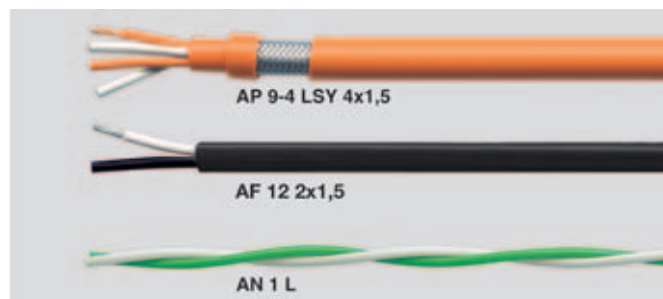
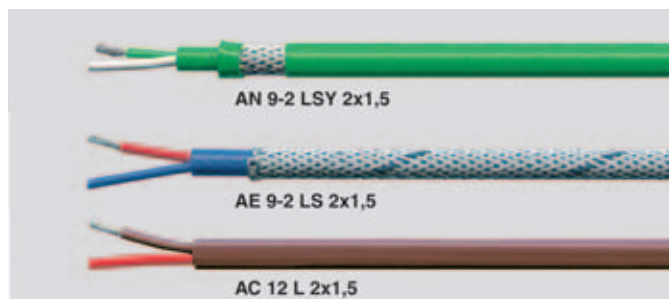


Photo: HELUKABEL®

Compensating Cables

Compensating Cables



Technical data

– Special insulation as per requirement of PVC, Silicone, Fluorinated polymeric or Glassfilament

– Conductor resistance

according DIN 43713

Fe: 0,080 Ohm/m

CuNi: 0,327 Ohm/m

NiCr: 0,07 Ohm/m

Ni: 0,3 Ohm/m

PtRh: 0,023 Ohm/m

Pt: 0,041 Ohm/m

– Test voltage

for PVC-, Fluorinated polymeric- and Silicone cables

core/core 500 V

core/screen 500 V

screen/screen 500 V

– Test voltage

Cables with Glassfilament

core/core 500 V

– Insulation resistance

for PVC, Silicone and Fluorinated polymeric

min. 10 MOhm x km

– Capacitance

(approx. value) – nF/km

	Stranded wire 1,5 mm ²	Solid wire 1,5 mm ²	Stranded wire 0,22mm ²
• PVC			
core	135	138	115
pair			
screened	240	245	180
• FEP			
core	60	60	45
pair			
screened	120	120	70
• Silicone			
core	80	70	45

– Induction

(guiding value)

for PVC, Fluorinated polymeric and Silicon cables < 1 mH/km

– Corrosiveness of combustion gases (free from halogen)

• Silicone + Glassfilament

Test method to VDE 0472 part 813 and IEC 60754-1

• no evolution of corrosive gases

– Behaviour in fire

PVC sheath self-extinguishing and flame retardant acc. to VDE 0482-322-1-2, DIN EN 60332-1-2/IEC 60332-1 (equals to DIN VDE 0472 part 804 test method B)

Cable structure

– Conductors of stranded wires or solid, insulated with special material

– Conductors: Fe/CuNi, Ni/Cr Ni or Pt Rh/Pt

– Insulations: PVC, Silicone, Fluorinated polymeric or Glassfilament

– Core identification:

 colour coded, single colour (see also colour-identification table)

– Colour code for pairs

 from 2 pairs and above the individual pairs number coded

– Jacketing materials are of PVC, Silicone, Fluorinated polymeric or Glassfilament-braiding

– Screened braiding of galvanized steel wire (type SV) or galvanized copper wire braided screen.

Measuring

For temperature measuring the temperature dependent upon the characteristics of materials are taken into consideration, for example the expansion thermometer of the thermocouples etc.

Temperature measuring appliances with a thermocouple as transmitter of the measured value consists generally of the thermocouple, the connection between the junction and a reference part, a comparative part where the temperature is known under a voltage measuring device.

The fitted connection line between the thermocouple and the comparative part must have the same thermoelectrical characteristics as the thermocouple.

The difference of temperature is measured between the measuring point and the comparative part of the cable. Tolerance of the meter resistance $\pm 10\%$.

The difference of temperature is measured between the measuring point and the comparative part of the cable.

Tolerance of the meter resistance $\pm 10\%$.

For hazardous areas

The compensating cables for thermoelements with plastic insulation are permitted to imprint colour longitudinal stripe of the same belonging thermoelement types, and as:

Cu/Cu-Ni = brown, Fe/Cu-Ni = dark blue, NiCr/Ni = green, Pt-Rh/Pt = white

The compensating cables for thermoelements with mineral insulation or with metal braiding must be identified with a light blue coloured tape of sufficient width for intrinsic safe, which can be webed in the braiding.

- Flame test to DIN VDE 0482 part 266-2/ HD 405.3, BS 4066 part 3/EN 50266-2/ IEC 60332-3 (equivalent DIN VDE 0472 part 804 test method C)

Application

Compensating cables are an essential part of exact and precise measuring capabilities. They are used as extension leads from the thermocoupling elements to the measure gauge.

Compensating cables are made up of a positive and a negative core which, at a thermocoupler temperature of up to +200°C, retain the same properties as a Thermopair according to DIN 43710.

Materials

(Compensating wires and strands) We distinguish between original raw materials and substitutes.

- Compensating wires and strands of **original raw materials** are made of the same material as the corresponding thermocouple and they are called **Thermocable** or **Thermocouplecable**.
- Compensating wires and strands of **substitute materials**, which consist of alloys and which are not identical with the corresponding thermocouple are called **Compensating Cable**.

– **Substitute materials** are used for the thermopairs Type **K** and Type **N**.

– **Precious metal thermopairs**

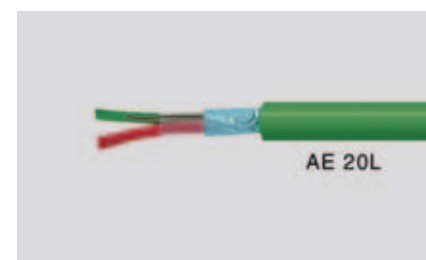
Type **R**, Type **S**, Type **B** consist of thermomaterials.

Thermocouple cables



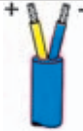



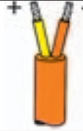

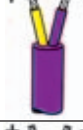



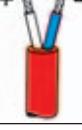
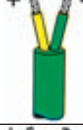
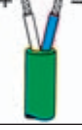

Thermocouple cables consist of the same element material as the thermocouple and are tested to the same temperatures. These cables are manufactured to customers request.

Note

Thermomaterials consist of very expensive materials while the substitutes are much cheaper.



Colour identification and temperature ranges

Identification letter of Thermopairs	Material combination		 NF C 42-324		 BS 4937	
	+(plus)	-(minus)	THL	AGL	THL	AGL
T	Cu	Cu Ni	TX -25°C to +100°C		TC -25°C to +100°C	
U	Cu	Cu Ni				
J	Fe	Cu Ni	JX -25°C to +200°C		JC -25°C to +250°C	
L	Fe	Cu Ni				
E	Ni Cr	Cu Ni	EX -25°C to +200°C		EC -25°C to +250°C	
K	Ni Cr	Ni	KX -25°C to +200°C		KC -25°C to +200°C	
	Ni Cr	Ni			WC 0°C to +150°C	
	Ni Cr	Ni			VC 0°C to +100°C	
N	Ni Cr Si	Ni Si				
R S	PtRh 13 PtRh 10	Pt Pt			SC 0°C to +200°C	
B	PtRh 30	PtRh 6			BC 0°C to +100°C	

The highest application temperature of the insulating materials or the application temperature range of the conductor material is limited for the application temperature range of the cable. Valid with the corresponding lower value.

For intrinsically safe installation generally provides with a blue coloured jacket and an element with the associated identification stripe.

