



MICC GROUP

cables for life

Mineral Insulated Stainless Steel &
Alloy Sheathed Thermocouples &
Transducer Cables & Probes

(Edition August 2017)

MICC Ltd

Temperature House, 21
Sedling Road
Wear Industrial Estate,
Washington
Tyne and Wear. UK

Tel: +44 (0) 191 416 8884
Fax: +44 (0) 191 419 2345
Email: sales@trmltd.co.uk





MICC GROUP

cables for life

The MICC Group would like to thank you for your interest in our products and we hope that this brochure enlightens you further on our range of Mineral Insulated Heating Units and Cables.

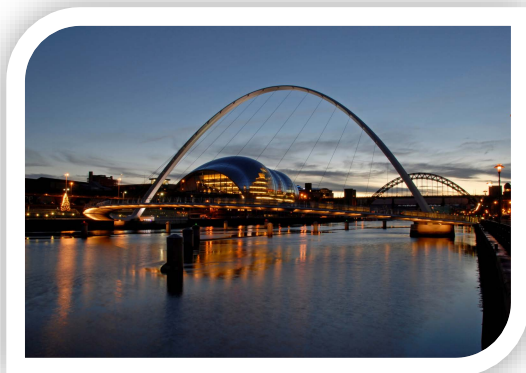
MICC is the UK's largest and only manufacturer of a full range of mineral insulated cable products. With a strong legacy dating back to the period of BICC's reign of the cabling industry, with the Directors and senior managers previous employees of BICC. We lead the World by manufacturing to the original BICC seamless tube techniques, specialising in MI cable for multiple purposes. In addition it has been proven to be the only true fire survival cable on the market, guaranteeing over 3 hours of circuit continuity providing enough escape time in the harshest of fires. We work with a range of global clients providing MI fire survival cable to include high rise buildings, tunnels, metro systems, hospitals and refuge shelters.

With the same experienced prior BICC specialists, we transform our Mineral Insulated cable into installable products and units, specialising in trace heating used to raise or maintain temperatures. Providing our leading trace heating systems for a range of sectors to include pipelines, tanks, rock crushers to car park ramps and helicopter pads. In addition MICC specialises in temperature measurement producing industrial thermocouples and RTDs measuring temperatures up to 1200°C! Shipped around the world for pipelines, steel foundries, and Nuclear power station boilers. We are also hazardous area specialists with wide range of approvals for Global operation.

MICC's Manufacturing Equipment Division is a leading global manufacturer of solutions for improving the efficiency and automation of Temperature sensor manufacture.

MICC are passionate about Mineral Insulated cable R&D, our dedicated team comes up with new products and services by working closely with our clients to produce solutions on their bespoke and specialist needs; we help them save time, reduce costs and increase profit!

Our many years of experience has positioned us a truly Global player, working with the some of the World's best known companies across a wide range of sectors, including; Oil & Gas, Automotive, General Engineering, Chemical, Commercial Buildings, Metro Systems, Airports, Hospitals, Prisons, and power generation including Nuclear and Concentrated Solar Power (CSP).





Mineral insulated thermocouple probes and cables manufactured by MICC group of companies are made up of a metal conductor embedded in a compacted Magnesium oxide (inorganic) insulant inside a metal sheath.

The inorganic nature of the construction enables the cables to operate at high temperatures for long periods of time in extremely harsh environments e.g. petro-chemical, reactor vessels and other applications where the integrity of the cable is most important.

Operating temperatures:

Operating temperatures is determined by operational temperature of the thermocouple materials and sheath material, whichever is lower.

