -50/+200°C <i>flexible:</i> -50/+200°C <i>short-time use:</i> +300°C
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	no flame propagation acc. to IEC 60332-3-24 + VDE 0482-332-3-24 resp. IEC 60332-3-25 + VDE 0482-332-3-25 Cat. C resp. D Flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2.
<b>Corrosivity:</b>	in compliance with IEC 60754-2 + VDE 0482-754-2 - no development of corrosive conflagration gases
<b>Smoke density:</b>	low (low smoke emission)
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 3 L:</b>	<b>A 4 L:</b>
Conductor cross section:	1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>
Outer diameter:	approx. 4.6 x 6.8 mm	approx. 4.8 x 7.0 mm
Weight/100m:	approx. 5.4 kg	approx. 7.4 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 3 L item no.	A 4 L item no.
Type T	4.28	TX	4128958	4158958
Type J	5.27	JX	4128952	4158952
Type K	4.10	KCA	4128995	4158995
Type K	4.10	KCB	4128999	4158999
Type K	4.10	KX	4128954	4158954
Type E	6.32	EX	4128953	4158953
Type R/S	0.65	R/SCB	4128997	4158997
Type N	2.77	NC	4128991	4158991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 3 L item no.	A 4 L item no.
Type L	5.37	LX	4128992	4158992
Type K	4.10	KCA	4128994	4158994
Type R/S	0.65	R/SCB	4128996	4158996
Type U	4.25	UX	4128998	4158998
Type B*	0.00	BC-100	4128901	4158901
Type B*	0.033	BC-200	4128902	4158902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables

# Compensation & Extension Cables

## FEP insulated cables

A 18 L · A 18-022 L · A 19 L · A 19-022 L with overall copper shield



A 18 L · A 18-022 L



A 19 L · A 19-022 L

### Construction:

<b>Insulation:</b>	FEP
<b>Stranding:</b>	2 conductors together
<b>Wrapping:</b>	<b>A 18 L, A 18-022 L:</b> PETP foil
<b>Shielding:</b>	<b>A 19 L, A 19-022 L:</b> tinned copper braiding
<b>Jacket material:</b>	FEP
<b>Shape:</b>	round
<b>Conductor construction:</b>	strand

### Technical data:

<b>Min. bending radius:</b>	12 x O.D.
<b>Radiation resistance:</b>	1 x 10 <sup>7</sup> cJ/kg
<b>Temperature range of insulation:</b>	<i>static:</i> -90/+180°C <i>flexible:</i> -55/+180°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Burning characteristics:</b>	no flame propagation acc. to IEC 60332-3-24 + VDE 0482-332-3-24 resp. IEC 60332-3-25 + VDE 0482-332-3-25 Cat. C resp. D Flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2.
<b>Chemical resistance:</b>	very good against fats, oils, salts and acids
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b>	<b>A 18 L:</b>	<b>A 18-022 L:</b>	<b>A 19 L:</b>	<b>A 19-022 L:</b>
Conductor cross section:	1.5 mm <sup>2</sup>	0.22 mm <sup>2</sup>	1.5 mm <sup>2</sup>	0.22 mm <sup>2</sup>
Outer diameter:	approx. 4.8 mm	approx. 2.5 mm	approx. 5.5 mm	approx. 3.0 mm
Weight/100m:	approx. 4.2 kg	approx. 1.0 kg	approx. 5.9 kg	approx. 1.9 kg

### IEC 60584

for thermocouple	EMK at 100°C in mV	cable type	A 18 L item no.	A 18-022 L item no.	A 19 L item no.	A 19-022 L item no.
Type T	4.28	TX	4338958	4331958	4358958	4351958
Type J	5.27	JX	4338952	4331952	4358952	4351952
Type K	4.10	KCA	4338995	4331995	4358995	4351995
Type K	4.10	KCB	4338999	4331999	4358999	4351999
Type K	4.10	KX	4338954	4331954	4358954	4351954
Type E	6.32	EX	4338953	4331953	4358953	4351953
Type R/S	0.65	R/SCB	4338997	4331997	4358997	4351997
Type N	2.77	NC	4338991	4331991	4358991	4351991

