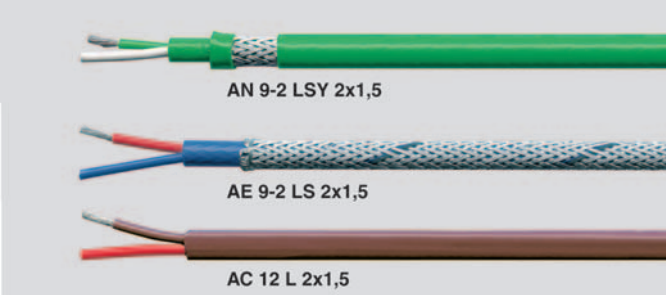
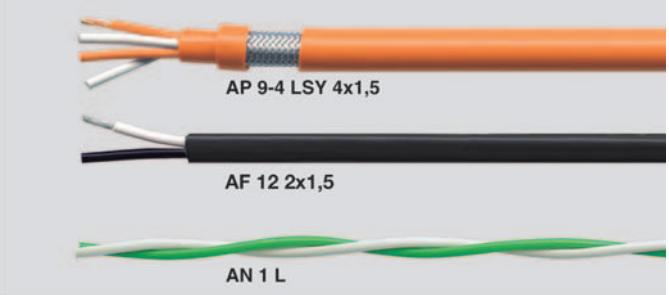
COMPENSATING CABLES





Technical data

- Special insulation of PVC, silicone, fluorpolymers, or glass fiber depending on the requirement
- **Conductor resistance** in accordance with 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 voltages** for PVC, fluorpolymers and silicone-cables

core/core	500 V
core/screen	500 V
screen/screen	500 V

– **Test voltage** for glass-fiber lines

core/core	500 V

– **Insulation resistance**
for PVC, silicone and fluoropolymers
min. 10 MOhm x km

– **Operating capacity**
(approx. value) – nF/km

	Stranded 1.5 mm²	Solid 1.5 mm²	Stranded 0.22 mm²
•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

– **Inductivity** (guide value)
for PVC, fluorpolymers and silicone versions < 1 mH/km

– **Corrosiveness of fire gases (halogen–free)**

• **Silicone + glass–fiber**
test in accordance with VDE 0472 Part 813 and IEC 60754-1

• No development of corrosive gases

Fire behavior

Self-extinguishing and flame-retardant in accordance with VDE 0482 322-1-2, DIN EN 60332-1-2/IEC 60332-1 (corresponds to DIN VDE 0472 Part 804 test type B)

Structure

- Conductors made of special materials
- Conductor type: Fe-Cu Ni, SoNiCr-SoNi, SoPtRh-SoPt, Cu-CuNi
- Insulation of PVC, silicone, fluorpolymers or glass-fiber
- Core coding: Single color (see Color table)
- Coding of the pairs, starting at 2 pairs the individual pairs are marked with imprinted numbering
- Jacket material of PVC, silicone, fluorpolymers or glass-fiber braid
- Braided screen of galvanized steel wire (type SY) or Cu-braid (type CY)

Measuring

For temperature measuring, the temperature-dependent characteristics of materials are taken into consideration, for example, the expansion thermometers or thermocouples, etc. Temperature measuring devices with a thermocouple as transducer usually consist of thermocouple, the connecting line from the connection point to the reference junction, a reference junction with a known temperature and a voltage measuring device.
The connecting line between the thermocouple and the reference junction must have the same thermo-electric properties as the thermocouple itself. The temperature differential is measured between the measuring point and the reference junction. Tolerance of the meter resistances ±10%.

Hazardous areas

The compensating cables for thermocouples with plastic insulation can be imprinted with longitudinal colored stripes depending on the type of the thermocouple, as follows:
Cu/Cu-Ni = brown, Fe/Cu-Ni = dark blue, NiCr/Ni = green, Pt-Rh/Pt = white
In the case of compensating cables for thermocouples with mineral insulation or with metal braiding, for color coding of the intrinsically safe property, a light blue band of sufficient width must also be woven in.

Use

For instrumentation and control technology, compensating cables (also referred to as compensation cables) are required for precise temperature measurements. They are used as a thermo-electric extension from the thermocouple to the measurement device.
The compensating cable consists of a positive core and a negative core, that generate the same thermo-electric voltage at connector head temperatures up to +200°C, as the thermocouple in accordance with DIN 43710.

Materials

(Compensating wires and strands) There is a distinction between original materials and substitutes.

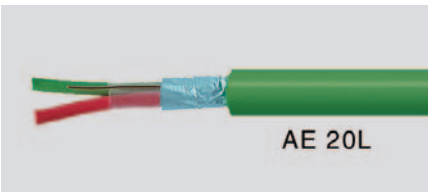
- Compensating wires and strands of **original materials** are made of the same material as the associated thermocouple and they are referred to as thermocable or thermocouple cable.
- Compensating wires and strands of **substitute materials** that consist of alloys and which are not identical to the associated thermocouple are called compensating cables.
  - **Substitute materials** are used for the Type K and Type N thermocouples
  - **Precious metal thermocouples** Type R, Type S, Type B consist of thermal materials.

Thermocouple cables

Thermocouple cables are made of the same element material as the thermocouple and are tested to the same temperatures. We offer thermocouple cables on customer request only.