Cable with corrosion resistant grades of stainless steel and nickel alloys sheath typically up to 600°C – 900°C

Cable with heat resistant stainless steel and nickel alloys sheath typically up to 1000°C – 1300°C

Thermocouple cable Sheath material: one of the following:

- 304** – AISI 304 Stainless Steel
- 321** – AISI 321 Stainless Steel
- 310** – AISI 310S Stainless Steel
- 316L** – AISI 316 Low Carbon Stainless Steel
- 316Ti** – AISI 316 Titanium Stabilised Stainless Steel
- 347** – AISI 347 Stainless Steel
- 446** – AISI 446 Stainless Steel
- 600** – Inconel 600
- 601** – Alloy 601
- 625** – Alloy 625
- NIC** – Nicrobell
- Other materials on request

Transducer cable

- 304** – AISI 304 Stainless Steel
- 321** – AISI 321 Stainless Steel
- 310** – AISI 310S Stainless Steel
- 316L** – AISI 316 Low carbon Stainless Steel
- 316Ti** – AISI 316 Ti stabilised Stainless Steel
- Other materials on request

No. of conductors: one of the following:

- Two conductors
- Four conductors
- Six conductors

- Two conductors
- Three conductors
- Four conductors
- Six conductors

Conductor materials:

One of the following thermocouple types:
K, N, J, E, T

Copper
Nickel
Other materials on request

Conductor configurations:

Alternating as standard Adjacent
on request

Evenly spaced Wide
spaced

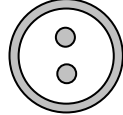
Insulation material:

Magnesium Oxide (MgO). Other materials on request

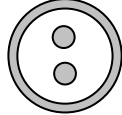


MICC GROUP
cables for life

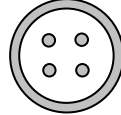
Thermocouple cables:



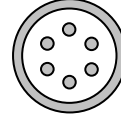
Two conductors



Two conductors
GDCD16

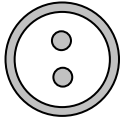


Four conductors

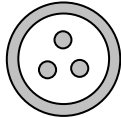


Six conductors

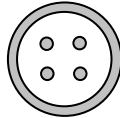
Transducer cables:



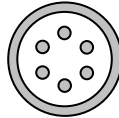
Two conductors



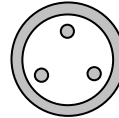
Three
conductors
evenly spaced



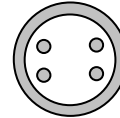
Four
conductors
evenly spaced



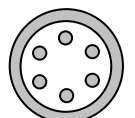
Six
conductors evenly
spaced



Three
conductors
C1



Four
conductors
C5



Six
conductors
C6

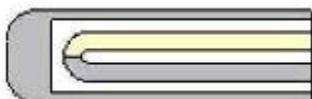
Approvals:

ISO 9001
ISO 14001
TS16949

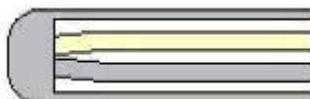


MICC GROUP
cables for life

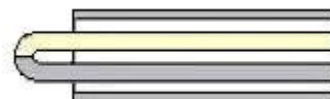
Thermocouple Junction Types



IJ - Insulated junction.
Conductors welded together and insulated from sheath



BJ - Bonded or grounded junction.
Conductors and sheath welded together



EJ Exposed junction
Conductors welded together and exposed outside sheath closure

Main Thermocouple Probe Design Types

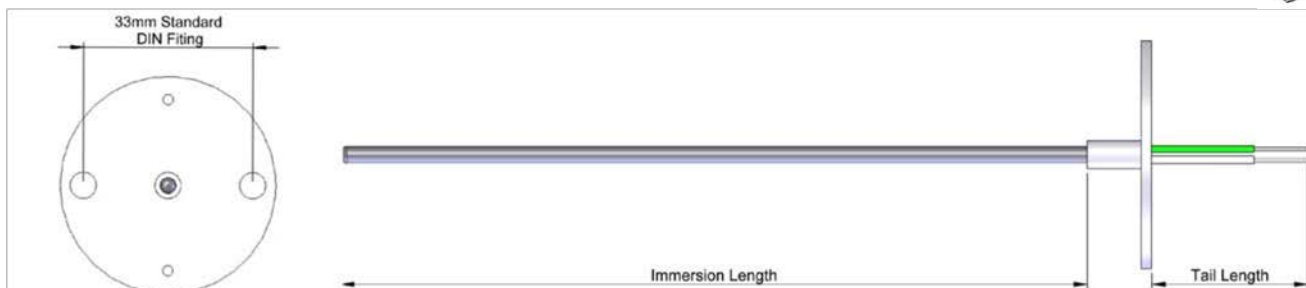


With plain pot



With 8 mm ISO seal

Can be supplied with 8 mm ISO locknuts to terminate the thermocouple if necessary



With transmitter mounting plate

Other designs on request

Ordering information:

To order please specify the following:

- Part reference (see example)
- Design lengths specified in mm, including immersion length and tail length.
- Type of junction
- Any accessories required e.g. lock nuts or termination glands. - Any special design and test requirements.