### DIN 43710 / 43714 (not valid for type B\*)

We continue to manufacture compensating and extension cables with color code acc. to DIN 43714 and the basic values of DIN 43710.

for thermocouple	EMK at 100°C in mV	cable type	A 18 L item no.	A 18-022 L item no.	A 19 L item no.	A 19-022 L item no.
Type L	5.37	LX	4338992	4331992	4358992	4351992
Type K	4.10	KCA	4338994	4331994	4358994	4351994
Type R/S	0.65	R/SCB	4338996	4331996	4358996	4351996
Type U	4.25	UX	4338998	4331998	4358998	4351998
Type B*	0.00	BC-100	4338901	4331901	4358901	4351901
Type B*	0.033	BC-200	4338902	4331902	4358902	4351902

\* Not standardized compensating cable for thermocouples type B with application temperatures up to 100°C resp. 200°C.  
C = compensating cables · X = extension cables

# Compensation & Extension Cables

## Fiber-glass insulated extension cables for thermocouples

Th LGS with fiber-glass braiding and steel wire armoring

Th LRS with special fiber-glass braiding and steel wire armoring



Th LGS · Th LRS

### Construction:

<b>Insulation:</b>	<b>Th LGS:</b> fiber-glass <b>Th LRS:</b> special fiber-glass
<b>Stranding:</b>	conductors together
<b>Braiding:</b>	<b>Th LGS:</b> fiber-glass <b>Th LRS:</b> special fiber-glass
<b>Armoring:</b>	galvanized steel wire armoring with tracer
<b>Shape:</b>	round

### Technical data:

<b>Min. bending radius:</b>	12 x O.D.
<b>Temperature range of insulation:</b>	<b>Th LGS:</b> max. +250°C <b>Th LRS:</b> max. +400°C
<b>Halogen-free:</b>	acc. to IEC 60754-1 + VDE 0482-754-1
<b>Burning characteristics:</b>	no flame propagation acc. to IEC 60332-3-24 + VDE 0482-332-3-24 resp. IEC 60332-3-25 + VDE 0482-332-3-25 Cat. C resp. D Flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2.
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b> Conductor construction:	<b>Th LGS:</b> 0.22 mm <sup>2</sup> = 7 x 0.20 mm ø 0.50 mm <sup>2</sup> = 16 x 0.20 mm ø 1.00 mm <sup>2</sup> = 32 x 0.20 mm ø	<b>Th LRS:</b> 0.22 mm <sup>2</sup> = 7 x 0.20 mm ø 0.50 mm <sup>2</sup> = 16 x 0.20 mm ø 1.00 mm <sup>2</sup> = 32 x 0.20 mm ø
---	--	--

### Th LGS

item no.	type	dimensions mm <sup>2</sup>	for thermocouple	nominal outer-ø inch	mm	cable weight ≈lbs/mft
▶ 47110...*	Th 20 LGS	2 x 0.22	Fe-CuNi	0.122	3.1	1
▶ 47111...*	Th 50 LGS	2 x 0.50	Fe-CuNi	0.146	3.7	3
▶ 47112...*	Th 100 LGS	2 x 1.00	Fe-CuNi	0.177	4.5	3
▶ 47113...*	Th 20-4 LGS	4 x 0.22	Fe-CuNi	0.138	3.5	2
▶ 47114...*	Th 50-4 LGS	4 x 0.50	Fe-CuNi	0.165	4.2	3
▶ 47115...*	Th 100-4 LGS	4 x 1.00	Fe-CuNi	0.213	5.4	5
▶ 47110...*	Th 20 LGS	2 x 0.22	NiCr-Ni	0.122	3.1	1
▶ 47111...*	Th 50 LGS	2 x 0.50	NiCr-Ni	0.146	3.7	2
▶ 47112...*	Th 100 LGS	2 x 1.00	NiCr-Ni	0.177	4.5	3
▶ 47113...*	Th 20-4 LGS	4 x 0.22	NiCr-Ni	0.138	3.5	2
▶ 47114...*	Th 50-4 LGS	4 x 0.50	NiCr-Ni	0.165	4.2	3
▶ 47115...*	Th 100-4 LGS	4 x 1.00	NiCr-Ni	0.213	5.4	5

