CAMUNA CAVI

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LAPP GROUP

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I. Introduction

The product range illustrated in this catalogue is manufactured by CAMUNA CAVI, a company specialized to manufacture instrumentation cables that have long been on national and international markets. It offers a range of cables intended for process industry, suitable to be installed in dangerous areas such as intrinsically safe areas or explosion proof areas.
*The cables are manufactured in accordance with national and international standards and norms (***CEI – IEC – VDE – BS – NF – UTE – NEC***) and according to the technical specifications issued by users and/or engineering companies.*

** CAMUNACAVI has manufactured and supplied cables according to the following Technical Specifications:*

1. STD • SM • MAT.041; STD • MAT.042; (SNAM PROGETTI)
2. ENI 0181.00 Rev. 2 and Rev. 11.; ENI 0163.00 Rev. 10; (ENICHEM GROUP)
3. MEU 817; MEU 750; (MONTEDISON)
4. ITN (Nuovo Pignone)
5. DANIELI
6. FWI (Foster Wheeler)
7. MAT • STA • STD; (AGIP)
8. EXXON

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Product selection table

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Product selection table	Cable type	Name	Cable description	Fields of application
INSTRUMENTATION CABLES	Power cables	***inStrum®*** 100	Power cables insulated in PVC	   
		inStrum® 101	Power cables, screened insulated in PVC	
		inStrum® 102-103	Power cables, screened or unscreened, insulated in rubber	
		inStrum® 104-105	Power cables, screened or unscreened, armoured, insulated in rubber	
		inStrum® 106-107	Power cables, screened or unscreened, insulated in crosslinked polyethylene	
		inStrum® 108-109	Power cables, screened or unscreened, armoured, insulated in crosslinked polyethylene	
	Control cables	***inStrum®*** 130	Control cables insulated in PVC	
		inStrum® 131	Signal and control cables, screened insulated in PVC	
		inStrum® 132-133	Control cables, screened or unscreened, insulated with PVC	
		inStrum® 134-135	Control cables, screened or unscreened, armoured, insulated with PVC	
	Signal and data transmission cables	***inStrum®*** 170-171	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, insulated with PVC	
		inStrum® 172-173	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with PVC	
		inStrum® IS 174-175	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, insulated with polyethylene	
		inStrum® IS 176-177	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with polyethylene	
		inStrum® 178	Data transmission cables, copper braid screened, insulated with PVC	
HALOGEN-FREE INSTRUMENTATION CABLES	Power cables	***inStrum® H*** 200	Power cables insulated in elastomeric compound, with low toxic and corrosive gas emission	  
		inStrum® H 201	Power cables armoured insulated in elastomeric compound, with low toxic and corrosive gas emission	
		inStrum® H 202	Power cables insulated in rubber, fire-retardant, with low toxic and corrosive gas emission	
		inStrum® H 203	Power cables armoured insulated in rubber, with low toxic and corrosive gas emission	
		inStrum® H 204	Power cables insulated in crosslinked polyethylene, with low toxic and corrosive gas emission	
		inStrum® H 205	Power cables, armoured insulated in crosslinked polyethylene, with low toxic and corrosive gas emission	

Product selection table

Product selection table	Cable type	Name	Cable description	Fields of application
HALOGEN-FREE INSTRUMENTATION CABLES	Control cables	***inStrum® H*** 230	Control cables insulated in elastomeric compound, with low toxic and corrosive gas emission	    
		inStrum® H 231	Control cables, armoured, insulated in elastomeric compound, with low toxic and corrosive gas emission	
		inStrum® H 232	Control cables, insulated in rubber, with low toxic and corrosive gas emission	
		inStrum® H 233	Control cables, armoured, insulated in rubber, with low toxic and corrosive gas emission	
		inStrum® H 234	Control cables, insulated in crosslinked polyethylene, with low toxic and corrosive gas emission	
		inStrum® H 235	Control cables, armoured, insulated in crosslinked polyethylene, with low toxic and corrosive gas emission	
	Signal and data transmission cables	***inStrum® H*** 270-271	Twisted pair, signal cables, screened on the single pair or on the total, insulated with elastomeric compound, with low toxic and corrosive gas emission	
		inStrum® H 272-273	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, and armoured, insulated with elastomeric compound, with low toxic and corrosive gas emission	
		inStrum® H 274-275	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, insulated in rubber, with low toxic and corrosive gas emission	
		inStrum® H 276-277	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, and armoured, insulated in crosslinked, with low toxic and corrosive gas emission	
		inStrum® H 278-279	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, insulated in crosslinked polyethylene, with low toxic and corrosive gas emission	
		inStrum® H 280-281	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated in crosslinked polyethylene, with low toxic and corrosive gas emission	
FIRE-RESISTANT INSTRUMENTATION CABLES	Power cables	***inStrum® Fire*** 300	Power cables insulated in elastomeric compound, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 301	Power cables armoured insulated in elastomeric compound, with low toxic and corrosive gas emission fire-resistant	

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Product selection table	Cable type	Name	Cable description	Fields of application
FIRE-RESISTANT INSTRUMENTATION CABLES	Power cables	***inStrum® Fire*** 302	Power cables insulated in rubber, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 303	Power cables armoured insulated in rubber, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 304	Power cables insulated in crosslinked polyethylene, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 305	Power cables armoured insulated in crosslinked polyethylene, with low toxic and corrosive gas emission, fire-resistant	
	Control cables	***inStrum® Fire*** 330-331	Control cables insulated in elastomeric compound, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 332-333	Control cables, screened or unscreened, armoured, insulated in elastomeric compound, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 334-335	Control cables insulated in rubber, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 336-337	Control cables insulated in rubber, screened or unscreened, armoured, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 338-339	Control cables insulated in crosslinked polyethylene, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 340-341	Control cables insulated in crosslinked polyethylene, screened or unscreened, armoured, with low toxic and corrosive gas emission, fire-resistant	
	Signal and data transmission cables	***inStrum® Fire*** 370-371	Twisted pair, signal cables, screened on the single pair or on the total, insulated with elastomeric compound, with low toxic and corrosive gas emission, fire-resistant	
		inStrum® Fire 372-373	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with elastomeric compound, with low toxic and corrosive gas emission	
		inStrum® Fire 374-375	Signal cables insulated in rubber, twisted in pair, screened on the single pair and on the total, or only on the total, with low toxic and corrosive gas emission, fire-resistant	

Product selection table

Product selection table	Cable type	Name	Cable description	Fields of application
FIRE-RESISTANT INSTRUMENTATION CABLES	Signal and data transmission cables	***inStrum® Fire*** 376-377	Signal cables insulated in rubber, twisted in pair, screened on the single pair and on the total, or only on the total, armoured, with low toxic and corrosive gas emission, fire resistant	
		inStrum® Fire 378-379	Signal cables insulated in crosslinked polyethylene, twisted in pair, screened on the single pair and on the total, or only on the total, with low toxic and corrosive gas emission, fire resistant	
		inStrum® Fire 380-381	Signal cables insulated in crosslinked polyethylene, twisted in pair, screened on the single pair and on the total, or only on the total and armoured, with low toxic and corrosive gas emission, fire resistant	
CABLES FOR THERMOCOUPLES	Extension and compensating cables	***inTherm®*** 10	Extension or compensating cables for thermocouples, insulated in PVC, twisted in pair	
		inTherm® 11-12	Extension or compensating cables for thermocouples, insulated in PVC, twisted in pair, screened on the single pair and on the total, or only on the total	
		inTherm® 13-14	Extension or compensating cables for thermocouples, insulated in PVC, twisted in pair, screened on the single pair and on the total, or only on the total, and armoured	
		inTherm® 15	Extension or compensating cables for thermocouples, insulated in crosslinked polyethylene, twisted in pair	
		inTherm® 16-17	Extension or compensating cables for thermocouples, insulated in low density polyethylene, twisted in pair, screened on the single pair and on the total, or only on the total	
		inTherm® 18-19	Extension or compensating cables for thermocouples, insulated in low density polyethylene, twisted in pair, screened on the single pair and on the total, or only on the total, and armoured	
		inTherm® 20	Extension or compensating cables for thermocouples, insulated in rubber, twisted in pair	
		inTherm® 21-22	Extension or compensating cables for thermocouples, insulated in rubber, twisted in pair, screened on the single pair and on the total, or only on the total	
		inTherm® 23-24	Extension or compensating cables for thermocouples, insulated in rubber, twisted in pair, screened on the single pair and on the total, or only on the total, and armoured	
		inTherm® 25	Extension or compensating cables for thermocouples, insulated in crosslinked polyethylene, twisted in pair	

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Product selection table	Cable type	Name	Cable description	Fields of application
CABLES FOR THERMOCOUPLES	Extension and compensating cables	***inTherm®*** 26-27	Extension or compensating cables for thermocouples, insulated in crosslinked polyethylene, twisted in pair, screened on the single pair and on the total, or only on the total	    
		inTherm® 28-29	Extension or compensating cables for thermocouples, insulated in crosslinked polyethylene, twisted in pair, screened on the single pair and on the total, or only on the total, and armoured	
		inTherm® 30	Extension or compensating cables for thermocouples, insulated in crosslinked elastomeric compound, twisted in pairs, with low smoke, toxic and corrosive gas emission	
		inTherm® 31-32	Extension or compensating cables for thermocouples, insulated in elastomeric compound, twisted in pair, screened on the single pair and on the total, with low smoke, toxic and corrosive gas emission	
		inTherm® 33-34	Extension or compensating cables for thermocouples, insulated in elastomeric compound, twisted in pair, screened on the single pair and on the total, armoured, with low smoke, toxic and corrosive gas emission	
		inTherm® NF 50	Extension or compensating cables, twisted in pair, screened	
		inTherm® NF 51	Extension or compensating cables, twisted in pair, screened on the single pair or on the total	
		inTherm® NF 52	Extension or compensating cables, twisted in pair, screened and armoured	
		inTherm® NF 53	Extension or compensating cables, twisted in pair, screened on the single pair and on the total, and armoured	
CABLES FOR LIFTING SYSTEMS	Flat cables	***inFlat®*** 400	Flat cables insulated in PVC, with PVC sheath	 
		inFlat® 401	Flat cables insulated in PVC, with PVC sheath	
		inFlat® 402	Flat cables insulated in PVC, with PVC sheath	
		inFlat® 403	Special construction flat cables insulated in PVC, with PVC sheath	
	Cables for hanging push-button strips	***inFlat®*** 450	Multicore control and signal cables, self-supporting, extra flexible, insulated in PVC, with PVC sheath	
CABLES ACCORDING TO BS	Power and control cables	***inStrum® BS*** 500	Power cables insulated in PVC	 
		inStrum® BS 501	Power cables insulated in PVC and armoured	
		inStrum® BS 502	Power cables insulated in crosslinked polyethylene	
		inStrum® BS 503	Power cables, armoured, insulated in crosslinked polyethylene	

Product selection table

Product selection table	Cable type	Name	Cable description	Fields of application
CABLES ACCORDING TO BS	Power and control cables	***inStrum® BS*** 504	Power cables, armoured insulated in crosslinked polyethylene, with low smoke, toxic and corrosive gas emission	
		inStrum® BS 505	Power cables, armoured insulated in rubber, with low smoke, toxic and corrosive gas emission	
	Signal and data transmission cables	***inStrum® BS*** 570-571	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, insulated with polyethylene	
		inStrum® BS 572-573	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with polyethylene	
		inStrum® BS 574-575	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, insulated with PVC	
		inStrum® BS 576-577	Twisted pair, signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with PVC	
CABLES ACCORDING TO NF	Power and control cables	***inStrum® NF*** 600	Power cables insulated in crosslinked polyethylene	
		inStrum® NF 601	Power cables, armoured, insulated in crosslinked polyethylene	
	Signal and data transmission cables	***inStrum® NF*** 670	Instrumentation cables, twisted in pairs, screened	
		inStrum® NF 671	Instrumentation cables, twisted in pairs, screened on the single pair and on the total	
		inStrum® NF 672	Instrumentation cables, twisted in pairs, screened and armoured	
		inStrum® NF 673	Instrumentation cables, twisted in pairs, screened on the single pair and on the total, armoured	
ACCESSORIES	Cable glands	SKINTOP® K-EExe II C	Increased safety, special cable gland, cold-resistant, halogen-free, for areas with risk of explosion EExe II areas with PG connection thread	
		SKINTOP® KR-EExe II C	Increased safety, special cable gland, cold-resistant, halogen-free, for areas with risk of explosion EExe II areas with reduced cable clamping range, with PG connection thread glands	
		SKINTOP® K-M EExe II ATEX	Increased safety, special cable gland, cold-resistant, for areas with risk of explosion EExe II areas with metric thread according to EN 50262	

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Product selection table	Cable type	Name	Cable description	Fields of application
ACCESSORIES	Cable glands	SKINTOP® KR1-M EExe II ATEX	Special cable gland, cold-resistant, for areas with risk of explosion with metric thread according to EN 50262 and with reduced cable clamping range	
		SKINTOP® K-EExe II C Blue	Special cable gland, cold-resistant, halogen-free, for intrinsically safe circuits in areas with risk of explosion with PG connection thread	
		SKINTOP® K-M EExe II ATEX Blue	Special cable gland, cold-resistant halogen free, for intrinsically safe circuits in ares with risk of explosion with metric thread according to EN 50262	
		SKINTOP® KR1-M EExe II ATEX Blue	Special cable gland, cold-resistant halogen free, for intrinsically safe circuits in ares with risk of explosion and with reduced cable clamping range	
		SKINTOP® MS-M-EX EExe II E	Special brass cable gland, for areas with risk of explosion with metric connection thread according to EN 50262	
		SKINTOP® MSR-M-EX EExe II E	Special brass cable gland, for areas with risk of explosion and with reduced cable clamping range	
		SKINTOP® MS-EX EExe II C	Special brass cable glands, for areas with risk of explosion, resistant to freezing conditions with PG connection thread	

Tables of symbols corresponding to the product application fields

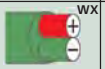
	Pharmaceutical industry
	Oil, gas and refinery
	Off-shore exploration
	Petrochemical industry
	Chemical industry
	Energy industry
	Civil engineering
	Naval industry and dockyards

Cable Identification Table

	Identification according to CEI Unel 35011	Abbreviations of materials	Description
Conductor	F	–	Flexible
	FF	–	Extra flexible
	R	–	Semiflexible
	U	–	Rigid
Conductor insulating materials	E	PE	Thermoplastic polyethylene insulating compound
	–	MGT	Mica glass tape
	E4	XLPE	Crosslinked polyethylene compound Max operating temperature 85°C
	G7	HEPR	High module ethylene propylene rubber compound; Max operating temperature 90°C
	G10	XL-LS0H	Crosslinked elastomeric compound with low smoke, toxic and corrosive gas emission; Max operating temperature 90°C
	R	PVC	TI1 and TI2 quality polyvynil chloride insulating compound; Max operating temperature 70°C
	R2	PVC	R2 quality polyvynil chloride insulating compound; Max operating temperature 70°C
	R7	PVC	TI3 quality polyvynil chloride insulating compound; Max operating temperature 90°C
Cable shape	O	–	Round shape cable cores, joined with or without filler to form a round cable
	X	–	Cores, as above, joined as visible helicoid (Twisted, Doubled)
	D	–	Cores, as above, sided in parallel; cable with flat outer shape
Screen materials	H	IS/OS*	Screen in aluminium tape
	H1	CuT	Screen in tape or strips or copper wires
	H2	CWB/TCWB**	Screen in copper braid
Sheath materials	E	PE	Ez quality polyethylene sheath
	R	PVC	TM1, TM2 or Rz polyvynil chloride sheath
	M1	LS0H	Thermoplastic sheath with low smoke, toxic and corrosive gas emission
Armour materials	A	SWB	Steel braid armour
	F	SWA	Armour steel wires
	N	STA	Armour steel tapes
	Z	SSA	Armour steel strips

*IS = single pair
*OS = on the total
**CWB = in red copper
**TCWB = in tinned copper

Extension and compensating cables for thermocouples

Type of Thermocouple	Cable type		Cable colour codes according to						Fields of temperature of the cables
	Extension Cable	Compen-sating Cable	(Internat) IEC standards	(D) DIN	(USA) ANSI	(UK) BS	(F) NFC	(J) JIS	
T +Cu -CuNi	**TX**								-25/+100°C
E +NiCr -CuNi	**EX**								-25/+200°C
J +Fe -CuNi	**JX**								-25/+200°C
K +NiCr - Ni	**KX**								-25/+200°C
		KCA							0/+100°C
		KCB							0/+150°C
N +NiCrSi -NiSi	**NX**								-25/+200°C
		NC							0/+150°C
R +PtRh 13% -Pt		**RCA**							0/+100°C
		RCB							0/+200°C
S +PtRh 10% -Pt		**SCA**							0/+100°C
		SCB							0/+200°C
B PtRh 30% PtRh 6%		**BC**							0/+100°C

Notes:

- *Extension cables for thermocouples are constructed with materials having the same composition as the thermocouple materials. They are defined by letter X that follows the thermocouple definition letter. For example TX.*
- *Compensating cables for thermocouples are constructed with materials having different composition with respect to thermocouple materials. They are defined by letter C that follows the thermocouple definition letter. For example KC.*
- *The compensating cable for thermocouple B can be realised with two copper conductors; in this case tolerance will be ± 3.5°C.*

Thermocouple material abbreviations:

T:	Cu-CuNi =	Copper-Copper Nickel
E:	NiCr-CuNi=	Nickel 10% Chrome-Nickel Copper
J:	Fe-CuNi=	Iron-Nickel Copper
K:	NiCr-Ni=	Nickel 10% Chrome-Nickel
N:	NiCrSi-NiSi=	Nickel Chrome Silica-Nickel Silica
R:	PtRh-Pt=	Platinum 13 Rhodium-Platinum
S:	PtRh-Pt=	Platinum 10% Rhodium-Platinum
B:	PtRh-PtRh=	Platinum 30% Rhodium-Platinum 6% Rhodium

Conductor Resistances
Conductor Make-Up

T5

Conductor Resistances

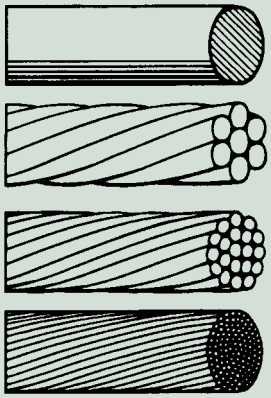
Conductor resistances for fine wire conductors (extract from VDE 0295and in accordance with international rules, e.g. IEC 228). Conductor make-up is governed by the maximum single wire diameter and the maximum conductor resistance.

Nominal cross-section	Conductor resistance for 20° C for 1 km in Ω ○ (maximum value)			
	of tinned copper wire		of untinned copper wire	
mm²	Class 1 + 2	Class 5 + 6	Class 1 + 2	Class 5 + 6
0.08		250.0		243.0
0.14		142.0		138.0
0.25		82.0		79.0
0.34		59.0		57.0
0.5	36.7	40.1	36.0	39.0
0.75	24.8	26.7	24.5	26.0
1	18.2	20.0	18.1	19.5
1.5	12.2	13.7	12.1	13.3
2.5	7.56	8.21	7.41	7.98
4	4.70	5.09	4.61	4.95
6	3.11	3.39	3.08	3.30
10	1.84	1.95	1.83	1.91
16	1.16	1.24	1.15	1.21
25	0.734	0.795	0.727	0.780

Nominal cross-section	Conductor resistance for 20° C for 1 km in Ω ○ (maximum value)			
	of tinned copper wire		of untinned copper wire	
mm²	Class 1 + 2	Class 5 + 6	Class 1 + 2	Class 5 + 6
35	0.529	0.565	0.524	0.554
50	0.391	0.393	0.387	0.386
70	0.270	0.277	0.268	0.272
95	0.195	0.210	0.193	0.206
120	0.154	0.164	0.153	0.161
150	0.126	0.132	0.124	0.129
185	0.100	0.108	0.0991	0.106
240	0.0762	0.0817	0.0754	0.0801
300	0.0607	0.0654	0.0601	0.0641
400	0.0475	0.0495	0.0470	0.0486
500	0.0369	0.0391	0.0366	0.0384

Conductor make-up: VDE 0295 resp. from 0.5 mm² in accordance with IEC 228

Cross-section mm²	Muti-strands to VDE 0295 Class 2	Multi-wire conductors	Fine-wire conductors VDE 0295 Class 5	Superfine strands to VDE 0295 Class 6			
0.14				~ 18 x 0.10	~ 18 x 0.1	~ 36 x 0.07	~ 72 x 0.05
0.25			~ 14 x 0.15	~ 32 x 0.10	~ 32 x 0.1	~ 65 x 0.07	~ 128 x 0.05
0.34		7 x 0.25	~ 19 x 0.15	~ 42 x 0.10	~ 42 x 0.1	~ 88 x 0.07	~ 174 x 0.05
0.38		7 x 0.27	~ 12 x 0.20	~ 21 x 0.15	~ 48 x 0.1	~ 100 x 0.07	~ 194 x 0.05
0.5	7 x 0.30	7 x 0.30	~ 16 x 0.20	~ 28 x 0.15	~ 64 x 0.1	~ 131 x 0.07	~ 256 x 0.05
0.75	7 x 0.37	7 x 0.37	~ 24 x 0.20	~ 42 x 0.15	~ 96 x 0.1	~ 195 x 0.07	~ 384 x 0.05
1.0	7 x 0.43	7 x 0.43	~ 32 x 0.20	~ 56 x 0.15	~ 128 x 0.1	~ 260 x 0.07	~ 512 x 0.05
1.5	7 x 0.52	7 x 0.52	~ 30 x 0.25	~ 84 x 0.15	~ 192 x 0.1	~ 392 x 0.07	~ 768 x 0.05
2.5	7 x 0.67	19 x 0.14	~ 50 x 0.25	~ 140 x 0.15	~ 320 x 0.1	~ 651 x 0.07	~ 1280 x 0.05
4	7 x 0.85	19 x 0.52	~ 56 x 0.30	~ 224 x 0.15	~ 512 x 0.1	~ 1040 x 0.07	
6	7 x 1.05	19 x 0.64	~ 84 x 0.30	~ 192 x 0.20	~ 768 x 0.1	~ 1560 x 0.07	
10	7 x 1.35	49 x 0.51	~ 80 x 0.40	~ 320 x 0.20	~ 1280 x 0.1	~ 2600 x 0.07	
16	7 x 1.70	49 x 0.65	~ 128 x 0.40	~ 512 x 0.20	~ 2048 x 0.1		
25	7 x 2.13	84 x 0.62	~ 200 x 0.40	~ 800 x 0.20	~ 3200 x 0.1		
35	7 x 2.52	133 x 0.58	~ 280 x 0.40	~ 1120 x 0.20			
50	19 x 1.83	133 x 0.69	~ 400 x 0.40	~ 705 x 0.30			
70	19 x 2.17	189 x 0.69	~ 356 x 0.50	~ 990 x 0.30			
95	19 x 2.52	259 x 0.69	~ 485 x 0.50	~ 1340 x 0.30			
120	37 x 2.03	336 x 0.67	~ 614 x 0.50	~ 1690 x 0.30			
150	37 x 2.27	392 x 0.69	~ 765 x 0.50	~ 2123 x 0.30			
185	37 x 2.52	494 x 0.69	~ 944 x 0.50	~ 1470 x 0.40			
240	61 x 2.24	627 x 0.70	~ 1225 x 0.50	~ 1905 x 0.40			
300	61 x 2.50	790 x 0.70	~ 1530 x 0.50	~ 2385 x 0.40			
400	61 x 2.89		~ 2035 x 0.50				
500	61 x 3.23		~ 1768 x 0.60				



The number of wires in columns 3-7 is optional. VDE 0295 specifies only the maximum diameter of the individual wires and the maximum resistance assigned to the cross-section

Conductor's Anglo-American Dimensions

Cross-section area	AWG	Number of wires	Single wire diameter	Conductor diameter	Electrical resistance of single conductor* at 20 °C acc. to IEC 344	
mm²			mm	mm	Ω/km	Ω/1000 feet
0.033	32	1	0.203	0.203	559	170
0.034	32	7	0.079	0.237	559	170
0.051	30	1	0.254	0.254	357	109
0.057	30	7	0.102	0.306	326	99.4
0.08		10	0.10	0.400	244	74.5
0.081	28	1	0.320	0.320	221	64.1
0.089	28	7	0.127	0.381	210	42.2
0.128	26	1	0.404	0.404	139	42.2
0.14		18	0.10	0.500	136	41.4
0.141	26	7	0.160	0.480	132	40.4
0.155	26	19	0.102	0.510	120	36.6
0.205	24	1	0.511	0.511	86.8	26.4
0.227	24	7	0.203	0.609	82.3	25.1
0.241	24	1	0.127	0.635	77.5	23.6
0.25		14	0.15	0.660	75.4	23.0
0.325	22	1	0.643	0.643	54.7	16.7
0.34		7	0.25	0.750	54.3	16.5
0.355	22	7	0.254	0.762	52.6	16.0
0.382	22	19	0.160	0.800	48.8	14.9
0.50		1	0.80	0.80	35.3	10.8
0.50		7	0.31	0.930	35.3	10.8
0.50		16	0.20	0.940	37.1	11.3
0.519	20	1	0.813	0.813	34.2	10.4
0.563	20	7	0.320	0.960	32.5	9.90
0.616	20	19	0.203	1.015	30.3	9.24
0.75		7	0.37	1.110	24.3	7.41
0.75		24	0.20	1.200	24.7	7.54
0.785		1	1.00	1.000	22.6	6.89
0.824	18	1	1.024	1.024	21.6	6.57
0.897	18	7	0.404	1.212	20.4	6.21
0.963	18	19	0.254	1.270	19.4	5.90
1.00		1	1.13	1.130	17.7	5.40
1.00		7	0.433	1.290	18.0	5.48
1.307	16	1	1.290	1.290	13.6	4.14
1.430	16	7	0.51	1.530	12.8	3.90
1.229	16	19	0.287	1.435	15.2	4.62
1.50		1	1.38	1.380	11.9	3.62
1.50		7	0.53	1.590	11.8	3.61
1.50		48	0.20	1.680	12.4	3.77
1.936	14	19	0.361	1.805	9.40	2.87
2.082	14	1	1.628	1.628	8.53	2.60
2.50		1	1.79	1.790	7.06	2.15
2.50		7	0.67	2.010	7.41	2.26
2.50		50	0.25	2.100	7.60	2.32
3.085	12	19	0.455	2.275	5.92	1.80
3.301	12	1	2.052	2.052	5.37	1.64
4.00		1	2.26	2.260	4.43	1.35
4.00		56	0.30	2.700	4.71	1.44
4.743	10	37	0.404	2.828	3.86	1.18
5.006	10	49	0.361	2.946	3.65	1.11
5.260	10	1	2.588	2.588	3.38	1.03
6.00		1	2.76	2.270	2.97	0.905
6.00		84	0.30	3.210	3.14	0.957
8.367	8	1	3.264	3.264	2.12	0.647
8.579	8	133	0.287	3.820	2.17	0.661
10.00		1	3.57	3.570	1.77	0.541
10.00		80	0.40	4.164	1.82	0.554
13.300	6	1	4.110	4.110	1.33	0.407
13.553	6	133	0.361	4.805	1.34	0.409
16.00		1	4.52	4.520	1.11	0.338
16.00		128	0.40	5.800	1.14	0.347
21.593	4	133	0.455	6.856	0.846	0.258
25.00		200	0.40	7.700	0.728	0.222
33.696	2	665	0.254	8.700	0.553	0.169
35.00		280	0.40	8.800	0.520	0.158
41.398	1	817	0.254	9.500	0.450	0.137
50.00		400	0.40	10.400	0.364	0.111
52.951	0	1045	0.254	10.900	0.352	0.107

* These values increase by stranding the conductors to form the cable core.

Protection Classes to EN 60529

Definition der Schutzarten nach EN 60529 (DIN 0470)

Die Schutzarten werden durch ein Kurzzeichen angegeben, das sich aus den zwei stets gleichbleibenden Kennbuchstaben IP und den Kennziffern für den Schutzgrad zusammensetzt, z.B. IP54

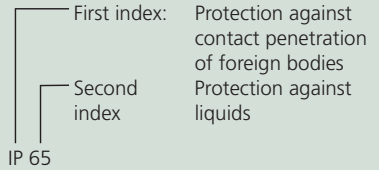
Protection Classes for protection against contact and foreign bodies

First figure	Designation	Scope of protection Explantation
0	No protection	
1	Protection against large foreign bodies	Protection against accidental, large-surface contact with active or internal moving parts, e.g. with the hand, but no protection against deliberate access to these parts. Protection against penetration of solid foreign bodies with a diameter larger than 50 mm.
2	Protection against medium-sized foreign bodies	Protection against contact by the fingers with active or internal moving parts. Protection against penetration of solid foreign bodies with a diameter larger than 12 mm.
3	Protection against small foreign bodies	Protection against contact with active or internal moving parts with tools, wires, etc. of a thickness greater than 2.5 mm. Protection against penetration of solid foreign bodies with a diameter larger than 2.5 mm.
4	Protection against granula foreign bodies	Protection against contact with active or internal moving parts with tools, wires, etc. of a thickness greater than 1 mm.
5	Protection against accumulation of dust	Complete protection against contact with live or internal moving parts, protection against harmful dust accumulations. The penetration of dust is not completely prevented, but the dust may not penetrate in such quantities that the mode of operation is restricted
6	Protection against ingress of dust	Complete protection against contract with live or internal moving parts. Protection against the ingress of dust.

Protection Classes for water protection

Second figure	Designation	Scope of protection Explanation
0	No protection	
1	Protection against dripping water falling vertically	Water drops which fall vertically, must not have any harmful effect.
2	Protection against dripping water falling at an angle	Water drops which fall at any angle from 15° to the vertical, may not any harmful effect.
3	Protection against sprayed water	Water which falls at any angle up to 60° to the vertical, must not have any harmful effect.
4	Protection against splashed water	Water which splashes from all directions on to the equipment must not have any harmful effect.
5	Protection against water jet	A water jet from a nozzle, which is directed from any direction against the equipmen, must not have any harmful effect.
6	Protection against flooding	In the event of temporary flooding, e.g. in heavy seas, water may not penetrate into the equipment in harmful quantities.
7	Protection against immersion	Water may not penetrate in harmfull quantities when the equipment is immersed in water under the the prescribed pressure and time conditions.
8	Protection against submersion	Water may not penetrate in harmful quantities if the equipment is submerged under water.

Example:
Identifying letters



III. Table of contents, technical information section

III. Technical information

a) Conductors for instrumentation cables

For copper conductors, the choice between flexible or rigid formation depends on type of laying installation, temperature, electrical and diameter features.
Stranding is the name given to the construction fase of the flexible conductor, also called strands. Stranding is performed by winding the peripheral wires in one or more layers around a central wire in a spiral, in order to obtain the desired cross section.
The seven (7) wire strand is the most used type of stranding for instrumentation cables.
Concerning extension or compensating cables for thermocouples, the conductors are in alloy of the type prescribed for the corresponding thermocouple.

b) Conductor insulation

The conductor insulation can usually be made of polyvynil chloride (PVC), thermoplastic polyethylene (PE) or crosslinked polyethylene (XLPE). In case of special requirements, for example when resistance to high temperatures, absence of halogens, resistance to fire are required, it is possible to use other special compounds. In fact, the use of a suitable insulating compound makes the cable resistant to high temperatures. On the other hand, fire-resistant cables are provided with mica tape wrapped around the conductor prior to insulation.
The selection of the material is determined by the type of application and by the features that the cable must have:

☐ Electrical properties relating to signal transmission
☐ Minimum or maximum operating temperatures
☐ Behaviour with fire
☐ Resistance to radiations
☐ Behaviour with oils or chemical agents.

c) Construction features of instrumentation cables

1. (Stranding) and "cable elements"

The stranding consists in twisting the conductors with one another. The stranding pitch is the distance between a point of the spiral and the next point in which the spiral returns in the same geometrical position.
Concentric-layer stranding, as in the case of the strand, is obtained by winding the peripheral conductors in one or more layers around a central wire or support in a spiral so as to obtain the desired formation.
Conductors can be stranded to form pairs, triads or sets of four; these groups of conductors thus formed are the cable elements. The elements can be further stranded in concentric layers so as to obtain the desired number of elements.
To prevent interference between the different elements (pairs, triads or sets of four), the stranding pitch of adjacent elements must be different. When each pair or triad, or set of four, is screened individually, a different stranding pitch is not needed.

2. The screening

The screening has the purpose of reducing or eliminating possible interferences in the cables.
Cables, and thus, instrumentation circuits, may be subject to the following noises:

☐ **Cross-Talk** noises. They are transmitted from a pair (or triad, or set of four) to the other within the multiple cable.
☐ Noises induced from the exterior by external cable sources.

2.1. Screening against internal interference

Internal interferences, or "Cross-Talk", are transmitted in a capacitive way or via electromagnetic induction, when DC, AC or pulsing signals are transmitted in the different cable pairs.
Electromagnetic interferences can be minor. Capacitive noises, on the other hand, should be eliminated or reduced. The methods for correcting such internal noises consist in screening each cable element individually, or in differentiating the stranding pitch of adjacent elements (see par. 1).

The screening can be realised using aluminium/Mylar tapes having a few micron thickness, wrapped helically. Mylar is a thin polyester film. Under the taping there is a "drain" wire which, in contact with aluminium, allows earthing. The taping is wrapped with a minimum overlapping of 25% so as to guarantee a 100% coverage even when the cable is flexing.

The screening can be performed in braiding or in wrapped copper wires; however, this solution is not very used since it is more expensive.

2.2. Screening against external interference

In the case of interferences generated outside the cable, the influence of magnetic and electrostatic fields can not longer be negletted. The type of screening and the material used must be suitable for the type of interference.

2.2.1. Electrostatic interference

The electrical field radiating from a power line or another source capacitively couples with the cable conductors (electrostatic induction). Such coupling causes a noise signal that overlaps to the signal transmitted in the conductors. To eliminate such noise, it is necessary to interrupt the capacitive coupling between external source and cable conductors. The most effective method is that of interposing an electrostatic screen around all conductors. It is possible to realise several types of screening, but the type with the best results is the one realised with aluminium/Mylar tapes or similar techniques, with a 100% coverage and earthed drain wire.

2.2.2. Electromagnetic interference

A current flowing into a conductor produces a magnetic field. If the cable of an instrumentation circuit crosses such magnetic field, an electromotive force is induced into it, which generates induced current. These currents overlap to the signal to transmit, thus creating noises. The most valid system to eliminate this type of noise is stranding (twisting) the conductors forming the cable elements (see paragraph C 1.)
With the conductor stranding it is possible to realise a series of adjacent rings that, when immersed in a magnetic field, tend to annul the noise effect since the current induced in a ring is in opposite direction with respect to the current induced in the adjacent ring.
Another method to reduce magnetic noises, even though it is less effective, consists in screening the cable with magnetic metal tapes, or in inserting the cable into a magnetic metal tube, since screening of conductive material would be penetrated by the force lines of the magnetic field, thus being useless.

3. The armour

The main function of the armour is to give mechanical protection to the cable from shocks or abrasions, from rodents, and also to give more tensile strength during installation and handling. In addition to mechanical protection, the armour can serve as a screen for electromagnetic fields and, in particular cases, as earth conductor.
As a consequence, mechanical and electrical requirements during the cable installation and operation determine the type of armour.

3.1. Galvanised steel braid armour (A), (SWB).

Light armour that imparts tensile strength. It allows a smaller bending radius compared to other armours; the coverage degree must be at least 80% (see Fig. 1).

Fig. 1

3.2. Galvanised steel wire armour (F), (SWA).

Armour with good mechanical protection, suitable for tensile loads.
It allows a good cable flexibility; the coverage degree is up to 90%.
It is possible to add a counterspiral in galvanised steel tape for a better mechanical protection (see figure 2).

Fig. 2

3.3. Galvanised steel tape armour (N), (STA).

Dual helicoid armour with overlap (see Fig. 3). Excellent protection against shocks, compression and rodents, but not suitable for tensile loads. It imparts the best protection from electromagnetic fields with compared to other armours.

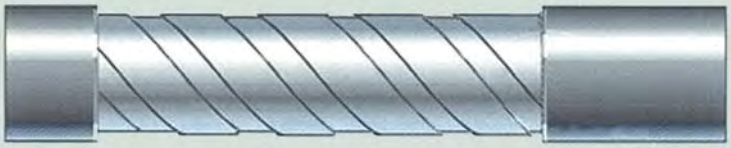


Fig. 3

3.4. Galvanised steel plate armour (Z), (SSA).

Armour with good mechanical protection, suitable for tensile loads.
Less flexible than F type armours.
It is possible to add a counterspiral in galvanised steel tape for an higher mechanical protection (see figure 4).

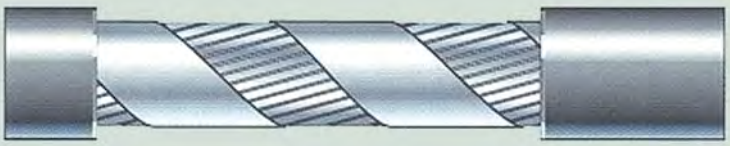


Fig. 4

4. The Sheaths

Intermediate and outer sheaths for instrumentation, extension and compensating cables, for thermocouples usually consist of polyvynil chloride (PVC) and in few cases, of polyethylene (PE). In case of special applications, it is possible to use other halogen-free or fire-resistant materials, for high temperatures and with low toxic and corrosive gas emission.

4.1. The intermediate-sheaths

Intermediate sheaths are necessary if armours or lead sheaths must be added to the cable. In these cases, their function is to protect the conductors from mechanical loads and from humidity.
Installation and operation temperatures, and behaviour in case of fire, are to be considered in the selection of such intermediate sheaths.

4.2. Outer sheaths

Outer sheaths for cables have the function to protect the elements forming the cable from humidity, from the action of oils and chemical agents, and from sun radiations.
For the protective function to be effective, and the sheath to last in time, the suitable compound must be selected according to the laying, to the specific use of the cable and to the environment where the cable is installed.
The following features are to be considered in the selection of the compound:

☐ Internal, external, underground laying, in piping, in trench ducts, in water bath, exposure to atmospheric agents.
☐ Installation and working temperatures.
☐ Various mechanical stresses during installation and operation.
☐ Presence of chemical agents in the environment, oils, vapours, or gases that may degrade the material.
☐ Need of not propagating fire
☐ The low emission of smokes and toxic and corrosive gases in case of fire.
☐ Absence of halogens.
☐ Sheath colours based on the area of application or based on the cable function.

d) Materials used for insulation and sheaths

1. Il PVC

PVC is used for a wide range of applications thanks to its adaptability. It can be modified with additives so as to adapt to the different required properties.
PVC can reach maximum operating temperatures of 70°C for standard compounds, and 90°C for special heat-resistant compounds.
PVC is self-extinguishing, and its self-extinguishing degree can be increased with additives.
PVC contains chlorine, a halogen element.
Most PVC compounds are resistant to some oils and solvents. With some additives, it is possible to increase such resistance.
PVC is used both in the construction of intermediate and outer sheaths and in the insulation of conductors.

2. Polyethylene (PE)

Polyethylene is an excellent insulator with good electrical properties; it has a very low dielectric constant, stable at all frequencies, and thus it has a high electrical resistance. In terms of flexibility, polyethylene can be more or less flexible according to whether it is low density (LDPE), the most flexible one, or high density (HDPE), the least flexible. Medium density polyethylene is in an intermediate position (MDPE) whereas crosslinked polyethylene (XLPE) exhibits a flexibility comparable to the LDPE, it is very resistant to humidity and water.

Polyethylene can reach maximum operating temperatures of 70°C for LDPE, 80°C for HDPE, 85°C for XLPE.
In general, polyethylene has good mechanical resistance features and a good resistance to oils and chemical agents.
These properties increase as the specific density of the polyethylene compound increases.

Normally, polyethylene is not self-extinguishing; once ignited, it tends to drip and burn without flame. For this reason, polyethylene as material for sheaths is only used for underground applications; for the same reason, cables with polyethylene sheaths should not be used in closed environments.
Thanks to its low dielectric constant, polyethylene is used as insulator on cable conductors only when it is necessary to keep the coupling capacity values between conductor and conductor, and conductor and screen, very low. Cables with insulation in polyethylene are used in intrinsically safe areas.

3. Polyamide (PA)

In the construction of instrumentation cables, polyamide is only used in the composition of a special sheath.
This sheath is made of layers of Aluminium Tape and HAPE heat sealed and coated with an additional polyamide sheath. The resulting sheath is an excellent barrier against the penetration of liquids and chemical agents, and for this reason it can be used in several cases as a valid alternative to lead sheaths. The advantages is a lighter cable with smaller diameter.

4. Lead

Lead sheaths are the safest barrier against humidity and hydrocarbons, and they are used to coat cables installed in petrochemical plants and refineries.
However, the known toxicity of lead during the manufacturing process of the cable and during use and disposal, and the high cost of the finished product, make it less requested.

5. Comparison of plastic material properties.

	Resistance to oils	Resistance to atmospheric agents	Resistance to acids	Resistance to alkalis	Resistance to aliphatic hydrocarbons (gasoline, kerosene, etc.)	Resistance to aromatic hydrocarbons (benzol, toluene, ethanol etc.)	Resistance to halogen hydrocarbons (degreasing solvents, alcohol, ethers, esters, etc.)
PVC	O	B-O	B-O	B-O	S	S-D	S-D
LDPE	B-O	O	B-O	B-O	B-O	S	B
HDPE	B-O	O	O	O	B-O	S	B
PA	O	O	S-D	O	B	B	B
S=scarce D=discreet B=good O=optimum E=excellent							

III. Technical information

e) Behaviour of plastic materials with fire.

1. Self-extinguishing and fire or flame retardant properties.

All insulated cables and with sheaths in plastic materials usually burn, but a self-extinguishing cable that comes into contact with fire should stop burning as soon as the fire stops.
Fire non-propagation properties of a cable depend on many factors: on the material used, on its thickness, on its weight per linear metre and above all, on the installation system.
The definition of a self-extinguishing cable is purely conventional, since it is determined from the results of specific tests as provided by the Standards.

The main self-extinguishing tests performed according to national standards are:

☐ CEI 20-35: flame non-propagation test executed on the single cable in vertical position.
☐ CEI 20-22 II: fire non-propagation test executed on a cable bundle.

The main self-extinguishing tests performed according to international standards are:

☐ IEC 332-1: flame non-propagation test executed on the single cable in vertical position (corresponding to the CEI 20-35 national standard).
☐ IEC 332-3: fire non-propagation test executed on a cable bundle (divided into three categories: A, B, and C which differ in the quantity expressed in litres per linear metre of the plastic material under test).