Compensating Cables

Materials for compensating cables

Standards	Art of thermocouple elements			Materials of compensating cables		
	Type	Plus-Pol (+)	Minus-Pol (-)	Code	Plus-Pol (+)	Minus-Pol (-)
DIN 43710	U	Cu	CuNi	UX	Cu	CuNi
	L	Fe	CuNi	LX	Fe	CuNi
DIN IEC 584	T	Cu	CuNi	TX	Cu	CuNi
	E	NiCr	CuNi	EX	NiCr	CuNi
	J	Fe	CuNi	JX	Fe	CuNi
	K	NiCr	Ni	KX	NiCr	Ni
	K	NiCr	Ni	KC 1	Fe	CuNi
	K	NiCr	Ni	KC 2	Cu	CuNi
	R/S	Pt 13/10 Rh	Pt	RC A/SC A	Cu	CuNi
	R/S	Pt 13/10 Rh	Pt	RC B/SC B	Cu	CuNi
NF	T	Cu	CuNi	TX	Cu	CuNi
	E	NiCr	CuNi	EX	NiCr	CuNi
	J	Fe	CuNi	JX	Fe	CuNi
	K	NiCr	Ni	KX	NiCr	Ni
	K	NiCr	Ni	VC	Cu	CuNi
	K	NiCr	Ni	WC	Fe	CuNi
	R/S	Pt 13/10 Rh	Pt	RC/SC	Cu	CuNi
	B	Pt 30 Rh	Pt 6 Rh	BC	Cu-Leg.	Cu
ANSI	T	Cu	CuNi	TX	Cu	CuNi
	E	NiCr	CuNi	EX	NiCr	CuNi
	J	Fe	CuNi	JX	Fe	CuNi
	K	NiCr	Ni	KX	NiCr	Ni
	R/S	Pt 13/10 Rh	Pt	RX/SX	Cu	CuNi
	B	Pt 30 Rh	Pt 6 Rh	BX	Cu	Cu

Characteristics of the conductors for thermo-pairs and compensating cables

Materials	Main components approx. %				Density at 20°C $\frac{g}{cm^3}$	Specific resistance at 20°C $\mu Ohm \cdot cm$	Resistance value (nominal value) Ohm/m	
	Cu	Ni	Mn	Others			mm \varnothing 0,20	mm \varnothing 1,38
CuNi	55	44	1	-	8,85	49	15,60	0,328
SoNi	51	45	2	Fe2	8,85	51	16,26	0,341
NiCr	-	Rest	-	Cr 10	8,7	72	22,90	0,481
Ni	-	95	MnAlSi	5	8,55	27	8,59	0,180
SoPt	95	3	2	-	8,9	12	3,82	0,0802
ECu	according to DIN 46 431				8,9	1,7	0,54	0,011
Fe	-	-	-	-	7,85	12	3,82	0,08
BPX	97	-	3	-	8,9	12,5	3,98	0,084

Compensating Cables

Part No.	Thermo-pair materials to DIN 43713	Thermo-pair Type	Type	Core insulation	Jacket/Armouring/Jacket	Outer ø ca. mm	Form	Temperature range of insulation °C	Temperature range at installation °C	Min. bending radius ..x cable ø	Weight ca. kg/km
Single pair: 2 x 1,5 mm² (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48001	Fe-CuNi (Ko)	L	AE 1 L stranded	PVC	-	5,4	round			7,5	40
48002	SoNiCr-SoNi	K	AN 1 L stranded	PVC	-	5,4	round	-10°C to +80°C	stationary: -25°C to +70°C	7,5	40
48003	SoPtRh-SoPt	S	AP 1 L stranded	PVC	-	5,4	round		flexing: -5°C to +70°C	7,5	40
48230	Cu-CuNi (Ko)	U	AC 1 L stranded	PVC	-	5,4	round			7,5	40
48478	Fe-CuNi	J	AF 1 L stranded	PVC	-	5,4	round			7,5	40
48004	Fe-CuNi (Ko)	L	AE 1 M stranded	PVC	-	5,4	round	-10°C to +80°C	stationary: -25°C to +70°C	10	40
48005	SoNiCr-SoNi	K	AN 1 M stranded	PVC	-	5,4	round		flexing: -5°C to +70°C	10	40
48006	SoPtRh-SoPt	S	AP 1 M stranded	PVC	-	5,4	round			10	40
48231	Cu-CuNi (Ko)	U	AC 1 M stranded	PVC	-	5,4	round			10	40
48007	Fe-CuNi (Ko)	L	AE 1 L-SIL stranded	Silicone	-	5,4	round	-60°C to +180°C	stationary: -25°C to +180°C	7,5	40
48008	SoNiCr-SoNi	K	AN 1 L-SIL stranded	Silicone	-	5,4	round		flexing: -25°C to +180°C	7,5	40
48009	SoPtRh-SoPt	S	AP 1 L-SIL stranded	Silicone	-	5,4	round		(short time +200°C)	7,5	40
48232	Cu-CuNi (Ko)	U	AC 1 L-SIL stranded	Silicone	-	5,4	round			7,5	40
48233	Fe-CuNi (Ko)	L	AE 2 M-SIL stranded	Silicone	textile tape/lead sheath/	7,8	round	-60°C to +180°C	stationary: -25°C to +180°C	15	248
48234	SoNiCr-SoNi	K	AN 2 M-SIL stranded	Silicone	tin. steel wire	7,8	round		flexing: -25°C to +180°C	15	248
48235	SoPtRh-SoPt	S	AP 2 M-SIL stranded	Silicone	braiding	7,8	round		(short time +200°C)	15	248
48236	Cu-CuNi (Ko)	U	AC 2 M-SIL stranded	Silicone		7,8	round			15	248
48010	Fe-CuNi (Ko)	L	AE 3 L parallel	glass filam.	glass filam. braid.	5,0x7,2	oval	-60°C to +200°C	stationary: -25°C to +200°C	7,5	64
48011	SoNiCr-SoNi	K	AN 3 L parallel	glass filam.	glass filam. braid.	5,0x7,2	oval		flexing: -25°C to +200°C	7,5	64
48012	SoPtRh-SoPt	S	AP 3 L parallel	glass filam.	glass filam. braid.	5,0x7,2	oval			7,5	64
48237	Cu-CuNi (Ko)	U	AC 3 L parallel	glass filam.	glass filam. braid.	5,0x7,2	oval			7,5	64
48238	Fe-CuNi (Ko)	L	AE 3 Ln-SIL parallel	Silicone	Silicone	5,2x7,4	oval	-60°C to +180°C	stationary: -25°C to +180°C	7,5	62
48239	SoNiCr-SoNi	K	AN 3 Ln-SIL parallel	Silicone	Silicone	5,2x7,4	oval		flexing: -25°C to +180°C	7,5	62
48240	SoPtRh-SoPt	S	AP 3 Ln-SIL parallel	Silicone	Silicone	5,2x7,4	oval		(short time +200°C)	7,5	62
48241	Cu-CuNi (Ko)	U	AC 3 Ln-SIL parallel	Silicone	Silicone	5,2x7,4	oval			7,5	62
48013	Fe-CuNi (Ko)	L	AE 4 L parallel	glass filam.	glass filam. braid./galv. steel wire-braiding	5,8x8,0	oval	-60°C to +200°C	stationary: -25°C to +200°C	7,5	87
48014	SoNiCr-SoNi	K	AN 4 L parallel	glass filam.		5,8x8,0	oval		flexing: -25°C to +200°C	7,5	87
48015	SoPtRh-SoPt	S	AP 4 L parallel	glass filam.		5,8x8,0	oval			7,5	87
48242	Cu-CuNi (Ko)	U	AC 4 L parallel	glass filam.		5,8x8,0	oval			7,5	87
48016	Fe-CuNi (Ko)	L	AE 4 Ln-SIL	Silicone	Silicone/galv. steel wire-braiding	6,0x8,2	oval	-60°C to +180°C	stationary: -25°C to +180°C	7,5	85
48017	SoNiCr-SoNi	K	AN 4 Ln-SIL	Silicone		6,0x8,2	oval		flexing: -25°C to +180°C	7,5	85
48018	SoPtRh-SoPt	S	AP 4 Ln-SIL	Silicone		6,0x8,2	oval		(short time +200°C)	7,5	85
48243	Cu-CuNi (Ko)	U	AC 4 Ln-SIL	Silicone		6,0x8,2	oval			7,5	85
48244	Fe-CuNi (Ko)	L	AE 5 L	PVC	PETP-tape/Cu-solid wire braiding/tinned/PVC-jacket	8,1	round	-10°C to +80°C	stationary: -25°C to +70°C	7,5	93
48245	SoNiCr-SoNi	K	AN 5 L	PVC		8,1	round		flexing: -5°C to +70°C	7,5	93
48246	SoPtRh-SoPt	S	AP 5 L	PVC		8,1	round			7,5	93
48247	Cu-CuNi (Ko)	U	AC 5 L	PVC		8,1	round			7,5	93
48248	Fe-CuNi (Ko)	L	AE 6 L-SIL	Silicone	PETP-tape/Cu-ground wire 0,5 mm ø / Alu-tape/Silicone	8,0	round	-60°C to +180°C	stationary: -25°C to +180°C	7,5	94
48249	SoNiCr-SoNi	K	AN 6 L-SIL	Silicone		8,0	round		flexing: -25°C to +180°C	7,5	94
48250	SoPtRh-SoPt	S	AP 6 L-SIL	Silicone		8,0	round		(short time +200°C)	7,5	94
48251	Cu-CuNi (Ko)	U	AC 6 L-SIL	Silicone		8,0	round			7,5	94
48252	Fe-CuNi (Ko)	L	AE 6 M-SIL	Silicone	PETP-tape/Cu-ground wire 0,5 mm ø / Alu-tape/Silicone	7,8	round	-60°C to +180°C	stationary: -25°C to +180°C	12	92
48253	SoNiCr-SoNi	K	AN 6 M-SIL	Silicone		7,8	round		flexing: -25°C to +180°C	12	92
48254	SoPtRh-SoPt	S	AP 6 M-SIL	Silicone		7,8	round		(short time +200°C)	12	92
48255	Cu-CuNi (Ko)	U	AC 6 M-SIL	Silicone		7,8	round			12	92
48019	Fe-CuNi (Ko)	L	AE 7 L parallel	PVC	glass filament	5,5x8,2	oval	-10°C to +80°C	stationary: -25°C to +70°C	7,5	60
48020	SoNiCr-SoNi	K	AN 7 L parallel	PVC	glass filament	5,5x8,2	oval		flexing: -5°C to +70°C	7,5	60
48021	SoPtRh-SoPt	S	AP 7 L parallel	PVC	glass filament	5,5x8,2	oval			7,5	60
48256	Cu-CuNi (Ko)	U	AC 7 L parallel	PVC	glass filament	5,5x8,2	oval			7,5	60
48022	Fe-CuNi (Ko)	L	AE 8 L	PVC	glass filament/galv. steel wire braiding	6,3x9,0	oval	-10°C to +80°C	stationary: -25°C to +70°C	7,5	82
48023	SoNiCr-SoNi	K	AN 8 L	PVC		6,3x9,0	oval		flexing: -5°C to +70°C	7,5	82
48024	SoPtRh-SoPt	S	AP 8 L	PVC		6,3x9,0	oval			7,5	82
48257	Cu-CuNi (Ko)	U	AC 8 L	PVC		6,3x9,0	oval			7,5	82
48025	Fe-CuNi (Ko)	L	AE 9 L	PVC	PVC	7,0	round	-10°C to +80°C	stationary: -25°C to +70°C	7,5	79
48026	SoNiCr-SoNi	K	AN 9 L	PVC	PVC	7,0	round		flexing: -5°C to +70°C	7,5	79
48027	SoPtRh-SoPt	S	AP 9 L	PVC	PVC	7,0	round			7,5	79
48258	Cu-CuNi (Ko)	U	AC 9 L	PVC	PVC	7,0	round			7,5	79
48479	Fe-CuNi	J	AF 9 L	PVC	PVC	7,0	round			7,5	79
48028	Fe-CuNi (Ko)	L	AE 9-2 LS	PVC	PVC/galv. steel wire braiding	7,8	round	-10°C to +80°C	stationary: -25°C to +70°C	7,5	108
48029	SoNiCr-SoNi	K	AN 9-2 LS	PVC		7,8	round		flexing: -5°C to +70°C	7,5	108
48030	SoPtRh-SoPt	S	AP 9-2 LS	PVC		7,8	round			7,5	108
48259	Cu-CuNi (Ko)	U	AC 9-2 LS	PVC		7,8	round			7,5	108
48480	Fe-CuNi	J	AF 9-2 LS	PVC		7,8	round		7,5	108	
48031	Fe-CuNi (Ko)	L	AE 9-2 LSY	PVC	PVC/galv. steel wire braiding/PVC	9,8	round	-10°C to +80°C	stationary: -25°C to +70°C	7,5	147
48032	SoNiCr-SoNi	K	AN 9-2 LSY	PVC		9,8	round		flexing: -5°C to +70°C	7,5	147
48069	SoPtRh-SoPt	S	AP 9-2 LSY	PVC		9,8	round			7,5	147
48260	Cu-CuNi (Ko)	U	AC 9-2 LSY	PVC		9,8	round			7,5	147