### Th LRS

item no.	type	dimensions mm <sup>2</sup>	for thermocouple	nominal outer-ø inch	mm	cable weight ≈lbs/mft
▶ 47210...*	Th 20 LRS	2 x 0.22	Fe-CuNi	0.122	3.1	1
▶ 47211...*	Th 50 LRS	2 x 0.50	Fe-CuNi	0.146	3.7	3
▶ 47212...*	Th 100 LRS	2 x 1.00	Fe-CuNi	0.177	4.5	3
▶ 47213...*	Th 20 -4 LRS	4 x 0.22	Fe-CuNi	0.138	3.5	2
▶ 47214...*	Th 50 -4 LRS	4 x 0.50	Fe-CuNi	0.165	4.2	3
▶ 47215...*	Th 100-4 LRS	4 x 1.00	Fe-CuNi	0.213	5.4	5
▶ 47210...*	Th 20 LRS	2 x 0.22	NiCr-Ni	0.122	3.1	1
▶ 47211...*	Th 50 LRS	2 x 0.50	NiCr-Ni	0.146	3.7	3
▶ 47212...*	Th 100 LRS	2 x 1.00	NiCr-Ni	0.177	4.5	3
▶ 47213...*	Th 20 -4 LRS	4 x 0.22	NiCr-Ni	0.138	3.5	2
▶ 47214...*	Th 50 -4 LRS	4 x 0.50	NiCr-Ni	0.165	4.2	3
▶ 47215...*	Th 100-4 LRS	4 x 1.00	NiCr-Ni	0.213	5.4	5

\*Thermocouple code see page M/5

# Compensation & Extension Cables

## PFA insulated extension cables for thermocouples

Th LTS with steel wire armoring · Th LTV stainless steel wire armoring



Th LTS



Th LTV

### Construction:

<b>Insulation:</b>	PFA
<b>Stranding:</b>	conductors together
<b>Braiding:</b>	fiber-glass
<b>Armoring:</b>	<b>Th LTS:</b> galvanized steel wire armoring with tracer <b>Th LTV:</b> galvanized steel wire armoring (VA) with tracer
<b>Shape:</b>	round

### Technical data:

<b>Min. bending radius:</b>	12 x O.D.
<b>Temperature range of insulation:</b>	<i>static:</i> max. +250°C <i>flexible:</i> max. +250°C <i>short time use:</i> +260°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Burning characteristics:</b>	no flame propagation acc. to IEC 60332-3-24 + VDE 0482-332-3-24 resp. IEC 60332-3-25 + VDE 0482-332-3-25 Cat. C resp. D Flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2.
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

<b>Type:</b> Conductor construction:	<b>Th LTS:</b> 0.22 mm <sup>2</sup> = 7 x 0.20 mm ø 0.50 mm <sup>2</sup> = 16 x 0.20 mm ø 1.00 mm <sup>2</sup> = 32 x 0.20 mm ø	<b>Th LTV:</b> 0.22 mm <sup>2</sup> = 7 x 0.20 mm ø 0.50 mm <sup>2</sup> = 16 x 0.20 mm ø 1.00 mm <sup>2</sup> = 32 x 0.20 mm ø
---	--	--