2. Halogen-free instrumentation cables, with low smoke, toxic and corrosive gas emission.

Halogen-free cables do not contain chlorine, fluorine, bromine, iodine. Cables in PVC, for example, contain chlorine.

In case of fire, the strong development of smoke can lower visibility in the building, so as to prevent the location of emergency exits.

Toxic gases developing during combustion are one of the main causes of death of people (even though they are not touched by the flames of a fire) that are exposed for too long to their action. Toxic gases are the product of combustion of all ingredients forming a compound of plastic material.

Corrosive gases combine with humidity to become aggressive acids (for example, acids that create from the emission of halogens) that may damage the breathing system of living beings, and that can corrode metals. Even when the damage from fire is minimum, corrosive gases often cause significant damages through ventilation ducts, even in areas that are not directly touched by the fire. The elements of electric and electronic systems, and visible or cement-protected steel structures are especially vulnerable.

Thus, it is important to choose halogen-free cables with low smoke, toxic and corrosive gas emission when they are to be installed in closed environments.

f) Electrical features.

During design, it is important to know the electrical parameters of the cable, resistance (R), Inductance (L), capacity (C). These parameters must be as low as possible to dissipate less energy.

1. Conductor resistance

Following the passage of current, the cable becomes hot; the resistance is the main heat source and the cause of voltage drop on the line. Therefore, containing the resistance value is very important.
Besides the specific resistance of the conductor material, the resistance value of a conductor portion depends on its length and on its section.
In addition, as the material temperature changes, the specific resistivity changes, and thus, also resistance.
Finally, resistance can increase as frequency increases.
The unit of measure of resistance is expressed in ohm (Ω). In the case of a cable, the total resistance of the two conductors (the sum) carrying the signal by the length unit is considered and expressed in ohm per kilometre (Ω/Km).

2. Capacity (C)

When electrical voltage is applied between the conductors of a cable, electric charges stabilise on the conductors, and the interposed dielectric material polarises. The quantity of electric charges depends on a parameter called capacity.
This parameter depends on the size and on the distance of the conductors, and on the interposed dielectric material.
If tension is variable, a charges variation occurs at each variation. This implies energy dissipation to modify, in direction and intensity, the electrical fields present.
The capacity values affects the circuit response times.
Moreover, maintaining a low capacity value is important in cables for intrinsically safety areas; the lower the cable capacity, the less the energy accumulates in the same cable.
The unit of measure of capacity is expressed in Farad (F). In the case of a cable, the capacity per length unit between two conductors (mutual capacity) and that between conductor and screen, are considered, expressed in nano-farad per kilometre (nF/Km)

3. Inductance (L)

The inductance value depends on the conductor section, on the stranding and on the type of material of the conductor.
The inductance value affects the circuit response times.

Ferromagnetic conductors in extension or compensating cables for thermocouples can reach high inductance values. This is to be considered when cables are installed in dangerous or intrinsically safety areas.
The unit of measure of inductance is expressed in Henry (H). In the case of a cable, inductance is measured in milli-Henry per kilometre (mH/Km).

4. Characteristic impedance (Z)

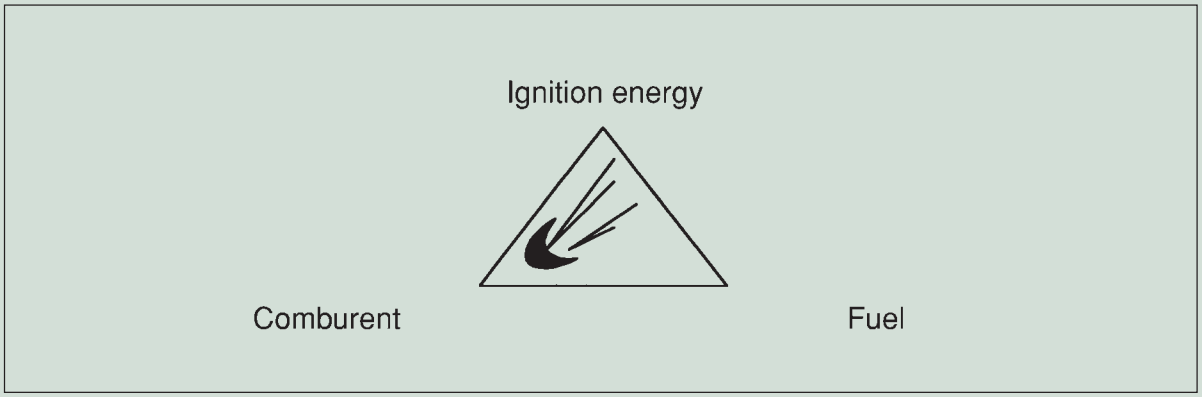
Electrically speaking, a cable is an impedance load. R, C, L are the cable parameters, and they are referred to the conductor pair, and the result of their "sum" is the impedance value. The value of Z determines the voltage drop from one end to the other of two conductors carrying a signal. By increasing the value of Z, also the voltage drop increases, or in the practice, the amplitude value of the signal to be transmitted decreases. This signal reduction is defined as attenuation.
The unit of measure of impedance is expressed in ohm (Ω).

Low attenuation values allow reaching greater transmission distances and less signal distortion.

III. Technical information

g) Dangerous areas

In production plants treating chemical and petrochemical products there is the risk that they may form flammable or explosive mixtures of gas, vapours or powders.
These short descriptions have the purpose of analysing and highlighting the most common methods of protection of electric circuits associated to such type of plant.
Free mixtures in he plant, in the presence of atmosphere and an energy source can cause different reactions: controlled combustion, flame wave, explosion.
The three components that make the reaction possible are schematised in the combustion triangle.



– Fuel in form of gas, vapours, powders.
– Comburent, usually air or oxygen
– Ignition electrical or thermal energy

Protection methods for undesired events tend to eliminate one or more components of the triangle to reduce the triggering risk to an acceptable level.

The three main protection methods applied to any electrical equipment installed in dangerous areas are as follows:

1. Explosion control:
this is the only method that allows explosion but it remains confined in a well-defined area, without propagating in the surrounding atmosphere.
Explosion-proof electrical equipment and cases belong to this method

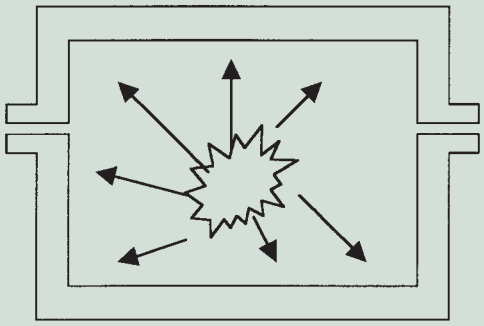
2 Segregation:
this method tends to separate or physically isolate electrical parts or hot surfaces of the explosive mixture.
The method includes different techniques such as pressurisation, encapsulation, etc.

3 Prevention:
the feature of this method consists in limiting both thermal and electrical energy at non-dangerous levels also in unfavourable circumstances. Intrinsically safe is the most representative technique of this method.

1. Explosion control

1.1. Explosion-proof plants and housings Ex “d”

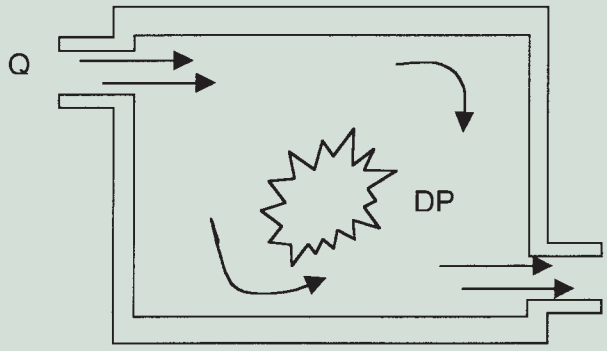
The method is the only one based on the explosion “containment” concept.



The presence of an explosive mixture (air-gas) is possible, with consequent explosion, which must be confined in a case constructed so as to stand the pressure developed by the explosion.
The robust mechanical construction of Ex “d” cases guarantees the non-propagation of the explosion in the atmosphere.
The same must be constructed with suitable materials which, in some cases, such as in petrochemical plants, may be steel and bronze.
The cable input requires special attention, reductions, cable glands, conduits, armoured cables, sealing.
In such plants, the housings cannot be opened while it is operating and supplied.
Such plants are suitable for protecting electrical equipment with high power level, such as: motors, transformers, lamps, solenoid valves, and actuators in general; that s, parts that may produce sparks.

2. Segregation

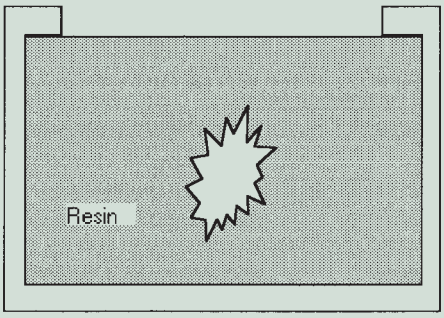
2.1. Pressurisation Ex “p”



Pressurisation is the method applied for protecting using the “Segregation” concept.
By maintaining the pressure of an inert gas through a continuous flow in the case, it is possible to prevent the inlet of the dangerous mixture into the same, thus avoiding contact with electrical parts.
Pressurisation with inside over-pressure, sometimes, is the only possible solution when high-energy level, big size housings or working areas are involved. For example when using large electrical machines or control panels

2.2. Encapsulation Ex “m”

This is a protection method based on segregation, through impregnation in resin of all electrical parts that may ignite the explosive mixture.

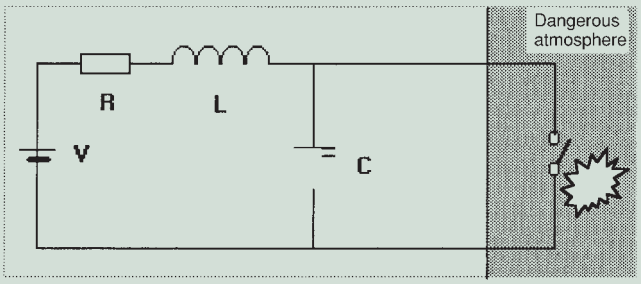


Encapsulation ensures a good mechanical protection, and is effective in preventing the inlet of explosive mixtures.
Used to protect small electric circuits not containing moving parts.

3. Prevention

3.1. Intrinsically safe Ex “i”

Intrinsically safe is the method that most represents the Prevention concept. It is based on the principle of limiting the energy stored in electrical circuits.
An intrinsically Safety circuit (IS) is virtually not capable of generating arcs, sparks, or thermal effects that may ignite the explosion of a dangerous mixture, both in normal operating conditions and in case of failure.
The CENELEC EN 50.020 standard provides for two categories of Ex “ia” and Ex”ib” safety, that mainly differ in the number of failures to be considered and for the different safety coefficient to be applied during design.
IS is the only method that protects both the equipment located in a dangerous area and the entire wiring, since it provides for the rupture, the short circuit or the accidental earthing of connection cables.



The intrinsically safe concept is applied to process instrumentation where the low required power is compatible with the energy limitation principle.
All plants constructed according to the IS method must have a single earthing point, so as to prevent differences of potential in the two or more earthing points.
In circuits provided with earthing for functional reasons, such as applications for thermocouples, the rest of the electrical circuit must be earthed.

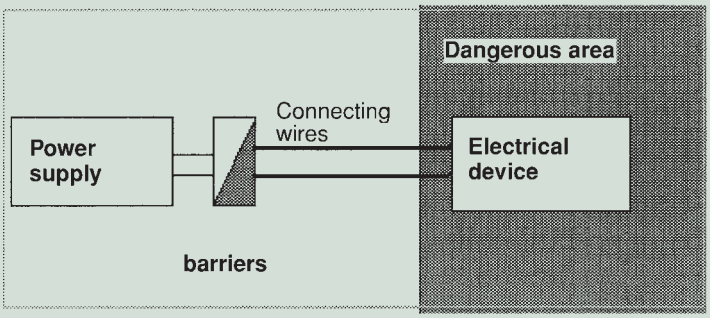
An IS system basically consists of:

– Power supply device in a safe area,

– IS barriers that limit energy and protect the circuit

– Connecting wires

– Electrical device in dangerous areas



When calculating intrinsically safety plants, all components forming the circuit must be considered; the parameters for a correct operation are as follows:

– Maximum tension with open circuit

– Maximum short-circuit current

– Maximum inductance admissible

– Maximum capacity admissible

– Maximum ratio between Inductance and Resistance

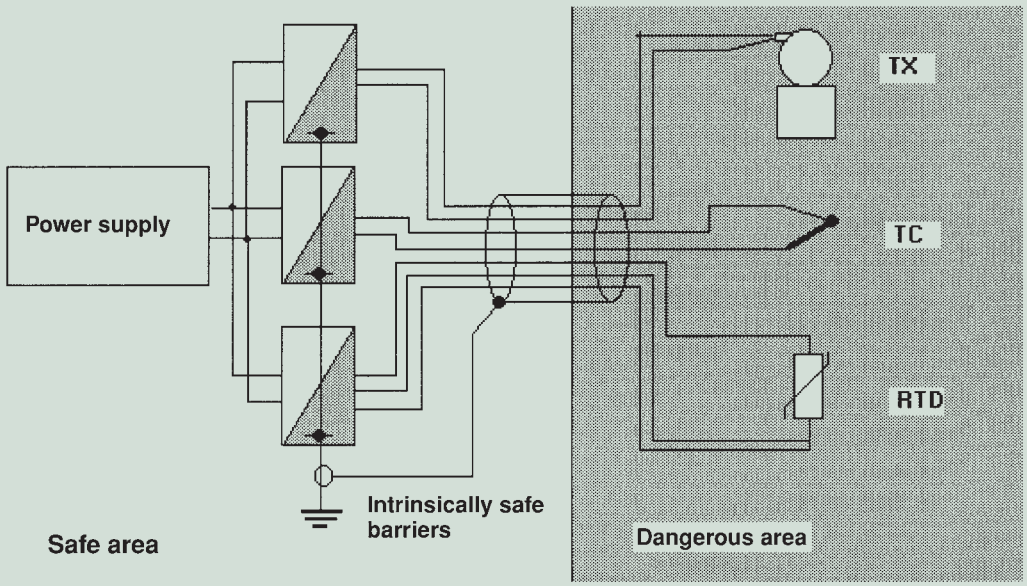
Compliance with these parameters guarantees the non-ignition of dangerous mixtures both in optimum operating conditions of the circuit and in case of failure.

As it can be seen in the diagram, an important element of the IS circuit is the connection cable, with its typical parameters of Capacity, Inductance and Resistance. Normally, the cable behaves as energy accumulator; for this reason, it must be designed and constructed with the purpose of obtaining such electrical parameters as to limit the energy accumulated by the same cable.

III. Technical information

Notes:

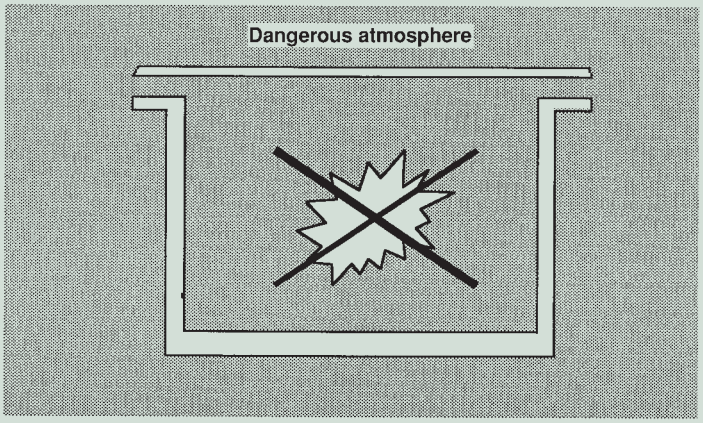
In IS plants, the use of cables to connect the devices in the dangerous areas is quite common and is allowed by the regulations. On the other hand, it is not possible for the same cable to carry non-homogeneous electrical signals, or signals coming from other devices than those described into Intrisically Safe regulations.



The above figure shows an example of correct installation of a cable containing three circuits with different devices having the same IS electrical protection.

3.2. Increased safety Ex “e”

This type of protection is based on the Prevention method. It consists in applying such safety measures to electrical constructions as to prevent the possibility of having arc, spark formation, or high temperatures inside or on the surface.
This type of protection is based on the EN 50.019 standards
It is basically used for protecting terminals, electrical connections, lamp-holders, non-sparkling motors, and it is often associated to other types of protection.
The standards provide for construction prescriptions to obtain a high safety coefficient both in normal operation and in case of failure or over-load.
The main items of these standards are: mechanical resistance, connections, wiring, components, distances both in air and in surface, insulators, IP protection degree.



3.3. Simplified protection method Ex “n”

The simplified EX”n” method is based on the explosion Prevention concept, using as parameter the condition of normal operation, without considering any failure situation.
This method is mainly used in England, and it is qualified as “non-incendive”
Construction prescriptions are similar to those required for the Ex “e” method.
For its nature, this type of protection can only be applied in Zone 2 or Division 2 of dangerous areas.
An example of application may be the use of Multiplexer devices which, in Zone 2, can receive signals from Zone O.
The combination of Simplified protection devices with IS devices s used for this application.

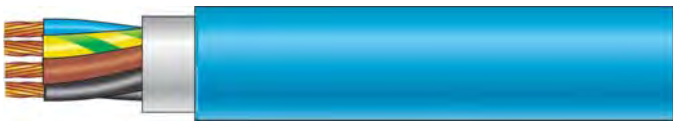
Summary

Instrumentation cables

INSTRUM® 100

Power cables insulated in PVC

N1VV-K
FR2OR
PVC/PVC



Application
The range of applications of **INSTRUM® 100** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 100 is suitable as power supply cable.
INSTRUM® 100 is suitable for static installation, both inside and outside in piping, and in cable tray.
Underground installation is possible as well.

Special feature
INSTRUM® 100 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-14
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 100 is a cable marked IMMEQU CEI 20-22 II

Cable make-up:
Fine bare copper strands, conductor insulation in special R2 PVC, stranded cores, outer sheath in special RZ PVC compound, light blue colour, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Installation temperature: 5°C min
- Test voltage: 4000 V
- Insulation resistance: >100 Mohm/Km
- Colour code: CEI UNEL 00722
- Strand construction: fine wires according to CEI 20-29, Cl5
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® 100

Power cables insulated in PVC

N1VV-K
FR2OR
PVC/PVC

Nominal voltage Uo/U: 600/1000 V

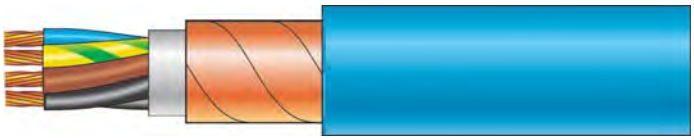
No conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)	No conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)	No conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)
2x1.5	0.8	13.00	2x2.5	0.8	14.00	2x4	1	16.00
3x1.5	0.8	13.50	3x2.5	0.8	14.50	3x4	1	16.50
4x1.5	0.8	14.50	4x2.5	0.8	15.50	4x4	1	18.00
5x1.5	0.8	15.50	5x2.5	0.8	16.50	5x4	1	19.50

No conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)	No conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)	No conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)
2x6	1	17.00	2x10	1	19.00	2x16	1	21.00
3x6	1	18.00	3x10	1	20.00	3x16	1	22.00
4x6	1	19.50	4x10	1	21.50	4x16	1	24.00
5x6	1	21.00	5x10	1	24.00	5x16	1	26.50

INSTRUM® 101

Power cables screened insulated in PVC

N1VC7V-K
FR2OH1R
PVC/PVC/DCuT/PVC



Application
The range of applications of **INSTRUM® 101** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 101 is suitable as power supply cable.
INSTRUM® 101 is suitable for static installation, both inside and outside in piping, cable tray.
Underground installation is possible as well.

Special feature
INSTRUM® 101 power cables are manufactured according to the following norms:
CEI 20-14
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 101
is a cable marked IEMMEQU
CEI 20-22 II

Cable make-up:
Fine bare copper strands, conductor insulation in special R2 PVC, stranded cores, intermediate sheath in PVC compound, screening with double red copper tape wrapped and overlapped, outer sheath in special RZ PVC compound, light blue colour, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: U_0/U 0.6/1 Kv
- Test voltage: 4000 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: fine wires according to CEI 20-29 Cl5
- Screen resistance: >/= 5 Ohm/Km
- Colour code: CEI UNEL 00722

INSTRUM® 101

Power cables screened insulated in PVC

N1VC7V-K
FR2OH1R
PVC/PVC/DCuT/PVC

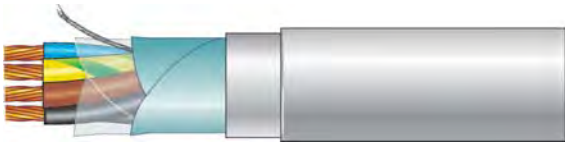
Nominal voltage Uo/U: 600/1000 V

No. conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)
5x1.5	0.8	15.50	5x2.5	0.8	16.50
7x1.5	0.8	16.50	7x2.5	0.8	17.50
10x1.5	0.8	19.50	10x2.5	0.8	21.50
12x1.5	0.8	20.50	12x2.5	0.8	22.50
16x1.5	0.8	22.00	16x2.5	0.8	24.50
19x1.5	0.8	23.00	19x2.5	0.8	26.00
24x1.5	0.8	26.50	24x2.5	0.8	29.50

INSTRUM® 102
INSTRUM® 103

Power cables, screened or unscreened, insulated in rubber

FG7OR/FG7OHR
HEPR/PVC
HEPR/OS/PVC



Application
The range of applications of **INSTRUM® 102/103** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 102/103 is suitable as power supply cable in industry, and building.
INSTRUM® 102/103 is suitable for static installation, in pipe or cable tray.
Underground installation is possible as well. The screening, when provided, imparts electrostatic protection to the conductors.

Special feature
INSTRUM® 102/103 power cables are manufactured according to the following norms:
CEI 20-13
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 102/103
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine strands of bare copper wire, conductor insulation with G7 high-quality module EP rubber, stranding in layers (for version 103, screening in aluminium/mylar tape with tinned copper drain wire), intermediate sheath in PVC compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath in special RZ type PVC compound, fire-retardant grey colour according to CEI 20-22 II norms.

Technical data

- Operating temperature: 90°C max
- Screen resistance: <30 Ohm/Km
- Operating voltage: U_0/U 0.6/1 Kv
- Test voltage: 4000 V
- Short-circuit temperature: 250°C max
- Installation temperature: 0°C min
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Insulation resistance: >1000 Mohm/Km
- Colour code: CEI UNEL 00722

INSTRUM® 102
INSTRUM® 103

Power cables, screened or unscreened, insulated in rubber

FG7OR/FG7OHR
HEPR/PVC
HEPR/OS/PVC

INSTRUM® 102

Nominal voltage Uo/U: 600/1000 V

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	11.60	2x2.5	0.7	12.60	2x4	0.7	13.62
3x1.5	0.7	12.05	3x2.5	0.7	13.13	3x4	0.7	14.22
4x1.5	0.7	12.83	4x2.5	0.7	14.04	4x4	0.7	15.26
5x1.5	0.7	13.70	5x2.5	0.7	15.05	5x4	0.7	16.43

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	15.20	2x10	0.7	17.20	2x16	0.7	19.80
3x6	0.7	15.92	3x10	0.7	18.07	3x16	0.7	20.87
4x6	0.7	17.17	4x10	0.7	19.58	4x16	0.7	22.71
5x6	0.7	18.56	5x10	0.7	21.26	5x16	0.7	24.77

INSTRUM® 103

Nominal voltage Uo/U: 600/1000 V

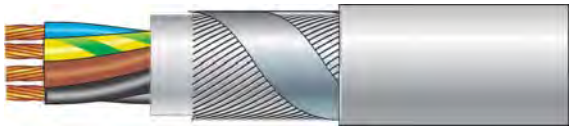
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	11.75	2x2.5	0.7	12.75	2x4	0.7	13.77
3x1.5	0.7	12.20	3x2.5	0.7	13.28	3x4	0.7	14.37
4x1.5	0.7	12.98	4x2.5	0.7	14.19	4x4	0.7	15.41
5x1.5	0.7	13.85	5x2.5	0.7	15.20	5x4	0.7	16.58

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	15.35	2x10	0.7	17.35	2x16	0.7	19.95
3x6	0.7	16.07	3x10	0.7	18.22	3x16	0.7	21.02
4x6	0.7	17.32	4x10	0.7	19.73	4x16	0.7	22.86
5x6	0.7	18.71	5x10	0.7	21.41	5x16	0.7	24.92

INSTRUM® 104
INSTRUM® 105

Power cables, screened or unscreened, armoured, insulated in rubber

FG7OFR/FG7OHFR
HEPR/PVC/SWACS/PVC
HEPR/OS/PVC/SWACS/PVC



Application
The range of applications of **INSTRUM® 104/105** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 104/105 is suitable as power supply cable in industry, and building.
INSTRUM® 104/105 is suitable for static installation and for underground installation as well; the armour protects the cable mechanically during installation, and it prevents deflection when installed. The screening, when provided, imparts electrostatic protection to the conductors.

Special feature
INSTRUM® 104/105 power cables are manufactured according to with the following norms:
CEI 20-13
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 104/105
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine strands of bare copper wire, conductor insulation with G7 high-quality module EP rubber, stranding in layers (for version 105, screening in aluminium/mylar tape with tinned copper drain wire), intermediate sheath in PVC compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath in special RZ type PVC compound, fire-retardant grey colour according to CEI 20-22 II norms.

Technical data

Operating temperature:
90°C max

Screen resistance:
<30 Ohm/Km

Operating voltage:
U_0/U 0.6/1 Kv

Test voltage:
4000 V

Short-circuit temperature:
250°C max

Installation temperature:
0°C min

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Insulation resistance:
>1000 Mohm/Km

Colour code:
CEI UNEL 00722

INSTRUM® 104
INSTRUM® 105

Power cables, screened or unscreened, armoured, insulated in rubber

FG7OFR/FG7OHFR
HEPR/PVC/SWACS/PVC
HEPR/OS/PVC/SWACS/PVC

INSTRUM® 104

Nominal voltage Uo/U: 600/1000 V

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x1.5	0.7	8.00	13.30	2x2.5	0.7	9.00	14.30
3x1.5	0.7	8.45	13.75	3x2.5	0.7	9.53	14.83
4x1.5	0.7	9.23	14.53	4x2.5	0.7	10.44	15.74
5x1.5	0.7	10.10	15.40	5x2.5	0.7	11.45	16.75

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x4	0.7	10.02	15.32	2x6	0.7	11.60	16.90
3x4	0.7	10.62	15.92	3x6	0.7	12.32	17.62
4x4	0.7	11.66	16.96	4x6	0.7	13.57	18.87
5x4	0.7	12.83	18.13	5x6	0.7	14.96	20.26

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x10	0.7	13.60	18.90	2x16	0.7	16.20	21.50
3x10	0.7	14.47	19.77	3x16	0.7	17.27	22.57
4x10	0.7	15.98	21.28	4x16	0.7	19.11	24.41
5x10	0.7	17.66	22.96	5x16	0.7	21.17	26.67

INSTRUM® 105

Nominal voltage Uo/U: 600/1000 V

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x1.5	0.7	8.14	13.45	2x2.5	0.7	9.14	14.45
3x1.5	0.7	8.59	13.90	3x2.5	0.7	9.67	14.98
4x1.5	0.7	9.37	14.68	4x2.5	0.7	10.58	15.89
5x1.5	0.7	10.24	15.55	5x2.5	0.7	11.59	16.90

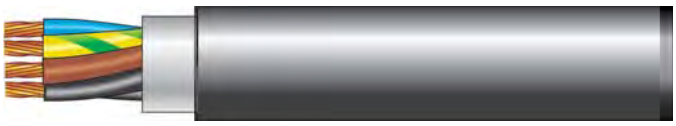
No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x4	0.7	10.16	15.47	2x6	0.7	11.74	17.05
3x4	0.7	10.76	16.07	3x6	0.7	12.46	17.77
4x4	0.7	11.80	17.11	4x6	0.7	13.71	19.02
5x4	0.7	12.97	18.28	5x6	0.7	15.10	20.41

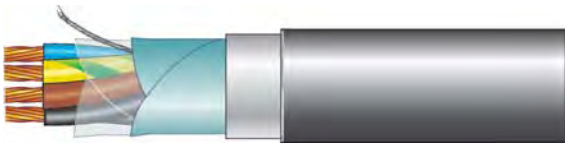
No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x10	0.7	13.74	19.05	2x16	0.7	16.34	21.65
3x10	0.7	14.61	19.92	3x16	0.7	17.41	22.72
4x10	0.7	16.12	21.43	4x16	0.7	19.25	24.56
5x10	0.7	17.80	23.11	5x16	0.7	21.31	26.82

INSTRUM® 106
INSTRUM® 107

Power cables, screened or unscreened, insulated in crosslinked polyethylene

FE4OR/FE4OHR
XLPE/PVC
XLPE/OS/PVC





Application
The range of applications of **INSTRUM® 106/107** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 106/107 is suitable as power supply cable in industry, and building.
INSTRUM® 106/107 is suitable for static installation, even in wet environments. The screening, when provided, imparts electrostatic protection to the conductors.

Special feature
INSTRUM® 106/107 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 106/107
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation in XLPE crosslinked polyethylene, stranding in layers (for version 107, screening in aluminium/mylar tape with drain wire in tinned copper), outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 85°C max
- Test voltage: 4000 V
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: <30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >10000 Mohm/Km
- Operating voltage: U_0/U 0.6/1 Kv
- Installation temperature: 0°C min
- Colour code: CEI UNEL 00722

INSTRUM® 106
INSTRUM® 107

Power cables, screened or unscreened, insulated in crosslinked polyethylene

FE4OR/FE4OHR
XLPE/PVC
XLPE/OS/PVC

INSTRUM® 106

Nominal voltage Uo/U: 600/1000 V

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	10.45	2x2.5	0.7	11.45	2x4	0.7	12.47
3x1.5	0.7	10.90	3x2.5	0.7	11.98	3x4	0.7	13.47
4x1.5	0.7	11.68	4x2.5	0.7	13.29	4x4	0.7	14.51
5x1.5	0.7	12.55	5x2.5	0.7	14.30	5x4	0.7	16.08

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	14.45	2x10	0.8	17.65	2x16	0.8	20.65
3x6	0.7	15.57	3x10	0.8	18.55	3x16	0.8	22.15
4x6	0.7	17.22	4x10	0.8	20.51	4x16	0.8	24.04
5x6	0.7	18.61	5x10	0.8	22.65	5x16	0.8	26.16

INSTRUM® 107

Nominal voltage Uo/U: 600/1000 V

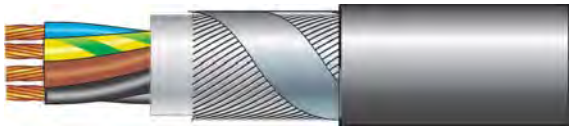
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	10.55	2x2.5	0.7	11.55	2x4	0.7	12.57
3x1.5	0.7	11.00	3x2.5	0.7	12.08	3x4	0.7	13.57
4x1.5	0.7	11.78	4x2.5	0.7	13.39	4x4	0.7	14.61
5x1.5	0.7	12.65	5x2.5	0.7	14.40	5x4	0.7	16.18

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	14.55	2x10	0.8	17.75	2x16	0.8	20.75
3x6	0.7	15.67	3x10	0.8	18.65	3x16	0.8	22.25
4x6	0.7	17.32	4x10	0.8	20.61	4x16	0.8	24.14
5x6	0.7	18.71	5x10	0.8	22.75	5x16	0.8	26.26

INSTRUM® 108
INSTRUM® 109

Power cables, screened or unscreened, armoured, insulated in crosslinked polyethylene

FE4OFR/FE4OHFR
XLPE/PVC/SWACS/PVC
XLPE/OS/PVC/SWACS/PVC



Application
The range of applications of **INSTRUM® 108/109** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 108/109 is suitable as power supply cable in industry, and building.
INSTRUM® 108/109 is suitable for static installation, even in wet environments. The armour protects mechanically the cable during installation, and it prevents deflection when installed. The screening, when provided, imparts electrostatic protection to the conductors.

Special feature
INSTRUM® 108/109 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 108/109
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine strands of bare copper wire, conductor insulation with G109 high-quality module EP rubber, stranding in layers (for version 20, screening in aluminium/mylar tape with tinned copper drain wire), intermediate sheath in PVC compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath in special RZ type PVC compound, fire-retardant grey colour according to CEI 20-22 II norms.

Technical data

Operating temperature:
85°C max

Test voltage:
4000 V

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Screen resistance:
<30 Ohm/Km

Short-circuit temperature:
250°C max

Insulation resistance:
>10000 Mohm/Km

Operating voltage:
U_0/U 0.6/1 Kv

Installation temperature:
0°C min

Colour code:
CEI UNEL 00722

INSTRUM® 108
INSTRUM® 109

Power cables, screened or unscreened, armoured, insulated in crosslinked polyethylene

FE4OFR/FE4OHFR
XLPE/PVC/SWACS/PVC
XLPE/OS/PVC/SWACS/PVC

INSTRUM® 108

Nominal voltage Uo/U: 600/1000 V

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x1.5	0.7	7.60	12.10	2x2.5	0.7	8.60	13.50
3x1.5	0.7	8.05	12.55	3x2.5	0.7	9.13	14.03
4x1.5	0.7	8.83	13.73	4x2.5	0.7	10.04	14.94
5x1.5	0.7	9.70	14.60	5x2.5	0.7	11.05	15.95

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x4	0.7	9.62	14.52	2x6	0.7	11.20	16.10
3x4	0.7	10.22	15.12	3x6	0.7	12.32	17.62
4x4	0.7	11.26	16.16	4x6	0.7	13.57	19.27
5x4	0.7	12.83	18.13	5x6	0.7	14.96	20.66

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x10	0.8	14.00	19.70	2x16	0.8	16.60	22.30
3x10	0.8	14.90	20.60	3x16	0.8	18.10	23.80
4x10	0.8	16.46	22.16	4x16	0.8	19.99	25.69
5x10	0.8	18.60	24.30	5x16	0.8	22.11	27.81

INSTRUM® 109

Nominal voltage Uo/U: 600/1000 V

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x1.5	0.7	7.75	12.25	2x2.5	0.7	8.75	13.65
3x1.5	0.7	8.20	12.70	3x2.5	0.7	9.28	14.18
4x1.5	0.7	8.98	13.88	4x2.5	0.7	10.19	15.09
5x1.5	0.7	9.85	14.75	5x2.5	0.7	11.20	16.10

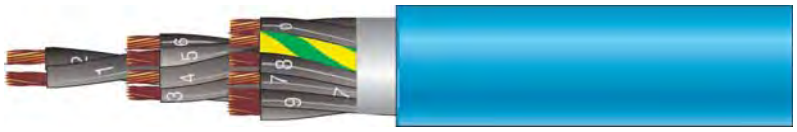
No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x4	0.7	9.77	14.67	2x6	0.7	11.35	16.65
3x4	0.7	10.37	15.27	3x6	0.7	12.47	17.77
4x4	0.7	11.41	16.71	4x6	0.7	13.72	19.42
5x4	0.7	12.98	18.28	5x6	0.7	15.11	20.81

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x10	0.8	14.15	19.85	2x16	0.8	16.75	22.45
3x10	0.8	15.05	20.75	3x16	0.8	18.25	23.95
4x10	0.8	16.61	22.31	4x16	0.8	20.14	25.84
5x10	0.8	18.75	24.45	5x16	0.8	22.26	27.96

INSTRUM® 130

Control cables insulated in PVC

N1VV-K
FR2OR
PVC/PVC



Application
The range of applications of **INSTRUM® 130** commands cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 130 is suitable as command and signal cable.
INSTRUM® 130 is suitable for static installation, both inside and outside in piping, on cabletray.
Underground installation is possible as well.

Special feature
INSTRUM® 130 commands cables are manufactured according to the following norms:
CEI 20-14
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 130
is a cable marked IEMMEQU CEI 20-22 II.

Cable make-up:
Fine bare copper strands, conductor insulation in R2 PVC, stranding in layers, outer sheath in special RZ PVC compound, light blue colour, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Installation temperature: 5°C min
- Test voltage: 4000 V
- Insulation resistance: >100 Mohm/Km
- Colour code: numbered black cores With or without G/V
- Strand construction: fine wires according to CEI 20-29, Cl5
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® 130

Control cables insulated in PVC

N1VV-K
FR2OR
PVC/PVC

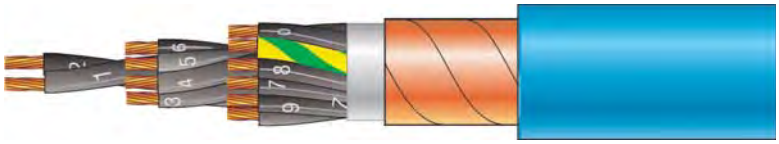
Nominal voltage Uo/U: 600/1000 V

No. conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)
5x1.5	0.8	15.50	5x2.5	0.8	16.50
7x1.5	0.8	16.50	7x2.5	0.8	17.50
10x1.5	0.8	19.50	10x2.5	0.8	21.50
12x1.5	0.8	20.50	12x2.5	0.8	22.50
16x1.5	0.8	22.00	16x2.5	0.8	24.50
19x1.5	0.8	23.00	19x2.5	0.8	26.00
24x1.5	0.8	26.50	24x2.5	0.8	29.50

INSTRUM® 131

Signal and control cables, screened insulated in PVC

N1VC7V-K
FR2OH1R
PVC/PVC/IDCuT/PVC



Application
The range of applications of **INSTRUM® 131** commands cables includes all electrical installations, in particular where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 131 is suitable as command and signal cable.
INSTRUM® 131 is suitable for static installation, both inside and outside in piping, on cable tray.
Underground installation is possible as well.

Special feature
INSTRUM® 131 command cables are manufactured according to the following norms:
CEI 20-14
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 131
is a cable marked IEMMEQU CEI 20-22 II.

Cable make-up:
Fine bare copper strands, conductor insulation in special R2 PVC, stranding in layers, intermediate sheath in special PVC compound, screening with double red copper tape wrapped and overlapped, outer sheath in special RZ PVC compound, light blue colour, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: U_0/U 0.6/1 Kv
- Test voltage: 4000 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: fine wires according to CEI 20-29, Cl5
- Screen resistance: </= 5 Ohm/Km
- Colour code: numbered black cores With or without G/V

INSTRUM® 131

Signal and control cables, screened, insulated in PVC

N1VC7V-K
FR2OH1R
PVC/PVC/DCuT/PVC

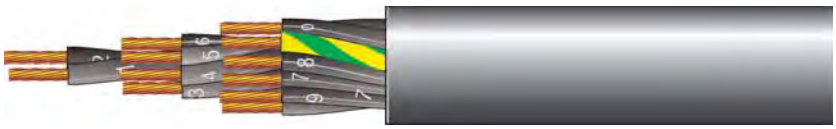
Nominal voltage Uo/U: 600/1000 V

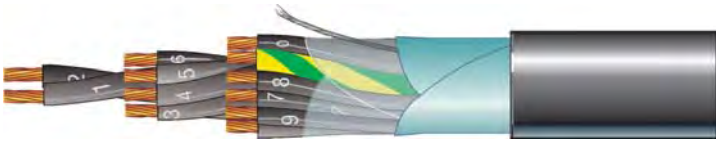
No. conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Maximum external Ø (mm)
5x1.5	0.8	17.50	5x2.5	0.8	18.50
7x1.5	0.8	18.50	7x2.5	0.8	19.50
10x1.5	0.8	21.50	10x2.5	0.8	23.50
12x1.5	0.8	22.50	12x2.5	0.8	24.50
16x1.5	0.8	24.00	16x2.5	0.8	26.50
19x1.5	0.8	25.00	19x2.5	0.8	28.00
24x1.5	0.8	28.50	24x2.5	0.8	31.50

INSTRUM® 132
INSTRUM® 133

Control cables, screened or unscreened, insulated with PVC

FR2OR/FR2OHR
PVC/PVC
PVC/OS/PVC





Application
The range of applications of **INSTRUM® 132/133** control cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 132/133 is suitable as control, signal and/or command cable.
INSTRUM® 132/133 is suitable for static installation, inside and for temporary outside use.
It is suitable for industry, fairs, and for electric panels. The screening, when provided, imparts electrostatic protection to the conductors.