MICC GROUP

cables for life

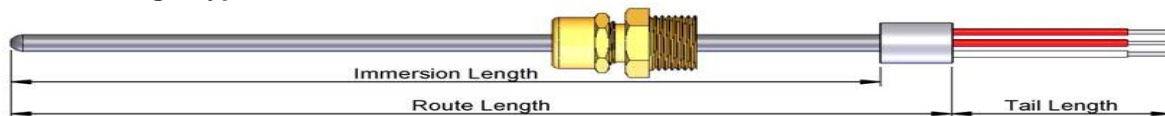
Thermocouple Probes and Cable Reference

		Description						
		P	2	K	-310-	60	S	
		T	4	N	-NIC-	0500	A	-AI2O3
Category	"P" – Thermocouple Probe "T" – Thermocouple cable							
Number of conductors	2 – Two conductors (Simplex) 4 – Four conductors (Duplex) 6 – Six conductors (Triplex)							
Thermocouple Type	"K" – Type K EN 60584-1 / ASTM E230-03 "N" – Type N EN 60584-1 / ASTM E230-03 "J" – Type J EN 60584-1 / ASTM E230-03 "T" – Type T EN 60584-1 / ASTM E230-03 "E" – Type E EN 60584-1 / ASTM E230-03							
Sheath material	"321" – AISI 321 Stainless Steel "310" – AISI 310S Stainless Steel "316L" – AISI 316L Stainless Steel "316Ti" – AISI 316Ti Stainless Steel "446" – AISI 446 Stainless Steel "600" – Inconel 600 "NIC" – Niobium							
Cable Diameter	2 or 3 digits metric range in 1/10 mm 4 digits imperial range in 1/1000 inch							
Thermocouple Class Tolerances	"S" – Class 1 EN 60585-2 "SS" – 1/2 Class 1 EN 60585-2 "A" – Special Limit ASTM E230-03							
Additional features	"AI2O3" – Alumina insulation "GD" – Design compliant with GD CD16 "MW" – Sheath thickness 20% OD min "TW" – Sheath thickness 25% OD min "ASTM" – MgO to ASTM 1652-03							

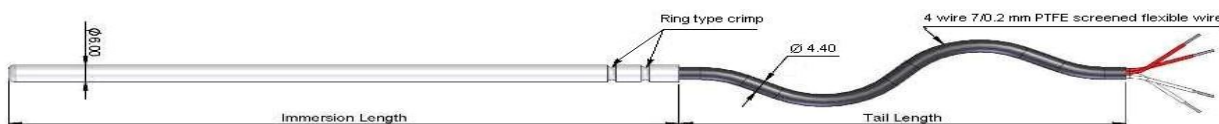


MICC GROUP
cables for life

RTD Probe Design Types



Three-wire with solid tails and gland



Four-wire with flexible tail

Ordering information:

To order please specify the following:

- Part reference (see example)
- Design lengths specified in mm, including immersion length, route length and tail length.
 - Tail type
- Seal type
- Any accessories required e.g. termination glands. - Any special design and test requirements.

Tail type

Type	Configuration	Colour code
PTFE insulated flexible	3 wire	2 Red & 1 White
	4 wire	2 Red & 2 White
PTFE insulated solid	3 wire	2 Red & 1 White
	4 wire	2 Red & 2 White
	3 wire & earth tail	2 Red, 1 White, & 1 Yellow/Green

Seal type

Fitting	Type	Tail type
Crimp	Plain	3 wire flexible
	Plain	4 wire flexible
Silver solder	Plain	3 wire solid
	Plain	4 wire solid
	Earth tail	3 wire & earth tail solid

Termination fittings

Reference	Material	Fitting size
TGMV4516	Brass	16 mm ISO Metric
TGMV6016		
TGMV4520		20 mm ISO Metric
TGMV6020		
TGMV4516	Stainless Steel	16 mm ISO Metric
TGMV6016		
TGMV4520		20 mm ISO Metric
TGMV6020		

Notes.