### Th LTS

item no.	type	dimensions mm <sup>2</sup>	for thermocouple	nominal outer-ø inch	mm	cable weight ≈lbs/mft
▶ 47310...*	Th 20 LTS	2 x 0.22	Fe-CuNi	0.130	3.3	1
▶ 47311...*	Th 50 LTS	2 x 0.50	Fe-CuNi	0.161	4.1	3
▶ 47312...*	Th 100 LTS	2 x 1.00	Fe-CuNi	0.193	4.9	3
▶ 47313...*	Th 20-4 LTS	4 x 0.22	Fe-CuNi	0.146	3.7	2
▶ 47314...*	Th 50-4 LTS	4 x 0.50	Fe-CuNi	0.185	4.7	3
▶ 47315...*	Th 100-4 LTS	4 x 1.00	Fe-CuNi	0.220	5.6	5
▶ 47310...*	Th 20 LTS	2 x 0.22	NiCr-Ni	0.130	3.3	1
▶ 47311...*	Th 50 LTS	2 x 0.50	NiCr-Ni	0.161	4.1	3
▶ 47312...*	Th 100 LTS	2 x 1.00	NiCr-Ni	0.193	4.9	3
▶ 47313...*	Th 20-4 LTS	4 x 0.22	NiCr-Ni	0.146	3.7	2
▶ 47314...*	Th 50-4 LTS	4 x 0.50	NiCr-Ni	0.185	4.7	3
▶ 47315...*	Th 100-4 LTS	4 x 1.00	NiCr-Ni	0.220	5.6	5

### Th LTV

item no.	type	dimensions mm <sup>2</sup>	for thermocouple	nominal outer-ø inch	mm	cable weight ≈lbs/mft
▶ 47350...*	Th 20 LTV	2 x 0.22	Fe-CuNi	0.126	3.2	1
▶ 47351...*	Th 50 LTV	2 x 0.50	Fe-CuNi	0.161	4.1	3
▶ 47352...*	Th 100 LTV	2 x 1.00	Fe-CuNi	0.193	4.9	3
▶ 47353...*	Th 20 -4 LTV	4 x 0.22	Fe-CuNi	0.142	3.6	2
▶ 47354...*	Th 50 -4 LTV	4 x 0.50	Fe-CuNi	0.185	4.7	3
▶ 47355...*	Th 100-4 LTV	4 x 1.00	Fe-CuNi	0.220	5.6	5
▶ 47350...*	Th 20 LTV	2 x 0.22	NiCr-Ni	0.126	3.2	1
▶ 47351...*	Th 50 LTV	2 x 0.50	NiCr-Ni	0.161	4.1	3
▶ 47352...*	Th 100 LTV	2 x 1.00	NiCr-Ni	0.193	4.9	3
▶ 47353...*	Th 20 -4 LTV	4 x 0.22	NiCr-Ni	0.142	3.6	2
▶ 47354...*	Th 50 -4 LTV	4 x 0.50	NiCr-Ni	0.185	4.7	3
▶ 47355...*	Th 100-4 LTV	4 x 1.00	NiCr-Ni	0.220	5.6	5

\*Thermocouple code see page M/5

# Compensation & Extension Cables

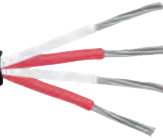


## RTD sensor cable

Connection cables for RTD



CKSKES · D-VIERSEN · RTD sensor cable 180 TW 4x26/7 AWG 38200043

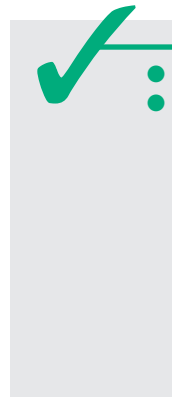


Marking for RTD sensor cable 180 TW 38200043:

SAB BRÖCKSKES · D-VIERSEN · RTD sensor cable 180 TW 4x26/7 AWG 38200043

### Technical data:

<b>Peak operating voltage:</b>	48 V		
<b>Testing voltage:</b>	conductor/conductor: 600 V conductor/shielding: 600 V		
<b>Min. bending radius</b> <i>fixed installation</i>	5 x O.D.		
<i>free movement:</i>	10 x O.D.		
<b>Temperature range</b>	<b>180 flex</b> <b>180 C flex</b> <b>180 highflex</b> <b>180 C highflex</b>	<b>180 TW</b> <b>180 C TW</b> -90/+180°C -55/+180°C	<b>250 TW</b> <b>250 C TW</b> -90/+250°C -55/+250°C
<i>static:</i>			
<i>flexible:</i>			
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30		