Note

Thermal materials consist of very expensive materials while the substitutes are significantly cheaper.



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COLOR CODING AND TEMPERATURE RANGES FOR THERMAL CABLES & COMPENSATING CABLES

Code letter of the thermocouple	Material combination		NF C 42-324		BS 4937	
	+ (plus)	- (minus)	Identification THL	AGL	Identification THL	AGL
T	**Cu**	**Cu Ni**	**TX** -25°C to +100°C	**TC** -25°C to +100°C	**TX** 0°C to +100°C	
U	**Cu**	**Cu Ni**				
J	**Fe**	**Cu Ni**	**JX** -25°C to +200°C	**JC** -25°C to +250°C	**JX** 0°C to +200°C	
L	**Fe**	**Cu Ni**				
E	**Ni Cr**	**Cu Ni**	**EX** -25°C to +200°C	**EC** -25°C to +250°C	**EX** 0°C to +200°C	
	Ni Cr	**Ni**	**KX** -25°C to +200°C	**KC** -25°C to +200°C	**KX** 0°C to +200°C	
K	**Ni Cr**	**Ni**		**WC** 0°C to +100°C		
	Ni Cr	**Ni**		**VC** 0°C to +100°C		**VX** 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		**SX** 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 limits the application temperature range of the cable. The lower value is valid.

As a rule, intrinsically safe cables have a blue jacket color and an identification stripe assigned to the element.

ANSI MC 96.1		DIN IEC 584		DIN 43710*	
Identification		Identification		Identification	
THL	AGL	THL	AGL	THL	AGL
TX 0°C to +100°C		**TX** -25°C to +100°C			
				UX** 0°C to +200°C	
JX 0°C to +200°C		**JX**** -25°C to +200°C			
				LX** 0°C to +200°C	
EX 0°C to +200°C		**EX** -25°C to +200°C			
KX 0°C to +200°C		**KX** -25°C to +200°C			
			KCA** 0°C to +150°C		
			KCB 0°C to +100°C		
		NX -25°C to +200°C	**NC** 0°C to +150°C		
	SX 0°C to +200°C		**RCA/SCA** 0°C to +100°C **RCB/SCB**** 0°C to +200°C		
	BX 0°C to +100°C	(According to DIN 43710/85)	**BC** 0°C to +100°C		

THL = Thermocouple wire
AGL = Compensating cable

Example: KCA Compensating cable KCA (plus) ≙ positive core for AGL KC
KCA (minus) ≙ negative core for AGL KC

*) DIN 43710 was withdrawn in April 1994. Thus the element types "U" and "L" are no longer standardized.

** standard type

L

COMPENSATING CABLES

Materials for compensating cables

Standards	Element type			Material of the compensating cable		
	Type	Plus pole (+)	Minus pole (-)	Code	Plus pole (+)	Minus pole (-)
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-ALY	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