L = conductor of stranded wires
M = solid conductor
tin. = tinned
galv. = galvanized

Continuation ▶

Compensating Cables

Part No.	Thermo-pair materials to DIN 43713	Thermo-pair Type	Type	Core insulation	Jacket/Armouring/Jacket	Outer ø ca. mm	Form	Temperature range of insulation °C	Temperature range at installation °C	Min. bending radius .x cable ø	Weight ca. kg/km
Single pair: 2 x 1,5 mm² (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48033	FE-CuNi (Ko)	L	AE 9 M	PVC	PVC	7,0	round		stationary:	12	79
48034	SoNiCr-SoNi	K	AN 9 M	PVC	PVC	7,0	round		-25°C to +70°C	12	79
48035	SoPtRh-SoPt	S	AP 9 M	PVC	PVC	7,0	round		flexing:	12	79
48261	Cu-CuNi (Ko)	U	AC 9 M	PVC	PVC	7,0	round		-5°C to +70°C	12	79
48262	Fe-CuNi (Ko)	L	AE 9-2 MSY	PVC		9,6	round		stationary:	12	144
48263	SoNiCr-SoNi	K	AN 9-2 MSY	PVC	PVC/galv. steel wire braiding/	9,6	round	-10°C to +80°C	-25°C to +70°C	12	144
48264	SoPtRh-SoPt	S	AP 9-2 MSY	PVC	PVC	9,6	round		flexing:	12	144
48265	Cu-CuNi (Ko)	U	AC 9-2 MSY	PVC		9,6	round		-5°C to +70°C	12	144
48036	Fe-CuNi (Ko)	L	AE 10 L-SIL parallel	Silicone	glass filament	5,5x8,2	oval		stationary:	7,5	59
48037	SoNiCr-SoNi	K	AN 10 L-SIL parallel	Silicone	glass filament	5,5x8,2	oval		-25°C to +180°C	7,5	59
48038	SoPtRh-SoPt	S	AP 10 L-SIL parallel	Silicone	glass filament	5,5x8,2	oval		flexing:	7,5	59
48266	Cu-CuNi (Ko)	U	AC 10 L-SIL parallel	Silicone	glass filament	5,5x8,2	oval		-25°C to +180°C (short time +200°C)	7,5	59
48039	Fe-CuNi (Ko)	L	AE 11 L	Silicone		6,3x9,0	oval		stationary:	7,5	82
48040	SoNiCr-SoNi	K	AN 11 L	Silicone	glass filament/ galv. steel wire braiding	6,3x9,0	oval	-60°C to +180°C	-25°C to +180°C	7,5	82
48041	SoPtRh-SoPt	S	AP 11 L	Silicone		6,3x9,0	oval		flexing:	7,5	82
48267	Cu-CuNi (Ko)	U	AC 11 L	Silicone		6,3x9,0	oval		-25°C to +180°C (short time +200°C)	7,5	82
48042	Fe-CuNi (Ko)	L	AE 11 Lr	Silicone		6,7	round		stationary:	7,5	83
48043	SoNiCr-SoNi	K	AN 11 Lr	Silicone	glass filament/ galv. steel wire braiding	6,7	round	-60°C to +180°C	-25°C to +180°C	7,5	83
48044	SoPtRh-SoPt	S	AP 11 Lr	Silicone		6,7	round		flexing:	7,5	83
48268	Cu-CuNi (Ko)	U	AC 11 Lr	Silicone		6,7	round		-25°C to +180°C (short time +200°C)	7,5	83
48045	Fe-CuNi (Ko)	L	AE 11 Mr	Silicone		6,5	round		stationary:	12	83
48046	SoNiCr-SoNi	K	AN 11 Mr	Silicone	glass filament/ galv. steel wire braiding	6,5	round	-60°C to +180°C	-25°C to +180°C	12	83
48047	SoPtRh-SoPt	S	AP 11 Mr	Silicone		6,5	round		flexing:	12	83
48269	Cu-CuNi (Ko)	U	AC 11 Mr	Silicone		6,5	round		-25°C to +180°C (short time +200°C)	12	83
48048	Fe-CuNi (Ko)	L	AE 12 L parallel	PVC	PVC	4,3x7,0	oval		stationary:	7,5	69
48049	SoNiCr-SoNi	K	AN 12 L parallel	PVC	PVC	4,3x7,0	oval		-25°C to +70°C	7,5	69
48050	SoPtRh-SoPt	S	AP 12 L parallel	PVC	PVC	4,3x7,0	oval		flexing:	7,5	69
48270	Cu-CuNi (Ko)	U	AC 12 L parallel	PVC	PVC	4,3x7,0	oval		-5°C to +70°C	7,5	69
48481	Fe-CuNi	J	AF 12 L parallel	PVC	PVC	4,3x7,0	oval			7,5	69
48051	Fe-CuNi (Ko)	L	AE 12 M parallel	PVC	PVC	4,2x6,8	oval		stationary:	12	61
48052	SoNiCr-SoNi	K	AN 12 M parallel	PVC	PVC	4,2x6,8	oval		-25°C to +70°C	12	61
48053	SoPtRh-SoPt	S	AP 12 M parallel	PVC	PVC	4,2x6,8	oval		flexing:	12	61
48271	Cu-CuNi (Ko)	U	AC 12 M parallel	PVC	PVC	4,2x6,8	oval		-5°C to +70°C	12	61
48054	Fe-CuNi (Ko)	L	AE 13 L parallel	Silicone	glass filament	3,2x5,9	oval		stationary:	7,5	45
48055	SoNiCr-SoNi	K	AN 13 L parallel	Silicone	glass filament	3,2x5,9	oval		-25°C to +180°C	7,5	45
48056	SoPtRh-SoPt	S	AP 13 L parallel	Silicone	glass filament	3,2x5,9	oval		flexing:	7,5	45
48272	Cu-CuNi (Ko)	U	AC 13 L parallel	Silicone	glass filament	3,2x5,9	oval		-25°C to +180°C (short time +200°C)	7,5	45
48057	Fe-CuNi (Ko)	L	AE 13 M	Silicone	glass filament	3,5x6,0	oval		stationary:	12	45
48058	SoNiCr-SoNi	K	AN 13 M	Silicone	glass filament	3,5x6,0	oval		-25°C to +180°C	12	45
48059	SoPtRh-SoPt	S	AP 13 M	Silicone	glass filament	3,5x6,0	oval		flexing:	12	45
48273	Cu-CuNi (Ko)	U	AC 13 M	Silicone	glass filament	3,5x6,0	oval		-25°C to +180°C (short time +200°C)	12	45
48060	Fe-CuNi (Ko)	L	AE 14 L	Silicone		11,7	round		stationary:	7,5	196
48061	SoNiCr-SoNi	K	AN 14 L	Silicone	special Silicone compound, foamed/ galv. steel tubing	11,7	round	-60°C to +180°C	-25°C to +180°C	7,5	196
48062	SoPtRh-SoPt	S	AP 14 L	Silicone		11,7	round		flexing:	7,5	196
48274	Cu-CuNi (Ko)	U	AC 14 L	Silicone		11,7	round		-25°C to +180°C (short time +200°C)	7,5	196
48063	Fe-CuNi (Ko)	L	AE 15 L	Silicone	Silicone	7,7	round		stationary:	7,5	76
48064	SoNiCr-SoNi	K	AN 15 L	Silicone	Silicone	7,7	round		-25°C to +180°C	7,5	76
48065	SoPtRh-SoPt	S	AP 15 L	Silicone	Silicone	7,7	round		flexing:	7,5	76
48275	Cu-CuNi (Ko)	U	AC 15 L	Silicone	Silicone	7,7	round		-25°C to +180°C (short time +200°C)	7,5	76
48482	Fe-CuNi	J	AF 15 L	Silicone	Silicone	7,7	round			7,5	76
48066	Fe-CuNi (Ko)	L	AE 15 LS	Silicone		7,8	round		stationary:	7,5	105
48067	SoNiCr-SoNi	K	AN 15 LS	Silicone	Silicone/ galv. steel wire braiding	7,8	round	-10°C to +180°C	-25°C to +180°C	7,5	105
48068	SoPtRh-SoPt	S	AP 15 LS	Silicone		7,8	round		flexing:	7,5	105
48276	Cu-CuNi (Ko)	U	AC 15 LS	Silicone		7,8	round		-25°C to +180°C (short time +200°C)	7,5	105
48277	Fe-CuNi (Ko)	L	AE 16 L-SIL parallel	Silicone	-	2,8x5,6	oval		stationary:	7,5	38
48278	SoNiCr-SoNi	K	AN 16 L-SIL parallel	Silicone	-	2,8x5,6	oval		-25°C to +180°C	7,5	38
48279	SoPtRh-SoPt	S	AP 16 L-SIL parallel	Silicone	-	2,8x5,6	oval		flexing:	7,5	38
48280	Cu-CuNi (Ko)	U	AC 16 L-SIL parallel	Silicone	-	2,8x5,6	oval		-25°C to +180°C (short time +200°C)	7,5	38
48281	Fe-CuNi (Ko)	L	AE 18 L	HELUFLO [®] -FEP	HELUFLO [®] -FEP	4,4	round		stationary:	7,5	37
48282	SoNiCr-SoNi	K	AN 18 L	HELUFLO [®] -FEP	HELUFLO [®] -FEP	4,4	round		-25°C to +205°C	7,5	37
48283	SoPtRh-SoPt	S	AP 18 L	HELUFLO [®] -FEP	HELUFLO [®] -FEP	4,4	round		flexing:	7,5	37
48284	Cu-CuNi (Ko)	U	AC 18 L	HELUFLO [®] -FEP	HELUFLO [®] -FEP	4,4	round		-25°C to +205°C	7,5	37
48285	Fe-CuNi (Ko)	L	AE 19 L	HELUFLO [®] -FEP		5,6	round		stationary:	7,5	60
48286	SoNiCr-SoNi	K	AN 19 L	HELUFLO [®] -FEP	PETP-tape/ Cu-solid wire braiding	5,6	round	-100°C to +200°C	-25°C to +205°C	7,5	60
48287	SoPtRh-SoPt	S	AP 19 L	HELUFLO [®] -FEP		5,6	round		flexing:	7,5	60
48288	Cu-CuNi (Ko)	U	AC 19 L	HELUFLO [®] -FEP	HELUFLO [®] -FEP	5,6	round		-25°C to +205°C	7,5	60

Continuation ▶

L = conductor of stranded wires
M = solid conductor
tin. = tinned
galv. = galvanized