### Outstanding features:

- high temperature resistant
- small diameter

type item no.	no. of conductors x cross section	conductor	insulation	color code	shield	jacket material	jacket color	outer-ø approx. in	outer-ø approx. mm	cable weight ≈ lbs/mft
<b>RTD sensor cable 180 TW</b>										
38200023	2 x 26/7 AWG	tinned copper	FEP	● ○		FEP		0.075	1.9	4
38200033	3 x 26/7 AWG	tinned copper	FEP	● ● ○		FEP		0.079	2.0	5
38200043	4 x 26/7 AWG	tinned copper	FEP	● ● ● ○		FEP		0.087	2.2	7
<b>RTD sensor cable 180 C TW</b>										
38201023	2 x 26/7 AWG	tinned copper	FEP	● ○	tinned copper	FEP		0.098	2.5	9
38201033	3 x 26/7 AWG	tinned copper	FEP	● ● ○	tinned copper	FEP		0.102	2.6	10
38201043	4 x 26/7 AWG	tinned copper	FEP	● ● ● ○	tinned copper	FEP		0.110	2.8	13
<b>RTD sensor cable 180 flex</b>										
38202023	2 x 26/7 AWG	tinned copper	FEP	● ○		Besilen®		0.098	2.5	6
38202033	3 x 26/7 AWG	tinned copper	FEP	● ● ○		Besilen®		0.102	2.6	7
38202043	4 x 26/7 AWG	tinned copper	FEP	● ● ● ○		Besilen®		0.110	2.8	9
<b>RTD sensor cable 180 C flex</b>										
38203023	2 x 26/7 AWG	tinned copper	FEP	● ○	tinned copper	Besilen®		0.118	3.0	9
38203033	3 x 26/7 AWG	tinned copper	FEP	● ● ○	tinned copper	Besilen®		0.122	3.1	11
38203043	4 x 26/7 AWG	tinned copper	FEP	● ● ● ○	tinned copper	Besilen®		0.130	3.3	14
<b>RTD sensor cable 250 TW</b>										
38204023	2 x 26/7 AWG	nickel-plated copper	PFA	● ○		PFA		0.075	1.9	4
38204033	3 x 26/7 AWG	nickel-plated copper	PFA	● ● ○		PFA		0.079	2.0	5
38204043	4 x 26/7 AWG	nickel-plated copper	PFA	● ● ● ○		PFA		0.087	2.2	7
<b>RTD sensor cable 250 C TW</b>										
38205023	2 x 26/7 AWG	nickel-plated copper	PFA	● ○	nickel-plated copper	PFA		0.098	2.5	9
38205033	3 x 26/7 AWG	nickel-plated copper	PFA	● ● ○	nickel-plated copper	PFA		0.102	2.6	10
38205043	4 x 26/7 AWG	nickel-plated copper	PFA	● ● ● ○	nickel-plated copper	PFA		0.110	2.8	13
<b>RTD sensor cable 180 highflex</b>										
38206023	2 x 26/7 AWG	tinned copper	Besilen®	● ○		Besilen®		0.126	3.2	8
38206033	3 x 26/7 AWG	tinned copper	Besilen®	● ● ○		Besilen®		0.130	3.3	9
38206043	4 x 26/7 AWG	tinned copper	Besilen®	● ● ● ○		Besilen®		0.142	3.6	11
<b>RTD sensor cable 180 C highflex</b>										
38207023	2 x 26/7 AWG	tinned copper	Besilen®	● ○	tinned copper	Besilen®		0.142	3.6	13
38207033	3 x 26/7 AWG	tinned copper	Besilen®	● ● ○	tinned copper	Besilen®		0.150	3.8	14
38207043	4 x 26/7 AWG	tinned copper	Besilen®	● ● ● ○	tinned copper	Besilen®		0.161	4.1	18

Other dimensions and colors are possible on request.