RTD probes manufactured to BS EN60751-2008 (IEC751).

Tolerance classes are to BS EN60751-2008.

Minimum immersion length = 100mm. Standard

tail length = 150mm

Maximum operating temperature = 550 C

Minimum operating temperature: Grade A = -196 C, Grade B = 0 C



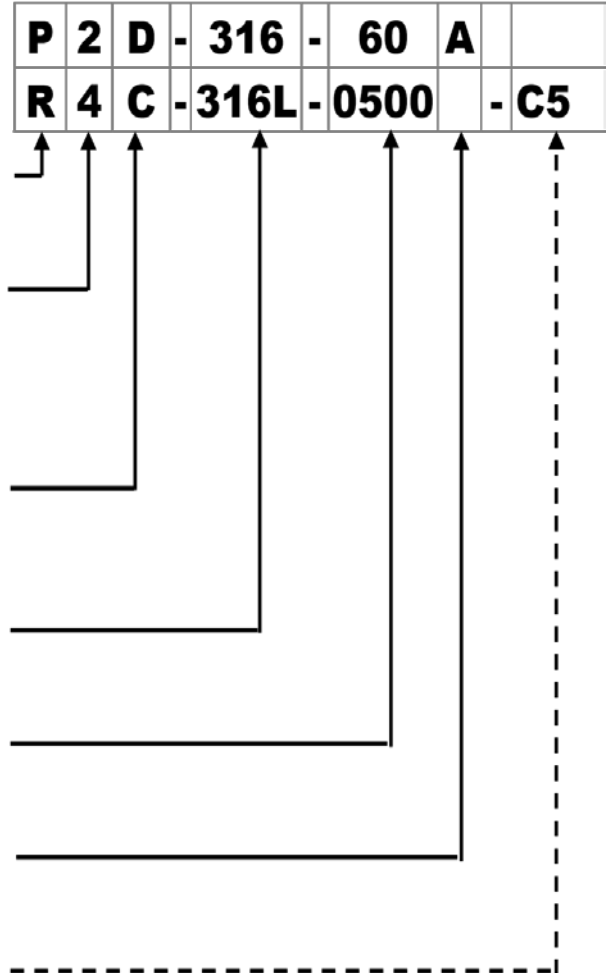
MICC GROUP

cables for life

Resistance Thermometers and Transducer

Cable Reference

	Description
Category	<p>“P” – Premium grade probe “T” – Commercial grade probe “R” – Transducer cable</p>
Number of conductors	<p>2 – Two conductors (Simplex) 4 – Four conductors (Duplex) 6 – Six conductors (Triplex)</p>
Conductors material	<p>“C” – Copper “D” – Nickel “A” – Nichrome “W” – AISI 310</p>
Sheath	<p>“321” – AISI 321 Stainless Steel material “316L” – AISI 316L Stainless Steel “316Ti” – AISI 316Ti Stainless Steel</p>
Cable Diameter	<p>2 or 3 digits metric range in 1/10 mm 4 digits imperial range in 1/1000 inch</p>
RTD Class Tolerances (probes only)	<p>“A” – Class A to EN 60751 “B” – Class B to EN 60751</p>
Additional features	<p>“C1” – 3 conductors wide spaced “C5” – 4 conductors wide spaced “C6” – 6 conductors wide spaced “SP” – special design</p>