Compensating Cables

Part No.	Thermo-pair materials to DIN 43713	Thermo-pair Type	Type	Core insulation	Jacket/Armouring/Jacket	Outer ø ca. mm	Form	Temperature range of insulation °C	Temperature range at installation °C	Min. bending radius ..x cable ø	Weight ca. kg/km
Single pair: 2 x 1,5 mm² (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48289	FE-CuNi (Ko)	L	AE 20 L	PVC	PETP-tape/	8,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	75
48290	SoNiCr-SoNi	K	AN 20 L	PVC	Cu-ground wire	8,0	round				
48291	SoPtRh-SoPt	S	AP 20 L	PVC	bare 0,5 mm ø /	8,0	round				
48292	Cu-CuNi (Ko)	U	AC 20 L	PVC	Alu-tape/PVC	8,0	round				
48293	Fe-CuNi (Ko)	L	AE 20 M	PVC	PETP-tape/	8,2	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	82
48294	SoNiCr-SoNi	K	AN 20 M	PVC	Cu-ground wire	8,2	round				
48295	SoPtRh-SoPt	S	AP 20 M	PVC	bare 0,5 mm ø /	8,2	round				
48296	Cu-CuNi (Ko)	U	AC 20 M	PVC	Alu-tape/PVC	8,2	round				
Multi-paired: 2 pairs (4 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48100	Fe-CuNi (Ko)	L	AE 9-4 L	PVC	PVC	8,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	125
48101	SoNiCr-SoNi	K	AN 9-4 L	PVC	PVC	8,3	round				
48102	SoPtRh-SoPt	S	AP 9-4 L	PVC	PVC	8,3	round				
48297	Cu-CuNi (Ko)	U	AC 9-4 L	PVC	PVC	8,3	round				
48483	Fe-CuNi	J	AF 9-4 L	PVC	PVC	8,3	round			7,5	125
48298	Fe-CuNi (Ko)	L	AE 9-4 LS	PVC	PVC/galv. steel wire braiding	8,9	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	155
48299	SoNiCr-SoNi	K	AN 9-4 LS	PVC		8,9	round				
48300	SoPtRh-SoPt	S	AP 9-4 LS	PVC		8,9	round				
48301	Cu-CuNi (Ko)	U	AC 9-4 LS	PVC		8,9	round				
48137	Fe-CuNi (Ko)	L	AE 9-4 LSY	PVC	PVC/galv. steel wire braiding/ PVC	11,4	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	220
48138	SoNiCr-SoNi	K	AN 9-4 LSY	PVC		11,4	round				
48139	SoPtRh-SoPt	S	AP 9-4 LSY	PVC		11,4	round				
48302	Cu-CuNi (Ko)	U	AC 9-4 LSY	PVC		11,4	round				
48303	Fe-CuNi (Ko)	L	AE 9-4 MSY	PVC	PVC/galv. steel wire braiding/ PVC	11,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	210
48304	SoNiCr-SoNi	K	AN 9-4 MSY	PVC		11,0	round				
48305	SoPtRh-SoPt	S	AP 9-4 MSY	PVC		11,0	round				
48306	Cu-CuNi (Ko)	U	AC 9-4 MSY	PVC		11,0	round				
48307	Fe-CuNi (Ko)	L	AE 20-4 M	PVC	PETP-tape/	10,8	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	137
48308	SoNiCr-SoNi	K	AN 20-4 M	PVC	Cu-ground wire	10,8	round				
48309	SoPtRh-SoPt	S	AP 20-4 M	PVC	bare 0,5 mm ø /	10,8	round				
48310	Cu-CuNi (Ko)	U	AC 20-4 M	PVC	Alu-tape/PVC	10,8	round				
Multi-paired: 3 pairs (6 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48103	Fe-CuNi (Ko)	L	AE 9-6 L	PVC	PVC	10,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	190
48104	SoNiCr-SoNi	K	AN 9-6 L	PVC	PVC	10,3	round				
48105	SoPtRh-SoPt	S	AP 9-6 L	PVC	PVC	10,3	round				
48311	Cu-CuNi (Ko)	U	AC 9-6 L	PVC	PVC	10,3	round				
48484	Fe-CuNi	J	AF 9-6 L	PVC	PVC	10,3	round			7,5	190
48312	Fe-CuNi (Ko)	L	AE 9-6 LS	PVC	PVC/galv. steel wire braiding	10,9	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	226
48313	SoNiCr-SoNi	K	AN 9-6 LS	PVC		10,9	round				
48314	SoPtRh-SoPt	S	AP 9-6 LS	PVC		10,9	round				
48315	Cu-CuNi (Ko)	U	AC 9-6 LS	PVC		10,9	round				
48140	Fe-CuNi (Ko)	L	AE 9-6 LSY	PVC	PVC/galv. steel wire braiding/ PVC	13,4	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	292
48141	SoNiCr-SoNi	K	AN 9-6 LSY	PVC		13,4	round				
48142	SoPtRh-SoPt	S	AP 9-6 LSY	PVC		13,4	round				
48316	Cu-CuNi (Ko)	U	AC 9-6 LSY	PVC		13,4	round				
48317	Fe-CuNi (Ko)	L	AE 9-6 MSY	PVC	PVC/galv. steel wire braiding/ PVC	12,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	272
48318	SoNiCr-SoNi	K	AN 9-6 MSY	PVC		12,5	round				
48319	SoPtRh-SoPt	S	AP 9-6 MSY	PVC		12,5	round				
48320	Cu-CuNi (Ko)	U	AC 9-6 MSY	PVC		12,5	round				
48321	Fe-CuNi (Ko)	L	AE 20-6 M	PVC	PETP-tape/	12,4	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	186
48322	SoNiCr-SoNi	K	AN 20-6 M	PVC	Cu-ground wire	12,4	round				
48323	SoPtRh-SoPt	S	AP 20-6 M	PVC	bare 0,5 mm ø /	12,4	round				
48324	Cu-CuNi (Ko)	U	AC 20-6 M	PVC	Alu-tape/PVC	12,4	round				
Multi-paired: 4 pairs (8 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm)											
48106	Fe-CuNi (Ko)	L	AE 9-8 L	PVC	PVC	11,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	238
48107	SoNiCr-SoNi	K	AN 9-8 L	PVC	PVC	11,0	round				
48108	SoPtRh-SoPt	S	AP 9-8 L	PVC	PVC	11,0	round				
48325	Cu-CuNi (Ko)	U	AC 9-8 L	PVC	PVC	11,0	round				
48485	Fe-CuNi	J	AF 9-8 L	PVC	PVC	11,0	round			7,5	238
48143	Fe-CuNi (Ko)	L	AE 9-8 LSY	PVC	PVC/galv. steel wire braiding/ PVC	14,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	410
48144	SoNiCr-SoNi	K	AN 9-8 LSY	PVC		14,0	round				
48145	SoPtRh-SoPt	S	AP 9-8 LSY	PVC		14,0	round				
48326	Cu-CuNi (Ko)	U	AC 9-8 LSY	PVC		14,0	round				

Continuation ▶

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galv. = galvanized

Compensating Cables