# Compensation & Extension Cables

## PFA insulated extension cables for resistance thermometers

TGV with fiber-glass braiding and stainless steel wire armoring



TGV

### Construction:

<b>Conductor:</b>	nickel-plated copper strands
<b>Insulation:</b>	PFA
<b>Braiding:</b>	fiber-glass
<b>Stranding:</b>	conductors together
<b>Armoring:</b>	galvanized steel wire armoring (VA) with tracer
<b>Shape:</b>	round

### Technical data:

<b>Min. bending radius:</b>	12 x O.D.
<b>Temperature range of insulation:</b>	<i>static:</i> max. +250°C
	<i>flexible:</i> max. +250°C
	<i>short time use:</i> +260°C
<b>Insulation resistance:</b>	> 1MΩ x km
<b>Burning characteristics:</b>	no flame propagation acc. to IEC 60332-3-24 + VDE 0482-332-3-24 resp. IEC 60332-3-25 + VDE 0482-332-3-25 Cat. C resp. D Flame retardant and self-extinguishing acc. to IEC 60332-1-2 + VDE 0482-332-1-2.
<b>Absence of harmful substances:</b>	acc. to RoHS directive of the European Union see page O/30

item no.	dimensions n x mm <sup>2</sup>	construction of strands n x wires ø	color code	nominal outer-ø inch	mm	cable weight ≈lbs/mft
▶ 4700218	2 x 0.18	10 x 0.15	red-white	0.134	3.4	1
▶ 4700318	3 x 0.18	10 x 0.15	red-red-white	0.142	3.6	2
▶ 4700418	4 x 0.18	10 x 0.15	red-red-white-white	0.157	4.0	2
▶ 4700618	6 x 0.18	10 x 0.15	red-red-white-white-black-black	0.189	4.8	3

# Compensation & Extension Cables

## Connection cables for resistance thermometers, special and hybrid cables



SAB identification	Picture	Insulation	Cross section	Outer diameter- mm	Temperature range of insulation
<b>Connection cables for resistance thermometers</b>					
TTL		PFA	0.12 - 0.18 mm <sup>2</sup>	2.3 - 2.5	fixed installation: max. +250°C  limited time of use: max. +260°C
Th LTS Th LTV		fiber-glass/ fiber-glass	0.018 mm <sup>2</sup>	2.9	fixed installation: max. +250°C
LiYY LiYCY BiHF-J BiHF/Cu/Bi-J		PVC  Besilen®	0.14 - 1.5 mm <sup>2</sup>	3.18 - 8.4 3.6 - 9.3 (braid) 4.3 - 18.6 6.4 - 17.0 (braid)	fixed installation: -30°C up to +70°C  fixed installation: -40°C up to +180°C
TGV		PFA fiber-glass (braid)	0.18 mm <sup>2</sup>	3.4 - 4.8	fixed installation: +250°C
<b>Special and hybrid cables</b>					
SAB Type	Picture	Insulation	Cross section	Outer diameter- mm	Temperature range of insulation
Type J ***		Conductor: PVC Jacket: PUR	3 x 2 x 0.5 mm <sup>2</sup> JX + 8 x 6 mm <sup>2</sup>	18.8	fixed installation: -25°C up to +70°C
Type K Type J Type L ***		Conductor: TPE Jacket: PUR	0.22 mm <sup>2</sup>	3.0	flexible application: -40°C up to +90°C
Type K Type J Type L ***		PI-foil PI-foil	0.20 mm <sup>2</sup>	0.9 x 0.5	fixed installation: -40°C up to +250°C

\*\*\* Type T, E, R/S, N on request



**For all cables possible on request:**

- heat resistant PVC up to +105°C
- notch resistant Besilen® jacket (EWKF)