Properties of the wires for thermocouples and compensating cables

Materials	Main components approx. %				Density at 20°C	Spec. resistance at 20°C	Resistance value (guide value) in ohm/m	
	Cu	Ni	Mn	Other	$\frac{g}{cm^3}$	µohm · cm	mm ø 0.20	mm ø 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	In accordance with 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.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
Single-pair: 2 x 1.5 mm² (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)											
48001	FE-CuNi (Ko)	L	AE 1 L stranded	PVC	-	5.4	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	40
48002	SoNiCr-SoNi	K	AN 1 L stranded	PVC	-	5.4	round			7.5	40
48003	SoPtRh-SoPt	S	AP 1 L stranded	PVC	-	5.4	round			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 flexing -5°C to +70°C	10	40
48005	SoNiCr-SoNi	K	AN 1 M stranded	PVC	-	5.4	round			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 flexing -25°C to +180°C (short time +200°C)	7.5	40
48008	SoNiCr-SoNi	K	AN 1 L-SIL stranded	silicone	-	5.4	round			7.5	40
48009	SoPtRh-SoPt	S	AP 1 L-SIL stranded	silicone	-	5.4	round			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/ tin. steel wire braid	7.8	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C	15	248
48234	SoNiCr-SoNi	K	AN 2 M-SIL stranded	silicone		7.8	round			15	248
48235	SoPtRh-SoPt	S	AP 2 M-SIL stranded	silicone		7.8	round			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-fiber	glass-fiber braid	5.0x7.2	oval	-60°C to +200°C	stationary -25°C to +200°C flexing -25°C to +200°C	7.5	64
48011	SoNiCr-SoNi	K	AN 3 L parallel	glass-fiber		5.0x7.2	oval			7.5	64
48012	SoPtRh-SoPt	S	AP 3 L parallel	glass-fiber		5.0x7.2	oval			7.5	64
48237	Cu-CuNi (Ko)	U	AC 3 L parallel	glass-fiber		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 flexing -25°C to +180°C (short time +200°C)	7.5	62
48239	SoNiCr-SoNi	K	AN 3 Ln-SIL parallel	silicone		5.2x7.4	oval			7.5	62
48240	SoPtRh-SoPt	S	AP 3 Ln-SIL parallel	silicone		5.2x7.4	oval			7.5	62
48241	Cu-CuNi (Ko)	U	AC 3 Ln-SIL parallel	silicone		5.2x7.4	oval			7.5	62
48013	Fe-CuNi (Ko)	L	AE 4 L parallel	glass-fiber	Glass-fiber braid/ galv. steel wire braid	5.8x8.0	oval	-60°C to +200°C	stationary -25°C to +200°C flexing -25°C to +200°C	7.5	87
48014	SoNiCr-SoNi	K	AN 4 L parallel	glass-fiber		5.8x8.0	oval			7.5	87
48015	SoPtRh-SoPt	S	AP 4 L parallel	glass-fiber		5.8x8.0	oval			7.5	87
48242	Cu-CuNi (Ko)	U	AC 4 L parallel	glass-fiber		5.8x8.0	oval			7.5	87
48016	Fe-CuNi (Ko)	L	AE 4 Ln-SIL	silicone	silicone/ galv. steel wire braid	6.0x8.2	oval	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	85
48017	SoNiCr-SoNi	K	AN 4 Ln-SIL	silicone		6.0x8.2	oval			7.5	85
48018	SoPtRh-SoPt	S	AP 4 Ln-SIL	silicone		6.0x8.2	oval			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/ galv. Cu-round wire braid/ PVC jacket	8.1	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	93
48245	SoNiCr-SoNi	K	AN 5 L	PVC		8.1	round			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/ bl. Cu-ground wire 0.5 mm ø / Alu tape/silicone	8.0	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	94
48249	SoNiCr-SoNi	K	AN 6 L-SIL	silicone		8.0	round			7.5	94
48250	SoPtRh-SoPt	S	AP 6 L-SIL	silicone		8.0	round			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/ bl. Cu-ground wire 0.5 mm ø / Alu tape/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)	12	92
48253	SoNiCr-SoNi	K	AN 6 M-SIL	silicone		7.8	round			12	92
48254	SoPtRh-SoPt	S	AP 6 M-SIL	silicone		7.8	round			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-fiber	5.5x8.2	oval	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	60
48020	SoNiCr-SoNi	K	AN 7 L parallel	PVC		5.5x8.2	oval			7.5	60
48021	SoPtRh-SoPt	S	AP 7 L parallel	PVC		5.5x8.2	oval			7.5	60
48256	Cu-CuNi (Ko)	U	AC 7 L parallel	PVC		5.5x8.2	oval			7.5	60
48022	Fe-CuNi (Ko)	L	AE 8 L	PVC	Glass-fiber/ galv. steel wire braid	6.9x9.0	oval	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	82
48023	SoNiCr-SoNi	K	AN 8 L	PVC		6.9x9.0	oval			7.5	82
48024	SoPtRh-SoPt	S	AP 8 L	PVC		6.9x9.0	oval			7.5	82
48257	Cu-CuNi (Ko)	U	AC 8 L	PVC		6.9x9.0	oval			7.5	82
48025	Fe-CuNi (Ko)	L	AE 9 L	PVC	PVC	7.0	round	-10°C to +80°	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	79
48026	SoNiCr-SoNi	K	AN 9 L	PVC		7.0	round			7.5	79
48027	SoPtRh-SoPt	S	AP 9 L	PVC		7.0	round			7.5	79
48258	Cu-CuNi (Ko)	U	AC 9 L	PVC		7.0	round			7.5	79
48479	Fe-CuNi	J	AF 9 L	PVC		7.0	round			7.5	79
48028	Fe-CuNi (Ko)	L	AE 9-2 LS	PVC	PVC/galv. steel wire braid	7.8	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	108
48029	SoNiCr-SoNi	K	AN 9-2 LS	PVC		7.8	round			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 braid/ PVC	9.8	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	147
48032	SoNiCr-SoNi	K	AN 9-2 LSY	PVC		9.8	round			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 = stranded conductor
M = solid conductor
tin. = tinned
galv. = galvanized