Part No.	Thermo-pair materials to DIN 43713	Thermo-pair Type	Type	Core insulation	Jacket/Armouring/Jacket	Outer ø ca. mm	Form	Temperature range of insulation °C	Temperature range at installation °C	Min. bending radius .x cable ø	Weight ca. kg/km
Multi-paired: 5 pairs (10 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm)											
48109	Fe-CuNi (Ko)	L	AE 9-10 L	PVC	PVC	13,0	round			7,5	284
48110	SoNiCr-SoNi	K	AN 9-10 L	PVC	PVC	13,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	284
48111	SoPtRh-SoPt	S	AP 9-10 L	PVC	PVC	13,0	round			7,5	284
48327	Cu-CuNi (Ko)	U	AC 9-10 L	PVC	PVC	13,0	round			7,5	284
48486	Fe-CuNi	J	AF 9-10 L	PVC	PVC	13,0	round			7,5	284
48146	Fe-CuNi (Ko)	L	AE 9-10 LSY	PVC	PVC/galv. steel wire braiding/ PVC	16,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	475
48147	SoNiCr-SoNi	K	AN 9-10 LSY	PVC		16,5	round			7,5	475
48148	SoPtRh-SoPt	S	AP 9-10 LSY	PVC		16,5	round			7,5	475
48328	Cu-CuNi (Ko)	U	AC 9-10 LSY	PVC		16,5	round			7,5	475
Multi-paired: 6 pairs (12 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48112	Fe-CuNi (Ko)	L	AE 9-12 L	PVC	PVC	13,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	320
48113	SoNiCr-SoNi	K	AN 9-12 L	PVC	PVC	13,5	round			7,5	320
48114	SoPtRh-SoPt	S	AP 9-12 L	PVC	PVC	13,5	round			7,5	320
48329	Cu-CuNi (Ko)	U	AC 9-12 L	PVC	PVC	13,5	round			7,5	320
48487	Fe-CuNi	J	AF 9-12 L	PVC	PVC	13,5	round			7,5	320
48330	Fe-CuNi (Ko)	L	AE 9-12 LS	PVC	PVC/galv. steel wire braiding	14,2	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	384
48331	SoNiCr-SoNi	K	AN 9-12 LS	PVC		14,2	round			7,5	384
48332	SoPtRh-SoPt	S	AP 9-12 LS	PVC		14,2	round			7,5	384
48333	Cu-CuNi (Ko)	U	AC 9-12 LS	PVC		14,2	round			7,5	384
48149	Fe-CuNi (Ko)	L	AE 9-12 LSY	PVC	PVC/galv. steel wire braiding/ PVC	17,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	483
48150	SoNiCr-SoNi	K	AN 9-12 LSY	PVC		17,5	round			7,5	483
48151	SoPtRh-SoPt	S	AP 9-12 LSY	PVC		17,5	round			7,5	483
48334	Cu-CuNi (Ko)	U	AC 9-12 LSY	PVC		17,5	round			7,5	483
48335	Fe-CuNi (Ko)	L	AE 9-12 MSY	PVC	PVC/galv. steel wire braiding/ PVC	16,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	478
48336	SoNiCr-SoNi	K	AN 9-12 MSY	PVC		16,5	round			12	478
48337	SoPtRh-SoPt	S	AP 9-12 MSY	PVC		16,5	round			12	478
48338	Cu-CuNi (Ko)	U	AC 9-12 MSY	PVC		16,5	round			12	478
48339	Fe-CuNi (Ko)	L	AE 20-12 M	PVC	PETP-tape/ Cu-ground wire bare 0,5 mm ø/ Alu-tape/ PVC	16,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	362
48340	SoNiCr-SoNi	K	AN 20-12 M	PVC		16,3	round			12	362
48341	SoPtRh-SoPt	S	AP 20-12 M	PVC		16,3	round			12	362
48342	Cu-CuNi (Ko)	U	AC 20-12 M	PVC		16,3	round			12	362
Multi-paired: 7 pairs (14 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm)											
48115	Fe-CuNi (Ko)	L	AE 9-14 L	PVC	PVC	14,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	396
48116	SoNiCr-SoNi	K	AN 9-14 L	PVC	PVC	14,5	round			7,5	396
48117	SoPtRh-SoPt	S	AP 9-14 L	PVC	PVC	14,5	round			7,5	396
48343	Cu-CuNi (Ko)	U	AC 9-14 L	PVC	PVC	14,5	round			7,5	396
48488	Fe-CuNi	J	AF 9-14 L	PVC	PVC	14,5	round			7,5	396
48152	Fe-CuNi (Ko)	L	AE 9-14 LSY	PVC	PVC/galv. steel wire braiding/ PVC	18,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	640
48153	SoNiCr-SoNi	K	AN 9-14 LSY	PVC		18,5	round			7,5	640
48154	SoPtRh-SoPt	S	AP 9-14 LSY	PVC		18,5	round			7,5	640
48344	Cu-CuNi (Ko)	U	AC 9-14 LSY	PVC		18,5	round			7,5	640
Multi-paired: 8 pairs (16 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48118	Fe-CuNi (Ko)	L	AE 9-16 L	PVC	PVC	15,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	419
48119	SoNiCr-SoNi	K	AN 9-16 L	PVC	PVC	15,1	round			7,5	419
48120	SoPtRh-SoPt	S	AP 9-16 L	PVC	PVC	15,1	round			7,5	419
48345	Cu-CuNi (Ko)	U	AC 9-16 L	PVC	PVC	15,1	round			7,5	419
48489	Fe-CuNi	J	AF 9-16 L	PVC	PVC	15,1	round			7,5	419
48346	Fe-CuNi (Ko)	L	AE 9-16 LS	PVC	PVC/galv. steel wire braiding	16,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	495
48347	SoNiCr-SoNi	K	AN 9-16 LS	PVC		16,1	round			7,5	495
48348	SoPtRh-SoPt	S	AP 9-16 LS	PVC		16,1	round			7,5	495
48349	Cu-CuNi (Ko)	U	AC 9-16 LS	PVC		16,1	round			7,5	495
48155	Fe-CuNi (Ko)	L	AE 9-16 LSY	PVC	PVC/galv. steel wire braiding/ PVC	19,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	623
48156	SoNiCr-SoNi	K	AN 9-16 LSY	PVC		19,3	round			7,5	623
48157	SoPtRh-SoPt	S	AP 9-16 LSY	PVC		19,3	round			7,5	623
48350	Cu-CuNi (Ko)	U	AC 9-16 LSY	PVC		19,3	round			7,5	623
48351	Fe-CuNi (Ko)	L	AE 9-16 MSY	PVC	PVC/galv. steel wire braiding/ PVC	18,7	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	616
48352	SoNiCr-SoNi	K	AN 9-16 MSY	PVC		18,7	round			12	616
48353	SoPtRh-SoPt	S	AP 9-16 MSY	PVC		18,7	round			12	616
48354	Cu-CuNi (Ko)	U	AC 9-16 MSY	PVC		18,7	round			12	616
48355	Fe-CuNi (Ko)	L	AE 20-16 M	PVC	PETP-tape/ Cu-ground wire bare 0,5 mm ø/ Alu-tape/ PVC	16,8	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	423
48356	SoNiCr-SoNi	K	AN 20-16 M	PVC		16,8	round			12	423
48357	SoPtRh-SoPt	S	AP 20-16 M	PVC		16,8	round			12	423
48358	Cu-CuNi (Ko)	U	AC 20-16 M	PVC		16,8	round			12	423