# Compensation & Extension Cables

## Compensating and Extension Cables for the automotive industry

SAB item no.	Picture	Cable type	T/C type	Insulation	Section	Cond.	Form	Outer-Ø	Temp.-range of insulation	thermoelectric voltage
<b>fiber-glass insulated thermo-cables (wire)</b>										
04899002		thermo-cable	type K	GL/GL	2 x 0.2 mm	wire	oval	approx. 0.8 x 1.3 mm	flexible application: -25°C up to +200°C fixed installation: -25°C up to +200°C	IEC 60584 class 1 tolerance ± 1,5°C
04892144		thermocouple cable	type K	GL/GL	2 x 0.5 mm	wire	oval	approx. 1.9 x 1.1 mm	flexible application: -40°C up to +250°C fixed installation: -40°C up to +250°C	IEC 60584 class 1
04899003		thermo-cable	type K	GL/GL	2 x 0.8 mm	wire	oval	approx. 2.5 x 1.4 mm	flexible application: -25°C up to +200°C fixed installation: -25°C up to +200°C	IEC 60584 class 1
04909016		thermocouple cable	type K	GL/GL	2 x 0.5 mm	wire	oval	approx. 2.0 x 1.2 mm	flexible application: max. +400°C fixed installation: max. +400°C	IEC 60584 class 1
<b>polyimide insulated thermo-cables (wire)</b>										
04339138		thermocouple cable	type K	KN-polyimide KP-bare/polyimide	2 x 0.2 mm	wire	oval	approx. 0.9 x 0.5 mm	flexible application: -40°C up to +250°C fixed installation: -40°C up to +250°C	IEC 60584 class 1 tolerance ± 1.5°C
04339186		thermocouple cable	type K	KN-polyimide KP-bare/polyimide	2 x 0.2 mm	wire	oval	approx. 0.7 x 0.5 mm	flexible application: -40°C up to +250°C fixed installation: -40°C up to +250°C	IEC 60584 class 1 tolerance ± 1.5°C
04339149		thermocouple cable	type K	polyimide + PTFE/polyimide	2 x 0.3 mm	wire	oval	approx. 0.9 x 1.7 mm	flexible application: -40°C up to +250°C fixed installation: -40°C up to +250°C	IEC 60584 class 1 tolerance ± 1.5°C
04339168		thermocouple cable	type K	KN-polyimide KP-PTFE/polyimide	2 x 0.2 mm	wire	oval	approx. 1.0 x 0.8 mm	flexible application: -40°C up to +250°C fixed installation: -40°C up to +250°C	IEC 60584 class 1
<b>polyimide/PFA insulated thermo-cables (wire)</b>										
04339196		thermocouple cable	type K	KN-polyimide KP-bare/polyimide/PFA	2 x 0.2 mm	wire	round	max. 1.0 mm	flexible application: -40°C up to +250°C fixed installation: -40°C up to +250°C	IEC 60584 class 1
<b>FEP insulated thermo-cables (wire)</b>										
04339152		thermocouple cable	type K	FEP/FEP	2 x 0.2 mm	wire	oval	approx. 1.7 x 1.1 mm	flexible application: -40°C up to +180°C fixed installation: -40°C up to +180°C	IEC 60584 class 1
<b>TPE insulated thermo-cable (strands)</b>										
04339177		thermocouple cable	type K	TPE/TPE	2 x 0.2 mm <sup>2</sup>	strands	round	approx. 3.0 mm	flexible application: -40°C up to +90°C fixed installation: -40°C up to +90°C	IEC 60584 class 1
<b>FEP/Besilen® insulated thermo-cables (strands)</b>										
04339193		thermocouple cable	type K	FEP/FEP/Bi	2 x 0.2 mm <sup>2</sup>	strands	round	approx. 3.8 mm	flexible application: -25°C up to +180°C fixed installation: -40°C up to +180°C	IEC 60584 class 2





