Special feature
INSTRUM® 132/133 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 132/133
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation in R2 PVC, stranding in layers (for version 133, screening in aluminium/mylar tape with drain wire in tinned copper), outer sheath in special RZ PVC compound, black colour, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 70°C max
- Test voltage: 1500/2000/3000/4000 V per 1.5/2/3 or 4 degree
- Screen resistance: < 30 Ohm/Km
- Strand construction: fine wires according to CEI 20-29 Cl5/IEC 60228 Cl5/VDE 0295, Cl5
- Short-circuit temperature: 160°C max
- Insulation resistance: >100 Mohm/Km
- Operating voltage: 300/300 V-300/500 450/750 V-0.6/1 kV
- Installation temperature: 5°C min
- Colour code: numbered black cores With or without yellow/green

INSTRUM® 132
INSTRUM® 133

Control cables, screened or unscreened, insulated with PVC

FR2OR/FR2OHR
PVC/PVC
PVC/OS/PVC

INSTRUM® 132

Nominal voltage Uo/U: 300/300 V and 300/500 V

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x0.5	0.5	7.13	5x0.75	0.5	7.67	5x1	0.6	8.75
7x0.5	0.5	7.70	7x0.75	0.5	8.30	7x1	0.6	9.50
12x0.5	0.5	9.89	12x0.75	0.5	10.72	12x1	0.6	12.78
19x0.5	0.5	11.90	19x0.75	0.5	12.90	19x1	0.6	14.90
24x0.5	0.5	13.80	24x0.75	0.5	15.00	24x1	0.6	17.60
30x0.5	0.5	14.58	30x0.75	0.5	16.06	30x1	0.6	18.83
48x0.5	0.5	18.29	48x0.75	0.5	20.12	48x1	0.6	23.58

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.6	9.56	5x2.5	0.6	10.91
7x1.5	0.6	10.40	7x2.5	0.6	12.30
12x1.5	0.6	14.02	12x2.5	0.6	16.30
19x1.5	0.6	16.60	19x2.5	0.6	19.30
24x1.5	0.6	19.60	24x2.5	0.6	23.00
30x1.5	0.6	20.95	30x2.5	0.6	24.55
48x1.5	0.6	26.42	48x2.5	0.6	31.10

Nominal voltage Uo/U: 450/750 V

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x0.5	0.7	8.21	5x0.75	0.7	8.75	5x1	0.7	9.29
7x0.5	0.7	8.90	7x0.75	0.7	9.50	7x1	0.7	10.10
12x0.5	0.7	11.95	12x0.75	0.7	12.78	12x1	0.7	13.61
19x0.5	0.7	13.90	19x0.75	0.7	14.90	19x1	0.7	16.10
24x0.5	0.7	16.40	24x0.75	0.7	17.80	24x1	0.7	19.00
30x0.5	0.7	17.34	30x0.75	0.7	18.83	30x1	0.7	20.31
48x0.5	0.7	21.75	48x0.75	0.7	23.58	48x1	0.7	25.61

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.7	10.10	5x2.5	0.8	12.39
7x1.5	0.7	11.40	7x2.5	0.8	13.50
12x1.5	0.7	14.85	12x2.5	0.8	18.16
19x1.5	0.7	17.80	19x2.5	0.8	21.50
24x1.5	0.7	21.00	24x2.5	0.8	25.80
30x1.5	0.7	22.43	30x2.5	0.8	27.32
48x1.5	0.7	28.25	48x2.5	0.8	34.56

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1	0.8	9.83	5x1.5	0.8	10.64	5x2.5	0.9	12.93
7x1	0.8	10.70	7x1.5	0.8	12.00	7x2.5	0.9	14.10
12x1	0.8	14.44	12x1.5	0.8	15.88	12x2.5	0.9	18.99
19x1	0.8	17.10	19x1.5	0.8	18.80	19x2.5	0.9	22.70
24x1	0.8	20.40	24x1.5	0.8	22.40	24x2.5	0.9	27.00
30x1	0.8	21.59	30x1.5	0.8	23.91	30x2.5	0.9	28.80
48x1	0.8	27.44	48x1.5	0.8	30.08	48x2.5	0.9	36.19

INSTRUM® 132
INSTRUM® 133

Control cables, screened or unscreened, insulated with PVC

FR2OR/FR2OHR
PVC/PVC
PVC/OS/PVC

INSTRUM® 133

Nominal voltage Uo/U: 300/300 V and 300/500 V

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x0.5	0.5	7.28	5x0.75	0.5	7.82	5x1	0.6	8.90
7x0.5	0.5	7.85	7x0.75	0.5	8.45	7x1	0.6	9.65
12x0.5	0.5	10.04	12x0.75	0.5	10.87	12x1	0.6	12.93
19x0.5	0.5	12.05	19x0.75	0.5	13.05	19x1	0.6	15.05
24x0.5	0.5	13.95	24x0.75	0.5	15.15	24x1	0.6	17.95
30x0.5	0.5	14.73	30x0.75	0.5	16.21	30x1	0.6	18.98
48x0.5	0.5	18.44	48x0.75	0.5	20.27	48x1	0.6	23.93

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.6	9.71	5x2.5	0.6	11.46
7x1.5	0.6	10.55	7x2.5	0.6	12.45
12x1.5	0.6	14.17	12x2.5	0.6	16.45
19x1.5	0.6	16.75	19x2.5	0.6	19.45
24x1.5	0.6	19.75	24x2.5	0.6	23.15
30x1.5	0.6	21.10	30x2.5	0.6	24.70
48x1.5	0.6	26.57	48x2.5	0.6	31.25

Nominal voltage Uo/U: 450/750 V

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x0.5	0.7	8.36	5x0.75	0.7	8.90	5x1	0.7	9.44
7x0.5	0.7	9.05	7x0.75	0.7	9.65	7x1	0.7	10.25
12x0.5	0.7	12.10	12x0.75	0.7	12.93	12x1	0.7	13.76
19x0.5	0.7	14.05	19x0.75	0.7	15.05	19x1	0.7	16.25
24x0.5	0.7	16.55	24x0.75	0.7	17.95	24x1	0.7	19.15
30x0.5	0.7	17.49	30x0.75	0.7	18.98	30x1	0.7	20.46
48x0.5	0.7	22.10	48x0.75	0.7	23.93	48x1	0.7	25.76

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.7	10.25	5x2.5	0.8	12.54
7x1.5	0.7	11.55	7x2.5	0.8	13.65
12x1.5	0.7	15.00	12x2.5	0.8	18.31
19x1.5	0.7	17.95	19x2.5	0.8	21.65
24x1.5	0.7	21.15	24x2.5	0.8	25.95
30x1.5	0.7	22.58	30x2.5	0.8	27.67
48x1.5	0.7	28.40	48x2.5	0.8	34.71

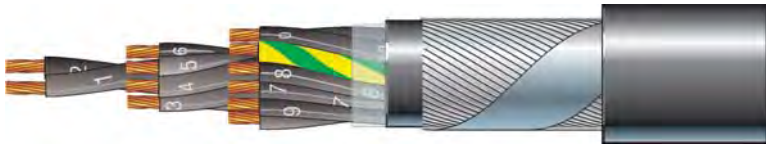
Nominal voltage Uo/U: 0.6/1 Kv

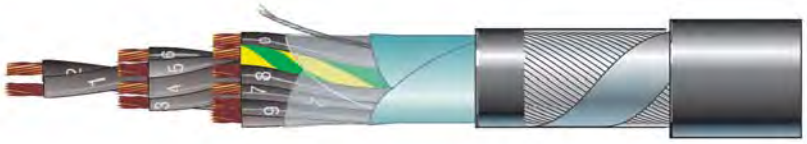
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1	0.8	9.98	5x1.5	0.8	10.79	5x2.5	0.9	13.08
7x1	0.8	10.85	7x1.5	0.8	12.15	7x2.5	0.9	14.25
12x1	0.8	14.59	12x1.5	0.8	16.03	12x2.5	0.9	19.14
19x1	0.8	17.25	19x1.5	0.8	18.95	19x2.5	0.9	22.85
24x1	0.8	20.55	24x1.5	0.8	22.55	24x2.5	0.9	27.15
30x1	0.8	21.74	30x1.5	0.8	24.06	30x2.5	0.9	28.95
48x1	0.8	27.59	48x1.5	0.8	30.23	48x2.5	0.9	36.34

INSTRUM® 134
INSTRUM® 135

Control cables, screened or unscreened, armoured, insulated with PVC

FR2ORFR/FR2OHRFR
PVC/PVC/SWACS/PVC
PVC/OS/PVC/SWACS/PVC





Application
The range of applications of **INSTRUM® 134/135** control cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 134/135 is suitable as control, signal and/or command cable.
INSTRUM® 134/135 is suitable for static installation, the armour protects mechanically the cable during installation, and it prevents deflection when installed, the screening, when provided, imparts electrostatic protection to the conductors.

Special feature
INSTRUM® 134/135 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 134/135
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine strands of bare copper wire, conductor insulation with R2 PVC, insulated twisted pair conductors (for version 135, they are wrapped with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in RZ PVC compound, armour in galvanised steel wires wrapped by galvanised steel tape counterspiral, outer sheath in special RZ type PVC compound, fire-retardant black colour according to CEI 20-22 II norms.

Technical data

Operating temperature:
70°C max

Test voltage:
1500/2000/3000/4000 V
per 1.5/2/3 or 4 degree

Strand construction:
fine wires according to
CEI 20-29 Cl5/IEC 60228
Cl5/VDE 0295, Cl5

Screen resistance:
< 30 Ohm/Km

Short-circuit temperature:
160°C max

Insulation resistance:
>100 Mohm/Km

Operating voltage:
300/300 V-300/500
450/750 V-0.6/1 kV

Installation temperature:
5°C min

Colour code:
numbered black cores
With or without yellow/green

INSTRUM® 134
INSTRUM® 135

Control cables, screened or unscreened, armoured, insulated with PVC

FR2ORFR/FR2OHRFR
PVC/PVC/SWACS/PVC
PVC/OS/PVC/SWACS/PVC

INSTRUM® 134

Nominal voltage Uo/U: 300/300 V and 300/500 V

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x0.5	0.5	7.13	10.83	5x0.75	0.5	7.67	11.77	5x1	0.6	8.75	12.85
7x0.5	0.5	7.70	11.80	7x0.75	0.5	8.30	12.40	7x1	0.6	9.50	13.60
12x0.5	0.5	9.89	13.99	12x0.75	0.5	10.72	14.82	12x1	0.6	12.78	17.08
19x0.5	0.5	11.90	16.20	19x0.75	0.5	12.90	17.20	19x1	0.6	14.90	19.40
24x0.5	0.5	13.80	18.30	24x0.75	0.5	15.00	19.50	24x1	0.6	17.60	22.50
30x0.5	0.5	14.58	19.08	30x0.75	0.5	16.06	20.76	30x1	0.6	18.83	23.93
48x0.5	0.5	18.29	23.19	48x0.75	0.5	20.12	25.22	48x1	0.6	23.58	29.28

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1.5	0.6	9.56	13.66	5x2.5	0.6	10.91	15.01
7x1.5	0.6	10.40	14.50	7x2.5	0.6	12.30	16.60
12x1.5	0.6	14.02	18.52	12x2.5	0.6	16.30	21.00
19x1.5	0.6	16.60	21.30	19x2.5	0.6	19.30	24.40
24x1.5	0.6	19.60	24.70	24x2.5	0.6	23.00	28.50
30x1.5	0.6	20.95	26.25	30x2.5	0.6	24.55	30.25
48x1.5	0.6	26.42	32.32	48x2.5	0.6	31.10	37.60

Nominal voltage Uo/U: 450/750 V

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x0.5	0.7	8.21	12.31	5x0.75	0.7	8.75	12.85	5x1	0.7	9.29	13.39
7x0.5	0.7	8.90	13.00	7x0.75	0.7	9.50	13.60	7x1	0.7	10.10	14.20
12x0.5	0.7	11.95	16.25	12x0.75	0.7	12.78	17.08	12x1	0.7	13.61	18.11
19x0.5	0.7	13.90	18.40	19x0.75	0.7	14.90	19.40	19x1	0.7	16.10	20.80
24x0.5	0.7	16.40	21.10	24x0.75	0.7	17.80	22.70	24x1	0.7	19.00	24.10
30x0.5	0.7	17.34	22.24	30x0.75	0.7	18.83	23.93	30x1	0.7	20.31	25.61
48x0.5	0.7	21.75	27.05	48x0.75	0.7	23.58	29.28	48x1	0.7	25.61	31.51

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1.5	0.7	10.10	14.20	5x2.5	0.8	12.39	16.69
7x1.5	0.7	11.40	15.70	7x2.5	0.8	13.50	18.00
12x1.5	0.7	14.85	19.35	12x2.5	0.8	18.16	23.06
19x1.5	0.7	17.80	22.70	19x2.5	0.8	21.50	26.80
24x1.5	0.7	21.00	26.30	24x2.5	0.8	25.80	31.70
30x1.5	0.7	22.43	27.93	30x2.5	0.8	27.32	33.42
48x1.5	0.7	28.25	34.35	48x2.5	0.8	34.56	41.46

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1	0.8	9.83	13.93	5x1.5	0.8	10.64	14.74	5x2.5	0.9	12.93	17.23
7x1	0.8	10.70	14.80	7x1.5	0.8	12.00	16.30	7x2.5	0.9	14.10	18.60
12x1	0.8	14.44	18.94	12x1.5	0.8	15.88	20.58	12x2.5	0.9	18.99	24.09
19x1	0.8	17.10	22.00	19x1.5	0.8	18.80	23.90	19x2.5	0.9	22.70	28.20
24x1	0.8	20.40	25.70	24x1.5	0.8	22.40	27.90	24x2.5	0.9	27.00	33.10
30x1	0.8	21.59	26.89	30x1.5	0.8	23.91	29.61	30x2.5	0.9	28.80	34.90
48x1	0.8	27.44	33.54	48x1.5	0.8	30.08	36.58	48x2.5	0.9	36.19	43.09

INSTRUM® 134
INSTRUM® 135

Control cables, screened or unscreened, armoured, insulated with PVC

FR2ORFR/FR2OHRFR
PVC/PVC/SWACS/PVC
PVC/OS/PVC/SWACS/PVC

INSTRUM® 135

Nominal voltage Uo/U: 300/300 V and 300/500 V

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x0.5	0.5	7.28	10.98	5x0.75	0.5	7.82	11.92	5x1	0.6	8.90	13.00
7x0.5	0.5	7.85	11.95	7x0.75	0.5	8.45	12.55	7x1	0.6	9.65	13.75
12x0.5	0.5	10.04	14.14	12x0.75	0.5	10.87	14.97	12x1	0.6	12.93	17.23
19x0.5	0.5	12.05	16.35	19x0.75	0.5	13.05	17.35	19x1	0.6	15.05	19.55
24x0.5	0.5	13.95	18.45	24x0.75	0.5	15.15	19.65	24x1	0.6	17.95	22.85
30x0.5	0.5	14.73	19.23	30x0.75	0.5	16.21	20.91	30x1	0.6	18.98	24.08
48x0.5	0.5	18.44	23.34	48x0.75	0.5	20.27	25.37	48x1	0.6	23.93	29.63

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1.5	0.6	9.71	13.81	5x2.5	0.6	11.46	15.76
7x1.5	0.6	10.55	14.65	7x2.5	0.6	12.45	16.75
12x1.5	0.6	14.17	18.67	12x2.5	0.6	16.45	21.15
19x1.5	0.6	16.75	21.45	19x2.5	0.6	19.45	24.55
24x1.5	0.6	19.75	24.85	24x2.5	0.6	23.15	28.65
30x1.5	0.6	21.10	26.40	30x2.5	0.6	24.70	30.40
48x1.5	0.6	26.57	32.47	48x2.5	0.6	31.25	37.75

Nominal voltage Uo/U: 450/750 V

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x0.5	0.7	8.36	12.46	5x0.75	0.7	8.90	13.00	5x1	0.7	9.44	13.54
7x0.5	0.7	9.05	13.15	7x0.75	0.7	9.65	13.75	7x1	0.7	10.25	14.35
12x0.5	0.7	12.10	16.40	12x0.75	0.7	12.93	17.23	12x1	0.7	13.76	18.26
19x0.5	0.7	14.05	18.55	19x0.75	0.7	15.05	19.55	19x1	0.7	16.25	20.95
24x0.5	0.7	16.55	21.25	24x0.75	0.7	17.95	22.85	24x1	0.7	19.15	24.25
30x0.5	0.7	17.49	22.39	30x0.75	0.7	18.98	24.08	30x1	0.7	20.46	25.76
48x0.5	0.7	22.10	27.60	48x0.75	0.7	23.93	29.63	48x1	0.7	25.76	31.66

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm))	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1.5	0.7	10.25	14.35	5x2.5	0.8	12.54	16.84
7x1.5	0.7	11.55	15.85	7x2.5	0.8	13.65	18.15
12x1.5	0.7	15.00	19.50	12x2.5	0.8	18.31	23.21
19x1.5	0.7	17.95	22.85	19x2.5	0.8	21.65	26.95
24x1.5	0.7	21.15	26.45	24x2.5	0.8	25.95	31.85
30x1.5	0.7	22.58	28.08	30x2.5	0.8	27.67	33.77
48x1.5	0.7	28.40	34.50	48x2.5	0.8	34.71	41.61

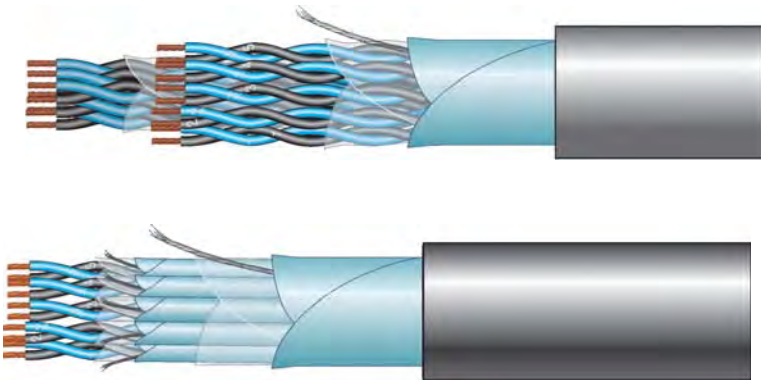
Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1	0.8	9.98	14.08	5x1.5	0.8	10.79	14.89	5x2.5	0.9	13.08	17.38
7x1	0.8	10.85	14.95	7x1.5	0.8	12.15	16.45	7x2.5	0.9	14.25	18.75
12x1	0.8	14.59	19.09	12x1.5	0.8	16.03	20.73	12x2.5	0.9	19.14	24.24
19x1	0.8	17.25	22.15	19x1.5	0.8	18.95	24.05	19x2.5	0.9	22.85	28.35
24x1	0.8	20.55	25.85	24x1.5	0.8	22.55	28.05	24x2.5	0.9	27.15	33.25
30x1	0.8	21.74	27.04	30x1.5	0.8	24.06	29.76	30x2.5	0.9	28.95	35.05
48x1	0.8	27.59	33.69	48x1.5	0.8	30.23	36.73	48x2.5	0.9	36.34	43.24

INSTRUM® 170
INSTRUM® 171

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, insulated with PVC

FR2XOHR/FR2XHOHR
PVC/OS/PVC
PVC/IS/OS/PVC



Application
The range of applications of **INSTRUM® 170/171** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 170/171 is suitable as signal and/or control cable in particular for the industry.
INSTRUM® 170/171 is suitable for static installation, it is generally used for safety installation (not of the intrinsically safe type),
The screening, when provided, imparts electrostatic protection to pairs and cable.

Special feature
INSTRUM® 170/171 signal cables are manufactured to according the following norms:
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 170/171
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
INSTRUM® 170/171 is also available in the version with three laid conductors.

Cable make-up:
Fine strands of bare copper wire, conductor insulation with R2 PVC, insulated twisted pair conductors (for version 171, they are wrapped with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in RZ PVC compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath in special RZ type PVC compound, fire-retardant black colour according to CEI 20-22 II norms.

Technical data

- Operating temperature: 70°C max
- Test voltage: 1500/2000/3000/4000 V per 1.5/2/3 or 4 degree
- Strand construction: fine wires according to CEI 20-29 Cl5/IEC 60228 Cl5/VDE 0295, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 160°C max
- Insulation resistance: >100 Mohm/Km
- Operating voltage: 300/300 V-300/500 450/750 V-0.6/1 kV
- Installation temperature: 5°C min
- Colour code: Blue/Black With numbering on black

INSTRUM® 170
INSTRUM® 171

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, insulated with PVC

FR2XOHR/FR2XHOHR
PVC/OS/PVC
PVC/IS/OS/PVC

INSTRUM® 170

Nominal voltage Uo/U: 300/300 V and 300/500 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.5	5.95	1x2x0.75	0.5	6.35	1x2x1	0.6	7.15
2x2x0.5	0.5	8.61	2x2x0.75	0.5	9.29	2x2x1	0.6	10.65
3x2x0.5	0.5	9.09	3x2x0.75	0.5	9.83	3x2x1	0.6	11.69
6x2x0.5	0.5	12.24	6x2x0.75	0.5	13.26	6x2x1	0.6	15.30
12x2x0.5	0.5	16.15	12x2x0.75	0.5	17.57	12x2x1	0.6	20.79
15x2x0.5	0.5	18.13	15x2x0.75	0.5	19.73	15x2x1	0.6	23.33
24x2x0.5	0.5	22.73	24x2x0.75	0.5	24.97	24x2x1	0.6	29.65
48x2x0.5	0.5	30.47	48x2x0.75	0.5	33.65	48x2x1	0.6	39.19

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.6	7.75	1x2x2.5	0.6	8.75
2x2x1.5	0.6	12.07	2x2x2.5	0.6	13.77
3x2x1.5	0.6	12.78	3x2x2.5	0.6	14.61
6x2x1.5	0.6	17.03	6x2x2.5	0.6	19.78
12x2x1.5	0.6	23.10	12x2x2.5	0.6	27.03
15x2x1.5	0.6	26.12	15x2x2.5	0.6	30.52
24x2x1.5	0.6	33.11	24x2x2.5	0.6	38.21
48x2x1.5	0.6	43.74			

Nominal voltage Uo/U: 450/750 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.7	6.75	1x2x0.75	0.7	7.15	1x2x1	0.7	7.55
2x2x0.5	0.7	9.97	2x2x0.75	0.7	10.65	2x2x1	0.7	11.73
3x2x0.5	0.7	10.56	3x2x0.75	0.7	11.69	3x2x1	0.7	12.42
6x2x0.5	0.7	14.28	6x2x0.75	0.7	15.30	6x2x1	0.7	16.52
12x2x0.5	0.7	19.18	12x2x0.75	0.7	20.79	12x2x1	0.7	22.40
15x2x0.5	0.7	21.53	15x2x0.75	0.7	23.33	15x2x1	0.7	25.12
24x2x0.5	0.7	27.21	24x2x0.75	0.7	29.65	24x2x1	0.7	31.89
48x2x0.5	0.7	36.42	48x2x0.75	0.7	39.19	48x2x1	0.7	42.36

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.7	8.15	1x2x2.5	0.8	9.55
2x2x1.5	0.7	12.75	2x2x2.5	0.8	15.13
3x2x1.5	0.7	13.52	3x2x2.5	0.8	16.27
6x2x1.5	0.7	18.25	6x2x2.5	0.8	22.22
12x2x1.5	0.7	24.72	12x2x2.5	0.8	30.25
15x2x1.5	0.7	27.92	15x2x2.5	0.8	34.11
24x2x1.5	0.7	35.15	24x2x2.5	0.8	42.69
48x2x1.5	0.7	46.92			

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1	0.8	7.95	1x2x1.5	0.8	8.55	1x2x2.5	0.9	9.95
2x2x1	0.8	12.41	2x2x1.5	0.8	13.43	2x2x2.5	0.9	16.01
3x2x1	0.8	13.15	3x2x1.5	0.8	14.25	3x2x2.5	0.9	17.00
6x2x1	0.8	17.54	6x2x1.5	0.8	19.27	6x2x2.5	0.9	23.24
12x2x1	0.8	24.01	12x2x1.5	0.8	26.33	12x2x2.5	0.9	31.86
15x2x1	0.8	26.92	15x2x1.5	0.8	29.72	15x2x2.5	0.9	35.71
24x2x1	0.8	34.13	24x2x1.5	0.8	37.19	24x2x2.5	0.9	44.73
48x2x1	0.8	45.53	48x2x1.5	0.8	49.69			

INSTRUM® 170
INSTRUM® 171

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, insulated with PVC

FR2XOHR/FR2XHOHR
PVC/OS/PVC
PVC/IS/OS/PVC

INSTRUM® 171

Nominal voltage Uo/U: 300/300 V and 300/500 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.5	5.95	1x2x0.75	0.5	6.35	1x2x1	0.6	7.15
2x2x0.5	0.5	8.91	2x2x0.75	0.5	9.59	2x2x1	0.6	10.95
3x2x0.5	0.5	9.42	3x2x0.75	0.5	10.15	3x2x1	0.6	12.01
6x2x0.5	0.5	12.69	6x2x0.75	0.5	13.71	6x2x1	0.6	15.95
12x2x0.5	0.5	16.78	12x2x0.75	0.5	18.39	12x2x1	0.6	21.41
15x2x0.5	0.5	18.84	15x2x0.75	0.5	20.63	15x2x1	0.6	24.23
24x2x0.5	0.5	23.83	24x2x0.75	0.5	26.07	24x2x1	0.6	30.55
48x2x0.5	0.5	31.90	48x2x0.75	0.5	34.87	48x2x1	0.6	40.81

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.6	7.75	1x2x2.5	0.6	8.75
2x2x1.5	0.6	12.37	2x2x2.5	0.6	14.07
3x2x1.5	0.6	13.11	3x2x2.5	0.6	14.93
6x2x1.5	0.6	17.48	6x2x2.5	0.6	20.43
12x2x1.5	0.6	23.93	12x2x2.5	0.6	27.85
15x2x1.5	0.6	26.83	15x2x2.5	0.6	31.42
24x2x1.5	0.6	34.01	24x2x2.5	0.6	39.11
48x2x1.5	0.6	45.37			

Nominal voltage Uo/U: 450/750 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.7	6.75	1x2x0.75	0.7	7.15	1x2x1	0.7	7.55
2x2x0.5	0.7	10.27	2x2x0.75	0.7	10.95	2x2x1	0.7	12.03
3x2x0.5	0.7	10.88	3x2x0.75	0.7	12.01	3x2x1	0.7	12.74
6x2x0.5	0.7	14.73	6x2x0.75	0.7	15.95	6x2x1	0.7	16.97
12x2x0.5	0.7	20.00	12x2x0.75	0.7	21.41	12x2x1	0.7	23.02
15x2x0.5	0.7	22.43	15x2x0.75	0.7	24.23	15x2x1	0.7	26.03
24x2x0.5	0.7	28.31	24x2x0.75	0.7	30.55	24x2x1	0.7	32.99
48x2x0.5	0.7	37.64	48x2x0.75	0.7	40.81	48x2x1	0.7	43.58

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.7	8.15	1x2x2.5	0.8	9.55
2x2x1.5	0.7	13.05	2x2x2.5	0.8	15.63
3x2x1.5	0.7	13.84	3x2x2.5	0.8	16.60
6x2x1.5	0.7	18.70	6x2x2.5	0.8	22.67
12x2x1.5	0.7	25.34	12x2x2.5	0.8	31.08
15x2x1.5	0.7	28.63	15x2x2.5	0.8	34.82
24x2x1.5	0.7	36.05	24x2x2.5	0.8	43.59
48x2x1.5	0.7	48.14			

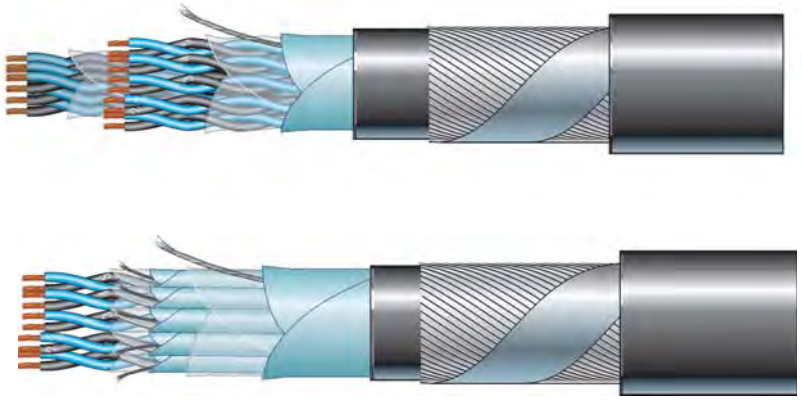
Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1	0.8	7.95	1x2x1.5	0.8	8.55	1x2x2.5	0.9	9.95
2x2x1	0.8	12.71	2x2x1.5	0.8	13.73	2x2x2.5	0.9	16.31
3x2x1	0.8	13.47	3x2x1.5	0.8	14.57	3x2x2.5	0.9	17.33
6x2x1	0.8	18.19	6x2x1.5	0.8	19.72	6x2x2.5	0.9	23.89
12x2x1	0.8	24.63	12x2x1.5	0.8	26.95	12x2x2.5	0.9	32.49
15x2x1	0.8	27.83	15x2x1.5	0.8	30.42	15x2x2.5	0.9	36.42
24x2x1	0.8	35.03	24x2x1.5	0.8	38.09	24x2x2.5	0.9	46.03
48x2x1	0.8	46.75	48x2x1.5	0.8	51.31			

INSTRUM® 172
INSTRUM® 173

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with PVC

FR2XOHRFR/FR2XHOHRFR
PVC/OS/PVC/SWACS/PVC
PVC/IS/OS/PVC/SWACS/PVC



Application
The range of applications of **INSTRUM® 172/173** power cables includes all electrical installations, in particular where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 172/173 is suitable as signal and/or control cable in particular for the industry.
INSTRUM® 172/173 is suitable for static installation, it is generally used for safety installation (not of the intrinsically safe type), the armour protects mechanically the cable during installation, and it prevents deflection when installed.
The screening, when provided, imparts electrostatic protection to pairs and cable.

Special feature
INSTRUM® 172/173 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 172/173
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
INSTRUM® 172/173 is also available in the version with three laid conductors.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine strands of bare copper wire, conductor insulation with R2 PVC, insulated twisted pair conductors (for version 173, they are laid with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in RZ PVC compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath in special RZ type PVC compound, fire-retardant black colour according to CEI 20-22 II norms.

Technical data

Operating temperature:
70°C max

Test voltage:
1500/2000/3000/4000 V
per 1.5/2/3 or 4 degree

Strand construction:
fine wires according to
CEI 20-29 Cl5/IEC 60228
Cl5/VDE 0295, Cl5

Screen resistance:
< 30 Ohm/Km

Short-circuit temperature:
160°C max

Insulation resistance:
>100 Mohm/Km

Operating voltage:
300/300 V-300/500
450/750 V-0.6/1 kV

Colour code:
Blue/Black
With numbering on black

INSTRUM® 172
INSTRUM® 173

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with PVC

FR2XOHRFR/FR2XHOHRFR
PVC/OS/PVC/SWACS/PVC
PVC/IS/OS/PVC/SWACS/PVC

INSTRUM® 172

Nominal voltage Uo/U: 300/300 V and 300/500 V

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)m)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x0.5	0.5	5.95	9.65	1x2x0.75	0.5	6.35	10.05	1x2x1	0.6	7.15	10.85
2x2x0.5	0.5	8.61	12.71	2x2x0.75	0.5	9.29	13.39	2x2x1	0.6	10.65	14.75
3x2x0.5	0.5	9.09	13.19	3x2x0.75	0.5	9.83	13.93	3x2x1	0.6	11.69	15.99
6x2x0.5	0.5	12.24	16.54	6x2x0.75	0.5	13.26	17.56	6x2x1	0.6	15.30	20.00
12x2x0.5	0.5	16.15	20.85	12x2x0.75	0.5	17.57	22.47	12x2x1	0.6	20.79	26.09
15x2x0.5	0.5	18.13	23.03	15x2x0.75	0.5	19.73	24.83	15x2x1	0.6	23.33	28.83
24x2x0.5	0.5	22.73	28.23	24x2x0.75	0.5	24.97	30.67	24x2x1	0.6	29.65	35.75
48x2x0.5	0.5	30.47	36.97	48x2x0.75	0.5	33.65	40.55	48x2x1	0.6	39.19	46.49

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x1.5	0.6	7.75	11.85	1x2x2.5	0.6	8.75	12.85
2x2x1.5	0.6	12.07	16.37	2x2x2.5	0.6	13.77	18.27
3x2x1.5	0.6	12.78	17.08	3x2x2.5	0.6	14.61	19.11
6x2x1.5	0.6	17.03	21.73	6x2x2.5	0.6	19.78	24.88
12x2x1.5	0.6	23.10	28.60	12x2x2.5	0.6	27.03	33.13
15x2x1.5	0.6	26.12	32.02	15x2x2.5	0.6	30.52	37.02
24x2x1.5	0.6	33.11	40.01	24x2x2.5	0.6	38.21	45.51
48x2x1.5	0.6	43.74	51.44				

Nominal voltage Uo/U: 450/750 V

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x0.5	0.7	6.75	10.45	1x2x0.75	0.7	7.15	10.85	1x2x1	0.7	7.55	11.65
2x2x0.5	0.7	9.97	14.07	2x2x0.75	0.7	10.65	14.75	2x2x1	0.7	11.73	16.03
3x2x0.5	0.7	10.56	14.66	3x2x0.75	0.7	11.69	15.99	3x2x1	0.7	12.42	16.72
6x2x0.5	0.7	14.28	18.78	6x2x0.75	0.7	15.30	20.00	6x2x1	0.7	16.52	21.22
12x2x0.5	0.7	19.18	24.28	12x2x0.75	0.7	20.79	26.09	12x2x1	0.7	22.40	27.90
15x2x0.5	0.7	21.53	26.83	15x2x0.75	0.7	23.33	28.83	15x2x1	0.7	25.12	31.02
24x2x0.5	0.7	27.21	33.31	24x2x0.75	0.7	29.65	35.75	24x2x1	0.7	31.89	38.39
48x2x0.5	0.7	36.42	43.32	48x2x0.75	0.7	39.19	46.49	48x2x1	0.7	42.36	49.66

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x1.5	0.7	8.15	12.25	1x2x2.5	0.8	9.55	13.65
2x2x1.5	0.7	12.75	17.05	2x2x2.5	0.8	15.13	19.63
3x2x1.5	0.7	13.52	18.02	3x2x2.5	0.8	16.27	20.97
6x2x1.5	0.7	18.25	23.15	6x2x2.5	0.8	22.22	27.72
12x2x1.5	0.7	24.72	30.42	12x2x2.5	0.8	30.25	36.75
15x2x1.5	0.7	27.92	34.02	15x2x2.5	0.8	34.11	41.01
24x2x1.5	0.7	35.15	42.05	24x2x2.5	0.8	42.69	49.99

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm))	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x1	0.8	7.95	12.05	1x2x1.5	0.8	8.55	12.65	1x2x2.5	0.9	9.95	14.05
2x2x1	0.8	12.41	16.71	2x2x1.5	0.8	13.43	17.93	2x2x2.5	0.9	16.01	20.71
3x2x1	0.8	13.15	17.45	3x2x1.5	0.8	14.25	18.75	3x2x2.5	0.9	17.00	21.70
6x2x1	0.8	17.54	22.44	6x2x1.5	0.8	19.27	24.37	6x2x2.5	0.9	23.24	28.74
12x2x1	0.8	24.01	29.71	12x2x1.5	0.8	26.33	32.23	12x2x2.5	0.9	31.86	38.36
15x2x1	0.8	26.92	33.02	15x2x1.5	0.8	29.72	35.82	15x2x2.5	0.9	35.71	42.61
24x2x1	0.8	34.13	41.03	24x2x1.5	0.8	37.19	44.09	24x2x2.5	0.9	44.73	52.43

INSTRUM® 172
INSTRUM® 173

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with PVC

FR2XOHRFR/FR2XHOHRFR
PVC/OS/PVC/SWACS/PVC
PVC/IS/OS/PVC/SWACS/PVC

INSTRUM® 173

Nominal voltage Uo/U: 300/300 V and 300/500 V

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x0.5	0.5	5.95	9.65	1x2x0.75	0.5	6.35	10.05	1x2x1	0.6	7.15	10.85
2x2x0.5	0.5	8.91	13.01	2x2x0.75	0.5	9.59	13.69	2x2x1	0.6	10.95	15.05
3x2x0.5	0.5	9.42	13.52	3x2x0.75	0.5	10.15	14.25	3x2x1	0.6	12.01	16.31
6x2x0.5	0.5	12.69	16.99	6x2x0.75	0.5	13.71	18.21	6x2x1	0.6	15.95	20.65
12x2x0.5	0.5	16.78	21.48	12x2x0.75	0.5	18.39	23.29	12x2x1	0.6	21.41	26.71
15x2x0.5	0.5	18.84	23.94	15x2x0.75	0.5	20.63	25.93	15x2x1	0.6	24.23	29.93
24x2x0.5	0.5	23.83	29.53	24x2x0.75	0.5	26.07	31.97	24x2x1	0.6	30.55	37.05
48x2x0.5	0.5	31.90	38.40	48x2x0.75	0.5	34.87	41.77	48x2x1	0.6	40.81	48.11

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x1.5	0.6	7.75	11.85	1x2x2.5	0.6	8.75	12.85
2x2x1.5	0.6	12.37	16.67	2x2x2.5	0.6	14.07	18.57
3x2x1.5	0.6	13.11	17.41	3x2x2.5	0.6	14.93	19.43
6x2x1.5	0.6	17.48	22.38	6x2x2.5	0.6	20.43	25.73
12x2x1.5	0.6	23.93	29.63	12x2x2.5	0.6	27.85	33.95
15x2x1.5	0.6	26.83	32.93	15x2x2.5	0.6	31.42	37.92
24x2x1.5	0.6	34.01	40.91	24x2x2.5	0.6	39.11	46.41
48x2x1.5	0.6	45.37	53.07				

Nominal voltage Uo/U: 450/750 V

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x0.5	0.7	6.75	10.45	1x2x0.75	0.7	7.15	10.85	1x2x1	0.7	7.55	11.65
2x2x0.5	0.7	10.27	14.37	2x2x0.75	0.7	10.95	15.05	2x2x1	0.7	12.03	16.33
3x2x0.5	0.7	10.88	14.98	3x2x0.75	0.7	12.01	16.31	3x2x1	0.7	12.74	17.04
6x2x0.5	0.7	14.73	19.23	6x2x0.75	0.7	15.95	20.65	6x2x1	0.7	16.97	21.67
12x2x0.5	0.7	20.00	25.10	12x2x0.75	0.7	21.41	26.71	12x2x1	0.7	23.02	28.52
15x2x0.5	0.7	22.43	27.93	15x2x0.75	0.7	24.23	29.93	15x2x1	0.7	26.03	31.93
24x2x0.5	0.7	28.31	34.41	24x2x0.75	0.7	30.55	37.05	24x2x1	0.7	32.99	39.89
48x2x0.5	0.7	37.64	44.54	48x2x0.75	0.7	40.81	48.11	48x2x1	0.7	43.58	51.28

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x1.5	0.7	8.15	12.25	1x2x2.5	0.8	9.55	13.65
2x2x1.5	0.7	13.05	17.35	2x2x2.5	0.8	15.63	20.33
3x2x1.5	0.7	13.84	18.34	3x2x2.5	0.8	16.60	21.30
6x2x1.5	0.7	18.70	23.80	6x2x2.5	0.8	22.67	28.17
12x2x1.5	0.7	25.34	31.24	12x2x2.5	0.8	31.08	37.58
15x2x1.5	0.7	28.63	34.73	15x2x2.5	0.8	34.82	41.72
24x2x1.5	0.7	36.05	42.95	24x2x2.5	0.8	43.59	51.29

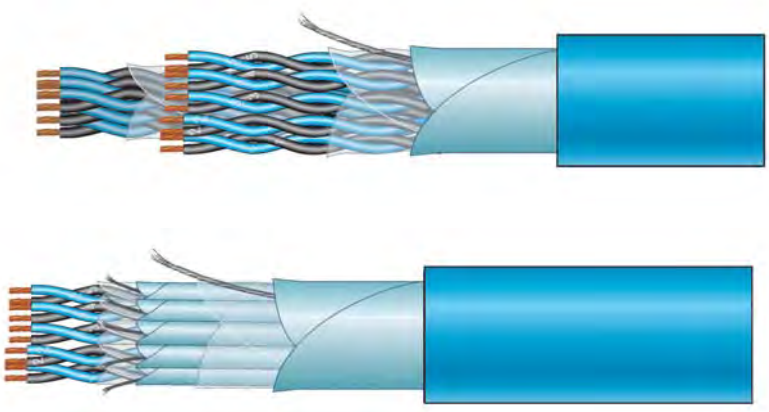
Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x1	0.8	7.95	12.05	1x2x1.5	0.8	8.55	12.65	1x2x2.5	0.9	9.95	14.05
2x2x1	0.8	12.71	17.01	2x2x1.5	0.8	13.73	18.23	2x2x2.5	0.9	16.31	21.01
3x2x1	0.8	13.47	17.97	3x2x1.5	0.8	14.57	19.07	3x2x2.5	0.9	17.33	22.23
6x2x1	0.8	18.19	23.09	6x2x1.5	0.8	19.72	24.82	6x2x2.5	0.9	23.89	29.59
12x2x1	0.8	24.63	30.33	12x2x1.5	0.8	26.95	33.05	12x2x2.5	0.9	32.49	38.99
15x2x1	0.8	27.83	33.93	15x2x1.5	0.8	30.42	36.92	15x2x2.5	0.9	36.42	43.32
24x2x1	0.8	35.03	41.93	24x2x1.5	0.8	38.09	45.39	24x2x2.5	0.9	46.03	53.73

INSTRUM® IS 174
INSTRUM® IS 175

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, insulated with polyethylene

FEXOHR/FEXHOHR
PE/OS/PVC
PE/IS/OS/PVC



Application
INSTRUM® IS 174/175 signal cable is suitable as signal and/or control cable in particular for the industry.
INSTRUM® IS 174/175 is suitable for static installation, generally used for intrinsically safe plants, the screening, when provided, imparts electrostatic protection to pairs and cable.

Special feature
INSTRUM® IS 174/175 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-37/2

NOTES:
INSTRUM® IS 174/175 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
INSTRUM® IS 174/175 is also available in the version with three laid conductors.

Cable make-up:
Fine bare copper strands, conductor insulation in low density polyethylene, insulated conductors twisted in pairs (for version 175, wrapped with polyester tape plus drain wire in tinned copper plus aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire in tinned copper, outer sheath in special RZ PVC compound, light blue colour, fire-retardant according to CEI 20-35 norms.