L

COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
Single-pair: 2 x 1.5 mm² (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)											
48033	FE-CuNi (Ko)	L	AE 9 M	PVC	PVC	7.0	round	-10°C to +80°	stationary -25°C to +70°C flexing -5°C to +70°C	12	79
48034	SoNiCr-SoNi	K	AN 9 M	PVC		7.0	round			12	79
48035	SoPtRh-SoPt	S	AP 9 M	PVC		7.0	round			12	79
48261	Cu-CuNi (Ko)	U	AC 9 M	PVC		7.0	round			12	79
48262	Fe-CuNi (Ko)	L	AE 9-2 MSY	PVC	PVC/galv. steel wire braid/ PVC	9.6	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	12	144
48263	SoNiCr-SoNi	K	AN 9-2 MSY	PVC		9.6	round			12	144
48264	SoPtRh-SoPt	S	AP 9-2 MSY	PVC		9.6	round			12	144
48265	Cu-CuNi (Ko)	U	AC 9-2 MSY	PVC		9.6	round			12	144
48036	Fe-CuNi (Ko)	L	AE 10 L-SIL parallel	silicone	glass-fiber	5.5x8.2	oval	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	59
48037	SoNiCr-SoNi	K	AN 10 L-SIL parallel	silicone		5.5x8.2	oval			7.5	59
48038	SoPtRh-SoPt	S	AP 10 L-SIL parallel	silicone		5.5x8.2	oval			7.5	59
48266	Cu-CuNi (Ko)	U	AC 10 L-SIL parallel	silicone		5.5x8.2	oval			7.5	59
48039	Fe-CuNi (Ko)	L	AE 11 L	silicone	Glass-fiber/ galv. steel wire braid	6.3x9.0	oval	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	82
48040	SoNiCr-SoNi	K	AN 11 L	silicone		6.3x9.0	oval			7.5	82
48041	SoPtRh-SoPt	S	AP 11 L	silicone		6.3x9.0	oval			7.5	82
48267	Cu-CuNi (Ko)	U	AC 11 L	silicone		6.3x9.0	oval			7.5	82
48042	Fe-CuNi (Ko)	L	AE 11 Lr	silicone	Glass-fiber/ galv. steel wire braid	6.7	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	83
48043	SoNiCr-SoNi	K	AN 11 Lr	silicone		6.7	round			7.5	83
48044	SoPtRh-SoPt	S	AP 11 Lr	silicone		6.7	round			7.5	83
48268	Cu-CuNi (Ko)	U	AC 11 Lr	silicone		6.7	round			7.5	83
48045	Fe-CuNi (Ko)	L	AE 11 Mr	silicone	Glass-fiber/ galv. steel wire braid	6.5	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	12	83
48046	SoNiCr-SoNi	K	AN 11 Mr	silicone		6.5	round			12	83
48047	SoPtRh-SoPt	S	AP 11 Mr	silicone		6.5	round			12	83
48269	Cu-CuNi (Ko)	U	AC 11 Mr	silicone		6.5	round			12	83
48048	Fe-CuNi (Ko)	L	AE 12 L parallel	PVC	PVC	4.3x7.0	oval	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	69
48049	SoNiCr-SoNi	K	AN12 L parallel	PVC		4.3x7.0	oval			7.5	69
48050	SoPtRh-SoPt	S	AP 12 L parallel	PVC		4.3x7.0	oval			7.5	69
48270	Cu-CuNi (Ko)	U	AC 12 L parallel	PVC		4.3x7.0	oval			7.5	69
48481	Fe-CuNi	J	AF 12 L parallel	PVC		4.3x7.0	oval			7.5	69
48051	Fe-CuNi (Ko)	L	AE 12 M parallel	PVC	PVC	4.2x6.8	oval	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	12	61
48052	SoNiCr-SoNi	K	AN12 M parallel	PVC		4.2x6.8	oval			12	61
48053	SoPtRh-SoPt	S	AP 12 M parallel	PVC		4.2x6.8	oval			12	61
48271	Cu-CuNi (Ko)	U	AC 12 M parallel	PVC		4.2x6.8	oval			12	61
48054	Fe-CuNi (Ko)	L	AE 13 L parallel	silicone	Glass-fiber	3.2x5.9	oval	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	45
48055	SoNiCr-SoNi	K	AN 13 L parallel	silicone		3.2x5.9	oval			7.5	45
48056	SoPtRh-SoPt	S	AP 13 L parallel	silicone		3.2x5.9	oval			7.5	45
48272	Cu-CuNi (Ko)	U	AC 13 L parallel	silicone		3.2x5.9	oval			7.5	45
48057	Fe-CuNi (Ko)	L	AE 13 M	silicone	Glass-fiber	3.5x6.0	oval	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	12	45
48058	SoNiCr-SoNi	K	AN 13 M	silicone		3.5x6.0	oval			12	45
48059	SoPtRh-SoPt	S	AP 13 M	silicone		3.5x6.0	oval			12	45
48273	Cu-CuNi (Ko)	U	AC 13 M	silicone		3.5x6.0	oval			12	45
48060	Fe-CuNi (Ko)	L	AE 14 L	silicone	Special foamed silicone mixture/ galv. Steel hose	11.7	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	196
48061	SoNiCr-SoNi	K	AN 14 L	silicone		11.7	round			7.5	196
48062	SoPtRh-SoPt	S	AP 14 L	silicone		11.7	round			7.5	196
48274	Cu-CuNi (Ko)	U	AC 14 L	silicone		11.7	round			7.5	196
48063	Fe-CuNi (Ko)	L	AE 15 L	silicone	silicone	7.7	round	-60°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	76
48064	SoNiCr-SoNi	K	AN 15 L	silicone		7.7	round			7.5	76
48065	SoPtRh-SoPt	S	AP 15 L	silicone		7.7	round			7.5	76
48275	Cu-CuNi (Ko)	U	AC 15 L	silicone		7.7	round			7.5	76
48482	Fe-CuNi	J	AF 15 L	silicone		7.7	round			7.5	76
48066	Fe-CuNi (Ko)	L	AE 15 LS	silicone	silicone/ galv. steel wire braid	7.8	round	-10°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	105
48067	SoNiCr-SoNi	K	AN 15 LS	silicone		7.8	round			7.5	105
48068	SoPtRh-SoPt	S	AP 15 LS	silicone		7.8	round			7.5	105
48276	Cu-CuNi (Ko)	U	AC 15 LS	silicone		7.8	round			7.5	105
48277	Fe-CuNi (Ko)	L	AE 16 L-SIL parallel	silicone	-	2.8x5.6	oval	-10°C to +180°C	stationary -25°C to +180°C flexing -25°C to +180°C (short time +200°C)	7.5	38
48278	SoNiCr-SoNi	K	AN 16 L-SIL parallel	silicone		2.8x5.6	oval			7.5	38
48279	SoPtRh-SoPt	S	AP 16 L-SIL parallel	silicone		2.8x5.6	oval			7.5	38
48280	Cu-CuNi (Ko)	U	AC 16 L-SIL parallel	silicone		2.8x5.6	oval			7.5	38
48281	Fe-CuNi (Ko)	L	AE 18 L	HELUFLON®-FEP	HELUFLON®-FEP	4.4	round	-100°C to 200°C	stationary -25°C to +205°C flexing -25°C to +205°C	7.5	37
48282	SoNiCr-SoNi	K	AN 18 L	HELUFLON®-FEP		4.4	round			7.5	37
48283	SoPtRh-SoPt	S	AP 18 L	HELUFLON®-FEP		4.4	round			7.5	37
48284	Cu-CuNi (Ko)	U	AC 18 L	HELUFLON®-FEP		4.4	round			7.5	37
48285	Fe-CuNi (Ko)	L	AE 19 L	HELUFLON®-FEP	PETP tape/ tin. Cu-round wire braid/ HELUFLON®-FEP	5.6	round	-100°C to 200°C	stationary -25°C to +205°C flexing -25°C to +205°C	7.5	60
48286	SoNiCr-SoNi	K	AN 19 L	HELUFLON®-FEP		5.6	round			7.5	60
48287	SoPtRh-SoPt	S	AP 19 L	HELUFLON®-FEP		5.6	round			7.5	60
48288	Cu-CuNi (Ko)	U	AC 19 L	HELUFLON®-FEP		5.6	round			7.5	60