MICC GROUP

cables for life

Thermocouple Cable Metric Range

Two core cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Insulation thickness	Nominal conductor resistance at 20 °C Loop,					Coil length
	mm					mm	mm	mm	mm	Ohm/m	
	nom		min	min	min	Type K	Type N	Type J	Type T	Type E	nom
T2x-***-05	0.50±0.02	2	0.08	0.06	0.04	126	171	78	65	153	300
T2x-***-10	1.00±0.02	2	0.15	0.12	0.08	31.5	43	19.6	16	38	300
T2x-***-15	1.50±0.02	2	0.23	0.18	0.12	14	19	8.7	7.2	17	300
T2x-***-20	2.00±0.03	2	0.30	0.24	0.16	7.9	10.7	4.9	3.8	9.6	300
T2x-***-30	3.00±0.03	2	0.45	0.30	0.24	3.5	4.8	2.2	1.8	4.25	300
T2x-***-45	4.50±0.03	2	0.68	0.45	0.36	1.56	2.1	0.97	0.8	1.9	140
T2x-***-60	6.00±0.05	2	0.90	0.60	0.48	0.88	1.2	0.54	0.45	1.1	80
T2x-***-80	8.00±0.05	2	1.20	0.80	0.64	0.49	0.67	0.31	0.25	0.6	40

Substitute "x" with required thermocouple type reference

Substitute *** with required sheath material reference

Four core cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Insulation thickness	Nominal conductor resistance at 20 °C Loop,					Coil length
	mm					mm	mm	mm	mm	Ohm/m	
	nom		min	min	min	Type K	Type N	Type J	Type T	Type E	nom
T4x-***-05	0.50±0.02	4	0.06	0.06	0.03	224	304	139	116	272	300
T4x-***-10	1.00±0.02	4	0.11	0.12	0.06	59	80	36	30	71	300
T4x-***-15	1.50±0.02	4	0.17	0.18	0.09	26	35	16	13	31	300
T4x-***-20	2.00±0.03	4	0.22	0.24	0.12	14.7	19.9	9.1	7.1	17.9	300
T4x-***-30	3.00±0.03	4	0.33	0.30	0.18	6.5	8.9	4.1	3.3	7.9	300
T4x-***-45	4.50±0.03	4	0.50	0.45	0.27	2.89	3.88	1.79	1.48	3.51	140
T4x-***-60	6.00±0.05	4	0.66	0.60	0.36	1.64	2.23	1.00	0.84	2.05	80
T4x-***-80	8.00±0.05	4	0.88	0.80	0.48	0.91	1.25	0.58	0.46	1.12	40

Substitute "x" with required thermocouple type reference

Substitute *** with required sheath material reference

Six core cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Insulation thickness	Nominal conductor resistance at 20 °C Loop,					Coil length
	mm					mm	mm	mm	mm	Ohm/m	
	nom		min	min	min	Type K	Type N	Type J	Type T	Type E	nom
T6x-***-05	0.50±0.02	6	0.06	0.06	0.03	224	304	139	116	272	300
T6x-***-10	1.00±0.02	6	0.11	0.12	0.05	59	80	36	30	71	300
T6x-***-15	1.50±0.02	6	0.17	0.18	0.08	26	35	16	13	31	300
T6x-***-20	2.00±0.03	6	0.22	0.24	0.10	14.7	19.9	9.1	7.1	17.9	300
T6x-***-30	3.00±0.03	6	0.33	0.30	0.15	6.5	8.9	4.1	3.3	7.9	300
T6x-***-45	4.50±0.03	6	0.50	0.45	0.23	2.89	3.88	1.79	1.48	3.51	140
T6x-***-60	6.00±0.05	6	0.66	0.60	0.30	1.64	2.23	1.00	0.84	2.05	80
T6x-***-80	8.00±0.05	6	0.88	0.80	0.40	0.91	1.25	0.58	0.46	1.12	40

Substitute "x" with required thermocouple type reference

Substitute *** with required sheath material reference



MICC GROUP

cables for life

Thermocouple Cable Imperial Range

Two core cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Insulation thickness	Nominal conductor resistance at 20 °C Loop,					Coil length
	mm					mm	mm	mm	mm	Ohm/m	
	nom		min	min	min	Type K	Type N	Type J	Type T	Type E	nom
T2x-***-0032	0.80±0.02	2	0.12	0.10	0.06	49	67	31	25	60	300
T2x-***-0063	1.60±0.02	2	0.24	0.19	0.13	12	17	7.6	6.3	15	300
T2x-***-0125	3.20±0.03	2	0.48	0.32	0.26	3.1	4.2	1.9	1.6	3.7	300
T2x-***-0188	4.80±0.05	2	0.72	0.48	0.38	1.4	1.9	0.85	0.7	1.7	125
T2x-***-0250	6.35±0.05	2	0.95	0.64	0.51	0.78	1.1	0.49	0.4	0.95	75
T2x-***-0500	12.70±0.05	2	1.91	1.27	1.02	0.2	0.27	0.12	0.1	0.24	18