Technical data

- Operating temperature: 60°C max
- Test voltage: 1500 V
- Strand construction fine wires according to CEI 20-29 Cl5/IEC 60228 Cl5/VDE 0295, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 150°C max
- Insulation resistance: >5000 Mohm/Km
- Operating voltage: 300/300 V
- Installation temperature: -5°C min
- Colour code: Blue/Black With numbering on black

INSTRUM® IS 174
INSTRUM® IS 175

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, insulated with polyethylene

FEXOHR/FEXHOHR
PE/OS/PVC
PE/IS/OS/PVC

INSTRUM® IS 174

Nominal voltage Uo/U: 300/300 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.5	5.95	1x2x0.75	0.5	6.35	1x2x1	0.6	7.15
2x2x0.5	0.5	8.61	2x2x0.75	0.5	9.29	2x2x1	0.6	10.65
3x2x0.5	0.5	9.09	3x2x0.75	0.5	9.83	3x2x1	0.6	11.69
6x2x0.5	0.5	12.24	6x2x0.75	0.5	13.26	6x2x1	0.6	15.30
12x2x0.5	0.5	16.15	12x2x0.75	0.5	17.57	12x2x1	0.6	20.79
15x2x0.5	0.5	18.13	15x2x0.75	0.5	19.73	15x2x1	0.6	23.33
24x2x0.5	0.5	22.73	24x2x0.75	0.5	24.97	24x2x1	0.6	29.65
48x2x0.5	0.5	30.47	48x2x0.75	0.5	33.65	48x2x1	0.6	39.19

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.6	7.75	1x2x2.5	0.6	8.75
2x2x1.5	0.6	12.07	2x2x2.5	0.6	13.77
3x2x1.5	0.6	12.78	3x2x2.5	0.6	14.61
6x2x1.5	0.6	17.03	6x2x2.5	0.6	19.78
12x2x1.5	0.6	23.10	12x2x2.5	0.6	27.03
15x2x1.5	0.6	26.12	15x2x2.5	0.6	30.52
24x2x1.5	0.6	33.11	24x2x2.5	0.6	38.21
48x2x1.5	0.6	43.74			

INSTRUM® IS 175

Nominal voltage Uo/U: 300/300 V

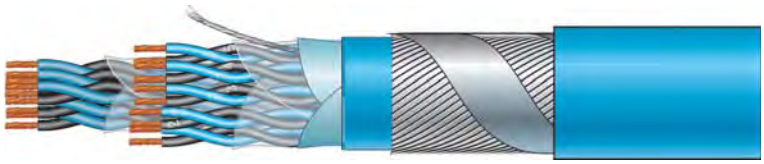
No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.5	5.95	1x2x0.75	0.5	6.35	1x2x1	0.6	7.15
2x2x0.5	0.5	8.91	2x2x0.75	0.5	9.59	2x2x1	0.6	10.95
3x2x0.5	0.5	9.42	3x2x0.75	0.5	10.15	3x2x1	0.6	12.01
6x2x0.5	0.5	12.69	6x2x0.75	0.5	13.71	6x2x1	0.6	15.95
12x2x0.5	0.5	16.78	12x2x0.75	0.5	18.39	12x2x1	0.6	21.41
15x2x0.5	0.5	18.84	15x2x0.75	0.5	20.63	15x2x1	0.6	24.23
24x2x0.5	0.5	23.83	24x2x0.75	0.5	26.07	24x2x1	0.6	30.55
48x2x0.5	0.5	31.90	48x2x0.75	0.5	34.87	48x2x1	0.6	40.81

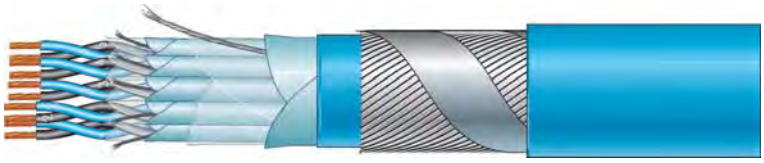
No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.6	7.75	1x2x2.5	0.6	8.75
2x2x1.5	0.6	12.37	2x2x2.5	0.6	14.07
3x2x1.5	0.6	13.11	3x2x2.5	0.6	14.93
6x2x1.5	0.6	17.48	6x2x2.5	0.6	20.43
12x2x1.5	0.6	23.93	12x2x2.5	0.6	27.85
15x2x1.5	0.6	26.83	15x2x2.5	0.6	31.42
24x2x1.5	0.6	34.01	24x2x2.5	0.6	39.11
48x2x1.5	0.6	45.37			

INSTRUM® IS 176
INSTRUM® IS 177

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with polyethylene

FEXOHRFR/FEXHOHRFR
PE/OS/PVC/SWACS/PVC
PE/IS/OS/PVC/SWACS/PVC





Application
INSTRUM® IS 176/177 signal cable is suitable as signal and/or control cable in particular for the industry.
INSTRUM® IS 176/177 is suitable for static installation, generally used for intrinsically safe plants, the armour protects mechanically the cable during installation, and it prevents deflection when installed, the screening, when provided, imparts electrostatic protection to pairs and cable.

Special feature
INSTRUM® IS 176/177 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-37/2

NOTES:
INSTRUM® IS 176/177 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
INSTRUM® IS 176/177 is also available in the version with three laid conductors.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Fine bare copper strands, conductor insulation in low density polyethylene, insulated conductors twisted in pairs (for version 177, wrapped with polyester tape plus drain wire in tinned copper plus aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire in tinned copper, intermediate sheath in special RZ PVC compound, armour in galvanised steel wires wrapped with counterspiral, outer sheath in special RZ PVC compound, light blue colour, fire-retardant according to CEI 20-35 norms.

Technical data

- Operating temperature: 60°C max
- Short-circuit temperature: 150°C max
- Operating voltage: 300/300 V
- Test voltage: 1500 V
- Insulation resistance: >5000 Mohm/Km
- Installation temperature: -5°C min
- Strand construction: fine wires according to CEI 20-29 Cl5/IEC 60228 Cl5/VDE 0295, Cl5
- Screen resistance: < 30 Ohm/Km
- Colour code: Blue/Black With numbering on black

INSTRUM® IS 176
INSTRUM® IS 177

Twisted pair signal cables, screened on the single pair and on the total, or only on the total, armoured, insulated with polyethylene

FEXOHRFR/FEXHOHRFR
PE/OS/PVC/SWACS/PVC
PE/IS/OS/PVC/SWACS/PVC

INSTRUM® IS 176

Nominal voltage Uo/U: 300/300 V

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x0.5	0.5	5.95	9.65	1x2x0.75	0.5	6.35	10.05	1x2x1	0.6	7.15	10.85
2x2x0.5	0.5	8.61	12.71	2x2x0.75	0.5	9.29	13.39	2x2x1	0.6	10.65	14.75
3x2x0.5	0.5	9.09	13.19	3x2x0.75	0.5	9.83	13.93	3x2x1	0.6	11.69	15.99
6x2x0.5	0.5	12.24	16.54	6x2x0.75	0.5	13.26	17.56	6x2x1	0.6	15.30	20.00
12x2x0.5	0.5	16.15	20.85	12x2x0.75	0.5	17.57	22.47	12x2x1	0.6	20.79	26.09
15x2x0.5	0.5	18.13	23.03	15x2x0.75	0.5	19.73	24.83	15x2x1	0.6	23.33	28.83
24x2x0.5	0.5	22.73	28.23	24x2x0.75	0.5	24.97	30.67	24x2x1	0.6	29.65	35.75
48x2x0.5	0.5	30.47	36.97	48x2x0.75	0.5	33.65	40.55	48x2x1	0.6	39.19	46.49

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x1.5	0.6	7.75	11.85	1x2x2.5	0.6	8.75	12.85
2x2x1.5	0.6	12.07	16.37	2x2x2.5	0.6	13.77	18.27
3x2x1.5	0.6	12.78	17.08	3x2x2.5	0.6	14.61	19.11
6x2x1.5	0.6	17.03	21.73	6x2x2.5	0.6	19.78	24.88
12x2x1.5	0.6	23.10	28.60	12x2x2.5	0.6	27.03	33.13
15x2x1.5	0.6	26.12	32.02	15x2x2.5	0.6	30.52	37.02
24x2x1.5	0.6	33.11	40.01	24x2x2.5	0.6	38.21	45.51
48x2x1.5	0.6	43.74	51.44				

INSTRUM® IS 177

Nominal voltage Uo/U: 300/300 V

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x0.5	0.5	5.95	9.65	1x2x0.75	0.5	6.35	10.05	1x2x1	0.6	7.15	10.85
2x2x0.5	0.5	8.91	13.01	2x2x0.75	0.5	9.59	13.69	2x2x1	0.6	10.95	15.05
3x2x0.5	0.5	9.42	13.52	3x2x0.75	0.5	10.15	14.25	3x2x1	0.6	12.01	16.31
6x2x0.5	0.5	12.69	16.99	6x2x0.75	0.5	13.71	18.21	6x2x1	0.6	15.95	20.65
12x2x0.5	0.5	16.78	21.48	12x2x0.75	0.5	18.39	23.29	12x2x1	0.6	21.41	26.71
15x2x0.5	0.5	18.84	23.94	15x2x0.75	0.5	20.63	25.93	15x2x1	0.6	24.23	29.93
24x2x0.5	0.5	23.83	29.53	24x2x0.75	0.5	26.07	31.97	24x2x1	0.6	30.55	37.05
48x2x0.5	0.5	31.90	38.40	48x2x0.75	0.5	34.87	41.77	48x2x1	0.6	40.81	48.11

No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
1x2x1.5	0.6	7.75	11.85	1x2x2.5	0.6	8.75	12.85
2x2x1.5	0.6	12.37	16.67	2x2x2.5	0.6	14.07	18.57
3x2x1.5	0.6	13.11	17.41	3x2x2.5	0.6	14.93	19.43
6x2x1.5	0.6	17.48	22.38	6x2x2.5	0.6	20.43	25.73
12x2x1.5	0.6	23.93	29.63	12x2x2.5	0.6	27.85	33.95
15x2x1.5	0.6	26.83	32.93	15x2x2.5	0.6	31.42	37.92
24x2x1.5	0.6	34.01	40.91	24x2x2.5	0.6	39.11	46.41
48x2x1.5	0.6	45.37	53.07				

INSTRUM® 178

Data transmission cables, screened in copper braid, insulated with PVC

FR2OH2R
PVC/CuWB/PVC

Application
The range of applications of **INSTRUM® 178** of data transmission cables includes all electrical installations, in particular where flame-retardant features are required according to CEI 20-22 II norms.
INSTRUM® 178 is suitable for static installation, generally used for data transmission, the copper screen has the purpose of protecting it from electrostatic and electromagnetic interferences.

Special feature
INSTRUM® 178 data transmission cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
CEI 20-37/2

NOTES:
INSTRUM® 178
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
INSTRUM 178 generally with tinned copper braid screening, is also available in the version with red copper braid screening.

Cable make-up:
Fine bare copper strands, conductor insulation in special R2 PVC, stranding in layers, tinned copper braid screening, outer sheath in special RZ PVC compound, grey colour, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Installation temperature: 5°C min
- Test voltage: 2000 V
- Insulation resistance: >100 Mohm/Km
- Colour code: CEI UNEL 00722 or according to customer specifications.
- Strand construction: fine wires according to CEI 20-29, Cl5
- Operating voltage: 300/500 V

INSTRUM® 178

Data transmission cables, screened in copper braid, insulated with PVC

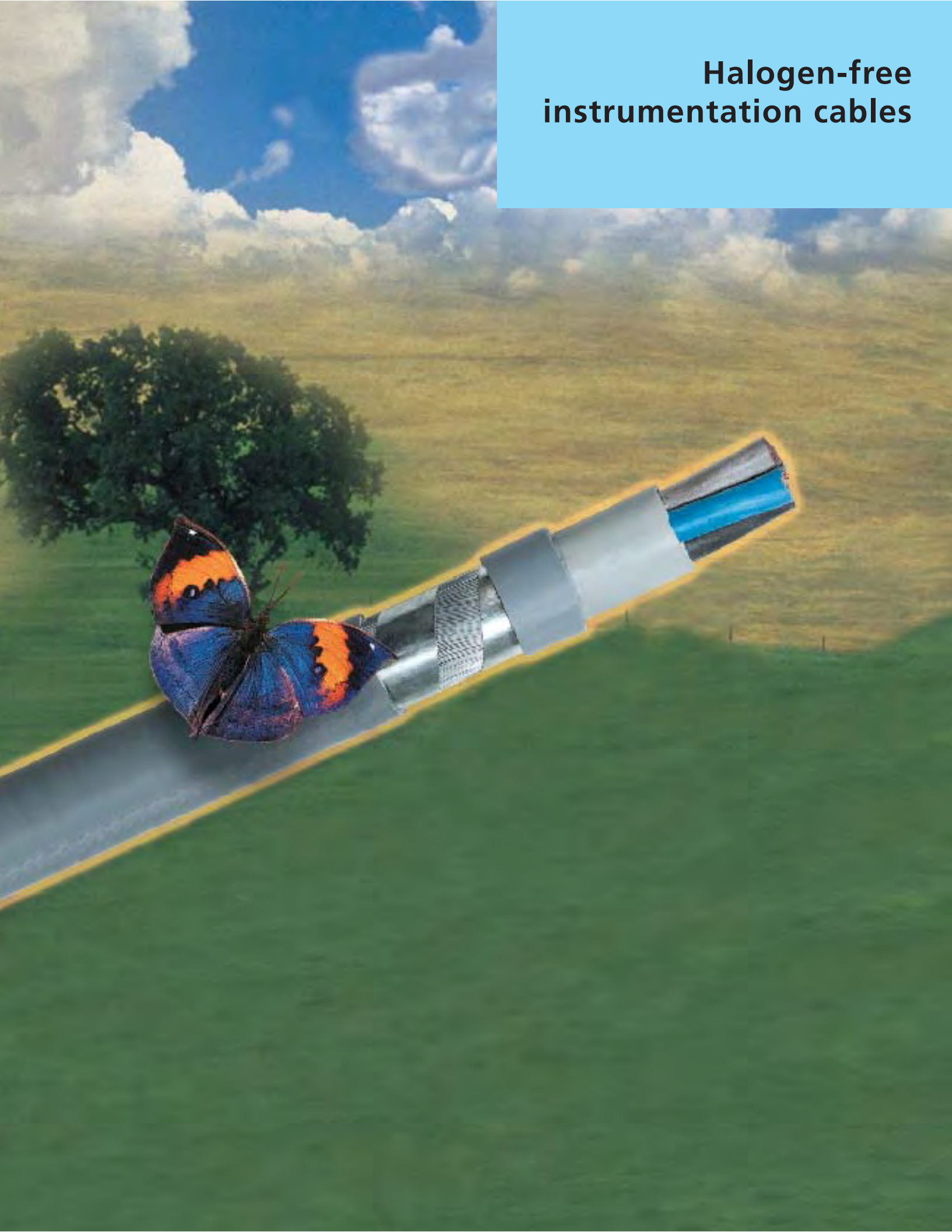
FR2OH2R
PVC/CuWB/PVC

Nominal voltage Uo/U: 300/500 V

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x0.5	0.5	6.33	2x0.75	0.5	6.73	2x1	0.6	7.65
3x0.5	0.5	6.62	3x0.75	0.5	7.05	3x1	0.6	8.03
5x0.5	0.5	7.78	5x0.75	0.5	8.32	5x1	0.6	9.40
7x0.5	0.5	8.35	7x0.75	0.5	8.95	7x1	0.6	10.15
12x0.5	0.5	10.54	12x0.75	0.5	11.77	12x1	0.6	13.43
19x0.5	0.5	12.55	19x0.75	0.5	13.55	19x1	0.6	15.95
24x0.5	0.5	14.45	24x0.75	0.5	16.05	24x1	0.6	18.65

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.6	8.25	2x2.5	0.6	9.25
3x1.5	0.6	8.67	3x2.5	0.6	9.75
5x1.5	0.6	10.21	5x2.5	0.6	11.96
7x1.5	0.6	11.45	7x2.5	0.6	12.95
12x1.5	0.6	14.67	12x2.5	0.6	17.15
19x1.5	0.6	17.45	19x2.5	0.6	20.35
24x1.5	0.6	20.65	24x2.5	0.6	24.05

Halogen-free instrumentation cables



INSTRUM® H 200

Power cables insulated with elastomeric compound with low toxic and corrosive gas emission

FG10OM1
XL-LSOH/LSOH

Application
The range of applications of **INSTRUM® H 200** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 200 is suitable for static installation, where people's safety must be ensured (cinemas, theatres, tunnels, underground railways, schools, offices, etc.);

Special feature
INSTRUM® H 200 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38

NOTES:
INSTRUM® H 200
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation G10 crosslinked elastomeric compound, stranding in layers, outer sheath in special M1 thermoplastic compound, black colour, fire-retardant according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V

Insulation resistance:
>200 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Operating voltage:
Uo/U 0.6/1 Kv

INSTRUM® H 200

Power cables insulated with elastomeric compound with low toxic and corrosive gas emission

FG10OM1
XL-LSOH/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	1.00	11.60	2x2.5	1.00	12.60	2x4	1.00	14.02
3x1.5	1.00	12.14	3x2.5	1.00	13.62	3x4	1.00	14.71
4x1.5	1.00	13.48	4x2.5	1.00	14.68	4x4	1.00	16.71
5x1.5	1.00	14.52	5x2.5	1.00	16.67	5x4	1.00	18.05

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	1.00	16.00	2x10	1.00	18.40	2x16	1.00	21.80
3x6	1.00	17.21	3x10	1.00	19.76	3x16	1.00	22.96
4x6	1.00	19.01	4x10	1.00	21.82	4x16	1.00	24.96
5x6	1.00	20.58	5x10	1.00	23.68	5x16	1.00	27.19

INSTRUM® H 201

Power cables, armoured, insulated with elastomeric compound with low toxic and corrosive gas emission

FG10OFM1
XL-LSOH/LSOH/SWACS/LSOH

Application
The range of applications of **INSTRUM® H 201** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 201 is suitable for static installation, where people's safety must be ensured (cinemas, theatres, tunnels, underground railways, schools, etc.); The armour mechanically protects the cable during installation, and it prevents deflection when installed.

Special feature
INSTRUM® H 201 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38

NOTES:
INSTRUM® H 201
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Fine strands of tinned copper wire, conductor insulation with G10 crosslinked elastomeric compound, laid stranding, intermediate sheath in M1 special thermoplastic compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath M1 thermoplastic compound, fire-retardant black colour according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V

Insulation resistance:
>200 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® H 201

Power cables, armoured, insulated with elastomeric compound with low toxic and corrosive gas emission

FG10OFM1
XL-LSOH/LSOH/SWACS/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x1.5	1.00	8.80	13.70	2x2.5	1.00	9.80	14.70
3x1.5	1.00	9.34	14.24	3x2.5	1.00	10.42	15.32
4x1.5	1.00	10.28	15.18	4x2.5	1.00	11.48	16.78
5x1.5	1.00	11.32	16.62	5x2.5	1.00	13.07	18.37

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x4	1.00	10.82	15.72	2x6	1.00	12.80	18.10
3x4	1.00	11.51	16.81	3x6	1.00	13.61	19.31
4x4	1.00	13.11	18.41	4x6	1.00	15.01	20.71
5x4	1.00	14.45	20.15	5x6	1.00	16.58	22.28

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x10	1.00	14.80	20.50	2x16	1.00	17.80	23.50
3x10	1.00	15.76	21.46	3x16	1.00	18.96	24.66
4x10	1.00	17.82	23.52	4x16	1.00	20.96	26.66
5x10	1.00	19.68	25.38	5x16	1.00	23.19	28.89

INSTRUM® H 202

Power cables insulated in rubber, fire-retardant with low emission of toxic and corrosive gases

FG7OM1
HEPR/LSOH

Application
The range of applications of **INSTRUM® H 202** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 202 is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases.

Special feature
INSTRUM® H 202 power cables are manufactured according to the following norms:
CEI 20-13
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38.

NOTES:
INSTRUM® H 202
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation in G7 high quality modul ethyl-propylene rubber, stranding in layers, outer sheath in special M1 thermoplastic compound, grey colour, fire-retardant according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V

Insulation resistance:
>1000 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® H 202

Power cables insulated in rubber, fire-retardant and with low emission of toxic and corrosive gases

FG7OM1
HEPR/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	11.60	2x2.5	0.7	12.60	2x4	0.7	13.62
3x1.5	0.7	12.05	3x2.5	0.7	13.13	3x4	0.7	14.22
4x1.5	0.7	12.83	4x2.5	0.7	14.04	4x4	0.7	15.26
5x1.5	0.7	13.70	5x2.5	0.7	15.05	5x4	0.7	16.43

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	15.20	2x10	0.7	17.20	2x16	0.7	19.80
3x6	0.7	15.92	3x10	0.7	18.07	3x16	0.7	20.87
4x6	0.7	17.17	4x10	0.7	19.58	4x16	0.7	22.71
5x6	0.7	18.56	5x10	0.7	21.26	5x16	0.7	24.77

INSTRUM® H 203

Power cables, armoured, insulated in rubber with low toxic and corrosive gas emission

FG7OFM1
HEPR/LSOH/SWACS/LSOH

Application
The range of applications of **INSTRUM® H 203** power cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 203 is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases. The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® H 203 power cables are manufactured according to the following norms:
CEI 20-13
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38

NOTES:
INSTRUM® H 203
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Fine strands of tinned copper wire, conductor insulation with G7 crosslinked elastomeric compound, laid stranding, intermediate sheath in M1 special thermoplastic compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath in M1 thermoplastic compound, fire-retardant black colour according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V

Insulation resistance:
>1000 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® H 203

Power cables, armoured, insulated in rubber with low toxic and corrosive gas emission

FG7OFM1
HEPR/LSOH/SWACS/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x1.5	0.7	8.00	13.30	2x2.5	0.7	9.00	14.30
3x1.5	0.7	8.45	13.75	3x2.5	0.7	9.53	14.83
4x1.5	0.7	9.23	14.53	4x2.5	0.7	10.44	15.74
5x1.5	0.7	10.10	15.40	5x2.5	0.7	11.45	16.75

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x4	0.7	10.02	15.32	2x6	0.7	11.60	16.90
3x4	0.7	10.62	15.92	3x6	0.7	12.32	17.62
4x4	0.7	11.66	16.96	4x6	0.7	13.57	18.87
5x4	0.7	12.83	18.13	5x6	0.7	14.96	20.26

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x10	0.7	13.60	18.90	2x16	0.7	16.20	21.50
3x10	0.7	14.47	19.77	3x16	0.7	17.27	22.57
4x10	0.7	15.98	21.28	4x16	0.7	19.11	24.41
5x10	0.7	17.66	22.96	5x16	0.7	21.17	26.67

INSTRUM® H 204

Power cables insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases

FE4OM1
XLPE/LSOH

Application
INSTRUM® H 204 power cable is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases.

Special feature
INSTRUM® H 204 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-37

NOTES:
INSTRUM® H 204
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation in crosslinked polyethilene stranding in layers, outer sheath M1 thermoplastic compound.

Technical data

- Operating temperature: 85°C max
- Short-circuit temperature: 250°C max
- Installation temperature: -5°C min
- Test voltage: 4000 V
- Insulation resistance: >10000 Mohm/Km
- Colour code: CEI UNEL 00722
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Operating voltage: U_0/U 0.6/1 Kv

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INSTRUM® H 204

Power cables insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases

FE4OM1
XLPE/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

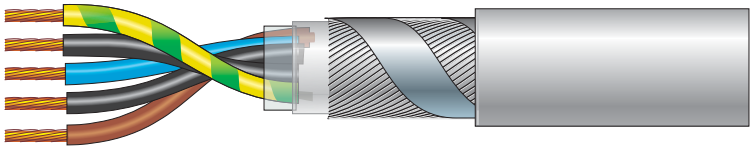
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	11.60	2x2.5	0.7	12.60	2x4	0.7	13.62
3x1.5	0.7	12.05	3x2.5	0.7	13.13	3x4	0.7	14.22
4x1.5	0.7	12.83	4x2.5	0.7	14.04	4x4	0.7	15.26
5x1.5	0.7	13.70	5x2.5	0.7	15.05	5x4	0.7	16.43

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	15.20	2x10	0.7	17.20	2x16	0.7	19.80
3x6	0.7	15.92	3x10	0.7	18.07	3x16	0.7	20.87
4x6	0.7	17.17	4x10	0.7	19.58	4x16	0.7	22.71
5x6	0.7	18.56	5x10	0.7	21.26	5x16	0.7	24.77

INSTRUM® H 205

Power cables, armoured, insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases

FE4OFM1
XLPE/LSOH/SWACS/LSOH



Application
INSTRUM® H 205 power cable is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® H 205 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-37

NOTES:
INSTRUM® H 205
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 normes.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Fine bare copper strands, conductor insulation in XLPE crosslinked polyethylene, stranding in layers, intermediate sheath in special M1 thermoplastic compound, armour with galvanised steel wires wrapped by counterspiral galvanised steel tape, outer sheath M1 thermoplastic compound.

Technical data

Operating temperature:
85°C max

Short-circuit temperature:
250°C max

Installation temperature:
-5°C min

Test voltage:
4000 V

Insulation resistance:
>10000 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® H 205

Power cables, armoured, insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases

FE4OFM1
XLPE/LSOH/SWACS/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x1.5	0.7	8.00	13.30	2x2.5	0.7	9.00	14.30
3x1.5	0.7	8.45	13.75	3x2.5	0.7	9.53	14.83
4x1.5	0.7	9.23	14.53	4x2.5	0.7	10.44	15.74
5x1.5	0.7	10.10	15.40	5x2.5	0.7	11.45	16.75

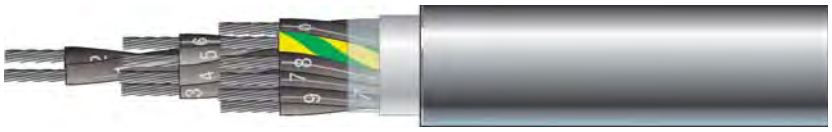
No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x4	0.7	10.02	15.32	2x6	0.7	11.60	16.90
3x4	0.7	10.62	15.92	3x6	0.7	12.32	17.62
4x4	0.7	11.66	16.96	4x6	0.7	13.57	18.87
5x4	0.7	12.83	18.13	5x6	0.7	14.96	20.26

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
2x10	0.7	13.60	18.90	2x16	0.7	16.20	21.50
3x10	0.7	14.47	19.77	3x16	0.7	17.27	22.57
4x10	0.7	15.98	21.28	4x16	0.7	19.11	24.41
5x10	0.7	17.66	22.96	5x16	0.7	21.17	26.67

INSTRUM® H 230

Control cables insulated with elastomeric compound with low toxic and corrosive gas emission

FG10OM1
XL-LSOH/LSOH



Application
The range of applications of **INSTRUM® H 230** control cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 230 is suitable for static installation, where people's safety must be ensured (cinemas, theatres, tunnels, underground railways, schools, offices, etc.);

Special feature
INSTRUM® H 230 control and command cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38

NOTES:
INSTRUM® H 230
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation in special G10 crosslinked elastomeric compound, stranding in layers, outer sheath in special M1 thermoplastic compound, black colour, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: -10°C min
- Test voltage: 4000 V
- Insulation resistance: >200 Mohm/Km
- Colour code: numbered black cores With or without yellow/green
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® H 230

Control cables insulated with elastomeric compound with low toxic and corrosive gas emission

FG10OM1
XL-LSOH/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	1.00	14.52	5x2.5	1.00	16.67
7x1.5	1.00	16.00	7x2.5	1.00	17.90
12x1.5	1.00	20.94	12x2.5	1.00	23.42
19x1.5	1.00	24.40	19x2.5	1.00	26.90
24x1.5	1.00	28.00	24x2.5	1.00	31.40
30x1.5	1.00	29.88	30x2.5	1.00	33.68
48x1.5	1.00	36.74	48x2.5	1.00	41.22

INSTRUM® H 231

Control cables, armoured, insulated with elastomeric compound with low toxic and corrosive gas emission

FG10OFM1
XL-LSOH/LSOH/SWACS/LSOH

Application
The range of applications of **INSTRUM® H 231** control cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 231 is suitable for static installation, where people's safety must be ensured (cinemas, theatres, tunnels, underground railways, schools, etc.); The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® H 231 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38

NOTES:
INSTRUM® H 231
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Fine strands of tinned copper wire, conductor insulation with G10 crosslinked elastomeric compound, laid stranding, intermediate sheath in M1 special thermoplastic compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath in M1 thermoplastic compound, fire-retardant black colour according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V

Insulation resistance:
>200 Mohm/Km

Colour code:
numbered black cores
With or without yellow/green

Strand construction:
fine wires according to
VDE 0295 Cl5/IEC 60228
Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® H 231

Control cables, armoured, insulated with elastomeric compound with low toxic and corrosive gas emission

FG10OFM1
XL-LSOH/LSOH/SWACS/LSOH

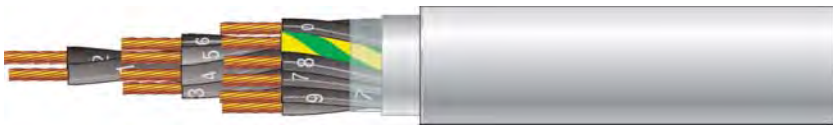
Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1.5	1.00	11.32	16.62	5x2.5	1.00	13.07	18.37
7x1.5	1.00	12.80	18.10	7x2.5	1.00	14.30	20.00
12x1.5	1.00	16.94	22.64	12x2.5	1.00	19.42	25.12
19x1.5	1.00	20.40	26.10	19x2.5	1.00	22.90	28.60
24x1.5	1.00	24.00	30.10	24x2.5	1.00	27.00	33.10
30x1.5	1.00	25.48	31.58	30x2.5	1.00	29.28	35.38
48x1.5	1.00	32.34	38.84	48x2.5	1.00	36.42	43.32

INSTRUM® H 232

Control cables insulated in rubber with low toxic and corrosive gas emission

FG7OM1
HEPR/LSOH



Application
The range of applications of **INSTRUM® H 232** control cables includes all electrical installations, in particular where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 232 is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases.

Special feature
INSTRUM® H 232 control cables are manufactured to according the following norms:
CEI 20-13
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38

NOTES:
INSTRUM® H 232
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation in G7 high quality ethyl-propylene rubber, stranding in layers, outer sheath M1 thermoplastic compound. RAL 7001 grey colour, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: -10°C min
- Test voltage: 4000 V
- Insulation resistance: >1000 Mohm/Km
- Colour code: numbered black cores With or without yellow/green
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® H 232

Control cables insulated in rubber with low toxic and corrosive gas emission

FG7OM1
HEPR/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.70	12.50	5x2.5	0.70	14.25
7x1.5	0.70	13.80	7x2.5	0.70	15.70
12x1.5	0.70	18.05	12x2.5	0.70	20.53
19x1.5	0.70	21.40	19x2.5	0.70	23.90
24x1.5	0.70	24.40	24x2.5	0.70	27.40
30x1.5	0.70	25.63	30x2.5	0.70	28.84
48x1.5	0.70	31.25	48x2.5	0.70	35.93

INSTRUM® H 233

Control cables, armoured, insulated in rubber with low toxic and corrosive gas emission

FG7OFM1
HEPR/LSOH/SWACS/LSOH

Application
The range of applications of **INSTRUM® H 233** control cables includes all electrical installations, where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 233 is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases. The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® H 233 control cables are manufactured according to the following norms:
CEI 20-13
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38 as regards emission limits.

NOTES:
INSTRUM® H 233
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine strands of tinned copper wire, conductor insulation with G7 crosslinked elastomeric compound, laid stranding, intermediate sheath in M1 thermoplastic compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath M1 thermoplastic compound, fire-retardant black colour according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V

Insulation resistance:
>1000 Mohm/Km

Colour code:
numbered black cores
With or without yellow/green

Strand construction:
fine wires according to
VDE 0295 Cl5/IEC 60228
Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® H 233

Control cables, armoured, insulated in rubber with low toxic and corrosive gas emission

FG7OFM1
HEPR/LSOH/SWACS/LSOH

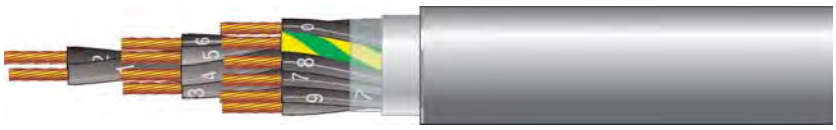
Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1.5	0.70	9.70	14.60	5x2.5	0.70	11.05	15.95
7x1.5	0.70	10.60	15.50	7x2.5	0.70	12.50	17.80
12x1.5	0.70	14.45	20.15	12x2.5	0.70	16.53	22.23
19x1.5	0.70	17.40	23.10	19x2.5	0.70	19.90	25.60
24x1.5	0.70	20.40	26.10	24x2.5	0.70	23.40	29.50
30x1.5	0.70	21.63	27.33	30x2.5	0.70	24.84	30.94
48x1.5	0.70	26.85	32.95	48x2.5	0.70	31.53	38.03

INSTRUM® H 234

Control cables insulated with crosslinked with low emission of toxic and corrosive gases

FE4OM1
XLPE/LSOH



Application
INSTRUM® H 234 control cable is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases.

Special feature
INSTRUM® H 234 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-37

NOTES:
INSTRUM® H 234
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation in crosslinked polyethylene XLPE stranding in layers, outer sheath M1 thermoplastic compound.

Technical data

- Operating temperature: 85°C max
- Short-circuit temperature: 250°C max
- Installation temperature: -5°C min
- Test voltage: 4000 V
- Insulation resistance: >10000 Mohm/Km
- Colour code: numbered black cores With or without yellow/green
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® H 234

Control cables insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases

FE4OM1
XLPE/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.70	12.50	5x2.5	0.70	14.25
7x1.5	0.70	13.80	7x2.5	0.70	15.70
12x1.5	0.70	18.05	12x2.5	0.70	20.53
19x1.5	0.70	21.40	19x2.5	0.70	23.90
24x1.5	0.70	24.40	24x2.5	0.70	27.40
30x1.5	0.70	25.63	30x2.5	0.70	28.84
48x1.5	0.70	31.25	48x2.5	0.70	35.93

INSTRUM® H 235

Control cables, armoured, insulated with crosslinked polyethylene, with low toxic and corrosive gas emission

FE4OFM1
XLPE/LSOH/SWACS/LSOH

Application
INSTRUM® H 235 control cable is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® H 235 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-37

NOTES:
INSTRUM® H 235
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine bare copper strands, conductor insulation in crosslinked polyethylene XLPE stranding in layers, intermediate sheath M1 thermoplastic compound, armour with galvanised steel wires wrapped with counterspiral galvanised steel tape, outer sheath M1 thermoplastic compound.

Technical data

Operating temperature:
85°C max

Short-circuit temperature:
250°C max

Installation temperature:
-5°C min

Test voltage:
4000 V

Insulation resistance:
>10000 Mohm/Km

Colour code:
numbered black cores
With or without yellow/green

Strand construction:
fine wires according to
VDE 0295 Cl5/IEC 60228
Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® H 235

Control cables, armoured, insulated with crosslinked polyethylene, with low toxic and corrosive gas emission

FE4OFM1
XLPE/LSOH/SWACS/LSOH

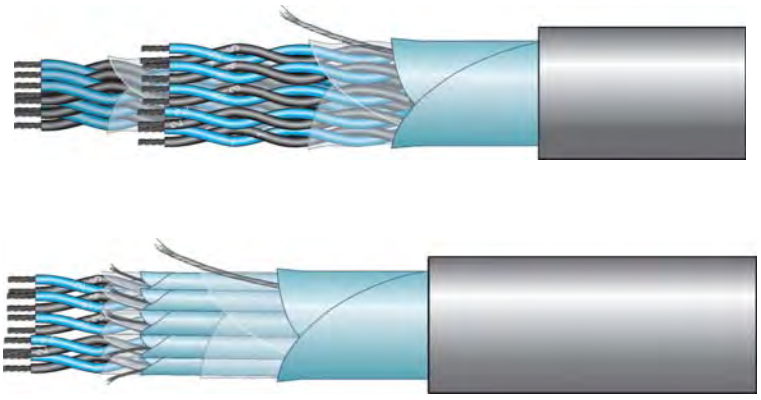
Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø under armour (mm)	External Ø (mm)
5x1.5	0.70	9.70	14.60	5x2.5	0.70	11.05	15.95
7x1.5	0.70	10.60	15.50	7x2.5	0.70	12.50	17.80
12x1.5	0.70	14.45	20.15	12x2.5	0.70	16.53	22.23
19x1.5	0.70	17.40	23.10	19x2.5	0.70	19.90	25.60
24x1.5	0.70	20.40	26.10	24x2.5	0.70	23.40	29.50
30x1.5	0.70	21.63	27.33	30x2.5	0.70	24.84	30.94
48x1.5	0.70	26.85	32.95	48x2.5	0.70	31.53	38.03

INSTRUM® H 270
INSTRUM® H 271

Twisted pair signal cables screened on single pair and on the total, or only on the total, insulated with elastomeric compound with low toxic and corrosive gas emission

FG10XOHM1/FG10XHOHM1
XL-LSOH/OS/LSOH
XL-LSOH/IS/OS/LSOH



Application
The range of applications of **INSTRUM® H 270/271** signal cables includes all electrical installations, in particular where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 270/271 is suitable for static installation, where people's safety must be ensured (cinemas, theatres, offices, tunnels, underground railways, schools, etc.); The screening, when provided, imparts electrostatic protection to pairs and cable.

Special feature
INSTRUM® H 270/271 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38

NOTES:
INSTRUM® H 270/271 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine strands of tinned copper wire, conductor insulation with G10 crosslinked elastomeric compound, insulated twisted pair conductors (for version 271, they are laid with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath M1 thermoplastic compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath in special M20 thermoplastic compound, fire-retardant black colour according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >200 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: Blue/Black With numbering on black

INSTRUM® H 270
INSTRUM® H 271

Twisted pair signal cables screened on single pair and on the total, or only on the total, insulated with elastomeric compound with low toxic and corrosive gas emission

FG10XOHM1/FG10XHOHM1
XL-LSOH/OS/LSOH
XL-LSOH/IS/OS/LSOH

INSTRUM® H 270

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	1.00	11.75	1x2x2.5	1.00	12.75
2x2x1.5	1.00	17.99	2x2x2.5	1.00	20.09
3x2x1.5	1.00	19.31	3x2x2.5	1.00	21.54
6x2x1.5	1.00	24.91	6x2x2.5	1.00	27.46
12x2x1.5	1.00	32.95	12x2x2.5	1.00	36.48
15x2x1.5	1.00	36.31	15x2x2.5	1.00	40.71
24x2x1.5	1.00	45.67	24x2x2.5	1.00	51.17

INSTRUM® H 271

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	1.00	11.75	1x2x2.5	1.00	12.75
2x2x1.5	1.00	18.29	2x2x2.5	1.00	20.39
3x2x1.5	1.00	19.63	3x2x2.5	1.00	21.86
6x2x1.5	1.00	25.36	6x2x2.5	1.00	27.91
12x2x1.5	1.00	33.57	12x2x2.5	1.00	37.10
15x2x1.5	1.00	37.02	15x2x2.5	1.00	41.41
24x2x1.5	1.00	46.57	24x2x2.5	1.00	52.07

INSTRUM® H 272
INSTRUM® H 273

Twisted pair signal cables screened on single pair and on the total, or only on the total, armoured, insulated with elastomeric compound with low toxic and corrosive gas emission

FG10XOHFM1/FG10XHOHFM1
XL-LSOH/OS/LSOH/SWACS/LSOH
XL-LSOH/IS/OS/LSOH/SWACS/LSOH

Application
The range of applications of **INSTRUM® H 272/273** signal cables includes all electrical installations, in particular where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 272/273 is suitable for static installation, where people's safety must be ensured (cinemas, theatres, tunnels, underground railways, schools, etc.);
The armour protects the cable mechanically during installation, and it prevents deflection when installed. The screening, when provided, imparts electrostatic protection to pairs and cable.

Special feature
INSTRUM® H 272/273 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38

NOTES:
INSTRUM® H 272/273 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine strands of tinned copper wire, conductor insulation with G10 crosslinked elastomeric compound, insulated twisted pair conductors (for version 273, they are laid with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath M1 thermoplastic compound, armour in galvanised steel wires wrapped with galvanised steel tape counterspiral, outer sheath M1 thermoplastic compound, fire-retardant black colour according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >200 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: Blue/Black With numbering on black

INSTRUM® H 272
INSTRUM® H 273

Twisted pair signal cables screened on single pair and on the total, or only on the total, armoured, insulated with elastomeric compound with low toxic and corrosive gas emission

FG10XOHFM1/FG10XHOHFM1
XL-LSOH/OS/LSOH/SWACS/LSOH
XL-LSOH/IS/OS/LSOH/SWACS/LSOH

INSTRUM® H 272

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	1.00	8.95	13.85	1x2x2.5	1.00	9.95	14.85
2x2x1.5	1.00	14.39	20.09	2x2x2.5	1.00	16.09	21.79
3x2x1.5	1.00	15.31	21.01	3x2x2.5	1.00	17.54	23.24
6x2x1.5	1.00	20.91	26.61	6x2x2.5	1.00	23.46	29.56
12x2x1.5	1.00	28.55	34.65	12x2x2.5	1.00	32.08	38.58
15x2x1.5	1.00	31.91	38.41	15x2x2.5	1.00	35.91	42.81
24x2x1.5	1.00	40.47	47.77	24x2x2.5	1.00	45.57	53.27

INSTRUM® H 273

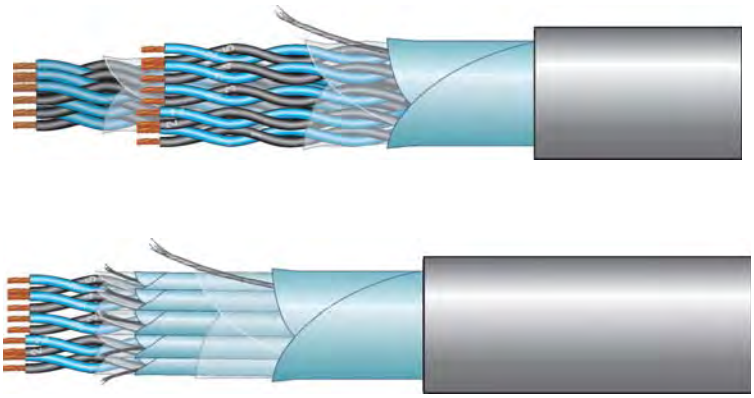
Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	1.00	8.95	13.85	1x2x2.5	1.00	9.95	14.85
2x2x1.5	1.00	14.69	20.39	2x2x2.5	1.00	16.39	22.09
3x2x1.5	1.00	15.63	21.33	3x2x2.5	1.00	17.86	23.56
6x2x1.5	1.00	21.36	27.06	6x2x2.5	1.00	23.91	30.01
12x2x1.5	1.00	29.17	35.27	12x2x2.5	1.00	32.70	39.20
15x2x1.5	1.00	32.62	39.12	15x2x2.5	1.00	36.61	43.51
24x2x1.5	1.00	41.37	48.67	24x2x2.5	1.00	46.47	54.17

INSTRUM® H 274
INSTRUM® H 275

Twisted pair signal cables screened on single pair and on the total, or only on the total, insulated in rubber with low toxic and corrosive gas emission

FG7XOHM1/FG7XHOHM1
HEPR/OS/LSOH
HEPR/IS/OS/LSOH



Application
The range of applications of **INSTRUM® H 274/275** signal cables includes all electrical installations, in particular where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 274/275 is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases. The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® H 274/275 signal cables are manufactured according to the following norms:
CEI 20-13
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38 as regards emission limits.