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

COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
Single-pair: 2 x 1.5 mm² (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)											
48289	FE-CuNi (Ko)	L	AE 20 L	PVC	PETP tape/ bl. Cu-ground wire 0.5 mm ø / Alu-tape/PVC	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	AE 20 L	PVC		8.0	round			7.5	75
48291	SoPtRh-SoPt	S	AE 20 L	PVC		8.0	round			7.5	75
48292	Cu-CuNi (Ko)	U	AE 20 L	PVC		8.0	round			7.5	75
48293	Fe-CuNi (Ko)	L	AE 20 M	PVC	PETP tape/ bl. Cu-ground wire 0.5 mm ø / Alu-tape/PVC	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	AE 20 M	PVC		8.2	round			12	82
48295	SoPtRh-SoPt	S	AE 20 M	PVC		8.2	round			12	82
48296	Cu-CuNi (Ko)	U	AE 20 M	PVC		8.2	round			12	82
Multiple-pair: 2 pair (4 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		8.3	round			7.5	125
48102	SoPtRh-SoPt	S	AP 9-4 L	PVC		8.3	round			7.5	125
48297	Cu-CuNi (Ko)	U	AC 9-4 L	PVC		8.3	round			7.5	125
48483	Fe-CuNi	J	AF 9-4 L	PVC		8.3	round			7.5	125
48298	Fe-CuNi (Ko)	L	AE 9-4 LS	PVC	PVC/ galv. steel wire braid	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			7.5	155
48300	SoPtRh-SoPt	S	AP 9-4 LS	PVC		8.9	round			7.5	155
48301	Cu-CuNi (Ko)	U	AC 9-4 LS	PVC		8.9	round			7.5	155
48137	Fe-CuNi (Ko)	L	AE 9-4 LSY	PVC	PVC/ galv. steel wire braid/ 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			7.5	220
48139	SoPtRh-SoPt	S	AP 9-4 LSY	PVC		11.4	round			7.5	220
48302	Cu-CuNi (Ko)	U	AC 9-4 LSY	PVC		11.4	round			7.5	220
48303	Fe-CuNi (Ko)	L	AE 9-4 MSY	PVC	PVC/ galv. steel wire braid/ 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			12	210
48305	SoPtRh-SoPt	S	AP 9-4 MSY	PVC		11.0	round			12	210
48306	Cu-CuNi (Ko)	U	AC 9-4 MSY	PVC		11.0	round			12	210
48307	Fe-CuNi (Ko)	L	AE 20-4 M	PVC	PETP tape/ bl. Cu-ground wire 0.5 mm ø / Alu-tape/PVC	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		10.8	round			12	137
48309	SoPtRh-SoPt	S	AP 20-4 M	PVC		10.8	round			12	137
48310	Cu-CuNi (Ko)	U	AC 20-4 M	PVC		10.8	round			12	137
Multiple-pair: 4 x 1.5 mm² (L = stranded wire, conductor make-up 48 x 0.20 mm)											
48474	Fe-CuNi (Ko)	L	AE 11-4 Lr	silicone	Glass-fiber/galv. steel wire braid	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	AE 11-4 Lr	silicone		7.8	round			7.5	11.8
48476	SoPtRh-SoPt	S	AE 11-4 Lr	silicone		7.8	round			7.5	11.8
48477	Cu-CuNi (Ko)	U	AE 11-4 Lr	silicone		7.8	round			7.5	11.8
Multiple-pair: 3 pairs (6 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		10.3	round			7.5	190
48105	SoPtRh-SoPt	S	AP 9-6 L	PVC		10.3	round			7.5	190
48311	Cu-CuNi (Ko)	U	AC 9-6 L	PVC		10.3	round			7.5	190
48484	Fe-CuNi	J	AF 9-6 L	PVC		10.3	round			7.5	190
48312	Fe-CuNi (Ko)	L	AE 9-6 LS	PVC	PVC/ galv. steel wire braid	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			7.5	266
48314	SoPtRh-SoPt	S	AP 9-6 LS	PVC		10.9	round			7.5	226
48315	Cu-CuNi (Ko)	U	AC 9-6 LS	PVC		10.9	round			7.5	226
48140	Fe-CuNi (Ko)	L	AE 9-6 LSY	PVC	PVC/ galv. steel wire braid/ 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			7.5	292
48142	SoPtRh-SoPt	S	AP 9-6 LSY	PVC		13.4	round			7.5	292
48316	Cu-CuNi (Ko)	U	AC 9-6 LSY	PVC		13.4	round			7.5	292
48317	Fe-CuNi (Ko)	L	AE 9-6 MSY	PVC	PVC/ galv. steel wire braid/ 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			12	272
48319	SoPtRh-SoPt	S	AP 9-6 MSY	PVC		12.5	round			12	272
48320	Cu-CuNi (Ko)	U	AC 9-6 MSY	PVC		12.5	round			12	272
48321	Fe-CuNi (Ko)	L	AE 20-6 M	PVC	PETP tape/ bl. Cu-ground wire 0.5 mm ø / Alu-tape/PVC	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		12.4	round			12	186
48323	SoPtRh-SoPt	S	AP 20-6 M	PVC		12.4	round			12	186
48324	Cu-CuNi (Ko)	U	AC 20-6 M	PVC		12.4	round			12	186
Multiple-pair: 4 pairs (8 x 1.5 mm²) (L = stranded wire, 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		11.0	round			7.5	238
48108	SoPtRh-SoPt	S	AP 9-8 L	PVC		11.0	round			7.5	238
48325	Cu-CuNi (Ko)	U	AC 9-8 L	PVC		11.0	round			7.5	238
48485	Fe-CuNi	J	AF 9-8 L	PVC		11.0	round			7.5	238
48143	Fe-CuNi (Ko)	L	AE 9-8 LSY	PVC	PVC/ galv. steel wire braid/ 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			7.5	410
48145	SoPtRh-SoPt	S	AP 9-8 LSY	PVC		14.0	round			7.5	410
48326	Cu-CuNi (Ko)	U	AC 9-8 LSY	PVC		14.0	round			7.5	410