Continuation ►

L = conductor of stranded wires
M = solid conductor
tin. = tinned
galv. = galvanized

Compensating Cables

Part No.	Thermo-pair materials to DIN 43713	Thermo-pair Type	Type	Core insulation	Jacket/Armouring/Jacket	Outer ø ca. mm	Form	Temperature range of insulation °C	Temperature range at installation °C	Min. bending radius .x cable ø	Weight ca. kg/km
Multi-paired: 9 pairs (18 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm)											
48121	Fe-CuNi (Ko)	L	AE 9-18 L	PVC	PVC	16,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	480
48122	SoNiCr-SoNi	K	AN 9-18 L	PVC	PVC	16,5	round			7,5	480
48123	SoPtRh-SoPt	S	AP 9-18 L	PVC	PVC	16,5	round			7,5	480
48359	Cu-CuNi (Ko)	U	AC 9-18 L	PVC	PVC	16,5	round			7,5	480
48490	Fe-CuNi	J	AF 9-18 L	PVC	PVC	16,5	round			7,5	480
48158	Fe-CuNi (Ko)	L	AE 9-18 LSY	PVC	PVC/galv. steel wire braiding/ PVC	20,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	758
48159	SoNiCr-SoNi	K	AN 9-18 LSY	PVC		20,5	round			7,5	758
48160	SoPtRh-SoPt	S	AP 9-18 LSY	PVC		20,5	round			7,5	758
48360	Cu-CuNi (Ko)	U	AC 9-18 LSY	PVC		20,5	round			7,5	758
Multi-paired: 10 pairs (20 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48124	Fe-CuNi (Ko)	L	AE 9-20 L	PVC	PVC	16,7	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	520
48125	SoNiCr-SoNi	K	AN 9-20 L	PVC	PVC	16,7	round			7,5	520
48126	SoPtRh-SoPt	S	AP 9-20 L	PVC	PVC	16,7	round			7,5	520
48361	Cu-CuNi (Ko)	U	AC 9-20 L	PVC	PVC	16,7	round			7,5	520
48491	Fe-CuNi	J	AF 9-20 L	PVC	PVC	16,7	round			7,5	520
48362	Fe-CuNi (Ko)	L	AE 9-20 LS	PVC	PVC/galv. steel wire braiding	17,7	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	613
48363	SoNiCr-SoNi	K	AN 9-20 LS	PVC		17,7	round			7,5	613
48364	SoPtRh-SoPt	S	AP 9-20 LS	PVC		17,7	round			7,5	613
48365	Cu-CuNi (Ko)	U	AC 9-20 LS	PVC		17,7	round			7,5	613
48161	Fe-CuNi (Ko)	L	AE 9-20 LSY	PVC		PVC/galv. steel wire braiding/ PVC	20,9			round	-10°C to +80°C
48162	SoNiCr-SoNi	K	AN 9-20 LSY	PVC	20,9		round	7,5	752		
48163	SoPtRh-SoPt	S	AP 9-20 LSY	PVC	20,9		round	7,5	752		
48366	Cu-CuNi (Ko)	U	AC 9-20 LSY	PVC	20,9		round	7,5	752		
48367	Fe-CuNi (Ko)	L	AE 9-20 MSY	PVC	PVC/galv. steel wire braiding/ PVC		20,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	
48368	SoNiCr-SoNi	K	AN 9-20 MSY	PVC		20,3	round	12			744
48369	SoPtRh-SoPt	S	AP 9-20 MSY	PVC		20,3	round	12			744
48370	Cu-CuNi (Ko)	U	AC 9-20 MSY	PVC		20,3	round	12			744
48371	Fe-CuNi (Ko)	L	AE 20-20 M	PVC		PETP-tape/ Cu-ground wire bare 0,5 mm ø/ Alu-tape/ PVC	20,3	round			-10°C to +80°C
48372	SoNiCr-SoNi	K	AN 20-20 M	PVC	20,3		round	12	542		
48373	SoPtRh-SoPt	S	AP 20-20 M	PVC	20,3		round	12	542		
48374	Cu-CuNi (Ko)	U	AC 20-20 M	PVC	20,3		round	12	542		
Multi-paired: 12 pairs (24 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48127	Fe-CuNi (Ko)	L	AE 9-24 L	PVC	PVC	19,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	614
48128	SoNiCr-SoNi	K	AN 9-24 L	PVC	PVC	19,0	round			7,5	614
48129	SoPtRh-SoPt	S	AP 9-24 L	PVC	PVC	19,0	round			7,5	614
48375	Cu-CuNi (Ko)	U	AC 9-24 L	PVC	PVC	19,0	round			7,5	614
48492	Fe-CuNi	J	AF 9-24 L	PVC	PVC	19,0	round			7,5	614
48376	Fe-CuNi (Ko)	L	AE 9-24 LS	PVC	PVC/galv. steel wire braiding	20,2	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	738
48377	SoNiCr-SoNi	K	AN 9-24 LS	PVC		20,2	round			7,5	738
48378	SoPtRh-SoPt	S	AP 9-24 LS	PVC		20,2	round			7,5	738
48379	Cu-CuNi (Ko)	U	AC 9-24 LS	PVC		20,2	round			7,5	738
48164	Fe-CuNi (Ko)	L	AE 9-24 LSY	PVC		PVC/galv. steel wire braiding/ PVC	24,2			round	-10°C to +80°C
48165	SoNiCr-SoNi	K	AN 9-24 LSY	PVC	24,2		round	7,5	938		
48166	SoPtRh-SoPt	S	AP 9-24 LSY	PVC	24,2		round	7,5	938		
48380	Cu-CuNi (Ko)	U	AC 9-24 LSY	PVC	24,2		round	7,5	938		
48381	Fe-CuNi (Ko)	L	AE 9-24 MSY	PVC	PVC/galv. steel wire braiding/ PVC		23,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	
48382	SoNiCr-SoNi	K	AN 9-24 MSY	PVC		23,1	round	12			907
48383	SoPtRh-SoPt	S	AP 9-24 MSY	PVC		23,1	round	12			907
48384	Cu-CuNi (Ko)	U	AC 9-24 MSY	PVC		23,1	round	12			907
48385	Fe-CuNi (Ko)	L	AE 20-24 M	PVC		PETP-tape/ Cu-ground wire bare 0,5 mm ø/ Alu-tape/ PVC	22,5	round			-10°C to +80°C
48386	SoNiCr-SoNi	K	AN 20-24 M	PVC	22,5		round	12	638		
48387	SoPtRh-SoPt	S	AP 20-24 M	PVC	22,5		round	12	638		
48388	Cu-CuNi (Ko)	U	AC 20-24 M	PVC	22,5		round	12	638		
Multi-paired: 16 pairs (32 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48389	Fe-CuNi (Ko)	L	AE 9-32 L	PVC	PVC	20,9	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	793
48390	SoNiCr-SoNi	K	AN 9-32 L	PVC	PVC	20,9	round			7,5	793
48391	SoPtRh-SoPt	S	AP 9-32 L	PVC	PVC	20,9	round			7,5	793
48392	Cu-CuNi (Ko)	U	AC 9-32 L	PVC	PVC	20,9	round			7,5	793
48493	Fe-CuNi	J	AF 9-32 L	PVC	PVC	20,9	round			7,5	793
48393	Fe-CuNi (Ko)	L	AE 9-32 LS	PVC	PVC/galv. steel wire braiding	22,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	923
48394	SoNiCr-SoNi	K	AN 9-32 LS	PVC		22,1	round			7,5	923
48395	SoPtRh-SoPt	S	AP 9-32 LS	PVC		22,1	round			7,5	923
48396	Cu-CuNi (Ko)	U	AC 9-32 LS	PVC		22,1	round			7,5	923