NOTES:
INSTRUM® H 274/275
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation G7 ethyl-propylene rubber, insulated conductors twisted in pairs (for version 275, with polyester tape and drain wire in tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire in tinned copper, outer sheath M1 thermoplastic compound, grey colour, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >1000 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: Blue/Black With numbering on black

INSTRUM® H 274
INSTRUM® H 275

Twisted pair signal cables screened on single pair and on the total, or only on the total, insulated in rubber with low toxic and corrosive gas emission

FG7XOHM1/FG7XHOHM1
HEPR/OS/LSOH
HEPR/IS/OS/LSOH

INSTRUM® H 274

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.7	11.75	1x2x2.5	0.7	12.75
2x2x1.5	0.7	15.95	2x2x2.5	0.7	17.65
3x2x1.5	0.7	16.72	3x2x2.5	0.7	18.54
6x2x1.5	0.7	21.05	6x2x2.5	0.7	23.60
12x2x1.5	0.7	27.12	12x2x2.5	0.7	30.84
15x2x1.5	0.7	30.12	15x2x2.5	0.7	34.72
24x2x1.5	0.7	37.55	24x2x2.5	0.7	43.45
48x2x1.5	0.7	49.72			

INSTRUM® H 275

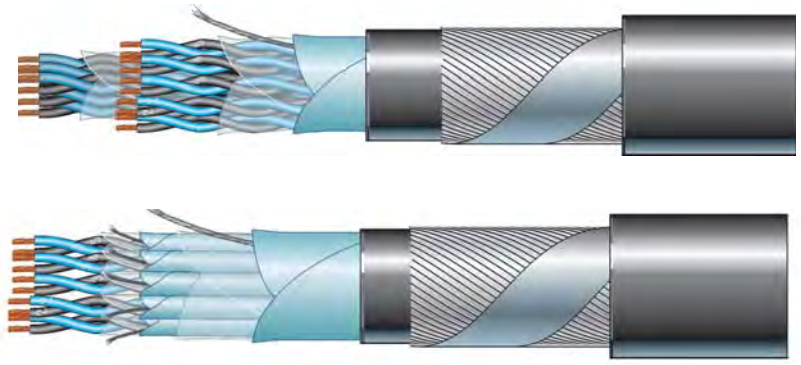
Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.7	11.75	1x2x2.5	0.7	12.75
2x2x1.5	0.7	16.25	2x2x2.5	0.7	17.95
3x2x1.5	0.7	17.04	3x2x2.5	0.7	18.87
6x2x1.5	0.7	21.50	6x2x2.5	0.7	24.05
12x2x1.5	0.7	27.74	12x2x2.5	0.7	31.87
15x2x1.5	0.7	30.83	15x2x2.5	0.7	35.42
24x2x1.5	0.7	38.45	24x2x2.5	0.7	44.35
48x2x1.5	0.7	51.14			

INSTRUM® H 276
INSTRUM® H 277

Twisted pair signal cables screened on single pair and on the total, or only on the total, armoured, insulated in rubber with low toxic and corrosive gas emission

FG7XOHFM1/FG7XHOHFM1
HEPR/OS/LSOH/SWACS/LSOH
HEPR/IS/OS/LSOH/SWACS/LSOH



Application
The range of applications of **INSTRUM® H 276/277** signal cables includes all electrical installations, in particular where flame-retardant features are required according to CEI 20-22 III norms.
INSTRUM® H 276/277 is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases. The armour mechanically protects the cable during installation, and it prevents deflection when installed.
The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® H 276/277 signal cables are manufactured according to the following norms:
CEI 20-13
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38 as regards emission limits.

NOTES:
INSTRUM® H 276/277
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine bare copper strands, conductor insulation G7 ethyl-propylene rubber, insulated conductors twisted in pairs (for version 277, and with polyester tape drain wire in tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire in tinned copper, intermediate sheath M1 thermoplastic compound, armour in galvanised steel wires wrapped with counterspiral galvanised steel, outer sheath M1 thermoplastic compound, grey colour, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >1000 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: Blue/Black With numbering on black

INSTRUM® H 276
INSTRUM® H 277

Twister pair signal cables screened on single pair and on the total, or only on the total, armoured, insulated in rubber with low toxic and corrosive gas emission

FG7XOHFM1/FG7XHOHFM1
HEPR/OS/LSOH/SWACS/LSOH
HEPR/IS/OS/LSOH/SWACS/LSOH

INSTRUM® H 276

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.7	8.15	13.45	1x2x2.5	0.7	9.15	14.45
2x2x1.5	0.7	12.35	17.65	2x2x2.5	0.7	14.05	19.35
3x2x1.5	0.7	13.12	18.42	3x2x2.5	0.7	14.94	20.24
6x2x1.5	0.7	17.45	22.75	6x2x2.5	0.7	20.00	25.30
12x2x1.5	0.7	23.32	28.82	12x2x2.5	0.7	26.84	32.54
15x2x1.5	0.7	26.12	31.82	15x2x2.5	0.7	30.52	37.02
24x2x1.5	0.7	33.15	39.85	24x2x2.5	0.7	38.65	45.75
48x2x1.5	0.7	44.52	52.02				

INSTRUM® H 277

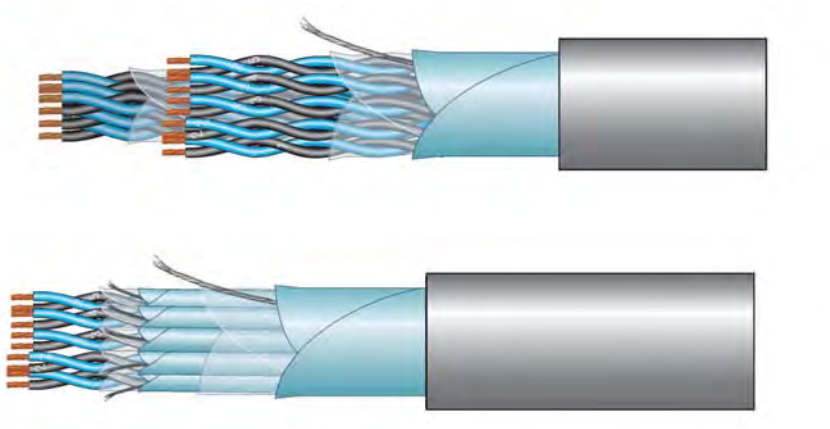
Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.7	8.15	13.45	1x2x2.5	0.7	9.15	14.45
2x2x1.5	0.7	12.65	17.95	2x2x2.5	0.7	14.35	19.65
3x2x1.5	0.7	13.44	18.74	3x2x2.5	0.7	15.27	20.57
6x2x1.5	0.7	17.90	23.20	6x2x2.5	0.7	20.45	25.75
12x2x1.5	0.7	23.94	29.44	12x2x2.5	0.7	27.87	33.77
15x2x1.5	0.7	26.83	32.53	15x2x2.5	0.7	31.22	37.72
24x2x1.5	0.7	34.05	40.75	24x2x2.5	0.7	39.55	46.65
48x2x1.5	0.7	45.74	53.24				

INSTRUM® H 278
INSTRUM® H 279

Twisted pair signal cables screened on single pair and on the total, or only on the total, insulated with crosslinked polyethylene, with low toxic and corrosive gas emission

FE4XOHM1/FE4XHOHM1
XLPE/OS/LSOH
XLPE/IS/OS/LSOH



Application
INSTRUM® H 278/279 signal cable is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases.
The screening, when provided, assures electrostatic protection.

Special feature
INSTRUM® H 278/279 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-37

NOTES:
INSTRUM® H 278/279 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine bare copper strands, conductor insulation XLPE, insulated conductors twisted in pairs (for version 279, and with polyester tape drain wire in tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire in tinned copper, outer sheath M1 thermoplastic compound.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >10000 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -5°C min
- Colour code: Blue/Black With numbering on black

INSTRUM® H 278
INSTRUM® H 279

Twisted pair signal cables screened on single pair and on the total, or only on the total, insulated with crosslinked polyethylene, with low toxic and corrosive gas emission

FE4XOHM1/FE4XHOHM1
XLPE/OS/LSOH
XLPE/IS/OS/LSOH

INSTRUM® H 278

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.7	10.55	1x2x2.5	0.7	11.55
2x2x1.5	0.7	15.55	2x2x2.5	0.7	17.65
3x2x1.5	0.7	16.72	3x2x2.5	0.7	18.54
6x2x1.5	0.7	21.85	6x2x2.5	0.7	24.40
12x2x1.5	0.7	27.72	12x2x2.5	0.7	31.64
15x2x1.5	0.7	30.92	15x2x2.5	0.7	35.52
24x2x1.5	0.7	38.15	24x2x2.5	0.7	44.25
48x2x1.5	0.7	50.92			

INSTRUM® H 279

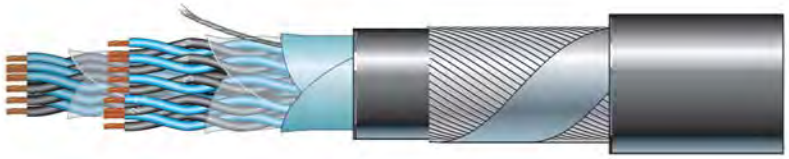
Nominal voltage Uo/U: 0.6/1 Kv

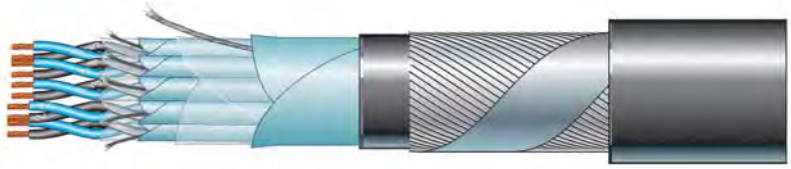
No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.7	10.55	1x2x2.5	0.7	11.55
2x2x1.5	0.7	15.85	2x2x2.5	0.7	17.95
3x2x1.5	0.7	17.04	3x2x2.5	0.7	19.27
6x2x1.5	0.7	22.30	6x2x2.5	0.7	24.85
12x2x1.5	0.7	28.34	12x2x2.5	0.7	32.87
15x2x1.5	0.7	31.63	15x2x2.5	0.7	36.22
24x2x1.5	0.7	39.05	24x2x2.5	0.7	45.55
48x2x1.5	0.7	52.14			

INSTRUM® H 280
INSTRUM® H 281

Twisted pair signal cables screened on single pair and on the total, or only on the total, armoured, insulated with crosslinked polyethylene with low toxic and corrosive gas emission

FE4XOHFM1/FE4XHOHFM1
XLPE/OS/LSOH/SWACS/LSOH
XLPE/IS/OS/LSOH/SWACS/LSOH





Application
INSTRUM® H 280/281 signal cable is suitable for static installation, both inside and outside, where it is important to protect people and preserve plants and equipment from the action of corrosive gases. The armour protects the cable mechanically during installation, and it prevents deflection when installed. The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® H 280/281 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-37

NOTES:
INSTRUM® H 280/281 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire braid.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Fine bare copper strands, conductor insulation in XLPE – insulated conductors twisted in pairs (for version 281, with polyester tape plus drain wire in tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire in tinned copper, intermediate sheath M1 thermoplastic compound, armour in galvanised steel wires wrapped with counterspiral galvanised steel tape, outer sheath M1 thermoplastic compound.

Technical data

Operating temperature:
90°C max

Test voltage:
4000 V max

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Screen resistance:
< 30 Ohm/Km

Short-circuit temperature:
250°C max

Insulation resistance:
>10000 Mohm/Km

Operating voltage:
Uo/U 0.6/1 Kv max

Installation temperature:
-5°C min

Colour code:
Blue/Black
With numbering on black

INSTRUM® H 280
INSTRUM® H 281

Twisted pair signal cables screened on single pair and on the total, or only on the total, armoured, insulated with crosslinked polyethylene with low toxic and corrosive gas emission

FE4XOHFM1/FE4XHOHFM1
XLPE/OS/LSOH/SWACS/LSOH
XLPE/IS/OS/LSOH/SWACS/LSOH

INSTRUM® H 280

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.7	7.75	12.25	1x2x2.5	0.7	8.75	13.65
2x2x1.5	0.7	12.35	17.65	2x2x2.5	0.7	14.05	19.75
3x2x1.5	0.7	13.12	18.42	3x2x2.5	0.7	14.94	20.64
6x2x1.5	0.7	17.85	23.55	6x2x2.5	0.7	20.40	26.10
12x2x1.5	0.7	23.72	29.82	12x2x2.5	0.7	27.24	33.34
15x2x1.5	0.7	26.52	32.62	15x2x2.5	0.7	31.12	37.62
24x2x1.5	0.7	33.75	40.65	24x2x2.5	0.7	39.45	46.75
48x2x1.5	0.7	45.32	53.02				

INSTRUM® H 281

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.7	7.75	12.25	1x2x2.5	0.7	8.75	13.65
2x2x1.5	0.7	12.65	17.95	2x2x2.5	0.7	14.35	20.05
3x2x1.5	0.7	13.44	19.14	3x2x2.5	0.7	15.27	20.97
6x2x1.5	0.7	18.30	24.00	6x2x2.5	0.7	20.85	26.55
12x2x1.5	0.7	24.34	30.44	12x2x2.5	0.7	28.47	34.57
15x2x1.5	0.7	27.23	33.33	15x2x2.5	0.7	31.82	38.32
24x2x1.5	0.7	34.65	41.55	24x2x2.5	0.7	40.35	47.65
48x2x1.5	0.7	46.54	54.24				

Fire-resistant instrumentation cables

INSTRUM® FIRE 300

Power cables insulated with elastomeric compound with low toxic and corrosive gas emission, fire-resistant

FG10OM1
MGT/XL-LSOH/LSOH

Application
The range of applications of **INSTRUM® FIRE 300** power cables includes all electrical installations requiring maximum safety requirements in case of fire, such as automatic fire-detection devices, fire alarm devices, emergency lights, lifting systems, aeration, switching off, automatic door opening devices, etc.
They are suitable for static installation.

Special feature
INSTRUM® FIRE 300 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331
CEI 20-45

NOTES:
INSTRUM® FIRE 300
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine tinned copper strands with fire-retardant barrier in mica glass tape, conductor insulation G10 crosslinked elastomeric compound, stranding in layers, outer sheath M1 thermoplastic compound, black colour, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: -10°C min
- Test voltage: 4000 V max
- Insulation resistance: >200 Mohm/Km
- Colour code: CEI UNEL 00722
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® FIRE 300

Power cables insulated with elastomeric compound with low toxic and corrosive gas emission, fire-resistant

FG10OM1
MGT/XL-LSOH/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	1.00	12.48	2x2.5	1.00	13.88	2x4	1.00	15.30
3x1.5	1.00	13.49	3x2.5	1.00	14.56	3x4	1.00	16.06
4x1.5	1.00	14.54	4x2.5	1.00	16.14	4x4	1.00	17.77
5x1.5	1.00	16.11	5x2.5	1.00	17.86	5x4	1.00	19.64

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	1.00	17.28	2x10	1.00	19.68	2x16	1.00	22.68
3x6	1.00	18.16	3x10	1.00	20.71	3x16	1.00	23.90
4x6	1.00	20.07	4x10	1.00	22.88	4x16	1.00	26.02
5x6	1.00	22.17	5x10	1.00	24.87	5x16	1.00	28.38

INSTRUM® FIRE 301

Power cables, armoured, insulated with elastomeric compound with low toxic and corrosive gas emission, fire-resistant

FG10OAM1
MGT/XL-LSOH/LSOH/SWB/LSOH

Application
The range of applications of **INSTRUM® FIRE 301** power cables includes all electrical installations requiring maximum safety requirements in case of fire, such as automatic fire-detection devices, fire alarm devices, emergency lights, lifting systems, aeration, switching off, automatic door opening devices, etc.
They are suitable for static installation.
The use of armoured cables is advisable when installation conditions are such as to not exclude any mechanical damage danger.

Special feature
INSTRUM® FIRE 301 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331
CEI 20-45

NOTES:
INSTRUM® FIRE 301
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine tinned copper strands with fire-retardant barrier in mica glass tape, conductor insulation G10 crosslinked compound, stranding in layers, intermediate sheath M1 thermoplastic compound, armour in galvanised steel braid, outer sheath M1 thermoplastic compound, black colour, fire-retardant according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V max

Insulation resistance:
>200 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to
VDE 0295 C15/IEC 60228
C15/CEI 20-29, C15

Operating voltage:
U_0/U 0.6/1 Kv

CAMUNACAVI

INSTRUM® FIRE 301

Power cables, armoured, insulated with elastomeric compound with low toxic and corrosive gas emission, fire-resistant

FG10OAM1
MGT/XL-LSOH/LSOH/SWB/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x1.5	1.00	9.68	14.08	2x2.5	1.00	10.68	15.08
3x1.5	1.00	10.29	14.69	3x2.5	1.00	11.36	15.76
4x1.5	1.00	11.34	15.74	4x2.5	1.00	12.94	17.74
5x1.5	1.00	12.91	17.71	5x2.5	1.00	14.26	19.46

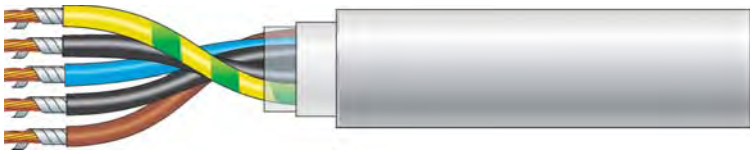
No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x4	1.00	12.10	16.90	2x6	1.00	13.68	18.48
3x4	1.00	12.86	17.66	3x6	1.00	14.56	19.76
4x4	1.00	14.17	19.37	4x6	1.00	16.07	21.27
5x4	1.00	15.64	20.84	5x6	1.00	18.17	23.37

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x10	1.00	15.68	20.88	2x16	1.00	18.68	23.88
3x10	1.00	16.71	21.91	3x16	1.00	19.90	25.10
4x10	1.00	18.88	24.08	4x16	1.00	22.02	27.22
5x10	1.00	20.87	26.07	5x16	1.00	24.38	29.98

INSTRUM® FIRE 302

Power cables insulated in rubber with low toxic and corrosive gas emission, fire-resistant

FG7OM1
MGT/HEPR/LSOH



Application:
The range of applications of **INSTRUM® FIRE 302** power cables includes electrical plants requiring integrity of the circuit even if the cable has burnt, for example safety devices, emergency light devices, etc.
INSTRUM® FIRE 302 is suitable for static installation.

Special feature:
INSTRUM® FIRE 302 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38 as regards emission limits.
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 302
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation in special G7 high quality ethyl-propylene rubber, stranding in layers, outer sheath in M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V max

Insulation resistance:
>1000 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to
VDE 0295 Cl5/IEC 60228
Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® FIRE 302

Power cables insulated in rubber with low toxic and corrosive gas emission, fire-resistant

FG7OM1
MGT/HEPR/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.70	11.28	2x2.5	0.70	12.28	2x4	0.70	13.70
3x1.5	0.70	11.80	3x2.5	0.70	13.27	3x4	0.70	14.37
4x1.5	0.70	12.69	4x2.5	0.70	14.30	4x4	0.70	15.92
5x1.5	0.70	14.09	5x2.5	0.70	15.84	5x4	0.70	17.62

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.70	15.68	2x10	0.70	18.08	2x16	0.70	21.48
3x6	0.70	16.87	3x10	0.70	19.42	3x16	0.70	22.61
4x6	0.70	18.23	4x10	0.70	21.44	4x16	0.70	24.57
5x6	0.70	20.15	5x10	0.70	23.25	5x16	0.70	26.76

INSTRUM® FIRE 303

Power cables insulated in rubber, armoured, with low toxic and corrosive gas emission, fire-resistant

FG7OAM1
MGT/HEPR/LSOH/SWB/LSOH

Application:
The range of applications of **INSTRUM® FIRE 303** power cables includes electrical plants requiring integrity of the circuit even if the cable has burnt, for example safety devices, emergency light devices, etc.
INSTRUM® FIRE 303 is suitable for static installation.
The armour mechanically protects the cable during installation, and it prevents deflection when installed.

Special feature:
INSTRUM® FIRE 303 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-36/IEC 331

NOTES:
INSTRUM® F 303
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation G7 high quality module ethyl-propylene rubber, stranding in layers, intermediate sheath M1 thermoplastic compound, armour in galvanised steel wire braid, outer sheath M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
-10°C min

Test voltage:
4000 V max

Insulation resistance:
>1000 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® FIRE 303

Power cables insulated in rubber, armoured, with low toxic and corrosive gas emission, fire-resistant

FG70AM1
MGT/HEPR/LSOH/SWB/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x1.5	0.70	8.48	12.48	2x2.5	0.70	9.48	13.88
3x1.5	0.70	9.00	13.40	3x2.5	0.70	10.07	14.47
4x1.5	0.70	9.89	14.29	4x2.5	0.70	11.10	15.50
5x1.5	0.70	10.89	15.29	5x2.5	0.70	12.64	17.44

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x4	0.70	10.50	14.90	2x6	0.70	12.48	17.28
3x4	0.70	11.17	15.57	3x6	0.70	13.27	18.07
4x4	0.70	12.72	17.52	4x6	0.70	14.63	19.83
5x4	0.70	14.02	19.22	5x6	0.70	16.15	21.35

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x10	0.70	14.48	19.68	2x16	0.70	17.48	22.68
3x10	0.70	15.42	20.62	3x16	0.70	18.61	23.81
4x10	0.70	17.44	22.64	4x16	0.70	20.57	25.77
5x10	0.70	19.25	24.45	5x16	0.70	22.76	27.96

INSTRUM® FIRE 304

Power cables insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases, fire-resistant

FE4OM1
MGT/XLPE/LSOH

Application:
The range of applications of **INSTRUM® FIRE 304** power cables includes electrical plants requiring integrity of the circuit even if the cable has burnt, for example safety devices, emergency light devices, etc.
INSTRUM® FIRE 304 is suitable for static installation.

Special feature:
INSTRUM® FIRE 304 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 304
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation in crosslinked polythylene XLPE compound, stranding in layers, outer sheath M1 thermoplastic compound, fire-retardant according to CEI 20-35 norms.

Technical data

- Operating temperature: 85°C max
- Short-circuit temperature: 250°C max
- Installation temperature: 0°C min
- Test voltage: 4000 V max
- Insulation resistance: >10000 Mohm/Km
- Colour code: CEI UNEL 00722
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® FIRE 304

Power cables insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases, fire-resistant

FE4OM1
MGT/XLPE/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.70	11.28	2x2.5	0.70	12.28	2x4	0.70	13.70
3x1.5	0.70	11.80	3x2.5	0.70	13.27	3x4	0.70	14.37
4x1.5	0.70	12.69	4x2.5	0.70	14.30	4x4	0.70	15.92
5x1.5	0.70	14.09	5x2.5	0.70	15.84	5x4	0.70	17.62

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.70	15.68	2x10	0.70	18.08	2x16	0.70	21.48
3x6	0.70	16.87	3x10	0.70	19.42	3x16	0.70	22.61
4x6	0.70	18.23	4x10	0.70	21.44	4x16	0.70	24.57
5x6	0.70	20.15	5x10	0.70	23.25	5x16	0.70	26.76

INSTRUM® FIRE 305

Armoured power cables insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases, fire-resistant

FE4OAM1
MGT/XLPE/LSOH/SWB/LSOH

Application:
The range of applications of **INSTRUM® FIRE 305** power cables includes electrical plants requiring integrity of the circuit even if the cable has burnt, for example safety devices, emergency light devices, etc.
INSTRUM® FIRE 305 is suitable for static installation.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature:
INSTRUM® FIRE 305 power cables are manufactured according to the following norms:
CEI 20-35
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 305
is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation in crosslinked polyethylene XLPE compound, stranding in layers, intermediate sheath M1 thermoplastic compound, armour in galvanised steel wire braid, outer sheath M1 thermoplastic compound, fire-retardant according to CEI 20-35 norms.

Technical data

Operating temperature:
85°C max

Short-circuit temperature:
250°C max

Installation temperature:
0°C min

Test voltage:
4000 V max

Insulation resistance:
>10000 Mohm/Km

Colour code:
CEI UNEL 00722

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® FIRE 305

Armoured power cables insulated with crosslinked polyethylene, with low emission of toxic and corrosive gases, fire-resistant

FE4OAM1
MGT/XLPE/LSOH/SWB/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x1.5	0.70	8.48	12.48	2x2.5	0.70	9.48	13.88
3x1.5	0.70	9.00	13.40	3x2.5	0.70	10.07	14.47
4x1.5	0.70	9.89	14.29	4x2.5	0.70	11.10	15.50
5x1.5	0.70	10.89	15.29	5x2.5	0.70	12.64	17.44

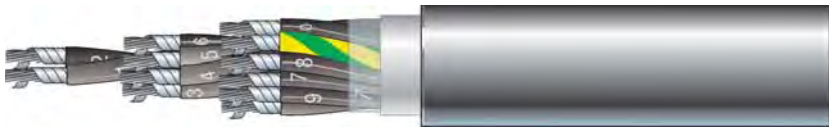
No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x4	0.70	10.50	14.90	2x6	0.70	12.48	17.28
3x4	0.70	11.17	15.57	3x6	0.70	13.27	18.07
4x4	0.70	12.72	17.52	4x6	0.70	14.63	19.83
5x4	0.70	14.02	19.22	5x6	0.70	16.15	21.35

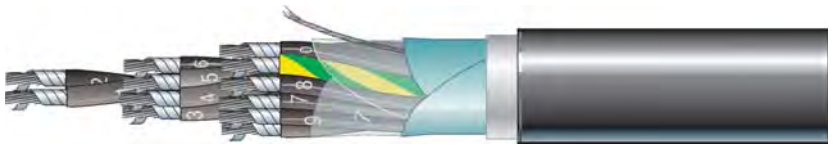
No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x10	0.70	14.48	19.68	2x16	0.70	17.48	22.68
3x10	0.70	15.42	20.62	3x16	0.70	18.61	23.81
4x10	0.70	17.44	22.64	4x16	0.70	20.57	25.77
5x10	0.70	19.25	24.45	5x16	0.70	22.76	27.96

INSTRUM® FIRE 330
INSTRUM® FIRE 331

Control cables, insulated with elastomeric compound, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant

FG10OM1/FG10OHM1
MGT/XL-LSOH/LSOH
MGT/XL-LSOH/OS/LSOH





Application
The range of applications of **INSTRUM® FIRE 330/331** control cables includes all electrical installations requiring maximum safety requirements in case of fire, such as automatic fire-detection devices, fire alarm devices, emergency lights, lifting systems, aeration, switching off, automatic door opening devices, etc.
The screening, when provided, assures an electrostatic protection to the cable.
Suitable for static installation.

Special feature
INSTRUM® FIRE 330/331 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331
CEI 20-45

NOTES:
INSTRUM® FIRE 330/331 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine tinned copper strands with fire-retardant barrier in mica glass tape, conductor insulation in G10 crosslinked elastomeric compound, stranding in layers, (for version 331, screening in aluminium/mylar tape with drain wire in tinned copper), outer sheath in M1 thermoplastic compound, black colour, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >200 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: numbered black cores

INSTRUM® FIRE 330
INSTRUM® FIRE 331

Control cables, insulated with elastomeric compound, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant

FG10OM1/FG10OHM1
MGT/XL-LSOH/LSOH
MGT/XL-LSOH/OS/LSOH

INSTRUM® FIRE 330

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	1.00	16.11	5x2.5	1.00	17.86
7x1.5	1.00	17.72	7x2.5	1.00	19.62
12x1.5	1.00	23.17	12x2.5	1.00	25.24
19x1.5	1.00	26.60	19x2.5	1.00	29.50
24x1.5	1.00	31.04	24x2.5	1.00	34.64
30x1.5	1.00	33.30	30x2.5	1.00	36.50
48x1.5	1.00	40.73	48x2.5	1.00	45.80

INSTRUM® FIRE 331

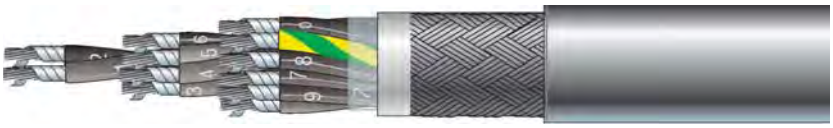
Nominal voltage Uo/U: 0.6/1 Kv

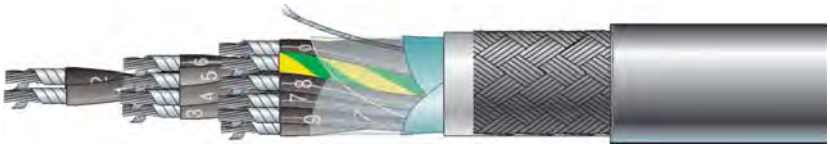
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	1.00	16.66	5x2.5	1.00	18.01
7x1.5	1.00	17.87	7x2.5	1.00	19.77
12x1.5	1.00	23.32	12x2.5	1.00	25.39
19x1.5	1.00	26.75	19x2.5	1.00	29.65
24x1.5	1.00	31.19	24x2.5	1.00	34.79
30x1.5	1.00	33.45	30x2.5	1.00	36.65
48x1.5	1.00	40.88	48x2.5	1.00	45.95

INSTRUM® FIRE 332
INSTRUM® FIRE 333

Control cables, screened or unscreened and armoured, insulated with elastomeric compound with low toxic and corrosive gas emission, fire-resistant

FG10OAM1/FG10OHAM1
MGT/XL-LSOH/LSOH/SWB/LSOH
MGT/XL-LSOH/OS/LSOH/SWB/LSOH





Application
The range of applications of **INSTRUM® FIRE 332/333** control cables includes all electrical installations requiring maximum safety requirements in case of fire, such as automatic fire-detection devices, fire alarm devices, emergency lights, lifting systems, aeration, switching off, automatic door opening devices, etc. They are suitable for static installation. The use of armoured cables is advisable when installation conditions are such as to not exclude any mechanical damage. The screening, when provided, assures an electrostatic protection to the conductors.

Special feature
INSTRUM® FIRE 332/333 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331
CEI 20-45

NOTES:
INSTRUM® FIRE 332/333 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Fine strands of tinned copper wire coated with fire-retardant barrier in glass-mica tape, conductor insulation with G10 crosslinked elastomeric compound, laid stranding (for version 333, screening in aluminium/mylar tape with tinned copper drain wire), intermediate sheath in M1 thermoplastic compound, armour in galvanised steel tape, outer sheath in special M1 thermoplastic compound, fire-retardant black colour according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Test voltage:
4000 V max

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Screen resistance:
< 30 Ohm/Km

Short-circuit temperature:
250°C max

Insulation resistance:
>200 Mohm/Km

Operating voltage:
Uo/U 0.6/1 Kv max

Installation temperature:
-10°C min

Colour code:
numbered black cores

INSTRUM® FIRE 332
INSTRUM® FIRE 333

Control cables, screened or unscreened and armoured, insulated with elastomeric compound with low toxic and corrosive gas emission, fire-resistant

FG10OAM1/FG10OHAM1
MGT/XL-LSOH/LSOH/SWB/LSOH
MGT/XL-LSOH/OS/LSOH/SWB/LSOH

INSTRUM® FIRE 332

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
5x1.5	1.00	12.91	17.71	5x2.5	1.00	14.26	19.46
7x1.5	1.00	14.12	19.32	7x2.5	1.00	15.62	20.82
12x1.5	1.00	19.17	24.37	12x2.5	1.00	21.24	26.44
19x1.5	1.00	22.60	27.80	19x2.5	1.00	25.10	30.70
24x1.5	1.00	26.64	32.24	24x2.5	1.00	30.24	35.84
30x1.5	1.00	28.90	34.50	30x2.5	1.00	32.10	37.70
48x1.5	1.00	35.93	41.93	48x2.5	1.00	40.60	47.00

INSTRUM® FIRE 333

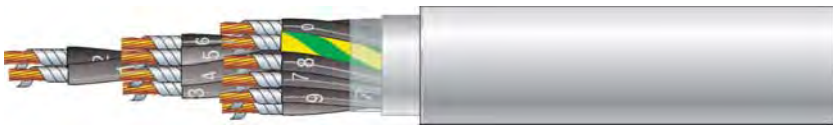
Nominal voltage Uo/U: 0.6/1 Kv

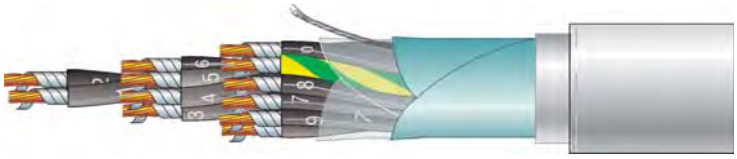
No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
5x1.5	1.00	13.06	17.86	5x2.5	1.00	14.41	19.61
7x1.5	1.00	14.27	19.47	7x2.5	1.00	15.77	20.97
12x1.5	1.00	19.32	24.52	12x2.5	1.00	21.39	26.59
19x1.5	1.00	22.75	27.95	19x2.5	1.00	25.25	30.85
24x1.5	1.00	26.79	32.39	24x2.5	1.00	30.39	35.99
30x1.5	1.00	29.05	34.65	30x2.5	1.00	32.25	37.85
48x1.5	1.00	36.08	42.08	48x2.5	1.00	40.75	47.15

INSTRUM® FIRE 334
INSTRUM® FIRE 335

Control cables insulated in rubber, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant

FG7OM1/FG7OHM1
MGT/HEPR/LSOH
MGT/HEPR/OS/LSOH





Application:
The range of applications of **INSTRUM® FIRE 334/335** control cables includes electrical plants requiring integrity of the circuit even if the cable has burnt, foe example safety devices.
INSTRUM® FIRE 334/335 is suitable for static installation. The screening, when provided, imparts electrostatic protection to the conductors.

Special feature:
INSTRUM® FIRE 334/335 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 334/335 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation in G7 high quality ethyl-propylene rubber, stranding in layers, (for version 335, screening in aluminium/mylar tape with drain wire tinned copper), outer sheath in M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 C15/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >1000 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: numbered black cores With or without yellow/green

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INSTRUM® FIRE 334
INSTRUM® FIRE 335

Control cables insulated in rubber, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant

FG7OM1/FG7OHM1
MGT/HEPR/LSOH
MGT/HEPR/OS/LSOH

INSTRUM® FIRE 334

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.70	14.09	5x2.5	0.70	15.84
7x1.5	0.70	15.52	7x2.5	0.70	17.42
12x1.5	0.70	20.28	12x2.5	0.70	22.75
19x1.5	0.70	23.60	19x2.5	0.70	26.10
24x1.5	0.70	27.04	24x2.5	0.70	30.44
30x1.5	0.70	28.45	30x2.5	0.70	32.66
48x1.5	0.70	35.44	48x2.5	0.70	39.91

INSTRUM® FIRE 335

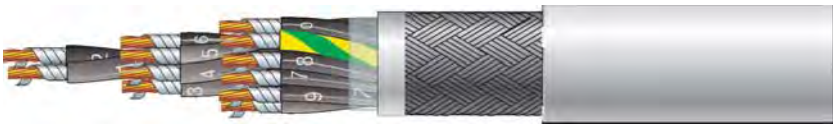
Nominal voltage Uo/U: 0.6/1 Kv

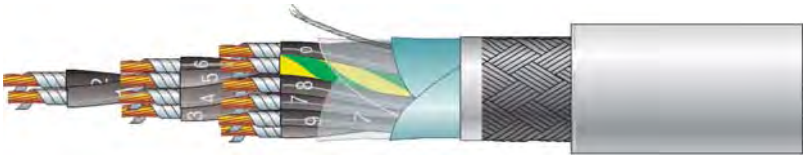
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.70	14.24	5x2.5	0.70	15.99
7x1.5	0.70	15.67	7x2.5	0.70	17.57
12x1.5	0.70	20.43	12x2.5	0.70	22.90
19x1.5	0.70	23.75	19x2.5	0.70	26.25
24x1.5	0.70	27.19	24x2.5	0.70	30.59
30x1.5	0.70	28.60	30x2.5	0.70	32.81
48x1.5	0.70	35.59	48x2.5	0.70	40.06

INSTRUM® FIRE 336
INSTRUM® FIRE 337

Control cables insulated in rubber, screened or unscreened and armoured, with low toxic and corrosive gas emission, fire-resistant

FG7OAM1/FG7OHAM1
MGT/HEPR/LSOH/SWB/LSOH
MGT/HEPR/OS/LSOH/SWB/LSOH





Application:
The range of applications of **INSTRUM® FIRE 336/337** control and command cables includes electrical plants requiring integrity of the circuit even if the cable has burnt, foe example safety devices.
INSTRUM® FIRE 336/337 is suitable for static installation.
The screening, when provided, assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature:
INSTRUM® FIRE 336/337 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 336/337 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation in G7 high quality ethyl-propylene rubber, stranding in layers, (for version 337, screening in aluminium/mylar tape with drain wire tinned copper), intermediate sheath in M1 thermoplastic compound, armour in galvanised steel braid, outer sheath in M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >1000 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: numbered black cores With or without yellow/green

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INSTRUM® FIRE 336
INSTRUM® FIRE 337

Control cables insulated in rubber, screened or unscreened and armoured, with low toxic and corrosive gas emission, fire-resistant

FG7OAM1/FG7OHAM1
MGT/HEPR/LSOH/SWB/LSOH
MGT/HEPR/OS/LSOH/SWB/LSOH

INSTRUM® FIRE 336

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
5x1.5	0.70	10.89	15.29	5x2.5	0.70	12.64	17.44
7x1.5	0.70	12.32	17.12	7x2.5	0.70	13.82	19.02
12x1.5	0.70	16.28	21.48	12x2.5	0.70	18.75	23.95
19x1.5	0.70	19.60	24.80	19x2.5	0.70	22.10	27.30
24x1.5	0.70	23.04	28.24	24x2.5	0.70	26.04	31.64
30x1.5	0.70	24.45	30.05	30x2.5	0.70	28.26	33.86
48x1.5	0.70	31.04	36.64	48x2.5	0.70	35.11	41.11

INSTRUM® FIRE 337

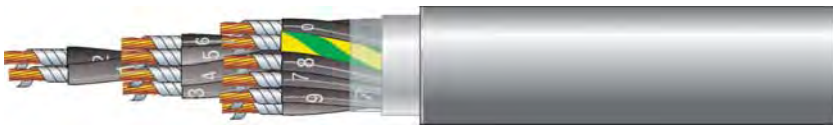
Nominal voltage Uo/U: 0.6/1 Kv

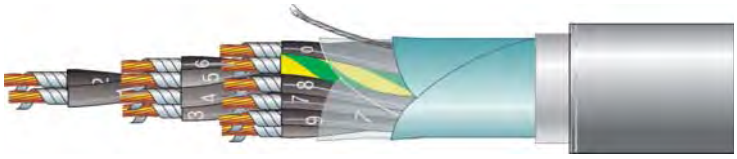
No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
5x1.5	0.70	11.04	15.44	5x2.5	0.70	12.79	17.59
7x1.5	0.70	12.47	17.27	7x2.5	0.70	13.97	19.17
12x1.5	0.70	16.43	21.63	12x2.5	0.70	18.90	24.10
19x1.5	0.70	19.75	24.95	19x2.5	0.70	22.25	27.45
24x1.5	0.70	23.19	28.39	24x2.5	0.70	26.19	31.79
30x1.5	0.70	24.60	30.20	30x2.5	0.70	28.41	34.01
48x1.5	0.70	31.19	36.79	48x2.5	0.70	35.26	41.26

INSTRUM® FIRE 338
INSTRUM® FIRE 339

Control cables insulated in crosslinked polyethylene, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant

FE4OM1/FE4OHM1
MGT/XLPE/LSOH
MGT/XLPE/OS/LSOH





Application:
The range of applications of **INSTRUM® FIRE 338/339** control cables includes electrical plants requiring integrity of the circuit even if the cable has burnt, for example safety devices.
INSTRUM® FIRE 338/339 is suitable for static installation. The screening, when provided, assures an electrostatic protection.

Special feature:
INSTRUM® FIRE 338/339 control cables are manufactured according to the following norms:
CEI 20-35
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 338/339 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation in crosslinked polyethylene XLPE compound, stranding in layers, (for version 339, screening in aluminium/mylar tape with drain wire tinned copper), outer sheath in special M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 85°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >10000 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: 0°C min
- Colour code: numbered black cores With or without yellow/green

INSTRUM® FIRE 338
INSTRUM® FIRE 339

Control cables insulated in crosslinked polyethylene, screened or unscreened, with low toxic and corrosive gas emission, fire-resistant

FE4OM1/FE4OHM1
MGT/XLPE/LSOH
MGT/XLPE/OS/LSOH

INSTRUM® FIRE 338

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.70	14.09	5x2.5	0.70	15.84
7x1.5	0.70	15.52	7x2.5	0.70	17.42
12x1.5	0.70	20.28	12x2.5	0.70	22.75
19x1.5	0.70	23.60	19x2.5	0.70	26.10
24x1.5	0.70	27.04	24x2.5	0.70	30.44
30x1.5	0.70	28.45	30x2.5	0.70	32.66
48x1.5	0.70	35.44	48x2.5	0.70	39.91

INSTRUM® FIRE 339

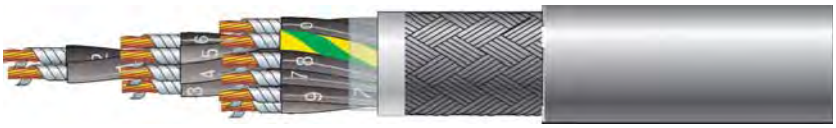
Nominal voltage Uo/U: 0.6/1 Kv

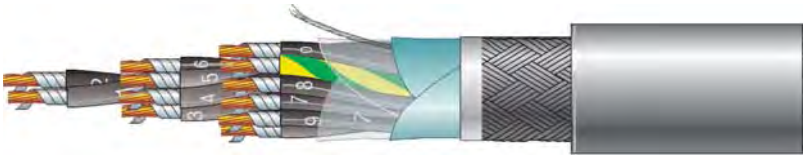
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
5x1.5	0.70	14.24	5x2.5	0.70	15.99
7x1.5	0.70	15.67	7x2.5	0.70	17.57
12x1.5	0.70	20.43	12x2.5	0.70	22.90
19x1.5	0.70	23.75	19x2.5	0.70	26.25
24x1.5	0.70	27.19	24x2.5	0.70	30.59
30x1.5	0.70	28.60	30x2.5	0.70	32.81
48x1.5	0.70	35.59	48x2.5	0.70	40.06

INSTRUM® FIRE 340
INSTRUM® FIRE 341

Control cables insulated in crosslinked polyethylene, screened or unscreened and armoured, with low toxic and corrosive gas emission, fire-resistant

FE4OAM1/FE4OHAM1
MGT/XLPE/LSOH/SWB/LSOH
MGT/XLPE/OS/LSOH/SWB/LSOH





Application:
The range of applications of **INSTRUM® FIRE 340/341** control cables includes electrical plants requiring integrity of the circuit even if the cable has burnt, for example safety devices.
INSTRUM® FIRE 340/341 is suitable for static installation.
The screening, when provided, assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature:
INSTRUM® FIRE 340/341 control and command cables are manufactured according to the following norms:
CEI 20-35
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 340/341 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation in crosslinked polyethylene XLPE compound, stranding in layers, (for version 341, screening in aluminium/mylar tape with drain wire tinned copper), intermediate sheath in M1 thermoplastic compound, armour in galvanised steel braid, outer sheath in M1 thermoplastic compound, fire-retardant according to CEI 20-35 norms.