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COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
Multiple-pair: 5 pairs (10 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm											
48109	FE-CuNi (Ko)	L	AE 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
48110	SoNiCr-SoNi	K	AN 9-10 L	PVC		13.0	round			7.5	284
48111	SoPtRh-SoPt	S	AP 9-10 L	PVC		13.0	round			7.5	284
48327	Cu-CuNi (Ko)	U	AC 9-10 L	PVC		13.0	round			7.5	284
48486	FE-CuNi (Ko)	J	AF 9-10 L	PVC		13.0	round			7.5	284
48146	Fe-CuNi (Ko)	L	AE 9-10 LSY	PVC	PVC/ galv. steel wire braid/ 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
Multiple-pair: 6 pairs (12 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		13.5	round			7.5	320
48114	SoPtRh-SoPt	S	AP 9-12 L	PVC		13.5	round			7.5	320
48329	Cu-CuNi (Ko)	U	AC 9-12 L	PVC		13.5	round			7.5	320
48487	Fe-CuNi	J	AF 9-12 L	PVC		13.5	round			7.5	320
48330	Fe-CuNi (Ko)	L	AE 9-12 LS	PVC	PVC/ galv. steel wire braid	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 braid/ 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 braid/ 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/ bl. Cu-ground wire 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
Multiple-pair: 7 pairs (14 x 1.5 mm²) (L = stranded wire, 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		14.5	round			7.5	396
48117	SoPtRh-SoPt	S	AP 9-14 L	PVC		14.5	round			7.5	396
48343	Cu-CuNi (Ko)	U	AC 9-14 L	PVC		14.5	round			7.5	396
48488	Fe-CuNi	J	AF 9-14 L	PVC		14.5	round			7.5	396
48152	Fe-CuNi (Ko)	L	AE 9-14 LSY	PVC	PVC/ galv. steel wire braid/ 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
Multiple-pair: 8 pairs (16 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		15.1	round			7.5	419
48120	SoPtRh-SoPt	S	AP 9-16 L	PVC		15.1	round			7.5	419
48345	Cu-CuNi (Ko)	U	AC 9-16 L	PVC		15.1	round			7.5	419
48489	Fe-CuNi	J	AF 9-16 L	PVC		15.1	round			7.5	419
48346	Fe-CuNi (Ko)	L	AE 9-16 LS	PVC	PVC/ galv. steel wire braid	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 braid/ 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 braid/ 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/ bl. Cu-ground wire 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