Continuation ▶

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Compensating Cables

Part No.	Thermo-pair materials to DIN 43713	Thermo-pair Type	Type	Core insulation	Jacket/Armouring/Jacket	Outer ø ca. mm	Form	Temperature range of insulation °C	Temperature range at installation °C	Min. bending radius .x cable ø	Weight ca. kg/km
Multi-paired: 16 pairs (32 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48397	Fe-CuNi (Ko)	L	AE 9-32 LSY	PVC		26,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	1141
48398	SoNiCr-SoNi	K	AN 9-32 LSY	PVC	PVC/galv. steel wire braiding/	26,1	round			7,5	1141
48399	SoPtRh-SoPt	S	AP 9-32 LSY	PVC	PVC	26,1	round			7,5	1141
48400	Cu-CuNi (Ko)	U	AC 9-32 LSY	PVC		26,1	round			7,5	1141
48401	Fe-CuNi (Ko)	L	AE 9-32 MSY	PVC		25,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	1130
48402	SoNiCr-SoNi	K	AN 9-32 MSY	PVC	PVC/galv. steel wire braiding/	25,3	round			12	1130
48403	SoPtRh-SoPt	S	AP 9-32 MSY	PVC	PVC	25,3	round			12	1130
48404	Cu-CuNi (Ko)	U	AC 9-32 MSY	PVC		25,3	round			12	1130
48405	Fe-CuNi (Ko)	L	AE 20-32 M	PVC	PETP-tape/	25,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	847
48406	SoNiCr-SoNi	K	AN 20-32 M	PVC	Cu-ground wire bare 0,5 mm ø/	25,1	round			12	847
48407	SoPtRh-SoPt	S	AP 20-32 M	PVC	Alu-tape/	25,1	round			12	847
48408	Cu-CuNi (Ko)	U	AC 20-32 M	PVC	PVC	25,1	round			12	847
Multi-paired: 18 pairs (36 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48130	Fe-CuNi (Ko)	L	AE 9-36 L	PVC	PVC	22,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	904
48132	SoNiCr-SoNi	K	AN 9-36 L	PVC	PVC	22,1	round			7,5	904
48133	SoPtRh-SoPt	S	AP 9-36 L	PVC	PVC	22,1	round			7,5	904
48409	Cu-CuNi (Ko)	U	AC 9-36 L	PVC	PVC	22,1	round			7,5	904
48494	Fe-CuNi	J	AF 9-36 L	PVC	PVC	22,1	round			7,5	904
48410	Fe-CuNi (Ko)	L	AE 9-36 LS	PVC		23,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	1040
48411	SoNiCr-SoNi	K	AN 9-36 LS	PVC	PVC/galv. steel wire braiding	23,3	round			7,5	1040
48412	SoPtRh-SoPt	S	AP 9-36 LS	PVC		23,3	round			7,5	1040
48413	Cu-CuNi (Ko)	U	AC 9-36 LS	PVC		23,3	round			7,5	1040
48167	Fe-CuNi (Ko)	L	AE 9-36 LSY	PVC		27,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	1268
48169	SoNiCr-SoNi	K	AN 9-36 LSY	PVC	PVC/galv. steel wire braiding/	27,3	round			7,5	1268
48170	SoPtRh-SoPt	S	AP 9-36 LSY	PVC	PVC	27,3	round			7,5	1268
48414	Cu-CuNi (Ko)	U	AC 9-36 LSY	PVC		27,3	round			7,5	1268
48415	Fe-CuNi (Ko)	L	AE 9-36 MSY	PVC		26,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	1232
48416	SoNiCr-SoNi	K	AN 9-36 MSY	PVC	PVC/galv. steel wire braiding/	26,1	round			12	1232
48417	SoPtRh-SoPt	S	AP 9-36 MSY	PVC	PVC	26,1	round			12	1232
48418	Cu-CuNi (Ko)	U	AC 9-36 MSY	PVC		26,1	round			12	1232
48419	Fe-CuNi (Ko)	L	AE 20-36 M	PVC	PETP-tape/	26,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	944
48420	SoNiCr-SoNi	K	AN 20-36 M	PVC	Cu-ground wire bare 0,5 mm ø/	26,0	round			12	944
48421	SoPtRh-SoPt	S	AP 20-36 M	PVC	Alu-tape/	26,0	round			12	944
48422	Cu-CuNi (Ko)	U	AC 20-36 M	PVC	PVC	26,0	round			12	944
Multi-paired: 19 pairs (38 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm)											
48134	Fe-CuNi (Ko)	L	AE 9-38 L	PVC	PVC	22,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	937
48135	SoNiCr-SoNi	K	AN 9-38 L	PVC	PVC	22,5	round			7,5	937
48136	SoPtRh-SoPt	S	AP 9-38 L	PVC	PVC	22,5	round			7,5	937
48423	Cu-CuNi (Ko)	U	AC 9-38 L	PVC	PVC	22,5	round			7,5	937
48171	Fe-CuNi (Ko)	L	AE 9-38 LSY	PVC		26,5	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	1340
48172	SoNiCr-SoNi	K	AN 9-38 LSY	PVC	PVC/galv. steel wire braiding/	26,5	round			7,5	1340
48173	SoPtRh-SoPt	S	AP 9-38 LSY	PVC	PVC	26,5	round			7,5	1340
48424	Cu-CuNi (Ko)	U	AC 9-38 LSY	PVC		26,5	round			7,5	1340
Multi-paired: 20 pairs (40 x 1,5 mm²) (L = stranded wires, conductor make-up 48 x 0,20 mm; M = solid conductor, diameter 1,38 mm)											
48425	Fe-CuNi (Ko)	L	AE 9-40 L	PVC	PVC	24,1	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	1032
48426	SoNiCr-SoNi	K	AN 9-40 L	PVC	PVC	24,1	round			7,5	1032
48427	SoPtRh-SoPt	S	AP 9-40 L	PVC	PVC	24,1	round			7,5	1032
48428	Cu-CuNi (Ko)	U	AC 9-40 L	PVC	PVC	24,1	round			7,5	1032
48429	Fe-CuNi (Ko)	L	AE 9-40 LS	PVC		25,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	1200
48430	SoNiCr-SoNi	K	AN 9-40 LS	PVC	PVC/galv. steel wire braiding	25,3	round			7,5	1200
48431	SoPtRh-SoPt	S	AP 9-40 LS	PVC		25,3	round			7,5	1200
48432	Cu-CuNi (Ko)	U	AC 9-40 LS	PVC		25,3	round			7,5	1200
48433	Fe-CuNi (Ko)	L	AE 9-40 LSY	PVC		29,3	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	1446
48434	SoNiCr-SoNi	K	AN 9-40 LSY	PVC	PVC/galv. steel wire braiding/	29,3	round			7,5	1446
48435	SoPtRh-SoPt	S	AP 9-40 LSY	PVC	PVC	29,3	round			7,5	1446
48436	Cu-CuNi (Ko)	U	AC 9-40 LSY	PVC		29,3	round			7,5	1446
48437	Fe-CuNi (Ko)	L	AE 9-40 MSY	PVC		28,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	1381
48438	SoNiCr-SoNi	K	AN 9-40 MSY	PVC	PVC/galv. steel wire braiding/	28,0	round			12	1381
48439	SoPtRh-SoPt	S	AP 9-40 MSY	PVC	PVC	28,0	round			12	1381
48440	Cu-CuNi (Ko)	U	AC 9-40 MSY	PVC		28,0	round			12	1381
48441	Fe-CuNi (Ko)	L	AE 20-40 M	PVC	PETP-tape/	26,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	12	1001
48442	SoNiCr-SoNi	K	AN 20-40 M	PVC	Cu-ground wire bare 0,5 mm ø/	26,0	round			12	1001
48443	SoPtRh-SoPt	S	AP 20-40 M	PVC	Alu-tape/	26,0	round			12	1001
48444	Cu-CuNi (Ko)	U	AC 20-40 M	PVC	PVC	26,0	round			12	1001