Technical data

Operating temperature:
85°C max

Screen resistance:
< 30 Ohm/Km

Operating voltage:
Uo/U 0.6/1 Kv max

Test voltage:
4000 V max

Short-circuit temperature:
250°C max

Installation temperature:
0°C min

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl15/CEI 20-29, Cl5

Insulation resistance:
>10000 Mohm/Km

Colour code:
numbered black cores
With or without yellow/green

INSTRUM® FIRE 340
INSTRUM® FIRE 341

Control cables insulated in crosslinked polyethylene, screened or unscreened and armoured, with low toxic and corrosive gas emission, fire-resistant

FE4OAM1/FE4OHAM1
MGT/XLPE/LSOH/SWB/LSOH
MGT/XLPE/OS/LSOH/SWB/LSOH

INSTRUM® FIRE 340

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
5x1.5	0.70	10.89	15.29	5x2.5	0.70	12.64	17.44
7x1.5	0.70	12.32	17.12	7x2.5	0.70	13.82	19.02
12x1.5	0.70	16.28	21.48	12x2.5	0.70	18.75	23.95
19x1.5	0.70	19.60	24.80	19x2.5	0.70	22.10	27.30
24x1.5	0.70	23.04	28.24	24x2.5	0.70	26.04	31.64
30x1.5	0.70	24.45	30.05	30x2.5	0.70	28.26	33.86
48x1.5	0.70	31.04	36.64	48x2.5	0.70	35.11	41.11

INSTRUM® FIRE 341

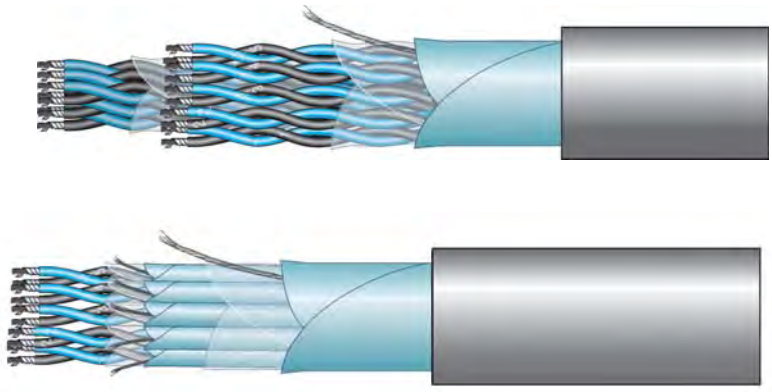
Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
5x1.5	0.70	11.04	15.44	5x2.5	0.70	12.79	17.59
7x1.5	0.70	12.47	17.27	7x2.5	0.70	13.97	19.17
12x1.5	0.70	16.43	21.63	12x2.5	0.70	18.90	24.10
19x1.5	0.70	19.75	24.95	19x2.5	0.70	22.25	27.45
24x1.5	0.70	23.19	28.39	24x2.5	0.70	26.19	31.79
30x1.5	0.70	24.60	30.20	30x2.5	0.70	28.41	34.01
48x1.5	0.70	31.19	36.79	48x2.5	0.70	35.26	41.26

INSTRUM® FIRE 370
INSTRUM® FIRE 371

Signal cables, twisted in pairs, screened on the single pair or on the total, insulated with elastomeric compound, with low toxic and corrosive gas emission, fire resistant

FG10XOHM1/FG10XHOHM1
MGT/XL-LSOH/OS/LSOH
MGT/XL-LSOH/IS/OS/LSOH



Application
The range of applications of **INSTRUM® FIRE 370/371** signal cables includes all electrical installations requiring maximum safety requirements in case of fire, such as automatic fire-detection devices, fire alarm devices, emergency lights, lifting systems, aeration, switching off, automatic door opening devices, etc. They are suitable for static installation.
The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® FIRE 370/371 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331
CEI 20-45

NOTES:
INSTRUM® FIRE 370/371 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine tinned copper strands with fire-retardant barrier in mica glass tape, conductor insulation in G10 crosslinked elastomeric compound, insulated conductors twisted in pairs (for version 371, wound with polyester tape and drain wire in tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in M1 thermoplastic compound, black colour, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >200 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: Blue/Black With numbering on black

INSTRUM® FIRE 370
INSTRUM® FIRE 371

Signal cables, twisted in pairs, screened on the single pair or on the total, insulated with elastomeric compound, with low toxic and corrosive gas emission, fire resistant

FG10XOHM1/FG10XHOHM1
MGT/XL-LSOH/OS/LSOH
MGT/XL-LSOH/IS/OS/LSOH

INSTRUM® FIRE 370

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	1.00	12.63	1x2x2.5	1.00	14.03
2x2x1.5	1.00	19.89	2x2x2.5	1.00	21.99
3x2x1.5	1.00	20.92	3x2x2.5	1.00	23.14
6x2x1.5	1.00	27.15	6x2x2.5	1.00	30.10
12x2x1.5	1.00	36.05	12x2x2.5	1.00	39.98
15x2x1.5	1.00	40.23	15x2x2.5	1.00	45.22
24x2x1.5	1.00	50.16			

INSTRUM® FIRE 371

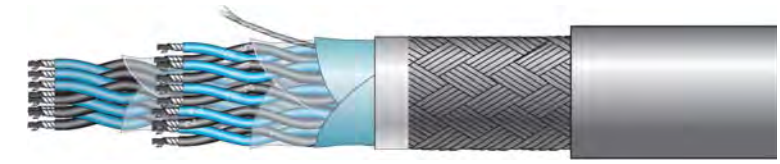
Nominal voltage Uo/U: 0.6/1 Kv

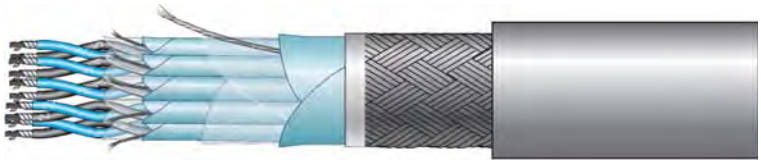
No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	1.00	12.63	1x2x2.5	1.00	14.03
2x2x1.5	1.00	20.19	2x2x2.5	1.00	22.29
3x2x1.5	1.00	21.64	3x2x2.5	1.00	23.47
6x2x1.5	1.00	27.60	6x2x2.5	1.00	30.55
12x2x1.5	1.00	36.67	12x2x2.5	1.00	40.60
15x2x1.5	1.00	40.93	15x2x2.5	1.00	45.93
24x2x1.5	1.00	51.46			

INSTRUM® FIRE 372
INSTRUM® FIRE 373

Signal cables, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured, insulated with elastomeric compound, with low toxic and corrosive gas emission, fire-resistant

FG10XOHAM1/FG10XHOHAM1
MGT/XL-LSOH/OS/LSOH/SWB/LSOH
MGT/XL-LSOH/IS/OS/LSOH/SWB/LSOH





Application
The range of applications of **INSTRUM® FIRE 372/373** signal cables includes all electrical installations requiring maximum safety requirements in case of fire, such as automatic fire-detection devices, fire alarm devices, emergency lights, lifting systems, aeration, switching off, automatic door opening devices, etc. They are suitable for static installation.
The use of armoured cables is raccomanded when installation conditions require mechanical protection.
The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® FIRE 372/373 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331
CEI 20-45

NOTES:
INSTRUM® FIRE 372/373 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine tinned copper strands with fire-retardant barrier in mica glass tape, conductor insulation in G10 crosslinked elastomeric compound, insulated conductors twisted in pairs (for version 373, with polyester tape plus drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath inM1 thermoplastic compound, black colour, fire-retardant according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Test voltage:
4000 V max

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Screen resistance:
< 30 Ohm/Km

Short-circuit temperature:
250°C max

Insulation resistance:
>200 Mohm/Km

Operating voltage:
Uo/U 0.6/1 Kv max

Installation temperature:
-10°C min

Colour code:
Blue/Black
With numbering on black

INSTRUM® FIRE 372
INSTRUM® FIRE 373

Signal cables, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured, insulated with elastomeric compound, with low toxic and corrosive gas emission, fire-resistant

FG10XOHAM1/FG10XHOHAM1
MGT/XL-LSOH/OS/LSOH/SWB/LSOH
MGT/XL-LSOH/IS/OS/LSOH/SWB/LSOH

INSTRUM® FIRE 372

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	1.00	9.83	14.23	1x2x2.5	1.00	10.83	15.23
2x2x1.5	1.00	15.89	21.09	2x2x2.5	1.00	17.99	23.19
3x2x1.5	1.00	16.92	22.12	3x2x2.5	1.00	19.14	24.34
6x2x1.5	1.00	23.15	28.35	6x2x2.5	1.00	25.70	31.30
12x2x1.5	1.00	31.65	37.25	12x2x2.5	1.00	35.18	41.18
15x2x1.5	1.00	35.43	41.43	15x2x2.5	1.00	40.02	46.42
24x2x1.5	1.00	44.96	51.76				

INSTRUM® FIRE 373

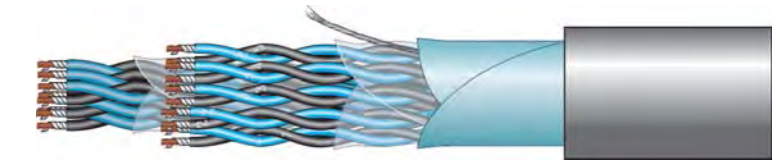
Nominal voltage Uo/U: 0.6/1 Kv

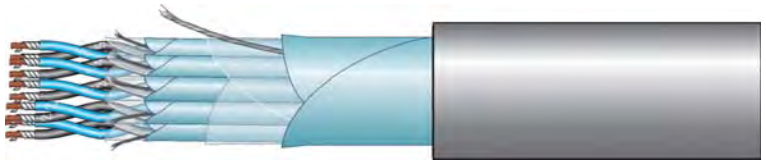
No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	1.00	9.83	14.23	1x2x2.5	1.00	10.83	15.23
2x2x1.5	1.00	16.19	21.39	2x2x2.5	1.00	18.29	23.49
3x2x1.5	1.00	17.64	22.84	3x2x2.5	1.00	19.47	24.67
6x2x1.5	1.00	23.60	28.80	6x2x2.5	1.00	26.15	31.75
12x2x1.5	1.00	32.27	37.87	12x2x2.5	1.00	35.80	41.80
15x2x1.5	1.00	36.13	42.13	15x2x2.5	1.00	40.73	47.13
24x2x1.5	1.00	45.86	52.66				

INSTRUM® FIRE 374
INSTRUM® FIRE 375

Signal cables insulated in rubber, twisted in pairs, screened on the single pair and on the total, or only on the total, with low toxic and corrosive gas emission, fire-resistant

FG7XOHM1/FG7XHOHM1
MGT/HEPR/OS/LSOH
MGT/HEPR/IS/OS/LSOH





Application:
The range of applications of **INSTRUM® FIRE 374/375** signal cables includes electrical plants requiring signal transmission even in case of fire.
INSTRUM® FIRE 374/375 is suitable for static installation. The screening, when provided, assures an electrostatic protection.

Special feature:
INSTRUM® FIRE 374/375 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 374/375 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine tinned copper strands with fire-retardant barrier in mica glass tape, conductor insulation in G7 high quality ethyl-propylene rubber, insulated conductors twisted in pairs (for version 375, with polyester tape and drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire itinned copper, outer sheath in M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >1000 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: -10°C min
- Colour code: Blue/Black cores With numbering on black

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INSTRUM® FIRE 374
INSTRUM® FIRE 375

Signal cables insulated in rubber, twisted in pairs, screened on the single pair and on the total, or only on the total, with low toxic and corrosive gas emission, fire-resistant

FG7XOHM1/FG7XHOHM1
MGT/HEPR/OS/LSOH
MGT/HEPR/IS/OS/LSOH

INSTRUM® FIRE 374

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.70	11.43	1x2x2.5	0.70	12.43
2x2x1.5	0.70	17.45	2x2x2.5	0.70	19.55
3x2x1.5	0.70	18.32	3x2x2.5	0.70	20.55
6x2x1.5	0.70	24.09	6x2x2.5	0.70	26.64
12x2x1.5	0.70	31.22	12x2x2.5	0.70	35.35
15x2x1.5	0.70	35.04	15x2x2.5	0.70	39.03
24x2x1.5	0.70	43.64	24x2x2.5	0.70	49.14

INSTRUM® FIRE 375

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.70	11.43	1x2x2.5	0.70	12.43
2x2x1.5	0.70	17.75	2x2x2.5	0.70	19.85
3x2x1.5	0.70	19.05	3x2x2.5	0.70	20.87
6x2x1.5	0.70	24.54	6x2x2.5	0.70	27.09
12x2x1.5	0.70	32.44	12x2x2.5	0.70	35.97
15x2x1.5	0.70	35.74	15x2x2.5	0.70	40.14
24x2x1.5	0.70	44.54	24x2x2.5	0.70	50.04

INSTRUM® FIRE 376
INSTRUM® FIRE 377

Signal cables, twisted in pairs, screened on the single pair and on the total, or only on the total, insulated in rubber, with low toxic and corrosive gas emission, fire-resistant

FG7XOHAM1/FG7XHOHAM1
MGT/HEPR/OS/LSOH/SWB/LSOH
MGT/HEPR/IS/OS/LSOH/SWB/LSOH

Application:
The range of applications of **INSTRUM® FIRE 376/377** signal cables includes electrical plants requiring signal transmission even in case of fire.
INSTRUM® FIRE 376/377 is suitable for static installation.
The screening, when provided, assures an electrostatic protection to pairs and cable.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature:
INSTRUM® FIRE 376/377 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-37
CEI 20-38
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 376/377 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Fine red copper strands wound with fire-retardant barrier in mica glass tape, conductor insulation in G7 high quality module ethyl-propylene rubber, insulated conductors twisted in pairs (for version 377, with polyester tape and drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, intermediate sheath in M1 thermoplastic compound, armour in galvanised steel braid, outer sheath in M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

Operating temperature:
90°C max

Test voltage:
4000 V max

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Screen resistance:
< 30 Ohm/Km

Short-circuit temperature:
250°C max

Insulation resistance:
>1000 Mohm/Km

Operating voltage:
Uo/U 0.6/1 Kv max

Installation temperature:
-10°C min

Colour code:
Blue/Black cores
With numbering on black

INSTRUM® FIRE 376
INSTRUM® FIRE 377

Signal cables, twisted in pairs, screened on the single pair and on the total, or only on the total, insulated in rubber, with low toxic and corrosive gas emission, fire-resistant

FG7XOHAM1/FG7XHOHAM1
MGT/HEPR/OS/LSOH/SWB/LSOH
MGT/HEPR/IS/OS/LSOH/SWB/LSOH

INSTRUM® FIRE 376

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.70	8.63	12.63	1x2x2.5	0.70	9.63	14.03
2x2x1.5	0.70	13.85	19.05	2x2x2.5	0.70	15.55	20.75
3x2x1.5	0.70	14.72	19.92	3x2x2.5	0.70	16.55	21.75
6x2x1.5	0.70	20.09	25.29	6x2x2.5	0.70	22.64	27.84
12x2x1.5	0.70	26.82	32.42	12x2x2.5	0.70	30.95	36.55
15x2x1.5	0.70	30.64	36.24	15x2x2.5	0.70	34.63	40.63
24x2x1.5	0.70	38.84	45.24	24x2x2.5	0.70	43.94	50.74

INSTRUM® FIRE 377

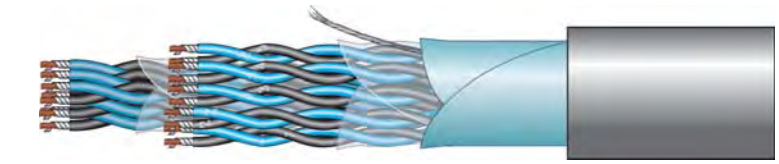
Nominal voltage Uo/U: 0.6/1 Kv

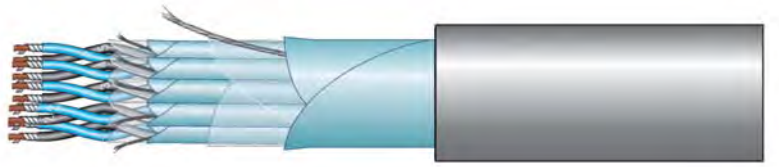
No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.70	8.63	12.63	1x2x2.5	0.70	9.63	14.03
2x2x1.5	0.70	14.15	19.35	2x2x2.5	0.70	15.85	21.05
3x2x1.5	0.70	15.05	20.25	3x2x2.5	0.70	16.87	22.07
6x2x1.5	0.70	20.54	25.74	6x2x2.5	0.70	23.09	28.29
12x2x1.5	0.70	28.04	33.64	12x2x2.5	0.70	31.57	37.17
15x2x1.5	0.70	31.34	36.94	15x2x2.5	0.70	35.34	41.34
24x2x1.5	0.70	39.74	46.14	24x2x2.5	0.70	44.84	51.64

INSTRUM® FIRE 378
INSTRUM® FIRE 379

Signal cables, twisted in pairs, screened on the single pair and on the total, or only on the total, insulated in crosslinked polyethylene, with low toxic and corrosive gas emission, fire-resistant

FE4XOHM1/FE4XHOHM1
MGT/XLPE/OS/LSOH
MGT/XLPE/IS/OS/LSOH





Application:
The range of applications of **INSTRUM® FIRE 378/379** signal cables includes electrical plants requiring signal transmission even in case of fire.
INSTRUM® FIRE 378/379 is suitable for static installation. The screening, when provided, assures an electrostatic protection.

Special feature:
INSTRUM® FIRE 378/379 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 378/379 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Fine tinned copper strands with fire-retardant barrier in mica glass tape, conductor insulation in crosslinked polythylene XLPE compound, insulated conductors twisted in pairs (for version 378, with polyester tape and drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in M1 thermoplastic compound, fire-retardant according to CEI 20-35 norms.

Technical data

- Operating temperature: 85°C max
- Test voltage: 4000 V max
- Strand construction: fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5
- Screen resistance: < 30 Ohm/Km
- Short-circuit temperature: 250°C max
- Insulation resistance: >10000 Mohm/Km
- Operating voltage: Uo/U 0.6/1 Kv max
- Installation temperature: 0°C min
- Colour code: Blue/Black cores With numbering on black

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INSTRUM® FIRE 378
INSTRUM® FIRE 379

Signal cables, twisted in pairs, screened on the single pair and on the total, or only on the total, insulated in crosslinked polyethylene, with low toxic and corrosive gas emission, fire-resistant

FE4XOHM1/FE4XHOHM1
MGT/XLPE/OS/LSOH
MGT/XLPE/IS/OS/LSOH

INSTRUM® FIRE 378

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.70	11.43	1x2x2.5	0.70	12.43
2x2x1.5	0.70	17.45	2x2x2.5	0.70	19.55
3x2x1.5	0.70	18.32	3x2x2.5	0.70	20.55
6x2x1.5	0.70	24.09	6x2x2.5	0.70	26.64
12x2x1.5	0.70	31.22	12x2x2.5	0.70	35.35
15x2x1.5	0.70	35.04	15x2x2.5	0.70	39.03
24x2x1.5	0.70	43.64	24x2x2.5	0.70	49.14

INSTRUM® FIRE 379

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1.5	0.70	11.43	1x2x2.5	0.70	12.43
2x2x1.5	0.70	17.75	2x2x2.5	0.70	19.85
3x2x1.5	0.70	19.05	3x2x2.5	0.70	20.87
6x2x1.5	0.70	24.54	6x2x2.5	0.70	27.09
12x2x1.5	0.70	32.44	12x2x2.5	0.70	35.97
15x2x1.5	0.70	35.74	15x2x2.5	0.70	40.14
24x2x1.5	0.70	44.54	24x2x2.5	0.70	50.04

INSTRUM® FIRE 380
INSTRUM® FIRE 381

Signal cables, twisted in pairs, screened on the single pair and on the total, or only on the total, armoured, insulated in crosslinked polyethylene, with low toxic and corrosive gas emission, fire-resistant

FE4XOHAM1/FE4XHOHAM1
MGT/XLPE/OS/LSOH/SWB/LSOH
MGT/XLPE/IS/OS/LSOH/SWB/LSOH

Application:
The range of applications of **INSTRUM® FIRE 380/381** signal cables includes electrical plants requiring signal transmission even in case of fire.
INSTRUM® FIRE 380/381 is suitable for static installation.
The screening, when provided, assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature:
INSTRUM® FIRE 380/381 signal cables are manufactured according to the following norms:
CEI 20-35
CEI 20-36/IEC 331

NOTES:
INSTRUM® FIRE 380/381 is also available in the version with class 2 stranded conductors and in the version with class 1 single wire of the CEI 20-29/IEC 60228 and VDE 0295 norms.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Fine red copper strands with fire-retardant barrier in mica glass tape, conductor insulation in crosslinked polyethylene XLPE compound, insulated conductors twisted in pairs (for version 381, wound with polyester tape and drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, intermediate sheath in M1 thermoplastic compound, armour in galvanised steel braid, outer sheath in M1 thermoplastic compound, fire-retardant according to CEI 20-35 norms.

Technical data

Operating temperature:
85°C max

Test voltage:
4000 V max

Strand construction:
fine wires according to VDE 0295 Cl5/IEC 60228 Cl5/CEI 20-29, Cl5

Screen resistance:
< 30 Ohm/Km

Short-circuit temperature:
250°C max

Insulation resistance:
>10000 Mohm/Km

Operating voltage:
Uo/U 0.6/1 Kv max

Installation temperature:
0°C min

Colour code:
Blue/Black cores
With numbering on black

INSTRUM® FIRE 380
INSTRUM® FIRE 381

Signal cables, twisted in pairs, screened on the single pair and on the total, or only on the total, armoured, insulated in crosslinked polyethylene, with low toxic and corrosive gas emission, fire-resistant

FE4XOHAM1/FE4XHOHAM1
MGT/XLPE/OS/LSOH/SWB/LSOH
MGT/XLPE/IS/OS/LSOH/SWB/LSOH

INSTRUM® FIRE 380

Nominal voltage Uo/U: 0.6/1 Kv

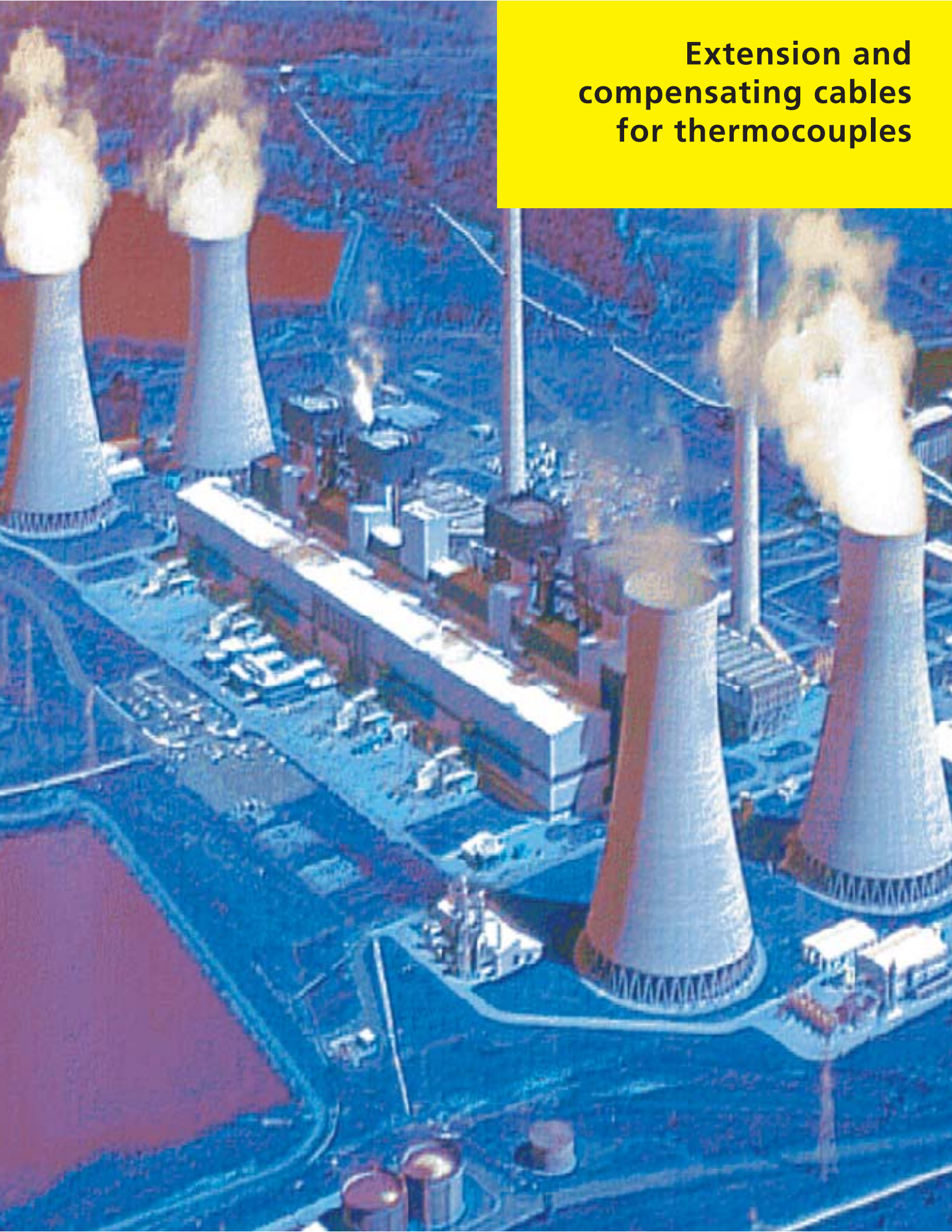
No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.70	8.63	12.63	1x2x2.5	0.70	9.63	14.03
2x2x1.5	0.70	13.85	19.05	2x2x2.5	0.70	15.55	20.75
3x2x1.5	0.70	14.72	19.92	3x2x2.5	0.70	16.55	21.75
6x2x1.5	0.70	20.09	25.29	6x2x2.5	0.70	22.64	27.84
12x2x1.5	0.70	26.82	32.42	12x2x2.5	0.70	30.95	36.55
15x2x1.5	0.70	30.64	36.24	15x2x2.5	0.70	34.63	40.63
24x2x1.5	0.70	38.84	45.24	24x2x2.5	0.70	43.94	50.74

INSTRUM® FIRE 381

Nominal voltage Uo/U: 0.6/1 Kv

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.70	8.63	12.63	1x2x2.5	0.70	9.63	14.03
2x2x1.5	0.70	14.15	19.35	2x2x2.5	0.70	15.85	21.05
3x2x1.5	0.70	15.05	20.25	3x2x2.5	0.70	16.87	22.07
6x2x1.5	0.70	20.54	25.74	6x2x2.5	0.70	23.09	28.29
12x2x1.5	0.70	28.04	33.64	12x2x2.5	0.70	31.57	37.17
15x2x1.5	0.70	31.34	36.94	15x2x2.5	0.70	35.34	41.34
24x2x1.5	0.70	39.74	46.14	24x2x2.5	0.70	44.84	51.64

Extension and compensating cables for thermocouples



INTHERM® 10

Extension or compensating cables for thermocouples, insulated in PVC, twisted in pairs

UR2XOR
PVC/PVC

Example of KX extension cable

Application
INTHERM® 10 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 10 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.

Special feature
INTHERM® 10 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 10
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation in R2 PVC compound, insulated conductors twisted in pairs, pairs stranded on one another, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: With PVC to 70°C / With PVC to 105°C
- Short-circuit temperature: 160°C max
- Installation temperature: 5°C min
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Colour code: ANSI, IEC, DIN, BS, NF See table T4
- Strand construction: single wire
- Operating voltage: U_0/U 300/300 V

INTHERM® 10

Extension or compensating cables for thermocouples, insulated in PVC, twisted in pairs

UR2XOR
PVC/PVC

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.5	4.22	1x2x16 AWG	0.6	6.38
2x2x20 AWG	0.5	6.53	2x2x16 AWG	0.6	10.27
3x2x20 AWG	0.5	6.92	3x2x16 AWG	0.6	10.90
6x2x20 AWG	0.5	9.30	6x2x16 AWG	0.6	15.10
12x2x20 AWG	0.5	12.65	12x2x16 AWG	0.6	20.77
15x2x20 AWG	0.5	14.46	15x2x16 AWG	0.6	23.50
24x2x20 AWG	0.5	18.20	24x2x16 AWG	0.6	29.80
48x2x20 AWG	0.5	24.52	48x2x16 AWG	0.6	38.90

INTHERM® 11
INTHERM® 12

Extension or compensating cables for thermocouples, insulated in PVC, twisted in pairs, screened on the single pair and on the total, or only on the total

UR2XOHR/UR2XHOHR
PVC/OS/PVC
PVC/IS/OS/PVC

Examples of KX extension cables

Application
INTHERM® 11/12 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 11/12 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.

Special feature
INTHERM® 11/12 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 11/12
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation with R2 PVC compound, insulated twisted pair conductors (for version 12, they are laid with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: With PVC to 70°C / With PVC to 105°C
- Short-circuit temperature: 160°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: single wire
- Operating voltage: U_0/U 300/300 V
- Colour code: ANSI, IEC, DIN, BS, NF See table T4

INTHERM® 11
INTHERM® 12

Extension or compensating cables for thermocouples, insulated in PVC, twisted in pairs, screened on the single pair and on the total, or only on the total

UR2XOHR/UR2XHOHR
PVC/OS/PVC
PVC/IS/OS/PVC

INTHERM® 11

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.5	4.37	1x2x16 AWG	0.6	6.53
2x2x20 AWG	0.5	6.68	2x2x16 AWG	0.6	10.42
3x2x20 AWG	0.5	7.07	3x2x16 AWG	0.6	11.05
6x2x20 AWG	0.5	9.45	6x2x16 AWG	0.6	15.25
12x2x20 AWG	0.5	12.80	12x2x16 AWG	0.6	20.92
15x2x20 AWG	0.5	14.61	15x2x16 AWG	0.6	23.65
24x2x20 AWG	0.5	18.35	24x2x16 AWG	0.6	29.95
48x2x20 AWG	0.5	24.67	48x2x16 AWG	0.6	39.05

INTHERM® 12

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.5	4.37	1x2x16 AWG	0.6	6.53
2x2x20 AWG	0.5	6.98	2x2x16 AWG	0.6	10.72
3x2x20 AWG	0.5	7.39	3x2x16 AWG	0.6	11.37
6x2x20 AWG	0.5	10.10	6x2x16 AWG	0.6	15.70
12x2x20 AWG	0.5	13.43	12x2x16 AWG	0.6	21.54
15x2x20 AWG	0.5	15.32	15x2x16 AWG	0.6	24.35
24x2x20 AWG	0.5	19.65	24x2x16 AWG	0.6	30.85
48x2x20 AWG	0.5	26.29	48x2x16 AWG	0.6	40.27

INTHERM® 13
INTHERM® 14

Extension or compensating cables for thermocouples, insulated in PVC, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured

UR2XOHRAR/UR2XHOHRAR
PVC/OS/PVC/SWB/PVC
PVC/IS/OS/PVC/SWB/PVC

Examples of KX extension cables

Application
INTHERM® 13/14 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 13/14 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.
The armour mechanically protects the cable during installation, and it prevents deflection when installed.

Special feature
INTHERM® 13/14 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 13/14
is also available in the version with flexible conductors.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Single wire conductors, insulation with R2 PVC compound, insulated twisted pair conductors (for version 14, they are laid with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in special RZ PVC compound, armour in galvanised steel wire braid, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

Operating temperature:
With PVC to 70°C
With PVC to 105°C

Test voltage:
1500 V

Strand construction:
single wire

Short-circuit temperature:
160°C max

Insulation resistance:
>100 Mohm/Km

Operating voltage:
U_0/U 300/300 V

Screen resistance:
< 30 Ohm/Km

Installation temperature:
5°C min

Colour code:
ANSI, IEC, DIN, BS, NF
See table T4

INTHERM® 13
INTHERM® 14

Extension or compensating cables for thermocouples, insulated in PVC, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured

UR2XOHRAR/UR2XHOHRAR
PVC/OS/PVC/SWB/PVC
PVC/IS/OS/PVC/SWB/PVC

INTHERM® 13

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.5	4.37	6.97	1x2x16 AWG	0.6	6.53	9.33
2x2x20 AWG	0.5	6.68	9.48	2x2x16 AWG	0.6	10.42	13.62
3x2x20 AWG	0.5	7.07	10.07	3x2x16 AWG	0.6	11.05	14.65
6x2x20 AWG	0.5	9.45	12.65	6x2x16 AWG	0.6	15.25	19.65
12x2x20 AWG	0.5	12.80	16.80	12x2x16 AWG	0.6	20.92	26.12
15x2x20 AWG	0.5	14.61	18.61	15x2x16 AWG	0.6	23.65	28.85
24x2x20 AWG	0.5	18.35	23.15	24x2x16 AWG	0.6	29.95	35.55
48x2x20 AWG	0.5	24.67	30.27	48x2x16 AWG	0.6	39.05	44.65

INTHERM® 14

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.5	4.37	6.97	1x2x16 AWG	0.6	6.53	9.33
2x2x20 AWG	0.5	6.98	9.98	2x2x16 AWG	0.6	10.72	13.92
3x2x20 AWG	0.5	7.39	10.39	3x2x16 AWG	0.6	11.37	14.97
6x2x20 AWG	0.5	10.10	13.30	6x2x16 AWG	0.6	15.70	20.10
12x2x20 AWG	0.5	13.43	17.43	12x2x16 AWG	0.6	21.54	26.74
15x2x20 AWG	0.5	15.32	19.72	15x2x16 AWG	0.6	24.35	29.95
24x2x20 AWG	0.5	19.65	24.45	24x2x16 AWG	0.6	30.85	36.45
48x2x20 AWG	0.5	26.29	31.89	48x2x16 AWG	0.6	40.27	45.87

INTHERM® 15

Extension or compensating cables for thermocouples, insulated with crosslinked polyethylene, twisted in pairs

UE4XOR
XLPE/PVC

Example of KX extension cable

Application
INTHERM® 15 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 15 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.

Special feature
INTHERM® 15 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 15
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation in crosslinked polyethilene XLPE, insulated conductors twisted in pairs, pairs stranded on one another, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: 0°C min
- Test voltage: 1500 V
- Insulation resistance: >10000 Mohm/Km
- Colour code: ANSI, IEC, DIN, BS, NF See table T4
- Strand construction: single wire
- Operating voltage: U_0/U 1500 V

INTHERM® 15

Extension or compensating cables for thermocouples, insulated in crosslinked polyethylene, twisted in pairs

UE4XOR
XLPE/PVC

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.6	7.82	1x2x16 AWG	0.6	9.38
2x2x20 AWG	0.6	10.21	2x2x16 AWG	0.6	13.27
3x2x20 AWG	0.6	11.25	3x2x16 AWG	0.6	13.90
6x2x20 AWG	0.6	13.52	6x2x16 AWG	0.6	18.30
12x2x20 AWG	0.6	17.66	12x2x16 AWG	0.6	23.97
15x2x20 AWG	0.6	19.66	15x2x16 AWG	0.6	26.30
24x2x20 AWG	0.6	23.84	24x2x16 AWG	0.6	32.80
48x2x20 AWG	0.6	30.49	48x2x16 AWG	0.6	42.30

INTHERM® 16
INTHERM® 17

Extension or compensating cables for thermocouples, insulated in low density polyethylene, twisted in pairs, screened on the single pair and on the total, or only on the total

UEXOHR/UEXHOHR
PE/OS/PVC
PE/IS/OS/PVC

Examples of Kx extension cables

Application
INTHERM® 16/17 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 16/17 is fire-retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.

Special feature
INTHERM® 16/17 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 16/17
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation in low density polyethylene, insulated conductors twisted in pairs (for version 17, wound with polyester tape plus drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-35 norms.

Technical data

- Operating temperature: 60°C max
- Short-circuit temperature: 150°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >5000 Mohm/Km
- Installation temperature: -5°C min
- Strand construction: single wire
- Operating voltage: U_0/U 300/300 V
- Colour code: ANSI, IEC, DIN, BS, NF See table T4

INTHERM® 16
INTHERM® 17

Extension or compensating cables for thermocouples, insulated in low density polyethylene, twisted in pairs, screened on the single pair and on the total, or only on the total

UEXOHR/UEXHOHR
PE/OS/PVC
PE/IS/OS/PVC

INTHERM® 16

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.6	7.97	1x2x16 AWG	0.6	9.53
2x2x20 AWG	0.6	10.36	2x2x16 AWG	0.6	13.42
3x2x20 AWG	0.6	10.80	3x2x16 AWG	0.6	14.05
6x2x20 AWG	0.6	13.67	6x2x16 AWG	0.6	18.45
12x2x20 AWG	0.6	17.81	12x2x16 AWG	0.6	24.12
15x2x20 AWG	0.6	19.81	15x2x16 AWG	0.6	26.45
24x2x20 AWG	0.6	23.99	24x2x16 AWG	0.6	32.95
48x2x20 AWG	0.6	30.64	48x2x16 AWG	0.6	42.45

INTHERM® 17

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.6	7.97	1x2x16 AWG	0.6	9.53
2x2x20 AWG	0.6	10.66	2x2x16 AWG	0.6	13.72
3x2x20 AWG	0.6	11.12	3x2x16 AWG	0.6	14.37
6x2x20 AWG	0.6	14.12	6x2x16 AWG	0.6	19.30
12x2x20 AWG	0.6	18.44	12x2x16 AWG	0.6	24.74
15x2x20 AWG	0.6	20.52	15x2x16 AWG	0.6	27.15
24x2x20 AWG	0.6	24.89	24x2x16 AWG	0.6	33.85
48x2x20 AWG	0.6	32.46	48x2x16 AWG	0.6	44.27

INTHERM® 18
INTHERM® 19

Extension or compensating cables for thermocouples, insulated in low density polyethylene, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured

UEXOHRAR/UEXHOHRAR
PE/OS/PVC/SWB/PVC
PE/IS/OS/PVC/SWB/PVC

Examples of KX extension cables

Application
INTHERM® 18/19 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 18/19 is fire-retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INTHERM® 18/19 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 18/19
is also available in the version with flexible conductors.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Single wire conductors, insulation in low density polyethylene, insulated conductors twisted in pairs (for version 19, wound with polyester tape and drain wire tinned copper ands aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, intermediate sheath in special RZ PVC compound, armour in galvanised steel braid, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-35 norms.

Technical data

- Operating temperature: 60°C max
- Short-circuit temperature: 150°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >5000 Mohm/Km
- Installation temperature: -5°C min
- Strand construction: single wire
- Operating voltage: max U_0/U 300/300 V
- Colour code: ANSI, IEC, DIN, BS, NF See table T4

INTHERM® 18
INTHERM® 19

Extension or compensating cables for thermocouples, insulated in low density polyethylene, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured

UEXOHRAR/UEXHOHRAR
PE/OS/PVC/SWB/PVC
PE/IS/OS/PVC/SWB/PVC

INTHERM® 18

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.6	5.17	9.17	1x2x16 AWG	0.6	6.73	10.73
2x2x20 AWG	0.6	7.56	11.56	2x2x16 AWG	0.6	10.22	14.62
3x2x20 AWG	0.6	8.00	12.00	3x2x16 AWG	0.6	10.85	15.25
6x2x20 AWG	0.6	10.47	14.87	6x2x16 AWG	0.6	14.85	20.05
12x2x20 AWG	0.6	14.21	19.41	12x2x16 AWG	0.6	20.12	25.32
15x2x20 AWG	0.6	15.81	21.01	15x2x16 AWG	0.6	22.45	27.65
24x2x20 AWG	0.6	19.99	25.19	24x2x16 AWG	0.6	28.55	34.15
48x2x20 AWG	0.6	26.24	31.84	48x2x16 AWG	0.6	37.65	43.65

INTHERM® 19

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.6	5.17	9.17	1x2x16 AWG	0.6	6.73	10.73
2x2x20 AWG	0.6	7.86	11.86	2x2x16 AWG	0.6	10.52	14.92
3x2x20 AWG	0.6	8.32	12.32	3x2x16 AWG	0.6	11.17	15.57
6x2x20 AWG	0.6	10.92	15.32	6x2x16 AWG	0.6	15.30	20.50
12x2x20 AWG	0.6	14.84	20.04	12x2x16 AWG	0.6	20.74	25.94
15x2x20 AWG	0.6	16.52	21.72	15x2x16 AWG	0.6	23.15	28.35
24x2x20 AWG	0.6	20.89	26.09	24x2x16 AWG	0.6	29.45	35.05
48x2x20 AWG	0.6	28.06	33.66	48x2x16 AWG	0.6	39.47	45.87

INTHERM® 20

Extension or compensating cables for thermocouples, insulated in rubber, twisted in pairs

UG7XOR
HEPR/PVC

Example of KX extension cable

Application
INTHERM® 20 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 20 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.

Special feature
INTHERM® 20 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 20
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation in G7 ethyl-propylene rubber, insulated conductors twisted in pairs, pairs stranded on one another, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: 0°C min
- Test voltage: 1500 V
- Insulation resistance: >1000 Mohm/Km
- Colour code: ANSI, IEC, DIN, BS, NF See table T4
- Strand construction: single wire
- Operating voltage: U_0/U 1500 V

INTHERM® 20

Extension or compensating cables for thermocouples, insulated in rubber, twisted in pairs

UG7XOR
HEPR/PVC

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.7	8.22	1x2x16 AWG	0.7	9.78
2x2x20 AWG	0.7	10.89	2x2x16 AWG	0.7	13.95
3x2x20 AWG	0.7	11.38	3x2x16 AWG	0.7	14.63
6x2x20 AWG	0.7	14.54	6x2x16 AWG	0.7	19.72
12x2x20 AWG	0.7	19.48	12x2x16 AWG	0.7	25.38
15x2x20 AWG	0.7	21.66	15x2x16 AWG	0.7	27.89
24x2x20 AWG	0.7	25.88	24x2x16 AWG	0.7	34.84
48x2x20 AWG	0.7	33.86	48x2x16 AWG	0.7	46.07

INTHERM® 21
INTHERM® 22

Extension or compensating cables for thermocouples, insulated in rubber, twisted in pairs, screened on the single pair and on the total, or only on the total

UG7XOHR/UG7XHOHR
HEPR/OS/PVC
HEPR/IS/OS/PVC

Examples of KX extension cables

Application
INTHERM® 21/22 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 21/22 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.