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

COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
Multiple-pair: 9 pairs (18 x 1.5 mm²) (L = stranded wire, 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	AE 9-18 L	PVC		16.5	round			7.5	480
48123	SoPtRh-SoPt	S	AE 9-18 L	PVC		16.5	round			7.5	480
48359	Cu-CuNi (Ko)	U	AE 9-18 L	PVC		16.5	round			7.5	480
48490	FE-CuNi	J	AF 9-18 L	PVC		16.5	round			7.5	480
48158	Fe-CuNi (Ko)	L	AE 9-18 LSY	PVC	PVC/ galv. steel wire braid/ 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	AE 9-18 LSY	PVC		20.5	round			7.5	758
48160	SoPtRh-SoPt	S	AE 9-18 LSY	PVC		20.5	round			7.5	758
48360	Cu-CuNi (Ko)	U	AE 9-18 LSY	PVC		20.5	round			7.5	758
Multiple-pair: 10 pairs (20 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		16.7	round			7.5	520
48126	SoPtRh-SoPt	S	AP 9-20 L	PVC		16.7	round			7.5	520
48361	Cu-CuNi (Ko)	U	AC 9-20 L	PVC		16.7	round			7.5	520
48491	Fe-CuNi	J	AF 9-20 L	PVC		16.7	round			7.5	520
48362	Fe-CuNi (Ko)	L	AE 9-20 LS	PVC	PVC/ galv. steel wire braid	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 braid/ PVC	20.9	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	752
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 braid/ PVC	20.3	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	12	744
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/ bl. Cu-ground wire 0.5 mm ø/ Alu-tape/PVC	20.3	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	12	542
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
Multiple-pair: 12 pairs (24 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		19.0	round			7.5	614
48129	SoPtRh-SoPt	S	AP 9-24 L	PVC		19.0	round			7.5	614
48375	Cu-CuNi (Ko)	U	AC 9-24 L	PVC		19.0	round			7.5	614
48492	Fe-CuNi	J	AF 9-24 L	PVC		19.0	round			7.5	614
48376	Fe-CuNi (Ko)	L	AE 9-24 LS	PVC	PVC/ galv. steel wire braid	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 braid/ PVC	24.2	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	7.5	938
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 braid/ PVC	23.1	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	12	907
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/ bl. Cu-ground wire 0.5 mm ø/ Alu-tape/PVC	22.5	round	-10°C to +80°C	stationary -25°C to +70°C flexing -5°C to +70°C	12	638
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
Multiple-pair: 16 pairs (32 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		20.9	round			7.5	793
48391	SoPtRh-SoPt	S	AP 9-32 L	PVC		20.9	round			7.5	793
48392	Cu-CuNi (Ko)	U	AC 9-32 L	PVC		20.9	round			7.5	793
48493	Fe-CuNi	J	AF 9-32 L	PVC		20.9	round			7.5	793
48393	Fe-CuNi (Ko)	L	AE 9-32 LS	PVC	PVC/ galv. steel wire braid	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

L = stranded conductor
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COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
Multiple-pair: 16 pairs (32 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 1.38 mm)											
48397	FE-CuNi (Ko)	L	AE 9-32 LSY	PVC	PVC/ galv. steel wire braid/ 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		26.1	round			7.5	1141
48399	SoPtRh-SoPt	S	AP 9-32 LSY	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	PVC/ galv. steel wire braid/ 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		25.3	round			12	1130
48403	SoPtRh-SoPt	S	AP 9-32 MSY	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/ bl. Cu-ground wire 0.5 mm ø/ Alu-tape/PVC	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		25.1	round			12	847
48407	SoPtRh-SoPt	S	AP 20-32 M	PVC		25.1	round			12	847
48408	Cu-CuNi (Ko)	U	AC 20-32 M	PVC		25.1	round			12	847
Multiple-pair: 18 pair (36 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		22.1	round			7.5	904
48133	SoPtRh-SoPt	S	AP 9-36 L	PVC		22.1	round			7.5	904
48409	Cu-CuNi (Ko)	U	AC 9-36 L	PVC		22.1	round			7.5	904
48494	Fe-CuNi	J	AF 9-36 L	PVC		22.1	round			7.5	904
48410	Fe-CuNi (Ko)	L	AE 9-36 LS	PVC	PVC/ galv. steel wire braid	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		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	PVC/ galv. steel wire braid/ 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		27.3	round			7.5	1268
48170	SoPtRh-SoPt	S	AP 9-36 LSY	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	PVC/ galv. steel wire braid/ 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		26.1	round			12	1232
48417	SoPtRh-SoPt	S	AP 9-36 MSY	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/ bl. Cu-ground wire 0.5 mm ø / Alu-tape/PVC	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		26.0	round			12	944
48421	SoPtRh-SoPt	S	AP 20-36 M	PVC		26.0	round			12	944
48422	Cu-CuNi (Ko)	U	AC 20-36 M	PVC		26.0	round			12	944
Multiple-pair: 19 pairs (38 x 1.5 mm²) (L = stranded wire, 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		22.5	round			7.5	937
48136	SoPtRh-SoPt	S	AP 9-38 L	PVC		22.5	round			7.5	937
48423	Cu-CuNi (Ko)	U	AC 9-38 L	PVC		22.5	round			7.5	937
48171	Fe-CuNi (Ko)	L	AE 9-38 LSY	PVC	PVC/ galv. steel wire braid/ 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		26.5	round			7.5	1340
48173	SoPtRh-SoPt	S	AP 9-38 LSY	PVC		26.5	round			7.5	1340
48424	Cu-CuNi (Ko)	U	AC 9-38 LSY	PVC		26.5	round			7.5	1340
Multiple-pair: 20 pairs (40 x 1.5 mm²) (L = stranded wire, conductor make-up 48 x 0.20 mm; M = solid conductor, conductor ø 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		24.1	round			7.5	1032
48427	SoPtRh-SoPt	S	AP 9-40 L	PVC		24.1	round			7.5	1032
48428	Cu-CuNi (Ko)	U	AC 9-40 L	PVC		24.1	round			7.5	1032
48429	Fe-CuNi (Ko)	L	AE 9-40 LS	PVC	PVC/ galv. steel wire braid	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		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	PVC/ galv. steel wire braid/ 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		29.3	round			7.5	1446
48435	SoPtRh-SoPt	S	AP 9-40 LSY	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	PVC/ galv. steel wire braid/ 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		28.0	round			12	1381
48439	SoPtRh-SoPt	S	AP 9-40 MSY	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 9-40M	PVC	PETP-tape/ bl. Cu-ground wire 0.5 mm ø /Alu-tape/ PVC	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 9-40 M	PVC		26.0	round			12	1001
48443	SoPtRh-SoPt	S	AP 9-40 M	PVC		26.0	round			12	1001
48444	Cu-CuNi (Ko)	U	AC 9-40 M	PVC		26.0	round			12	1001