Four core cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Insulation thickness	Nominal conductor resistance at 20 °C Loop,					Coil length
	mm					mm	mm	mm	mm	Ohm/m	
	nom		min	min	min	Type K	Type N	Type J	Type T	Type E	nom
T4x-***-0032	0.80±0.02	4	0.10	0.10	0.05	77	105	48	39	94	300
T4x-***-0063	1.60±0.02	4	0.19	0.19	0.10	19	27	12	10	23	300
T4x-***-0125	3.20±0.03	4	0.38	0.32	0.19	4.8	6.6	3.0	2.5	5.8	300
T4x-***-0188	4.80±0.05	4	0.58	0.48	0.29	2.2	3.0	1.3	1.1	2.7	125
T4x-***-0250	6.35±0.05	4	0.76	0.64	0.38	1.2	1.7	0.8	0.6	1.5	75
T4x-***-0500	12.70±0.05	4	1.52	1.27	0.76	0.31	0.42	0.19	0.16	0.38	18

Six core cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Insulation thickness	Nominal conductor resistance at 20 °C Loop,					Coil length
	mm					mm	mm	mm	mm	Ohm/m	
	nom		min	min	min	Type K	Type N	Type J	Type T	Type E	nom
T6x-***-0032	0.80±0.02	0.07	0.10	0.04	224	77	105	48	39	94	0.07
T6x-***-0063	1.60±0.02	0.14	0.19	0.08	59	19	27	12	10	23	0.14
T6x-***-0125	3.20±0.03	0.29	0.32	0.16	26	4.8	6.6	3.0	2.5	5.8	0.29
T6x-***-0188	4.80±0.05	0.43	0.48	0.24	14.7	2.2	3.0	1.3	1.1	2.7	0.43
T6x-***-0250	6.35±0.05	0.57	0.64	0.32	6.5	1.2	1.7	0.8	0.6	1.5	0.57
T6x-***-0500	12.70±0.05	1.14	1.27	0.64	2.89	0.31	0.42	0.19	0.16	0.38	1.14

Substitute "x" with required thermocouple type reference

Substitute *** with required sheath material reference



MICC GROUP

cables for life

Transducer Cable Range

Two core cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Conductors PCD	Nominal conductor resistance at 20 °C		Coil length
						Ohm/m	Ohm/m	
	mm		mm	mm	mm	R2C-	R2D-	m
	nom		min	min	min	R2C-	R2D-	nom
R2x-***-15	1.50±0.02	2	0.30	0.23	0.45	0.243	1.358	300
R2x-***-16	1.60±0.02	2	0.32	0.24	0.48	0.214	1.194	300
R2x-***-30	3.00±0.03	2	0.60	0.30	1.00	0.061	0.340	300
R2x-***-32	3.20±0.03	2	0.64	0.32	1.07	0.053	0.298	300
R2x-***-45	4.50±0.03	2	0.90	0.45	1.50	0.027	0.151	140
R2x-***-48	4.80±0.03	2	0.92	0.48	1.59	0.026	0.144	140
R2x-***-60	6.00±0.05	2	1.20	0.60	2.00	0.015	0.085	80
R2x-***-64	6.40±0.05	2	1.28	0.64	2.13	0.013	0.075	80

Substitute "x" with required transducer type reference

Substitute *** with required sheath material reference

Three core evenly spaced cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Conductors PCD	Nominal conductor resistance at 20 °C		Coil length
						Ohm/m	Ohm/m	
	mm		mm	mm	mm	R3C-	R3D-	m
	nom		min	min	min	R3C-	R3D-	nom
R3x-***-30	3.00±0.03	3	0.45	0.30	1.04	0.108	0.604	300
R3x-***-32	3.20±0.03	3	0.48	0.32	1.11	0.095	0.531	300
R3x-***-45	4.50±0.03	3	0.68	0.45	1.56	0.048	0.268	140
R3x-***-48	4.80±0.03	3	0.72	0.48	1.67	0.042	0.236	140
R3x-***-60	6.00±0.05	3	0.90	0.60	2.09	0.027	0.151	80
R3x-***-64	6.40±0.05	3	0.96	0.64	2.23	0.024	0.133	80