Special feature
INTHERM® 21/22 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 21/22
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation with R7 PVC compound, insulated twisted pair conductors (for version 22, they are laid with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in special RZ PVC compound, armour in galvanised steel wire braid, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >1000 Mohm/Km
- Installation temperature: 0°C min
- Strand construction: single wire
- Operating voltage: U_0/U 300/300 V
- Colour code: ANSI, IEC, DIN, BS, NF See table T4

INTHERM® 21
INTHERM® 22

Extension or compensating cables for thermocouples, insulated in rubber, twisted in pairs, screened on the single pair and on the total, or only on the total

UG7XOHR/UG7XHOHR
HEPR/OS/PVC
HEPR/IS/OS/PVC

INTHERM® 21

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.7	8.37	1x2x16 AWG	0.7	9.93
2x2x20 AWG	0.7	11.04	2x2x16 AWG	0.7	14.10
3x2x20 AWG	0.7	11.53	3x2x16 AWG	0.7	14.78
6x2x20 AWG	0.7	14.69	6x2x16 AWG	0.7	19.87
12x2x20 AWG	0.7	19.63	12x2x16 AWG	0.7	25.53
15x2x20 AWG	0.7	21.81	15x2x16 AWG	0.7	28.04
24x2x20 AWG	0.7	26.03	24x2x16 AWG	0.7	34.99
48x2x20 AWG	0.7	34.01	48x2x16 AWG	0.7	46.22

INTHERM® 22

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.7	8.37	1x2x16 AWG	0.7	9.93
2x2x20 AWG	0.7	11.34	2x2x16 AWG	0.7	14.40
3x2x20 AWG	0.7	11.85	3x2x16 AWG	0.7	15.50
6x2x20 AWG	0.7	15.54	6x2x16 AWG	0.7	20.32
12x2x20 AWG	0.7	20.25	12x2x16 AWG	0.7	26.15
15x2x20 AWG	0.7	22.52	15x2x16 AWG	0.7	28.75
24x2x20 AWG	0.7	26.93	24x2x16 AWG	0.7	35.89
48x2x20 AWG	0.7	35.24	48x2x16 AWG	0.7	47.44

INTHERM® 23
INTHERM® 24

Extension or compensating cables for thermocouples, insulated in rubber, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured

UG7XOHRAR/UG7XHOHRAR
HEPR/OS/PVC/SWB/PVC
HEPR/IS/OS/PVC/SWB/PVC

Examples of KX extension cables

Application
INTHERM® 23/24 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 23/24 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INTHERM® 23/24 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 23/24
is also available in the version with flexible conductors.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Single wire conductors, insulation with R7 PVC compound, insulated twisted pair conductors (for version 24, they are laid with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in special RZ PVC compound, armour in galvanised steel wire braid, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Screen resistance:
< 30 Ohm/Km

Test voltage:
1500 V

Insulation resistance:
>1000 Mohm/Km

Installation temperature:
0°C min

Strand construction:
single wire

Operating voltage:
max U_0/U 300/300 V

Colour code:
ANSI, IEC, DIN, BS, NF
See table T4

INTHERM® 23
INTHERM® 24

Extension or compensating cables for thermocouples, insulated in rubber, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured

UG7XOHRAR/UG7XHOHRAR
HEPR/OS/PVC/SWB/PVC
HEPR/IS/OS/PVC/SWB/PVC

INTHERM® 23

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.7	5.57	9.57	1x2x16 AWG	0.7	7.13	11.13
2x2x20 AWG	0.7	8.24	12.24	2x2x16 AWG	0.7	10.90	15.30
3x2x20 AWG	0.7	8.73	12.73	3x2x16 AWG	0.7	11.58	15.98
6x2x20 AWG	0.7	11.49	15.89	6x2x16 AWG	0.7	15.87	21.07
12x2x20 AWG	0.7	15.63	20.83	12x2x16 AWG	0.7	21.53	26.73
15x2x20 AWG	0.7	17.81	23.01	15x2x16 AWG	0.7	24.04	29.64
24x2x20 AWG	0.7	22.03	27.23	24x2x16 AWG	0.7	30.59	36.19
48x2x20 AWG	0.7	29.61	35.21	48x2x16 AWG	0.7	41.02	47.42

INTHERM® 24

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.7	5.57	9.57	1x2x16 AWG	0.7	7.13	11.13
2x2x20 AWG	0.7	8.54	12.54	2x2x16 AWG	0.7	11.20	15.60
3x2x20 AWG	0.7	9.05	13.45	3x2x16 AWG	0.7	12.30	17.10
6x2x20 AWG	0.7	12.34	17.14	6x2x16 AWG	0.7	16.32	21.52
12x2x20 AWG	0.7	16.25	21.45	12x2x16 AWG	0.7	22.15	27.35
15x2x20 AWG	0.7	18.52	23.72	15x2x16 AWG	0.7	24.75	30.35
24x2x20 AWG	0.7	22.93	28.13	24x2x16 AWG	0.7	31.49	37.09
48x2x20 AWG	0.7	30.84	36.44	48x2x16 AWG	0.7	42.24	48.64

INTHERM® 25

Extension or compensating cables for thermocouples, insulated with crosslinked polyethylene, twisted in pairs

UE4XOR
XLPE/PVC

Example of KX extension cable

Application
INTHERM® 25 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 25 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.

Special feature
INTHERM® 25 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 25
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation in crosslinked polyethylene XLPE, insulated conductors twisted in pairs, pairs stranded on one another, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
0°C min

Test voltage:
1500 V

Insulation resistance:
>1000 Mohm/Km

Colour code:
ANSI, IEC, DIN, BS, NF
See table T4

Strand construction:
single wire

Operating voltage:
U_0/U 1500 V

INTHERM® 25

Extension or compensating cables for thermocouples, insulated with crosslinked polyethylene, twisted in pairs

UE4XOR
XLPE/PVC

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.6	7.82	1x2x16 AWG	0.6	9.38
2x2x20 AWG	0.6	10.21	2x2x16 AWG	0.6	13.27
3x2x20 AWG	0.6	11.25	3x2x16 AWG	0.6	13.90
6x2x20 AWG	0.6	13.52	6x2x16 AWG	0.6	18.30
12x2x20 AWG	0.6	17.66	12x2x16 AWG	0.6	23.97
15x2x20 AWG	0.6	19.66	15x2x16 AWG	0.6	26.30
24x2x20 AWG	0.6	23.84	24x2x16 AWG	0.6	32.80
48x2x20 AWG	0.6	30.49	48x2x16 AWG	0.6	42.30

INTHERM® 26
INTHERM® 27

Extension or compensating cables for thermocouples, insulated with crosslinked polyethylene, twisted in pairs, screened on the single pair and on the total, or only on the total

UE4XOHR/UE4XHOHR
XLPE/OS/PVC
XLPE/IS/OS/PVC

Examples of KX extension cables

Application
INTHERM® 26/27 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 26/27 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.

Special feature
INTHERM® 26/27 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 26/27
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation with crosslinked polyethylene XLPE compound, insulated twisted pair conductors (for version 27, they are wrapped with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >10000 Mohm/Km
- Installation temperature: 0°C min
- Strand construction: single wire
- Operating voltage: U_0/U 300/300 V
- Colour code: ANSI, IEC, DIN, BS, NF See table T4

INTHERM® 26
INTHERM® 27

Extension or compensating cables for thermocouples, insulated with crosslinked polyethylene, twisted in pairs, screened on the single pair and on the total, or only on the total

UE4XOHR/UE4XHOHR
XLPE/OS/PVC
XLPE/IS/OS/PVC

INTHERM® 26

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.6	7.97	1x2x16 AWG	0.6	9.53
2x2x20 AWG	0.6	10.36	2x2x16 AWG	0.6	13.42
3x2x20 AWG	0.6	10.80	3x2x16 AWG	0.6	14.05
6x2x20 AWG	0.6	13.67	6x2x16 AWG	0.6	18.45
12x2x20 AWG	0.6	17.81	12x2x16 AWG	0.6	24.12
15x2x20 AWG	0.6	19.81	15x2x16 AWG	0.6	26.45
24x2x20 AWG	0.6	23.99	24x2x16 AWG	0.6	32.95
48x2x20 AWG	0.6	30.64	48x2x16 AWG	0.6	42.45

INTHERM® 27

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.6	7.97	1x2x16 AWG	0.6	9.53
2x2x20 AWG	0.6	10.66	2x2x16 AWG	0.6	13.72
3x2x20 AWG	0.6	11.12	3x2x16 AWG	0.6	14.37
6x2x20 AWG	0.6	14.12	6x2x16 AWG	0.6	19.30
12x2x20 AWG	0.6	18.44	12x2x16 AWG	0.6	24.74
15x2x20 AWG	0.6	20.52	15x2x16 AWG	0.6	27.15
24x2x20 AWG	0.6	24.89	24x2x16 AWG	0.6	33.85
48x2x20 AWG	0.6	32.46	48x2x16 AWG	0.6	44.27

INTHERM® 28
INTHERM® 29

Extension or compensating cables for thermocouples, insulate with crosslinked polyethylene, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured

UE4XOHRAR/UE4XHOHRAR
XLPE/OS/PVC/SWB/PVC
XLPE/IS/OS/PVC/SWB/PVC

Examples of KX extension cables

Application
INTHERM® 28/29 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 28/29 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INTHERM® 28/29 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 II
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 28/29
is also available in the version with flexible conductors.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped

Cable make-up:
Single wire conductors, insulation with XLPE crosslinked polyethylene compound, insulated double pair conductors (for version 29, they are wrapped with polyester tape and tinned copper drain wire and aluminium/mylar tape), pairs laid on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in special RZ PVC compound, armour in galvanised steel wire braid, outer sheath in special RZ PVC compound, fire-retardant according to CEI 20-22 II norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >10000 Mohm/Km
- Installation temperature: 0°C min
- Strand construction: single wire
- Operating voltage: max U_0/U 300/300 V
- Colour code: ANSI, IEC, DIN, BS, NF See table T4

INTHERM® 28
INTHERM® 29

Extension or compensating cables for thermocouples, insulate with crosslinked polyethylene, twisted in pairs, screened on the single pair and on the total, or only on the total, and armoured

UE4XOHRAR/UE4XHOHRAR
XLPE/OS/PVC/SWB/PVC
XLPE/IS/OS/PVC/SWB/PVC

INTHERM® 28

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.6	5.17	9.17	1x2x16 AWG	0.6	6.73	10.73
2x2x20 AWG	0.6	7.56	11.56	2x2x16 AWG	0.6	10.22	14.62
3x2x20 AWG	0.6	8.00	12.00	3x2x16 AWG	0.6	10.85	15.25
6x2x20 AWG	0.6	10.47	14.87	6x2x16 AWG	0.6	14.85	20.05
12x2x20 AWG	0.6	14.21	19.41	12x2x16 AWG	0.6	20.12	25.32
15x2x20 AWG	0.6	15.81	21.01	15x2x16 AWG	0.6	22.45	27.65
24x2x20 AWG	0.6	19.99	25.19	24x2x16 AWG	0.6	28.55	34.15
48x2x20 AWG	0.6	26.24	31.84	48x2x16 AWG	0.6	37.65	43.65

INTHERM® 29

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.6	5.17	9.17	1x2x16 AWG	0.6	6.73	10.73
2x2x20 AWG	0.6	7.86	11.86	2x2x16 AWG	0.6	10.52	14.92
3x2x20 AWG	0.6	8.32	12.32	3x2x16 AWG	0.6	11.17	15.57
6x2x20 AWG	0.6	10.92	15.32	6x2x16 AWG	0.6	15.30	20.50
12x2x20 AWG	0.6	14.84	20.04	12x2x16 AWG	0.6	20.74	25.94
15x2x20 AWG	0.6	16.52	21.72	15x2x16 AWG	0.6	23.15	28.35
24x2x20 AWG	0.6	20.89	26.09	24x2x16 AWG	0.6	29.45	35.05
48x2x20 AWG	0.6	28.06	33.66	48x2x16 AWG	0.6	39.47	45.87

INTHERM® 30

Extension or compensating cables for thermocouples, insulated with crosslinked elastomeric compound, twisted in pairs, with low emission of smokes, toxic and corrosive gases

UG10XOM1
XL-LSOH/LSOH

Example of KX extension cable

Application
INTHERM® 30 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 30 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.

Special feature
INTHERM® 30 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-38
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 30
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation in crosslinked G10 elastomeric compound, insulated conductors twisted in pairs, pairs stranded on one another, outer sheath in special M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: 0°C min
- Test voltage: 1500 V
- Insulation resistance: >200 Mohm/Km
- Colour code: ANSI, IEC, DIN, BS, NF See table T4
- Strand construction: single wire
- Operating voltage: U_0/U 1500 V

INTHERM® 30

Extension or compensating cables for thermocouples, insulated with crosslinked elastomeric compound, twisted in pairs, with low emission of smokes, toxic and corrosive gases

UG10XOM1
XL-LSOH/LSOH

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.7	8.22	1x2x16 AWG	0.7	9.78
2x2x20 AWG	0.7	10.89	2x2x16 AWG	0.7	13.95
3x2x20 AWG	0.7	11.38	3x2x16 AWG	0.7	14.63
6x2x20 AWG	0.7	14.54	6x2x16 AWG	0.7	19.72
12x2x20 AWG	0.7	19.48	12x2x16 AWG	0.7	25.38
15x2x20 AWG	0.7	21.66	15x2x16 AWG	0.7	27.89
24x2x20 AWG	0.7	25.88	24x2x16 AWG	0.7	34.84
48x2x20 AWG	0.7	33.86	48x2x16 AWG	0.7	46.07

INTHERM® 31
INTHERM® 32

Extension or compensating cables for thermocouples, insulated with elastomeric compound, twisted in pairs, screened on the single pair and on the total, or only on the total, with very low emission of smokes, toxic and corrosive gases

UG10XOHM1/UG10XHOHM1
XL-LSOH/OS/LSOH
XL-LSOH/IS/OS/LSOH

Examples of KX extension cables

Application
INTHERM® 31/32 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 31/32 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the reqired accuracy degree.
The screening, when provided, assures an electrostatic protection.

Special feature
INTHERM® 31/32 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-38
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 31/32
is also available in the version with flexible conductors.

Cable make-up:
Single wire conductors, insulation in crosslinked G10 crosslinked elastomeric compound, insulated conductors twisted in pairs (for version 32, wound with polyester tape and drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in special M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >200 Mohm/Km
- Installation temperature: 0°C min
- Strand construction: single wire
- Operating voltage: U_0/U 300/300 V
- Colour code: ANSI, IEC, DIN, BS, NF See table T4

INTHERM® 31
INTHERM® 32

Extension or compensating cables for thermocouples, insulated with elastomeric compound, twisted in pairs, screened on the single pair and on the total, or only on the total, with very low emission of smokes, toxic and corrosive gases

UG10XOHM1/UG10XHOHM1
XL-LSOH/OS/LSOH
XL-LSOH/IS/OS/LSOH

INTHERM® 31

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.7	8.37	1x2x16 AWG	0.7	9.93
2x2x20 AWG	0.7	11.04	2x2x16 AWG	0.7	14.10
3x2x20 AWG	0.7	11.53	3x2x16 AWG	0.7	14.78
6x2x20 AWG	0.7	14.69	6x2x16 AWG	0.7	19.87
12x2x20 AWG	0.7	19.63	12x2x16 AWG	0.7	25.53
15x2x20 AWG	0.7	21.81	15x2x16 AWG	0.7	28.04
24x2x20 AWG	0.7	26.03	24x2x16 AWG	0.7	34.99
48x2x20 AWG	0.7	34.01	48x2x16 AWG	0.7	46.22

INTHERM® 32

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	External Ø (mm)
1x2x20 AWG	0.7	8.37	1x2x16 AWG	0.7	9.93
2x2x20 AWG	0.7	11.34	2x2x16 AWG	0.7	14.40
3x2x20 AWG	0.7	11.85	3x2x16 AWG	0.7	15.50
6x2x20 AWG	0.7	15.54	6x2x16 AWG	0.7	20.32
12x2x20 AWG	0.7	20.25	12x2x16 AWG	0.7	26.15
15x2x20 AWG	0.7	22.52	15x2x16 AWG	0.7	28.75
24x2x20 AWG	0.7	26.93	24x2x16 AWG	0.7	35.89
48x2x20 AWG	0.7	35.24	48x2x16 AWG	0.7	47.44

INTHERM® 33
INTHERM® 34

Extension or compensating cables for thermocouples, insulated with elastomeric compound, twisted in pairs, screened on the single pair and on the total, or only on the total, armoured, with very low emission of smokes, toxic and corrosive gases

UG10XOHAM1/UG10XHOHAM1
XL-LSOH/OS/LSOH/SWB/LSOH
XL-LSOH/IS/OS/LSOH/SWB/LSOH

Examples of KX extension cables

Application
INTHERM® 33/34 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® 33/34 is fire retardant and is basically used to measure temperature variations in industrial applications.
The cable choice depends on the thermocouple, on the temperature and on the required accuracy degree.
The screening, when provided, assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INTHERM® 33/34 extension or compensating cables are manufactured according to the following norms:
CEI 20-35
CEI 20-22 III
CEI 20-38
DIN IEC 584
DIN 43710/43713/43714
ANSI MC 96.1
BS 4937
NFC 42-324
JIS C 1610

NOTES:
INTHERM® 33/34
is also available in the version with flexible conductors.
Armours are available in the following versions:
- Galvanised steel wire with galvanised steel tape counterspiral.
- Galvanised steel plate with galvanised steel tape counterspiral.
- Double galvanised steel tape overlapped.

Cable make-up:
Single wire conductors, insulation in crosslinked G10 elastomeric compound, insulated conductors twisted in pairs (for version 34, with polyester tape and drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, intermediate sheath in special M1 thermoplastic compound, armour in galvanised steel braid, outer sheath in special M1 thermoplastic compound, fire-retardant according to CEI 20-22 III norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >200 Mohm/Km
- Installation temperature: 0°C min
- Strand construction: single wire
- Operating voltage: max U_0/U 300/300 V
- Colour code: ANSI, IEC, DIN, BS, NF See table T4

INTHERM® 33
INTHERM® 34

Extension or compensating cables for thermocouples, insulated with elastomeric compound, twisted in pairs, screened on the single pair and on the total, or only on the total, armoured, with very low emission of smokes, toxic and corrosive gases

UG10XOHAM1/UG10XHOHAM1
XL-LSOH/OS/LSOH/SWB/LSOH
XL-LSOH/IS/OS/LSOH/SWB/LSOH

INTHERM® 33

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.7	5.57	9.57	1x2x16 AWG	0.7	7.13	11.13
2x2x20 AWG	0.7	8.24	12.24	2x2x16 AWG	0.7	10.90	15.30
3x2x20 AWG	0.7	8.73	12.73	3x2x16 AWG	0.7	11.58	15.98
6x2x20 AWG	0.7	11.49	15.89	6x2x16 AWG	0.7	15.87	21.07
12x2x20 AWG	0.7	15.63	20.83	12x2x16 AWG	0.7	21.53	26.73
15x2x20 AWG	0.7	17.81	23.01	15x2x16 AWG	0.7	24.04	29.64
24x2x20 AWG	0.7	22.03	27.23	24x2x16 AWG	0.7	30.59	36.19
48x2x20 AWG	0.7	29.61	35.21	48x2x16 AWG	0.7	41.02	47.42

INTHERM® 34

Nominal voltage Uo/U: 300/300 V

No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X AWG	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x20 AWG	0.7	5.57	9.57	1x2x16 AWG	0.7	7.13	11.13
2x2x20 AWG	0.7	8.54	12.54	2x2x16 AWG	0.7	11.20	15.60
3x2x20 AWG	0.7	9.05	13.45	3x2x16 AWG	0.7	12.30	17.10
6x2x20 AWG	0.7	12.34	17.14	6x2x16 AWG	0.7	16.32	21.52
12x2x20 AWG	0.7	16.25	21.45	12x2x16 AWG	0.7	22.15	27.35
15x2x20 AWG	0.7	18.52	23.72	15x2x16 AWG	0.7	24.75	30.35
24x2x20 AWG	0.7	22.93	28.13	24x2x16 AWG	0.7	31.49	37.09
48x2x20 AWG	0.7	30.84	36.44	48x2x16 AWG	0.7	42.24	48.64

INTHERM® NF 50

Extension or compensating cables, twisted in pairs, screened

URXOHR
PVC/OS/PVC

Example of KX extension cable

Application
INTHERM® NF 50 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® NF 50 is basically used to measure temperature variations in industrial applications, particularly in oil industry.
The screening assures an electrostatic protection.

Special feature
INTHERM® NF 50 extension or compensating cables are manufactured according to the following norms:
NF M 87-201
IEC 332.1
IEC 332.3

NOTES:
The conductor class changes according to the norms and according to the required section:
It can be with single wire for 0.50 mm section, or flexible for 1 mm section.

Cable make-up:
Single wire or flexible conductors, insulation in special PVC compound, insulated conductors twisted in pairs, pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in special hydrocarbon-resistant PVC compound.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to NF M 87-201
- Operating voltage: 300/300 V
- Colour code: According to NF C 42-324 or IEC 584 See table T4

INTHERM® NF 50

Extension or compensating cables, twisted in pairs, screened

URXOHR
PVC/OS/PVC

Nominal voltage Uo/U: 300/300 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1	0.5	6.75
1x2x1.3	0.5	6.75

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
3x2x0.5	0.5	8.73
7x2x0.5	0.5	11.33
12x2x0.5	0.5	15.05
19x2x0.5	0.5	17.85
27x2x0.5	0.5	21.57

INTHERM® NF 51

Extension or compensating cables, twisted in pairs, screened on the single pair and on the total

URXHROHR
PVC/IS/PVC/OS/PVC

Example of KX extension cable

Application
INTHERM® NF 51 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® NF 51 is basically used to measure temperature variations in industrial applications, particularly in oil industry.
The screening assures an electrostatic protection to pairs and cable.

Special feature
INTHERM® NF 51 extension or compensating cables are manufactured according to the following norms:
NF M 87-201
IEC 332.1
IEC 332.3

NOTES:
The conductor class changes according to the norms and according to the required section:
It can be with single wire for 0.50 mm section, or flexible for 1 mm section.

Cable make-up:
Single wire or flexible conductors, insulation in special PVC compound, insulated conductors twisted in pairs with polyester tape and drain wire tinned copper and aluminium/mylar tape, pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in special hydrocarbon-resistant PVC compound.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Screen resistance: < 30 Ohm/Km
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to NF M 87-201
- Operating voltage: 300/300 V
- Colour code: According to NF C 42-324 or IEC 584 See table T4

INTHERM® NF 51

Extension or compensating cables, twisted in pairs, screened on the single pair and on the total

URXHROHR
PVC/IS/PVC/OS/PVC

Nominal voltage Uo/U: 300/300 V

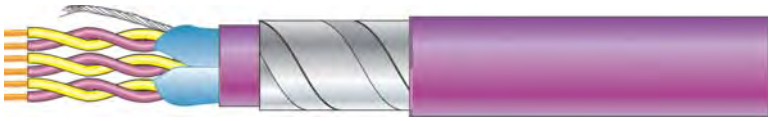
No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x1	0.5	6.75
1x2x1.3	0.5	6.75

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
3x2x0.5	0.5	12.06
7x2x0.5	0.5	16.38
12x2x0.5	0.5	21.88
19x2x0.5	0.5	26.00
27x2x0.5	0.5	31.50

INTHERM® NF 52

Extension or compensating cables, twisted in pairs, screened and armoured

URXOHRNR
PVC/OS/PVC/STA/PVC



Example of KX extension cable

Application
INTHERM® NF 52 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® NF 52 is basically used to measure temperature variations in industrial applications, particularly in oil industry.
The screening assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INTHERM® NF 52 extension or compensating cables are manufactured according to the following norms:
NF M 87-201
IEC 332.1
IEC 332.3

NOTES:
The conductor class changes according to the norms and according to the required section:
It can be with single wire for 0.50 mm section, or flexible for 1 mm section.

Cable make-up:
Single wire or flexible conductors, insulation in special PVC compound, insulated conductors twisted in pairs, pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, intermediate sheath in special hydrocarbon-resistant PVC compound, armour in double steel tape overlapped, outer sheath in special hydrocarbon-resistant PVC compound.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: 300/300 V
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to NF M 87-201
- Screen resistance: < 30 Ohm/Km
- Colour code: According to NF C 42-324 or IEC 584 See table T4

INTHERM® NF 52

Extension or compensating cables, twisted in pairs, screened and armoured

URXOHRNR
PVC/OS/PVC/STA/PVC

Nominal voltage Uo/U: 300/300 V

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1	0.5	6.75	9.75
1x2x1.3	0.5	6.75	9.75

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
3x2x0.5	0.5	8.73	11.73
7x2x0.5	0.5	11.33	14.53
12x2x0.5	0.5	15.05	18.45
19x2x0.5	0.5	17.85	21.45
27x2x0.5	0.5	21.57	25.37

INTHERM® NF 53

Extension or compensating cables, twisted in pairs, screened on the single pair and on the total, and armoured

URXHROHRNR
PVC/IS/PVC/OS/PVC/STA/PVC

Example of KX extension cable

Application
INTHERM® NF 53 extension or compensating cable allows connection between the thermocouple and the indicator or recording equipment.
INTHERM® NF 53 is basically used to measure temperature variations in industrial applications, particularly in oil industry.
The screening assures an electrostatic protection.
The armour mechanically protects the cable during installation, and it prevents deflection when installed.

Special feature
INTHERM® NF 53 extension or compensating cables are manufactured according to the following norms:
NF M 87-201
IEC 332.1
IEC 332.3

NOTES:
The conductor class changes according to the norms and according to the required section:
It can be with single wire for 0.50 mm section, or flexible for 1 mm section.

Cable make-up:
Single wire or flexible conductors, insulation in special PVC compound, insulated conductors twisted in pairs and wound with polyester tape and drain wire tinned copper and aluminium/mylar tape, the whole insulated with a special PVC sheath, pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, intermediate sheath in special hydrocarbon-resistant PVC compound, armour in double steel tape overlapped, outer sheath in special hydrocarbon-resistant PVC compound

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: 300/300 V
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to NF M 87-201
- Screen resistance: < 30 Ohm/Km
- Colour code: According to NF C 42-324 or IEC 584 See table T4

INTHERM® NF 53

Extension or compensating cables, twisted in pairs, screened on the single pair and on the total, and armoured

URXHROHRNR
PVC/IS/PVC/OS/PVC/STA/PVC

Nominal voltage Uo/U: 300/300 V

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1	0.5	6.75	9.75
1x2x1.3	0.5	6.75	9.75

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
3x2x0.5	0.5	12.06	15.46
7x2x0.5	0.5	16.38	19.98
12x2x0.5	0.5	21.88	25.68
19x2x0.5	0.5	26.00	30.00
27x2x0.5	0.5	31.50	35.70

Cables for lifting systems

INFLAT® 400

Flat cables insulated in PVC with PVC sheath

H05VVH6-F
FRDR

Application
The range of application of **INFLAT® 400** flat cables includes electrical systems suitable for lift or elevator installation, having a suspended free length not exceeding 35 m and a movement speed not exceeding 1.6 m/s, with max ambient temperature of 40°C and min. of 0°C.

Special feature
INFLAT® 400 flat cables are constructed according to the following norms:
CEI 20-25
CENELEC HD 359 S2
CEI 20-55
CEI EN 50214
CEI 20-35

NOTES:
INFLAT® 400
is a cable marked IEMMEQU.
It is available also in the version not marked with CEI 20-22 II.
It is also available in version H05VVD3H6-F with two side textile or metal carrying ropes .

Cable make-up:
Fine strands of copper wire, conductor insulation with TI2 PVC compound, insulated cores sided in parallel, outer sheath in TM2 PVC compound.

Technical data

Operating temperature:
0°C/40°C

Operating voltage:
U_0/U 300/500 V

Strand construction:
fine wires according to CEI 20-29, Cl5

Colour code:
CEI UNEL 00722

INFLAT® 400

Flat cables insulated in PVC with PVC sheath

H05VVH6-F
FRDR

Nominal voltage Uo/U: 300/500 V

Denomination	No. conductors (mm)	Outside dimensions (mm)
H05VVH6-F	6x0.75	4.4 x 18.70
H05VVH6-F	9x0.75	4.4 x 27.00
H05VVH6-F	12x0.75	4.4 x 34.20
H05VVH6-F	16x0.75	4.4 x 44.90
H05VVH6-F	20x0.75	4.4 x 56,.60
H05VVH6-F	24x0.75	4.4 x 66.30

INFLAT® 401

Flat cables insulated in PVC with PVC sheath

H07VVH6-F
FRDR

Application
The range of application of **INFLAT® 401** flat cables includes electrical systems suitable for lift or elevator installation, having a suspended free length not exceeding 35 m and a movement speed not exceeding 1.6 m/s, with max ambient temperature of 40°C and min. of 0°C.

Special feature
INFLAT® 401 flat cables are constructed according to the following norms:
CEI 20-25
CENELEC HD 359 S2
CEI 20-35

NOTES:
INFLAT® 401
is a cable marked IEMMEQU.
It is available also in the version not marked with CEI 20-22 II.
It is also available in version H07VVD3H6-F with two side textile or metal carrying ropes .

Cable make-up:
Fine strands of copper wire, conductor insulation with TI2 PVC compound, insulated cores sided in parallel, outer sheath in TM2 PVC compound.

Technical data

Operating temperature:
0°C/40°C

Operating voltage:
U_0/U 450/750 V

Strand construction:
fine wires according to CEI 20-29, Cl5

Colour code:
CEI UNEL 00722

INFLAT® 401

Flat cables insulated in PVC with PVC sheath

H07VVH6-F
FRDR

Nominal voltage Uo/U: 450/750 V

Denomination	No. conductors (mm)	Outside dimensions (mm)
H07VVH6-F	4x1.5	5.4 x 15.60
H07VVH6-F	6x1.5	5.4 x 23.10
H07VVH6-F	8x1.5	5.4 x 29.10
H07VVH6-F	10x1.5	5.4 x 36.40
H07VVH6-F	12x1.5	5.4 x 42.60
H07VVH6-F	16x1.5	5.4 x 56.10
H07VVH6-F	20x1.5	5.4 x 62.20
H07VVH6-F	4x2.5	6.0 x 19.00
H07VVH6-F	6x2.5	6.0 x 27.60
H07VVH6-F	8x2.5	6.0 x 35.80
H07VVH6-F	10x2.5	6.0 x 44.40
H07VVH6-F	12x2.5	6.0 x 52.60
H07VVH6-F	16x2.5	6.0 x 69.40
H07VVH6-F	4x4	6.9 x 21.00
H07VVH6-F	4x6	7.7 x 24.20
H07VVH6-F	4x10	9.5 x 29.80
H07VVH6-F	4x16	11.0 x 35.40
FRDR	4x25	13.6 x 42.20
FRDR	4x35	14.6 x 47.20
FRDR	4x50	18.0 x 67.00

INFLAT® 402

Flat cables insulated in PVC with PVC sheath

A07VVH-F
FRDR

Application
The range of application of **INFLAT® 402** flat cables includes electrical systems suitable for installing lifts and elevators, even in wet rooms, where the cables are freely suspended but are not subject to additional loads.
In case of External laying, application is not allowed at temperatures below 0°C.

Special feature
INFLAT® 402 flat cables are constructed according to the following norms:
CEI UNEL 73659
CEI 20-35

NOTES:
INFLAT® 402
is a cable marked IEMMEQU.
It is available also in the version not marked with CEI 20-22 II.

Cable make-up:
Fine strands of copper wire, conductor insulation with TI2 PVC compound, insulated cores sided in parallel, outer sheath in TM2 PVC compound.

Technical data

Operating temperature:
0°C/40°C

Operating voltage:
U_0/U 450/750 V

Strand construction:
fine wires according to CEI 20-29, Cl5

Colour code:
CEI UNEL 00722

INFLAT® 402

Flat cables insulated in PVC with PVC sheath

A07VVH-F
FRDR

Nominal voltage Uo/U: 450/750 V

Denomination	No. conductors (mm)	Outside dimensions (mm)
A07VVH-F	4x1	5.0 x 18.40
A07VVH-F	6x1	5.0 x 22.20
A07VVH-F	9x1	5.0 x 31.80
A07VVH-F	12x1	5.0 x 47.20
A07VVH-F	16x1	5.0 x 63.20
A07VVH-F	20x1	5.0 x 79.20
A07VVH-F	24x1	5.0 x 93.20

INFLAT® 403

Special construction flat cables insulated in PVC, with PVC sheath

FRH2DR
PVC/TcuS/PVC

Application
The range of application of **INFLAT® 403** flat cables includes electrical systems suitable for transport and lifting field, both inside and outside, with small dimensions and fast movement with a minimum ambient temperature of 0°C.

Special feature
INFLAT® 403 flat cables are constructed according to the following norms:
CEI 20-35

NOTES:
INFLAT® 403
is also available in the CEI 20-22 II version.

Cable make-up:
Fine copper strands, conductor insulation in TI2 PVC compound, insulated conductors screened by a spiral of fine wires in tinned copper and wrapped by a numbered polyester tape, insulated and screened cores sided in parallel, outer sheath in TM2 PVC compound.

Technical data

Operating temperature:
0°C/40°C

Operating voltage:
U_0/U 300/500 V, 450/750 V

Strand construction:
fine wires according to CEI 20-29, Cl5

Colour code:
CEI UNEL 00722

INFLAT® 403

Special construction flat cables insulated in PVC, with PVC sheath

FRH2DR
PVC/TcuS/PVC

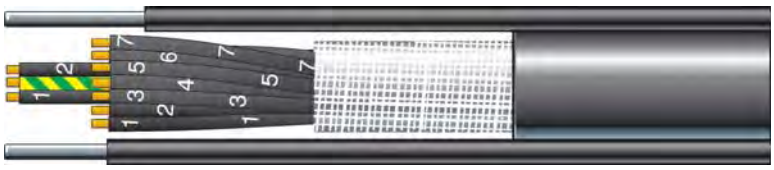
Nominal voltage Uo/U: 300/500 and 450/750 V

Denomination	No. conductors (mm)	Outside dimensions (mm)
FRH2DR	4x1.5	5.4 x 15.60
FRH2DR	6x1.5	5.4 x 23.10
FRH2DR	8x1.5	5.4 x 29.10
FRH2DR	10x1.5	5.4 x 36.40
FRH2DR	12x1.5	5.4 x 42.60
FRH2DR	16x1.5	5.4 x 56.10
FRH2DR	20x1.5	5.4 x 62.20

INFLAT® 450

Multi-core self-supporting control and signal cable, extra-flexible, insulated with PVC with PVC sheath

FFROYR
PVC/PVC



Application
The range of applications of **INFLAT® 450** includes all control and signal cables where tensile strength is sustained by two side steel wires inserted in the outer sheath.
INFLAT® 450 is applied in suspended switchboards and lifting and handling systems
For better flexibility, the different conductor layers are covered with a textile tape which improves the possibility of reciprocal movement between conductors and between conductors and outer sheath.

Special feature
INFLAT® 450 control and signal cables are manufactured according to the following norms:
CEI 20-35

NOTES:
INFLAT® 450
is also available in the CEI 20-22 II version.

Cable make-up:
Very fine strands of copper wire, conductor insulated with TI2 PVC compound, stronded in layers, each layers wrapped with fabric tape, outer sheath in TM2 PVC compound.
Two strain relief steel wires are inserted in the outer sheath.

Technical data

Operating temperature:
70°C max

Short-circuit temperature:
160°C max

Operating voltage:
U_0/U 300/500 V

Test voltage:
4000 V

Strand construction:
fine wires according to CEI 20-29, Cl6

Colour code:
numbered black cores
With or without G/V

Tensile strength:
2100 N

INFLAT® 450

Multi-core self-supporting control and signal cables, extra-flexible, insulated with PVC with PVC sheath

FFROYR
PVC/PVC

Nominal voltage Uo/U: 300/500 V

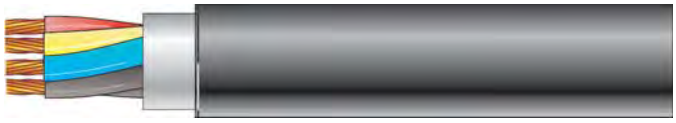
No. conductors (mm)	External Ø (mm)	Rope distance from their centre (mm)
8 x 1.5	16.3	24.1
12 x 1.5	18.4	26.2
16 x 1.5	20.2	28.4
20 x 1.5	22.8	31.3

Cables according to BS standards

INSTRUM® BS 500

Power cables insulated in PVC

RROR
PVC/PVC



Application
INSTRUM® BS 500 is used as power supply cable in industry, suitable for static installation, in piping, raceways or trays. Underground installation is possible as well.

Special feature
INSTRUM® BS 500 power cables are manufactured according to the following norms:
BS 6346
BS 4066 P1
BS 4066 P3
IEC 332.1
IEC 332.3

NOTES:
INSTRUM® BS 500
is also available in the version with class 1 single wire conductors of the CEI 20-29/IEC 60228 and VDE 0295 norms, where the conductor size allows it.

Cable make-up:
Semiflexible copper conductors, conductor insulation in TI1 PVC compound, stranding in layers, outer sheath in TM1 PVC compound, black colour, fire-retardant according to BS 4066 P1 and P3 norms.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Installation temperature: 5°C min
- Test voltage: 4000 V
- Insulation resistance: >100 Mohm/Km
- Colour code: BS 6346
- Strand construction: circular cables according to IEC 228/CEI 20-29/VDE 0295, Cl2
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® BS 500

Power cables insulated in PVC

RROR
PVC/PVC

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x10	1.00	16.10	2x16	1.00	18.60
3x10	1.00	17.00	3x16	1.00	19.70
4x10	1.00	18.60	4x16	1.00	21.60

INSTRUM® BS 501

Power cables insulated in PVC and armoured

RROFR
PVC/PVC/SWA/PVC

Application
INSTRUM® BS 501 is used as power supply cable, suitable for static installation, in piping, raceways or trays.
Underground installation is possible as well.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® BS 501 power cables are manufactured according to the following norms:
BS 6346
BS 4066 P1
BS 4066 P3
IEC 332.1
IEC 332.3

NOTES:
INSTRUM® BS 501
is also available in the version with class 1 single wire conductors of the CEI 20-29/IEC 60228 and VDE 0295 norms, where the conductor size allows it.

Cable make-up:
Semiflexible copper conductors, conductor insulation in TI1 PVC compound, stranding in layers, filler or inner sheath in PVC compound, armour in galvanised steel wire spiral, outer sheath in TM1 PVC compound, black colour, fire-retardant according to BS 4066 P1 and P3 norms.

Technical data

Operating temperature:
70°C max

Short-circuit temperature:
160°C max

Installation temperature:
5°C min

Test voltage:
4000 V

Insulation resistance:
>100 Mohm/Km

Colour code:
BS 6346

Strand construction:
circular cables according to IEC 228/CEI 20-29/VDE 0295, Cl2

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® BS 501

Power cables insulated in PVC and armoured

RROFR
PVC/PVC/SWA/PVC

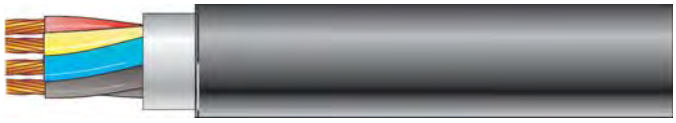
Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.6	12.30	2x2.5	0.7	13.60	2x4	0.8	15.10
3x1.5	0.6	12.80	3x2.5	0.7	14.10	3x4	0.8	15.80
4x1.5	0.6	13.50	4x2.5	0.7	15.00	4x4	0.8	17.80
7x1.5	0.6	15.20	7x2.5	0.7	18.00	7x4	0.8	20.50
12x1.5	0.6	19.40	12x2.5	0.7	22.40	12x4	0.8	26.80
19x1.5	0.6	22.20	19x2.5	0.7	26.60	19x4	0.8	30.50
27x1.5	0.6	26.70	27x2.5	0.7	30.70	27x4	0.8	37.10
37x1.5	0.6	29.20	37x2.5	0.7	34.00	37x4	0.8	40.80

INSTRUM® BS 502

Power cables insulated with crosslinked polyethylene

RE4OR
XLPE/PVC



Application
INSTRUM® BS 502 is used as power supply cable, suitable for static installation, in piping, raceways or trays.
Underground installation is possible as well.

Special feature
INSTRUM® BS 502 power cables are manufactured according to the following norms:
BS 5467
BS 4066 P1
IEC 332.1

NOTES:
INSTRUM® BS 502
is also available in the version with class 1 single wire conductors of the CEI 20-29/IEC 60228 and VDE 0295 norms, where size allows it.

Cable make-up:
Semiflexible copper conductors, conductor insulation in crosslinked polyethylene XLPE stranding in layers, outer sheath in PVC compound type 9 according to BS 6746, black colour, fire-retardant according to BS 4066 P1 norms.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: 0°C min
- Test voltage: 4000 V
- Insulation resistance: >1000 Mohm/Km
- Colour code: BS 5467
- Strand construction: circular cables according to IEC 228/CEI 20-29/VDE 0295, Cl2
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® BS 502

Power cables insulated with crosslinked polyethylene

RE4OR
XLPE/PVC

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x16	0.7	17.20
3x16	0.7	18.30
4x16	0.7	20.00

INSTRUM® BS 503

Power cables insulated with crosslinked polyethylene and armoured

RE4OFR
XLPE/PVC/SWA/PVC

Application
INSTRUM® BS 503 is used as power supply cable in industry, suitable for static installation, in piping, raceways or trays. Underground installation is possible as well.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® BS 503 power cables are manufactured according to the following norms:
BS 5467
BS 4066 P1
IEC 332.1

NOTES:
INSTRUM® BS 503
is also available in the version with class 1 single wire conductors of the CEI 20-29/IEC 60228 and VDE 0295 norms, where size allows it.

Cable make-up:
Copper stranded conductors, conductor insulation with crosslinked polyethylene XLPE, stranding in layers, filler or inner sheath in PVC compound, armour in galvanised steel wire spiral, outer sheath in PVC compound type 9 according to BS 6746, black colour, fire-retardant according to BS 4066 P1 norms.