# Compensation & Extension Cables

## Compensating and Extension Cables for the automotive industry

SAB item no.	Picture	Cable type	T/C type	Insulation	Section	Cond.	Form	Outer-Ø	Temp.-range of insulation	thermoelectric voltage
<b>FEP/Besilen® connection cables for resistance thermometers (strands)</b>										
04709224		connection cable	tinned copper strands	FEP/Bi	2 x 0.14 mm <sup>2</sup>	strands	round	approx. 2.8 mm	flexible application: -25°C up to +180°C fixed installation: -40°C up to +180°C	
04700423		connection cable	tinned copper strands	FEP/Bi	4 x 0.22 mm <sup>2</sup>	strands	round	approx. 3.9 mm	flexible application: -25°C up to +180°C fixed installation: -40°C up to +180°C	
38339132		connection cable	tinned copper strands	FEP/C/ FEP	4 x 0.22 mm <sup>2</sup>	strands	round	approx. 3.0 mm	flexible application: -55°C up to +180°C fixed installation: -90°C up to +180°C	
<b>FEP insulated thermo-cables (strands)</b>										
04339157		thermo-cable	type K	FEP/FEP	2 x 0.22 mm <sup>2</sup>	strands	oval	approx. 2.5 x 1.5 mm	flexible application: -25°C up to +180°C fixed installation: -25°C up to +180°C	IEC 60584 tolerance ± 1°C
04339137		thermo-cable	type K	FEP/FEP	2 x 0.22 mm <sup>2</sup>	strands	round	approx. 2.0 mm	flexible application: -25°C up to +180°C fixed installation: -25°C up to +180°C	IEC 60584 tolerance ± 1°C
04339154		thermo-cable	type K	FEP/FEP	8 x 2 x 0.22 mm <sup>2</sup>	strands	round	approx. 6.4 mm	flexible application: -25°C up to +180°C fixed installation: -25°C up to +180°C	IEC 60584 class 2
04339135		thermo-cable	type K	FEP/FEP	16 x 2 x 0.22 mm <sup>2</sup> twisted pairs	strands	round	approx. 7.7 mm	flexible application: -25°C up to +180°C fixed installation: -25°C up to +180°C	IEC 60584 class 2
04359085		thermocouple 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 application: -55°C up to +180°C fixed installation: -90°C up to +180°C	IEC 60584 class 1
<b>FEP insulated thermo-cables with screening (strands)</b>										
04359037		thermo-cable	type K	FEP/C/ FEP	2 x 0.22 mm <sup>2</sup>	strands	round	approx. 2.6 mm	flexible application: -25°C up to +180°C fixed installation: -25°C up to +180°C	IEC 60584 tolerance ± 1.5°C
<b>Besilen® insulated thermo-cables (strands)</b>										
04519019		thermo-cable	type K	GL/ Silicone	2 x 0.22 mm <sup>2</sup>	strands	round	approx. 3.2 mm	flexible application: -25°C up to +200°C fixed installation: -25°C up to +200°C	IEC 60584 class 1

# Compensation & Extension Cables

## Color code and temperature range for compensating and extension cables

THERMOCOUPLE											
Code	Material ⊕ ⊖	IEC 60584 Identification		DIN 43710* Identification		ANSI 96.1 Identification		BS 4937 Identification		NFC 42-324 Identification	
		THL	AGL	THL	AGL	THL	AGL	THL	AGL	THL	AGL
T	Cu - Cu Ni	 TX -25° to +100°C		 0° to +100°C	 0° to +100°C	 -25° to +200°C					
U	Cu - Cu Ni		 UX 0° to +200°C								
J	Fe - Cu Ni	 JX -25° to +200°C		 0° to +200°C	 0° to +200°C	 -25° to +200°C					
L	Fe - Cu Ni		 LX 0° to +200°C								
E	Ni Cr - Cu Ni	 EX -25° to +200°C		 0° to +200°C	 0° to +200°C	 -25° to +200°C					
K	Ni Cr - Ni	 KX -25° to +200°C		 0° to +200°C	 0° to +200°C	 -25° to +200°C					
K	Ni Cr - Ni	 KCA 0° to +150°C				 0° to +150°C					
K	Ni Cr - Ni	 KCB 0° to +100°C				 0° to +100°C	 0° to +100°C				
N	Ni Cr Si - Ni Si	 NX -25° to +200°C	 NC 0° to +150°C								
R S	Pt Rh 13 - Pt Pt Rh 10 - Pt	 RCB/ SCB 0° to +200°C		 0° to +200°C	 0° to +200°C	 0° to +200°C					
B	Pt Rh 30 - Pt Rh 6			 0° to +100°C		 0° to +100°C					

The application temperature range of the cable is limited by the highest application temperature of the insulating material or the application temperature range of the conductor material. In all cases the respective lower figure is valid. The compensating cable for the thermocouple type B can also be manufactured, deviating from the corresponding standards, for a temperature range from 0 to +200°C (SAB-Type BC-200). Variant color codes can be manufactured for a minimum order quantity.

\* The standard 43710 was withdrawn in April 1994.

Therefore, the element types "U" and "L" are not standardized anymore.

THL = extension cable · AGL = compensating cable