Continuation ▶

L = conductor of stranded wires
M = solid conductor
tin. = tinned
galv. = galvanized

Compensating Cables

Part No.	Thermo-pair materials to DIN 43713	Thermo-pair Type	Type	Core insulation	Jacket/Armouring/Jacket	Outer ø ca. mm	Form	Temperature range of insulation °C	Temperature range at installation °C	Min. bending radius .x cable ø	Weight ca. kg/km
Single pair: 2 x 0,22 mm² (stranded wires, conductor make-up 7 x 0,20 mm)											
48200	FE-CuNi (Ko)	L	AE 1 L	PVC		1,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	10
48201	SoNiCr-SoNi	K	AN 1 L	PVC		1,0	round			7,5	10
48202	SoPtRh-SoPt	S	AP 1 L	PVC		1,0	round			7,5	10
48460	Cu-CuNi (Ko)	U	AC 1 L	PVC		1,0	round			7,5	10
Single pair: 2 x 0,22 mm² (stranded wires, conductor make-up 7 x 0,20 mm)											
48203	Fe-CuNi (Ko)	L	AE 9-022	PVC	PVC	4,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	22
48204	SoNiCr-SoNi	K	AN 9-022	PVC	PVC	4,0	round			7,5	22
48205	SoPtRh-SoPt	S	AP 9-022	PVC	PVC	4,0	round			7,5	22
48461	Cu-CuNi (Ko)	U	AC 9-022	PVC	PVC	4,0	round			7,5	22
48206	Fe-CuNi (Ko)	L	AE 5-022	PVC	PETP-tape/ Cu-solid wire braid.	4,9	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	31
48207	SoNiCr-SoNi	K	AN 5-022	PVC		4,9	round			7,5	31
48208	SoPtRh-SoPt	S	AP 5-022	PVC	tinned/ PVC	4,9	round			7,5	31
48462	Cu-CuNi (Ko)	U	AC 5-022	PVC		4,9	round			7,5	31
48463	Fe-CuNi (Ko)	L	AE 15-022	glass filam.	Silicone	3,4	round	-40°C to +200°C	stationary: -25°C to +180°C flexing: -25°C to +180°C (short time +200°C)	7,5	16
48464	SoNiCr-SoNi	K	AN 15-022	glass filam.	Silicone	3,4	round			7,5	16
48465	SoPtRh-SoPt	S	AP 15-022	glass filam.	Silicone	3,4	round			7,5	16
48466	Cu-CuNi (Ko)	U	AC 15-022	glass filam.	Silicone	3,4	round			7,5	16
48209	Fe-CuNi (Ko)	L	AE 15-G 022	glass filam.		3,9	round	-40°C to +200°C	stationary: -25°C to +180°C flexing: -25°C to +180°C (short time +200°C)	7,5	22
48210	SoNiCr-SoNi	K	AN 15-G 022	glass filam.	Silicone/ glass filam.	3,9	round			7,5	22
48211	SoPtRh-SoPt	S	AP 15-G 022	glass filam.		3,9	round			7,5	22
48467	Cu-CuNi (Ko)	U	AC 15-G 022	glass filam.		3,9	round			7,5	22
48212	Fe-CuNi (Ko)	L	AE (GI-SIL-GI-S)	glass filam.	Silicone/ glass filament/ galv. steel wire braiding	5,0	round	-40°C to +200°C	stationary: -25°C to +180°C flexing: -25°C to +180°C (short time +200°C)	7,5	25
48213	SoNiCr-SoNi	K	AN (GI-SIL-GI-S)	glass filam.		5,0	round			7,5	25
48214	SoPtRh-SoPt	S	AP (GI-SIL-GI-S)	glass filam.		5,0	round			7,5	25
48468	Cu-CuNi (Ko)	U	AC (GI-SIL-GI-S)	glass filam.		5,0	round			7,5	25
Single pair: 2 x 0,5 mm² (stranded wires, conductor make-up 16 x 0,20 mm)											
48215	Fe-CuNi (Ko)	L	AE (GI-SIL)	glass filam.	Silicone	4,6	round	-40°C to +200°C	stationary: -25°C to +200°C flexing: -25°C to +200°C	7,5	18
48216	SoNiCr-SoNi	K	AN (GI-SIL)	glass filam.	Silicone	4,6	round			7,5	18
48217	SoPtRh-SoPt	S	AP (GI-SIL)	glass filam.	Silicone	4,6	round			7,5	18
48469	Cu-CuNi (Ko)	U	AC (GI-SIL)	glass filam.	Silicone	4,6	round			7,5	18
Single pair: 2 x 0,75 mm² (stranded wires, conductor make-up 24 x 0,20 mm)											
48218	Fe-CuNi (Ko)	L	AE (PVC-PVC)	PVC	PVC	6,0	round	-10°C to +80°C	stationary: -25°C to +70°C flexing: -5°C to +70°C	7,5	25
48219	SoNiCr-SoNi	K	AN (PVC-PVC)	PVC	PVC	6,0	round			7,5	25
48220	SoPtRh-SoPt	S	AP (PVC-PVC)	PVC	PVC	6,0	round			7,5	25
48470	Cu-CuNi (Ko)	U	AC (PVC-PVC)	PVC	PVC	6,0	round			7,5	25
Multi-paired: 4 x 0,22 mm² (stranded wires, conductor make-up 7 x 0,20 mm)											
48221	Fe-CuNi (Ko)	L	AE (PVC-PVC)	PVC	PVC	6,0	round	-10°C to +80°C	stationary: -20°C to +80°C flexing: -5°C to +80°C	7,5	33
48222	SoNiCr-SoNi	K	AN (PVC-PVC)	PVC	PVC	6,0	round			7,5	33
48223	SoPtRh-SoPt	S	AP (PVC-PVC)	PVC	PVC	6,0	round			7,5	33
48471	Cu-CuNi (Ko)	U	AC (PVC-PVC)	PVC	PVC	6,0	round			7,5	33
48224	Fe-CuNi (Ko)	L	AE (PVC-C-PVC)	PVC		6,0	round	-10°C to +80°C	stationary: -20°C to +80°C flexing: -5°C to +80°C	7,5	37
48225	SoNiCr-SoNi	K	AN (PVC-C-PVC)	PVC	galv. Cu-braiding/ PVC-jacket	6,0	round			7,5	37
48226	SoPtRh-SoPt	S	AP (PVC-C-PVC)	PVC		6,0	round			7,5	37
48472	Cu-CuNi (Ko)	U	AC (PVC-C-PVC)	PVC		6,0	round			7,5	37
48227	Fe-CuNi (Ko)	L	AE (GI-SIL)	glass filam.	Silicone	6,0	round	-40°C to +200°C	stationary: -25°C to +180°C flexing: -25°C to +180°C	7,5	35
48228	SoNiCr-SoNi	K	AN (GI-SIL)	glass filam.	Silicone	6,0	round			7,5	35
48229	SoPtRh-SoPt	S	AP (GI-SIL)	glass filam.	Silicone	6,0	round			7,5	35
48473	Cu-CuNi (Ko)	U	AC (GI-SIL)	glass filam.	Silicone	6,0	round			7,5	35
Multi-paired: 4 x 1,5 mm² (stranded wires, conductor make-up 48 x 0,20 mm)											
48474	Fe-CuNi (Ko)	L	AE 11-4 Lr	Silicone		7,8	round	-60°C to +180°C	stationary: -25°C to +180°C flexing: -25°C to +180°C (short time +200°C)	7,5	11,8
48475	SoNiCr-SoNi	K	AN 11-4 Lr	Silicone	glass filament/ galv. steel wire braiding	7,8	round			7,5	11,8
48476	SoPtRh-SoPt	S	AP 11-4 Lr	Silicone		7,8	round			7,5	11,8
48477	Cu-CuNi (Ko)	U	AC 11-4 Lr	Silicone		7,8	round			7,5	11,8

L = conductor of stranded wires
M = solid conductor
tin. = tinned
galv. = galvanized