Technical data

Operating temperature:
90°C max

Short-circuit temperature:
250°C max

Installation temperature:
0°C min

Test voltage:
4000 V

Insulation resistance:
>10000 Mohm/Km

Colour code:
BS 5467

Strand construction:
circular cables according to IEC 228/CEI 20-29/VDE 0295, Cl2

Operating voltage:
U_0/U 0.6/1 Kv

INSTRUM® BS 503

Power cables insulated with crosslinked polyethylene and armoured

RE4OFR
XLPE/PVC/SWA/PVC

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	12.50	2x2.5	0.7	13.60	2x4	0.7	14.70
3x1.5	0.7	13.00	3x2.5	0.7	14.10	3x4	0.7	15.30
4x1.5	0.7	14.00	4x2.5	0.7	15.00	4x4	0.7	16.40
7x1.5	0.7	15.90	7x2.5	0.7	17.10	7x4	0.7	19.70
12x1.5	0.7	20.20	12x2.5	0.7	22.40	12x4	0.7	25.70
19x1.5	0.7	23.20	19x2.5	0.7	26.60	19x4	0.7	29.30
27x1.5	0.7	27.90	27x2.5	0.7	30.70	27x4	0.7	34.40
37x1.5	0.7	30.60	37x2.5	0.7	33.80	37x4	0.7	39.20

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	15.90	2x10	0.7	18.00	2x16	0.7	20.00
3x6	0.7	16.60	3x10	0.7	19.50	3x16	0.7	21.20
4x6	0.7	18.70	4x10	0.7	21.10	4x16	0.7	22.90

INSTRUM® BS 504

Armoured power cables, insulated with crosslinked polyethylene, with low toxic and corrosive smoke and gas emission

RE4OFM1
XLPE/LSOH/SWA/LSOH

Application
INSTRUM® BS 504 is used as power supply cable suitable for static installation.
Underground installation is possible as well.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® BS 504 power cables are manufactured according to the following norms:
BS 6724
BS 4066 P1
IEC 332.1

NOTES:
INSTRUM® BS 504
is also available in the version with class 1 single wire conductors of the CEI 20-29/IEC 60228 and VDE 0295 norms, where size allows it.

Cable make-up:
Copper stranded conductors, conductor insulation with crosslinked polyethylene XLPE stranding in layers, filler or inner sheath in thermoplastic material with low halogen emission, armour in galvanised steel wires, outer sheath in thermoplastic material with low halogen emission, fire-retardant black colour according to BS 4066 P1.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: -5°C min
- Test voltage: 4000 V
- Insulation resistance: >10000 Mohm/Km
- Colour code: BS 6724
- Strand construction: circular cables according to IEC 228/CEI 20-29/VDE 0295, Cl2
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® BS 504

Armoured power cables, insulated with crosslinked polyethylene, with low toxic and corrosive smoke and gas emission

RE4OFM1
XLPE/LSOH/SWA/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	12.50	2x2.5	0.7	13.60	2x4	0.7	14.70
3x1.5	0.7	13.00	3x2.5	0.7	14.10	3x4	0.7	15.30
4x1.5	0.7	14.00	4x2.5	0.7	15.00	4x4	0.7	16.40
7x1.5	0.7	15.90	7x2.5	0.7	17.10	7x4	0.7	19.70
12x1.5	0.7	20.20	12x2.5	0.7	22.40	12x4	0.7	25.70
19x1.5	0.7	23.20	19x2.5	0.7	26.60	19x4	0.7	29.30
27x1.5	0.7	27.90	27x2.5	0.7	30.70	27x4	0.7	34.40
37x1.5	0.7	30.60	37x2.5	0.7	33.80	37x4	0.7	39.20

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	15.90	2x10	0.7	18.00	2x16	0.7	20.00
3x6	0.7	16.60	3x10	0.7	19.50	3x16	0.7	21.20
4x6	0.7	18.70	4x10	0.7	21.10	4x16	0.7	22.90

INSTRUM® BS 505

Armoured power cables, insulated in rubber, with low toxic and corrosive smoke and gas emission

RG7OFM1
EPR/LSOH/SWA/LSOH

Application
INSTRUM® BS 505 is used as power supply cable suitable for static installation.
Underground installation is possible as well.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® BS 505 power cables are manufactured according to the following norms:
BS 6724
BS 4066 P1
IEC 332.1

NOTES:
INSTRUM® BS 505
is also available in the version with class 1 single wire conductors of the CEI 20-29/IEC 60228 and VDE 0295 norms, where size allows it.

Cable make-up:
Copper stranded conductors, conductor insulation in EPR ethyl-propylene rubber, stranding in layers, filler or inner sheath in thermoplastic material with low halogen emission, armour in galvanised steel wires, outer sheath in thermoplastic material with low halogen emission, fire-retardant black colour according to BS 4066 P1.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: -10°C min
- Test voltage: 4000 V
- Insulation resistance: >1000 Mohm/Km
- Colour code: BS 6724
- Strand construction: circular cables according to IEC 228/CEI 20-29/VDE 0295, Cl2
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® BS 505

Armoured power cables, insulated in rubber, with low toxic and corrosive smoke and gas emission

RG7OFM1
EPR/LSOH/SWA/LSOH

Nominal voltage Uo/U: 0.6/1 Kv

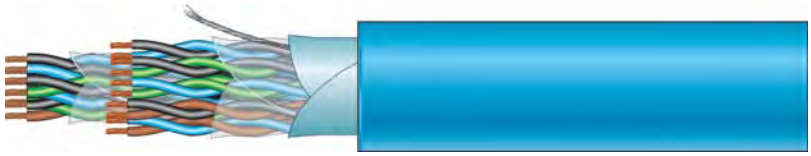
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	12.50	2x2.5	0.7	13.60	2x4	0.7	14.70
3x1.5	0.7	13.00	3x2.5	0.7	14.10	3x4	0.7	15.30
4x1.5	0.7	14.00	4x2.5	0.7	15.00	4x4	0.7	16.40
7x1.5	0.7	15.90	7x2.5	0.7	17.10	7x4	0.7	19.70
12x1.5	0.7	20.20	12x2.5	0.7	22.40	12x4	0.7	25.70
19x1.5	0.7	23.20	19x2.5	0.7	26.60	19x4	0.7	29.30
27x1.5	0.7	27.90	27x2.5	0.7	30.70	27x4	0.7	34.40
37x1.5	0.7	30.60	37x2.5	0.7	33.80	37x4	0.7	39.20

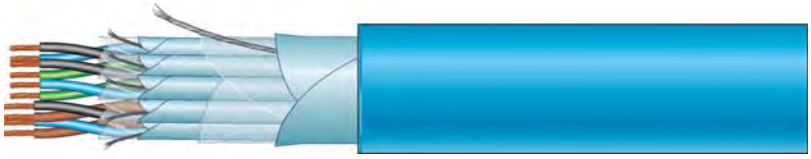
No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	15.90	2x10	0.7	18.00	2x16	0.7	20.00
3x6	0.7	16.60	3x10	0.7	19.50	3x16	0.7	21.20
4x6	0.7	18.70	4x10	0.7	21.10	4x16	0.7	22.90

INSTRUM® BS 570
INSTRUM® BS 571

Twisted pair signal cables insulated on the single pair and on the total, or only on the total, insulated with polyethylene

FEXOHR/FEXHOHR
PE/OS/PVC
PE/IS/OS/PVC





Application
INSTRUM® BS 570/571 is generally used in industrial processes, in production plants, for data, control and signal transmission, typically in chemical and petrochemical industry.
INSTRUM® BS 570/571 is suitable for static installation, used for intrinsically safe systems.
The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® BS 570/571 signal cables are manufactured according to the following norms:
BS 5308 P1/T1
BS 4066 P1
IEC 332.1

NOTES:
INSTRUM® BS 570/571
The formation of conductors provided by the specification changes according to the required section, and it is provided according to class 1 or 2 or 5 of CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Copper wire conductors, conductor insulation with polyethylene type 03 according to BS 6234, insulated are twisted in pairs conductors (for version 571, covered with polyester tape and tinned copper drainage wire and aluminium/mylar tape), pairs strouded on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in TM1 PVC compound, fire retardant blue colour according to BS 4066 P1 norms.

Technical data

- Operating temperature: 60°C max
- Short-circuit temperature: 150°C max
- Operating voltage: 300/500 V
- Test voltage: 2000 V
- Insulation resistance: >5000 Mohm/Km
- Installation temperature: -5°C min
- Strand construction: according to BS 5308 P1
- Screen resistance: < 30 Ohm/Km
- Colour code: Appendix ABS 5308 P1

INSTRUM® BS 570
INSTRUM® BS 571

Twisted pair signal cables insulated on the single pair and on the total, or only on the total, insulated with polyethylene

FEXOHR/FEXHOHR
PE/OS/PVC
PE/IS/OS/PVC

INSTRUM® BS 570

Nominal section (mm²)	Conductor make up (mm)	Conductor class
0.50	16x0.20	5
0.75	24x0.20	5
1.50	7x0.53	2

Nominal voltage Uo/U: 300/500 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.6	6.00	1x2x0.75	0.6	6.30	1x2x1.5	0.6	7.30
2x2x0.5	0.6	6.90	2x2x0.75	0.6	7.30	2x2x1.5	0.6	8.70
5x2x0.5	0.6	12.10	5x2x0.75	0.6	13.30	5x2x1.5	0.6	15.40
10x2x0.5	0.6	16.20	10x2x0.75	0.6	17.70	10x2x1.5	0.6	20.60
15x2x0.5	0.6	18.80	15x2x0.75	0.6	20.40	15x2x1.5	0.6	24.20
20x2x0.5	0.6	21.30	20x2x0.75	0.6	23.50	20x2x1.5	0.6	27.50
30x2x0.5	0.6	25.90	30x2x0.75	0.6	28.50	30x2x1.5	0.6	33.30
50x2x0.5	0.6	32.90	50x2x0.75	0.6	36.40	50x2x1.5	0.6	42.60

INSTRUM® BS 571

Nominal section (mm²)	Conductor make up (mm)	Conductor class
0.50	16x0.20	5
0.75	24x0.20	5
1.50	7x0.53	2

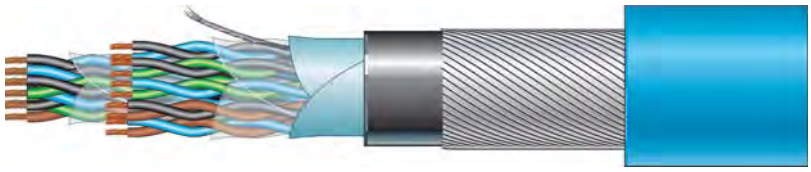
Nominal voltage Uo/U: 300/500 V

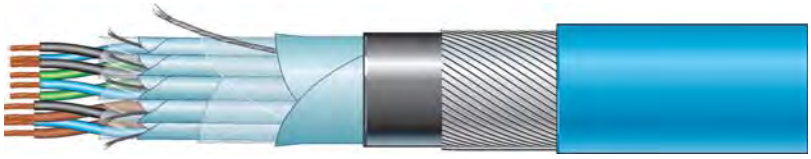
No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.6	11.00	1x2x0.75	0.6	11.80	1x2x1.5	0.6	13.70
5x2x0.5	0.6	14.20	5x2x0.75	0.6	15.30	5x2x1.5	0.6	17.80
10x2x0.5	0.6	20.10	10x2x0.75	0.6	21.70	10x2x1.5	0.6	25.50
15x2x0.5	0.6	23.50	15x2x0.75	0.6	25.40	15x2x1.5	0.6	29.80
20x2x0.5	0.6	26.30	20x2x0.75	0.6	28.80	20x2x1.5	0.6	33.40
30x2x0.5	0.6	31.30	30x2x0.75	0.6	34.50	30x2x1.5	0.6	40.00
50x2x0.5	0.6	40.70	50x2x0.75	0.6	44.00	50x2x1.5	0.6	51.20

INSTRUM® BS 572
INSTRUM® BS 573

Twisted pair signal cables insulated on the single pair and on the total, or only on the total, armoured, insulated with polyethylene

FEXOHEFR/FEXHOHEFR
PE/OS/PE/SWA/PVC
PE/IS/OS/PE/SWA/PVC





Application
INSTRUM® BS 572/573 is generally used in industrial processes, in production plants, for data, control and signal transmission, typically in chemical and petrochemical industry.
INSTRUM® BS 572/573 is suitable for static installation, used for intrinsically safe systems, the armour mechanically protects the cable during installation, and it prevents deflection when installed.
The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® BS 572/573 signal cables are manufactured according to the following norms:
BS 5308 P1/T2
BS 4066 P1
IEC 332.1

NOTES:
INSTRUM® BS 572/573
The formation of conductors provided by the specification changes according to the required section, and it is provided according to class 1 or 2 or 5 of CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Copper wire conductors, conductor insulation with polyethylene type 03 according to BS 6234, insulated conductors are twisted in pairs (for version 573, covered with polyester tape and tinned copper drainage wire and aluminium/mylar tape), pairs strouded on one another, screening in aluminium/mylar tape with tinned copper drain wire, intermediate sheath in type 03 polyethylene according to BS 6234, armour in galvanised steel wire spiral, outer sheath in special TM1 PVC compound, blue colour, fire-retardant according to BS 4066 P1 norms.

Technical data

- Operating temperature: 60°C max
- Short-circuit temperature: 150°C max
- Operating voltage: 300/500 V
- Test voltage: 2000 V
- Insulation resistance: >5000 Mohm/Km
- Installation temperature: -5°C min
- Strand construction: according to BS 5308 P1
- Screen resistance: < 30 Ohm/Km
- Colour code: Appendix ABS 5308 P1

INSTRUM® BS 572
INSTRUM® BS 573

Twisted pair signal cables insulated on the single pair and on the total, or only on the total, armoured, insulated with polyethylene

FEXOHEFR/FEXHOHEFR
PE/OS/PE/SWA/PVC
PE/IS/OS/PE/SWA/PVC

INSTRUM® BS 572

Nominal section (mm²)	Conductor make up (mm)	Conductor class
0.50	1x0.80	1
1.00	1x1.13	1
0.50	16x0.20	5
1.50	7x0.53	2

Nominal voltage Uo/U: 300/500 V

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x0.5	0.50	5.30	9.70	1x2x1	0.60	6.40	10.80	1x2x0.5	0.60	6.00	10.40
2x2x0.5	0.50	6.10	10.50	2x2x1	0.60	7.40	12.00	2x2x0.5	0.60	6.90	11.30
5x2x0.5	0.50	10.60	15.20	5x2x1	0.60	13.20	18.70	5x2x0.5	0.60	12.10	16.90
10x2x0.5	0.50	14.00	19.70	10x2x1	0.60	17.40	23.30	10x2x0.5	0.60	16.20	21.90
15x2x0.5	0.50	16.10	21.80	15x2x1	0.60	20.30	27.10	15x2x0.5	0.60	18.80	25.40
20x2x0.5	0.50	18.40	25.00	20x2x1	0.60	23.40	30.20	20x2x0.5	0.60	21.30	28.10
30x2x0.5	0.50	22.00	28.80	30x2x1	0.60	28.00	35.20	30x2x0.5	0.60	25.90	32.90
50x2x0.5	0.50	27.90	35.10	50x2x1	0.60	36.30	44.70	50x2x0.5	0.60	32.90	41.10

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.60	7.30	11.90
2x2x1.5	0.60	8.70	13.30
5x2x1.5	0.60	15.40	21.10
10x2x1.5	0.60	20.60	27.40
15x2x1.5	0.60	24.20	31.20
20x2x1.5	0.60	27.50	35.50
30x2x1.5	0.60	33.30	41.50
50x2x1.5	0.60	42.60	52.40

INSTRUM® BS 573

Nominal section (mm²)	Conductor make up (mm)	Conductor class
0.50	1x0.80	1
1.00	1x1.13	1
0.50	16x0.20	5
1.50	7x0.53	2

Nominal voltage Uo/U: 300/500 V

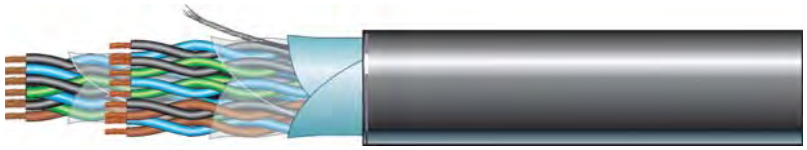
No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x0.5	0.50	9.30	13.90	1x2x1	0.60	11.80	16.60	1x2x0.5	0.60	11.00	15.80
5x2x0.5	0.50	12.50	18.00	5x2x1	0.60	15.20	20.90	5x2x0.5	0.60	14.20	19.90
10x2x0.5	0.50	17.30	23.20	10x2x1	0.60	21.60	28.40	10x2x0.5	0.60	20.10	26.90
15x2x0.5	0.50	20.10	26.70	15x2x1	0.60	25.20	32.20	15x2x0.5	0.60	23.50	30.30
20x2x0.5	0.50	22.50	29.30	20x2x1	0.60	28.80	36.80	20x2x0.5	0.60	26.30	33.30
30x2x0.5	0.50	26.90	33.90	30x2x1	0.60	34.40	42.80	30x2x0.5	0.60	31.30	39.50
50x2x0.5	0.50	35.10	43.50	50x2x1	0.60	43.90	53.90	50x2x0.5	0.60	40.70	50.50

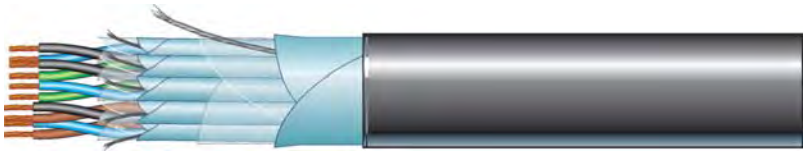
No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x1.5	0.60	13.70	19.40
5x2x1.5	0.60	17.80	24.40
10x2x1.5	0.60	25.50	32.50
15x2x1.5	0.60	29.80	37.80
20x2x1.5	0.60	33.40	41.60
30x2x1.5	0.60	40.00	49.80

INSTRUM® BS 574
INSTRUM® BS 575

Signal cables, twisted in pairs, screened on the single pair and/or on the total, or only on the total, insulated with PVC

FRXOHR/FRXHOHR
PVC/OS/PVC
PVC/IS/OS/PVC





Application
INSTRUM® BS 574/575 is generally used in industrial processes, in production plants, for data, control and signal transmission, typically in chemical and petrochemical industry.
INSTRUM® BS 574/575 is suitable for static installation; used for safety installation (not of the intrinsically safe system); The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® BS 574/575 signal cables are manufactured according to the following norms:
BS 5308 P2/T1
BS 4066 P1
BS 4066 P3
IEC 332.1
IEC 332.3.

NOTES:
INSTRUM® BS 574/575
The formation of conductors provided by the specification changes according to the required section, and it is provided according to class 1 or 2 or 5 of CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Copper conductors, conductor insulation in special TI1 PVC compound, insulated conductors twisted in pairs and wrapped with polyester tape and drain wire tinned copper and aluminium/mylar tape, pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in special TM1 PVC compound, black colour, fire-retardant according to CEI 4066 P1 and P3 norms.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: 300/500 V
- Test voltage: 2000 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to BS 5308 P2
- Screen resistance: < 30 Ohm/Km
- Colour code: Appendix ABS 5308 P2

INSTRUM® BS 574
INSTRUM® BS 575

Signal cables, twisted in pairs, screened on the single pair and/or on the total, or only on the total, insulated with PVC

FRXOHR/FRXHOHR
PVC/OS/PVC
PVC/IS/OS/PVC

INSTRUM® BS 574

Nominal section (mm²)	Conductor make up (mm)	Conductor class
0.50	16x0.20	5
0.75	24x0.20	5
1.50	7x0.53	2

Nominal voltage Uo/U: 300/500 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.6	6.00	1x2x0.75	0.6	6.30	1x2x1.5	0.6	7.30
2x2x0.5	0.6	6.90	2x2x0.75	0.6	7.30	2x2x1.5	0.6	8.70
5x2x0.5	0.6	12.10	5x2x0.75	0.6	13.30	5x2x1.5	0.6	15.40
10x2x0.5	0.6	16.20	10x2x0.75	0.6	17.70	10x2x1.5	0.6	20.60
15x2x0.5	0.6	18.80	15x2x0.75	0.6	20.40	15x2x1.5	0.6	24.20
20x2x0.5	0.6	21.30	20x2x0.75	0.6	23.50	20x2x1.5	0.6	27.50
30x2x0.5	0.6	25.90	30x2x0.75	0.6	28.50	30x2x1.5	0.6	33.30
50x2x0.5	0.6	32.90	50x2x0.75	0.6	36.40	50x2x1.5	0.6	42.60

INSTRUM® BS 575

Nominal section (mm²)	Conductor make up (mm)	Conductor class
0.50	16x0.20	5
0.75	24x0.20	5
1.50	7x0.53	2

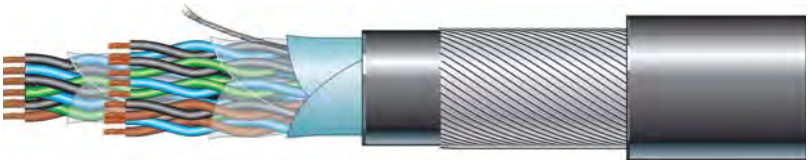
Nominal voltage Uo/U: 300/500 V

N° Coppie X mm²	Insulation thickness (mm)	External Ø (mm)	N° Coppie X mm²	Insulation thickness (mm)	External Ø (mm)	N° Coppie X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.5	0.6	11.00	1x2x0.75	0.6	11.80	1x2x1.5	0.6	13.70
5x2x0.5	0.6	14.20	5x2x0.75	0.6	15.30	5x2x1.5	0.6	17.80
10x2x0.5	0.6	20.10	10x2x0.75	0.6	21.70	10x2x1.5	0.6	25.50
15x2x0.5	0.6	23.50	15x2x0.75	0.6	25.40	15x2x1.5	0.6	29.80
20x2x0.5	0.6	26.30	20x2x0.75	0.6	28.80	20x2x1.5	0.6	33.40
30x2x0.5	0.6	31.30	30x2x0.75	0.6	34.50	30x2x1.5	0.6	40.00
50x2x0.5	0.6	40.70	50x2x0.75	0.6	44.00	50x2x1.5	0.6	51.20

INSTRUM® BS 576
INSTRUM® BS 577

Twisted pair signal cables screened on the single pair and on the total, or only on the total, armoured, insulated with PVC

FRXOHRFR/FRXHOHRFR
PVC/OS/PVC/SWA/PVC
PVC/IS/OS/PVC/SWA/PVC



Application
INSTRUM® BS 576/577 is generally used in industrial processes, in production plants, for data, control and signal transmission, typically in chemical and petrochemical industry.
INSTRUM® BS 576/577 is suitable for static installation, it is generally used for safety installation (not of the intrinsically safe), the armour mechanically protects the cable during installation, and it prevents deflection when installed.
The screening, when provided, assures an electrostatic protection.

Special feature
INSTRUM® BS 576/577 signal cables are manufactured according to the following norms:
BS 5308 P2/T2
BS 4066 P1
BS 4066 P3
IEC 332.1
IEC 332.3.

NOTES:
INSTRUM® BS 576/577
The formation of conductors provided by the specification changes according to the required section, and it is provided according to class 1 or 2 or 5 of CEI 20-29/IEC 60228 and VDE 0295 norms.

Cable make-up:
Copper conductors, conductor insulation in special TI1 PVC compound, insulated conductors twisted in pairs (for version 577, wrapped with polyester tape and drain wire tinned copper and aluminium/mylar tape), pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, inner sheath in special TM1 PVC compound, armour in galvanised steel wire spiral, outer sheath in special TM1 PVC compound, black colour, fire-retardant according to BS 4066 P1 and P3 norms.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: 300/500 V
- Test voltage: 2000 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to BS 5308 P2
- Screen resistance: < 30 Ohm/Km
- Colour code: Appendix ABS 5308 P2

INSTRUM® BS 576
INSTRUM® BS 577

Twisted pair signal cables screened on the single pair and on the total, or only on the total, armoured, insulated with PVC

FRXOHRFR/FRXHOHRFR
PVC/OS/PVC/SWA/PVC
PVC/IS/OS/PVC/SWA/PVC

INSTRUM® BS 576

Nominal section (mm²)	Conductor make up (mm)	Conductor class
0.50	16x0.20	5
0.75	24x0.20	5
1.50	7x0.53	2

Nominal Uo/U: 300/500 V

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x0.5	0.60	6.00	10.40	1x2x0.75	0.60	6.30	10.70	1x2x1.5	0.60	7.30	11.90
2x2x0.5	0.60	6.90	11.30	2x2x0.75	0.60	7.30	11.90	2x2x1.5	0.60	8.70	13.30
5x2x0.5	0.60	12.10	16.90	5x2x0.75	0.60	13.30	18.80	5x2x1.5	0.60	15.40	21.10
10x2x0.5	0.60	16.20	21.90	10x2x0.75	0.60	17.70	24.30	10x2x1.5	0.60	20.60	27.40
15x2x0.5	0.60	18.80	25.40	15x2x0.75	0.60	20.40	27.20	15x2x1.5	0.60	24.20	31.20
20x2x0.5	0.60	21.30	28.10	20x2x0.75	0.60	23.50	30.30	20x2x1.5	0.60	27.50	34.70
30x2x0.5	0.60	25.90	32.90	30x2x0.75	0.60	28.50	36.50	30x2x1.5	0.60	33.30	41.50
50x2x0.5	0.60	32.90	41.10	50x2x0.75	0.60	36.40	46.00	50x2x1.5	0.60	42.60	52.40

INSTRUM® BS 577

Nominal section (mm²)	Conductor make up (mm)	Conductor class
0.50	16x0.20	5
0.75	24x0.20	5
1.50	7x0.53	2

Nominal voltage Uo/U: 300/500 V

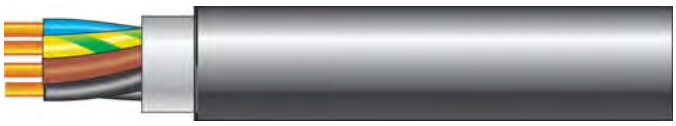
No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x0.5	0.60	11.00	15.80	1x2x0.75	0.60	11.80	16.60	1x2x1.5	0.60	13.70	19.40
5x2x0.5	0.60	14.20	19.90	5x2x0.75	0.60	15.30	21.00	5x2x1.5	0.60	17.80	24.40
10x2x0.5	0.60	20.10	26.90	10x2x0.75	0.60	21.70	28.50	10x2x1.5	0.60	25.50	32.50
15x2x0.5	0.60	23.50	30.30	15x2x0.75	0.60	25.40	32.40	15x2x1.5	0.60	29.80	37.80
20x2x0.5	0.60	26.30	33.30	20x2x0.75	0.60	28.80	36.80	20x2x1.5	0.60	33.40	41.60
30x2x0.5	0.60	31.30	39.50	30x2x0.75	0.60	34.50	42.90	30x2x1.5	0.60	40.00	49.80
50x2x0.5	0.60	40.70	50.50	50x2x0.75	0.60	44.00	54.00				

Cables according to NF standards

INSTRUM® NF 600

Power cables insulated in crosslinked polyethylene

UE4OR
XLPE/PVC



Application
INSTRUM® NF 600 is used as power supply, control and signal cable in industry, is for static installation, in piping or trays.

Special feature
INSTRUM® NF 600 power cables are manufactured according to the following norms:
NF C 32-321
IEC 332.1
IEC 332.3

NOTES:
INSTRUM® NF 600
Usually provided with class 1 conductors; for larger sections, it is also provided with class 2.

Cable make-up:
Single wire red copper conductors, insulation in crosslinked polyethylene, inner sheath in PVC, outer sheath in special PVC compound.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: 0°C min
- Test voltage: 4000 V
- Insulation resistance: >10000 Mohm/Km
- Colour code: NF C 32.321
- Strand construction: fine wires according to VDE 0295 Cl1/IEC 60228 Cl1/CEI 20-29, Cl1
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® NF 600

Power cables insulated in crosslinked polyethylene

UE4OR
XLPE/PVC

Nominal voltage Uo/U: 0.6/1 Kv

Class 2 strand

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	11.20	2x2.5	0.7	12.00	2x4	0.7	13.20
3x1.5	0.7	11.70	3x2.5	0.7	12.50	3x4	0.7	13.80
4x1.5	0.7	12.40	4x2.5	0.7	13.40	4x4	0.7	14.80
5x1.5	0.7	13.30	5x2.5	0.7	14.40	5x4	0.7	16.00
7x1.5	0.7	14.20	7x2.5	0.7	15.40	7x4	0.7	17.20
8x1.5	0.7	15.10	8x2.5	0.7	16.50	8x4	0.7	18.40
10x1.5	0.7	17.20	10x2.5	0.7	18.80	10x4	0.7	22.00
12x1.5	0.7	17.70	12x2.5	0.7	19.30	12x4	0.7	22.60
14x1.5	0.7	18.40	14x2.5	0.7	20.20	14x4	0.7	23.60
19x1.5	0.7	21.00	19x2.5	0.7	23.00	19x4	0.7	26.00
24x1.5	0.7	24.00	24x2.5	0.7	26.40			
30x1.5	0.7	25.20	30x2.5	0.7	27.80			
37x1.5	0.7	27.00	37x2.5	0.7	29.80			

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x6	0.7	14.40	2x10	0.7	16.20	2x16	0.7	18.20
3x6	0.7	15.10	3x10	0.7	17.00	3x16	0.7	19.20
4x6	0.7	16.30	4x10	0.7	18.50	4x16	0.7	21.70
5x6	0.7	17.60	5x10	0.7	20.10	5x16	0.7	23.60

Nominal voltage Uo/U: 0.6/1 Kv

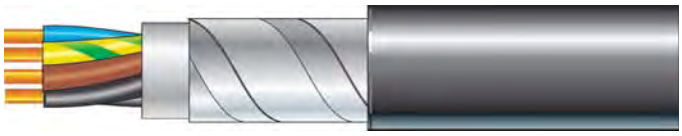
Class 1 strand

No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	External Ø (mm)
2x1.5	0.7	10.80	2x2.5	0.7	11.60
3x1.5	0.7	11.20	3x2.5	0.7	12.00
4x1.5	0.7	11.90	4x2.5	0.7	12.90
5x1.5	0.7	12.70	5x2.5	0.7	13.80
7x1.5	0.7	13.50	7x2.5	0.7	14.70
8x1.5	0.7	14.40	8x2.5	0.7	15.70
10x1.5	0.7	16.30	10x2.5	0.7	17.90
12x1.5	0.7	16.70	12x2.5	0.7	18.40
14x1.5	0.7	17.50	14x2.5	0.7	19.20
19x1.5	0.7	19.10	19x2.5	0.7	21.90
24x1.5	0.7	22.70	24x2.5	0.7	25.10
30x1.5	0.7	23.80	30x2.5	0.7	26.40
37x1.5	0.7	25.50	37x2.5	0.7	28.30

INSTRUM® NF 601

Power cables, armoured, insulated in crosslinked polyethylene

UE4ORNR
XLPE/PVC/STA/PVC



Application
INSTRUM® NF 601 is used as power supply, control and signal cable in industry, for static installation, in piping or trays.
The armour mechanically protects the cable during installation, and it prevents deflection when installed.

Particolarità
INSTRUM® NF 601 power cables are manufactured according to the following norms:
NF C 32-322
IEC 332.1
IEC 332.3

NOTE:
INSTRUM® NF 601
Usually provided with class 1 conductors; for larger sections, it is also provided with class 2.

Caratteristiche costruttive:
Single wire red copper conductors, insulation in crosslinked polyethylene, inner sheath in special PVC compound, armour in double steel tape overlapped, outer sheath in special PVC compound.

Technical data

- Operating temperature: 90°C max
- Short-circuit temperature: 250°C max
- Installation temperature: 0°C min
- Test voltage: 4000 V
- Insulation resistance: >10000 Mohm/Km
- Colour code: NF C 32.321
- Strand construction: fine wires according to VDE 0295 Cl1/IEC 60228 Cl1/CEI 20-29, Cl1
- Operating voltage: U_0/U 0.6/1 Kv

INSTRUM® NF 601

Power cables, armoured, insulated in crosslinked polyethylene

UE4ORNR
XLPE/PVC/STA/PVC

Nominal voltage Uo/U: 0.6/1 Kv — Class 2 strand

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x1.5	0.70	7.60	11.20	2x2.5	0.70	8.40	12.00	2x4	0.70	9.60	13.40
3x1.5	0.70	8.10	11.70	3x2.5	0.70	8.90	12.50	3x4	0.70	10.20	14.00
4x1.5	0.70	8.80	12.40	4x2.5	0.70	9.80	13.60	4x4	0.70	11.20	15.00
5x1.5	0.70	9.70	13.50	5x2.5	0.70	10.80	14.60	5x4	0.70	12.40	16.20
7x1.5	0.70	10.60	14.40	7x2.5	0.70	11.80	15.60	7x4	0.70	13.60	17.40
8x1.5	0.70	11.50	15.30	8x2.5	0.70	12.90	16.70	8x4	0.70	14.80	18.80
10x1.5	0.70	13.60	17.40	10x2.5	0.70	15.20	19.20	10x4	0.70	18.40	22.60
12x1.5	0.70	14.10	18.10	12x2.5	0.70	15.70	19.70	12x4	0.70	19.00	23.20
14x1.5	0.70	14.80	18.80	14x2.5	0.70	16.60	20.60	14x4	0.70	20.00	24.20
19x1.5	0.70	17.40	21.40	19x2.5	0.70	19.40	23.60	19x4	0.70	22.40	26.80
24x1.5	0.70	20.40	24.60	24x2.5	0.70	22.80	27.20				
30x1.5	0.70	21.60	26.00	30x2.5	0.70	24.20	28.80				
37x1.5	0.70	23.40	27.80	37x2.5	0.70	26.20	30.80				

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x6	0.70	10.80	14.60	2x10	0.70	12.60	16.40	2x16	0.70	14.60	18.60
3x6	0.70	11.50	15.30	3x10	0.70	13.40	17.40	3x16	0.70	15.60	19.60
4x6	0.70	12.70	16.50	4x10	0.70	14.90	18.90	4x16	0.70	18.10	22.30
5x6	0.70	14.00	18.00	5x10	0.70	16.50	20.70	5x16	0.70	20.00	24.20

Nominal voltage Uo/U: 0.6/1 Kv — Class 1 strand

No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)	No. conductors X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
2x1.5	0.7	7.20	10.80	2x2.5	0.7	8.00	11.60
3x1.5	0.7	7.60	11.20	3x2.5	0.7	8.40	12.00
4x1.5	0.7	8.30	11.90	4x2.5	0.7	9.30	13.10
5x1.5	0.7	9.10	12.90	5x2.5	0.7	10.20	14.00
7x1.5	0.7	9.90	13.70	7x2.5	0.7	11.10	14.90
8x1.5	0.7	10.80	14.60	8x2.5	0.7	12.10	15.90
10x1.5	0.7	12.70	16.50	10x2.5	0.7	14.30	18.30
12x1.5	0.7	13.10	17.10	12x2.5	0.7	14.80	18.80
14x1.5	0.7	13.90	17.90	14x2.5	0.7	15.60	19.60
19x1.5	0.7	15.50	19.50	19x2.5	0.7	18.30	22.50
24x1.5	0.7	19.10	23.30	24x2.5	0.7	21.50	25.90
30x1.5	0.7	20.20	24.60	30x2.5	0.7	22.80	27.40
37x1.5	0.7	21.90	26.30	37x2.5	0.7	24.70	29.30

INSTRUM® NF 670

Instrumentation cables, twisted in pairs, screened

FRXOHR
PVC/OS/PVC

Application
The range of applications of **INSTRUM® NF 670** instrument cables includes all electrical installations where data, signals or controls have to be transmitted, in particular in petrochemical industry.
The screening assures an electrostatic protection.

Special feature
INSTRUM® NF 670 instrument cables are manufactured according to the following norms:
NF M 87-202
IEC 332.1
IEC 332.3

NOTES:
The conductor class changes according to the norms and according to the required section:
it can be class 1 for a 0.50-mm section or class 2 for a 0.88-mm section.

Cable make-up:
Single wire copper conductors, insulation in special PVC compound, insulated conductors twisted in pairs, pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in special hydrocarbon-resistant PVC compound.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: 300/300 V
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to NF M 87-202
- Screen resistance: < 30 Ohm/Km
- Colour code: according to NF M 87-202

INSTRUM® NF 670

Instrumentation cables, twisted in pairs, screened

FRXOHR
PVC/OS/PVC

Nominal voltage Uo/U: 300/300 V

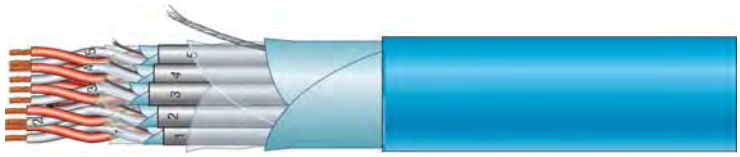
No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
1x2x0.9	0.5	6.55
1x3x0.9	0.5	6.88
1x4x0.9	0.5	7.45

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
3x2x0.5	0.5	8.73
7x2x0.5	0.5	11.33
12x2x0.5	0.5	15.05
19x2x0.5	0.5	17.85
27x2x0.5	0.5	21.57

INSTRUM® NF 671

Twisted in pairs instrumentation cables, screened on the single pair and on the total

FRXHROHR
PVC/IS/PVC/OS/PVC



Application
The range of applications of **INSTRUM® NF 671** instrumentation cables includes all electrical installations where data, signals or controls have to be transmitted, in particular in petrochemical industry.
The screening assures an electrostatic protection.

Special feature
INSTRUM® NF 671 instrument cables are manufactured according to the following norms:
NF M 87-202
IEC 332.1
IEC 332.3

NOTES:
The conductor class changes according to the norms and according to the required section:
it can be class 1 for a 0.50-mm_ section or class 2 for a 0.88-mm_ section.

Cable make-up:
Single wire copper conductors, insulation in special PVC compound, insulated conductors twisted in pairs, pairs stranded on one another, screening in aluminium/mylar tape with drain wire tinned copper, outer sheath in special hydrocarbon-resistant PVC compound.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: 300/300 V
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to NF M 87-202
- Screen resistance: < 30 Ohm/Km
- Colour code: according to NF M 87-202

INSTRUM® NF 671

Twisted in pairs instrumentation cables, screened on the single pair and on the total

FRXHROHR
PVC/IS/PVC/OS/PVC

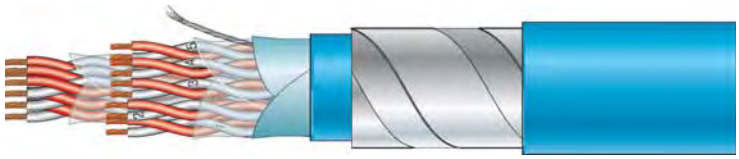
Nominal voltage Uo/U: 300/300 V

No. pairs X mm²	Insulation thickness (mm)	External Ø (mm)
3x2x0.5	0.5	12.06
7x2x0.5	0.5	16.38
12x2x0.5	0.5	21.88
19x2x0.5	0.5	26.00
27x2x0.5	0.5	31.50

INSTRUM® NF 672

Instrumentation cables, twisted in pairs, screened and armoured

FRXOHRNR
PVC/OS/PVC/STA/PVC



Application
The range of applications of **INSTRUM® NF 672** instrument cables includes all electrical installations where data, signals or controls have to be transmitted, in particular in petrochemical industry.
The screening assurese an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® NF 672 instrument cables are manufactured according to the following norms:
NF M 87-202
IEC 332.1
IEC 332.3

NOTES:
The conductor class changes according to the norms and according to the required section:
it can be class 1 for a 0.50-mm_ section or class 2 for a 0.88-mm_ section.

Cable make-up:
Copper conductors, insulation in special PVC compound, insulated conductors twisted in pairs, pairs stranded on one another, screening in aluminium/mylar tape with drain wire in tinned copper, inner sheath in special hydrocarbon-resistant PVC compound, armour in double steel tape overlapped, outer sheath in special hydrocarbon-resistant PVC compound.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: 300/300 V
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to NF M 87-202
- Screen resistance: < 30 Ohm/Km
- Colour code: according to NF M 87-202

INSTRUM® NF 672

Instrumentation cables, twisted in pairs, screened and armoured

FRXOHRNR
PVC/OS/PVC/STA/PVC

Nominal voltage Uo/U: 300/300 V

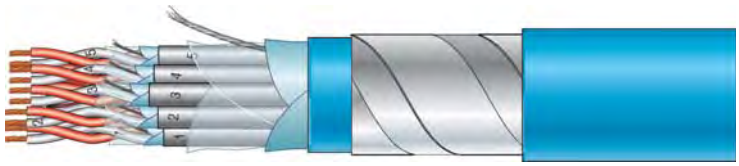
No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
1x2x0.9	0.5	6.55	9.55
1x3x0.9	0.5	6.88	9.88
1x4x0.9	0.5	7.45	10.45

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
3x2x0.5	0.5	8.73	11.73
7x2x0.5	0.5	11.33	14.53
12x2x0.5	0.5	15.05	18.45
19x2x0.5	0.5	17.85	21.45
27x2x0.5	0.5	21.57	25.37

INSTRUM® NF 673

Twisted pair instrumentation cables, screened on the single pair and on the total, armoured

FRXHROHRNR
PVC/IS/PVC/OS/PVC/STA/PVC



Application
The range of applications of **INSTRUM® NF 673** instrument cables includes all electrical installations where data, signals or controls have to be transmitted, in particular in petrochemical industry.
The screening assures an electrostatic protection.
The armour protects the cable mechanically during installation, and it prevents deflection when installed.

Special feature
INSTRUM® NF 673 instrument cables are manufactured according to the following norms:
NF M 87-202
IEC 332.1
IEC 332.3

NOTES:
The conductor class changes according to the norms and according to the required section:
it can be class 1 for a 0.50-mm_ section or class 2 for a 0.88-mm_ section.

Cable make-up:
Cpper wire conductors, conductor insulation with special PVC compound, double pair insulated conductors covered with polyester tape, drain wire and aluminium/mylar tape, insulated with a special PVC compound sheath, pairs strouded on one another, screening in aluminium/mylar tape with tinned copper drain wire, inner sheath in special hydrocarbon-resistant PVC compound, armour in double steel tape overlapped, outer sheath in special hydrocarbon-resistant PVC compound.

Technical data

- Operating temperature: 70°C max
- Short-circuit temperature: 160°C max
- Operating voltage: 300/300 V
- Test voltage: 1500 V
- Insulation resistance: >100 Mohm/Km
- Installation temperature: 5°C min
- Strand construction: according to NF M 87-202
- Screen resistance: < 30 Ohm/Km
- Colour code: according to NF M 87-202

INSTRUM® NF 673

Twisted pair instrumentation cables, screened on the single pair and on the total, armoured

FRXHROHRNR
PVC/IS/PVC/OS/PVC/STA/PVC

Nominal voltage Uo/U: 300/300 V

No. pairs X mm²	Insulation thickness (mm)	Ø Under armour (mm)	External Ø (mm)
3x2x0.5	0.5	12.06	14.26
7x2x0.5	0.5	16.38	18.78
12x2x0.5	0.5	21.88	24.48
19x2x0.5	0.5	26.00	29.00
27x2x0.5	0.5	31.50	34.70