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COMPENSATING CABLES

Part no.	Thermocouple element material in accordance with DIN 43713	Thermocouple type	Type	Core insulation	Jacket/ armoring jacket	Outer ø approx. mm	Form	Temperature range of insulation °C	Installation temperature range °C	min. bending radius x cable ø	Weight approx. kg/km
Single-pair: 2 x 0.22 mm² (L = stranded wire, 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	AE 1 L	PVC		1.0	round			7.5	10
48202	SoPtRh-SoPt	S	AE 1 L	PVC		1.0	round			7.5	10
48460	Cu-CuNi (Ko)	U	AE 1 L	PVC		1.0	round			7.5	10
Single-pair: 2 x 0.22 mm² (L = stranded wire, 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	AE 9-022	PVC		4.0	round			7.5	22
48205	SoPtRh-SoPt	S	AE 9-022	PVC		4.0	round			7.5	22
48461	Cu-CuNi (Ko)	U	AE 9-022	PVC		4.0	round			7.5	22
48206	Fe-CuNi (Ko)	L	AE 5-022	PVC	PETP tape/ galv. Cu-round wire braid/ PVC	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		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-fiber	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-fiber		3.4	round			7.5	16
48465	SoPtRh-SoPt	S	AP 15-022	glass-fiber		3.4	round			7.5	16
48466	Cu-CuNi (Ko)	U	AC 15-022	glass-fiber		3.4	round			7.5	16
48209	Fe-CuNi (Ko)	L	AE 15-G 022	glass-fiber	silicone/glass-fiber	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-fiber		3.9	round			7.5	22
48211	SoPtRh-SoPt	S	AP 15-G 022	glass-fiber		3.9	round			7.5	22
48467	Cu-CuNi (Ko)	U	AC 15-G 022	glass-fiber		3.9	round			7.5	22
48212	Fe-CuNi (Ko)	L	AE (GI-SIL-GI-S)	glass-fiber	silicone/ Glass-fiber/ galv. steel wire braid	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-fiber		5.0	round			7.5	25
48214	SoPtRh-SoPt	S	AP (GI-SIL-GI-S)	glass-fiber		5.0	round			7.5	25
48468	Cu-CuNi (Ko)	U	AC (GI-SIL-GI-S)	glass-fiber		5.0	round			7.5	25
Single-pair: 2 x 0.5 mm² (L = stranded wire, conductor make-up 16 x 0.20 mm)											
48215	Fe-CuNi (Ko)	L	AE (GI-SIL)	glass-fiber	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-fiber		4.6	round			7.5	18
48217	SoPtRh-SoPt	S	AP (GI-SIL)	glass-fiber		4.6	round			7.5	18
48469	Cu-CuNi (Ko)	U	AC (GI-SIL)	glass-fiber		4.6	round			7.5	18
Single-pair: 2 x 0.75 mm² (L = stranded wire, 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		6.0	round			7.5	25
48220	SoPtRh-SoPt	S	AP (PVC-PVC)	PVC		6.0	round			7.5	25
48470	Cu-CuNi (Ko)	U	AC (PVC-PVC)	PVC		6.0	round			7.5	25
Multiple-pair: 4 x 0.22 mm² (stranded wire, 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		6.0	round			7.5	33
48223	SoPtRh-SoPt	S	AP (PVC-PVC)	PVC		6.0	round			7.5	33
48471	Cu-CuNi (Ko)	U	AC (PVC-PVC)	PVC		6.0	round			7.5	33
48224	Fe-CuNi (Ko)	L	AE (PVC-C-PVC)	PVC	galv. Cu-braid/ PVC jacket	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		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 (GIL-SIL)	glass-fiber	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 (GIL-SIL)	glass-fiber		6.0	round			7.5	35
48229	SoPtRh-SoPt	S	AP (GIL-SIL)	glass-fiber		6.0	round			7.5	35
48473	Cu-CuNi (Ko)	U	AC (GIL-SIL)	glass-fiber		6.0	round			7.5	35

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

L