Substitute "x" with required transducer type reference

Substitute *** with required sheath material reference

Four core evenly spaced cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Conductors PCD	Nominal conductor resistance at 20 °C		Coil length
						Ohm/m	Ohm/m	
	mm		mm	mm	mm	R4C-	R4D-	m
	nom		min	min	min	R4C-	R4D-	nom
R4x-***-30	3.00±0.03	4	0.34	0.30	1.04	0.047	1.057	300
R4x-***-32	3.20±0.03	4	0.36	0.32	1.11	0.095	0.943	300
R4x-***-45	4.50±0.03	4	0.50	0.45	1.56	0.048	0.489	140
R4x-***-48	4.80±0.03	4	0.54	0.48	1.67	0.042	0.419	140
R4x-***-60	6.00±0.05	4	0.68	0.60	2.09	0.027	0.264	80
R4x-***-64	6.40±0.05	4	0.72	0.64	2.23	0.024	0.236	80

Substitute "x" with required transducer type reference

Substitute *** with required sheath material reference



MICC GROUP

cables for life

Six core evenly spaced cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Conductors PCD	Nominal conductor resistance at 20 °C		Coil length
						Ohm/m	Ohm/m	
	mm		mm	mm	mm			m
	nom		min	min	min	R4C-	R4D-	nom
R6x-***-30	3.00±0.03	6	0.34	0.30	1.37	0.19	1.057	300
R6x-***-32	3.20±0.03	6	0.36	0.32	1.46	0.17	0.943	300
R6x-***-45	4.50±0.03	6	0.50	0.45	2.06	0.09	0.489	140
R6x-***-48	4.80±0.03	6	0.54	0.48	2.19	0.08	0.419	140
R6x-***-60	6.00±0.05	6	0.68	0.60	2.74	0.05	0.264	80
R6x-***-64	6.40±0.05	6	0.72	0.64	2.92	0.04	0.236	80

Substitute "x" with required transducer type reference

Substitute *** with required sheath material reference

Three core C1 configuration cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Conductors PCD	Nominal conductor resistance at 20 °C		Coil length
						Ohm/m	Ohm/m	
	mm		mm	mm	mm			m
	nom		min	min	min	R3C-	R3D-	nom
R3x-***-30-C1	3.00±0.03	3	0.34	0.30	1.62	0.19	1.057	300
R3x-***-32-C1	3.20±0.03	3	0.36	0.32	1.73	0.17	0.943	300
R3x-***-45-C1	4.50±0.03	3	0.50	0.45	2.43	0.09	0.489	140
R3x-***-48-C1	4.80±0.03	3	0.53	0.48	2.59	0.08	0.419	140
R3x-***-60-C1	6.00±0.05	3	0.68	0.60	3.24	0.05	0.264	80
R3x-***-64-C1	6.40±0.05	3	0.72	0.64	3.46	0.04	0.236	80

Substitute "x" with required transducer type reference

Substitute *** with required sheath material reference

Four core C5 configuration cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Conductors PCD	Nominal conductor resistance at 20 °C		Coil length
						Ohm/m	Ohm/m	
	mm		mm	mm	mm			m
	nom		min	min	min	R4C-	R4D-	nom
R4x-***-30-C5	3.00±0.03	4	0.34	0.30	1.62	0.19	1.057	300
R4x-***-32-C5	3.20±0.03	4	0.36	0.32	1.73	0.17	0.943	300
R4x-***-45-C5	4.50±0.03	4	0.50	0.45	2.43	0.09	0.489	140
R4x-***-48-C5	4.80±0.03	4	0.53	0.48	2.59	0.08	0.419	140
R4x-***-60-C5	6.00±0.05	4	0.68	0.60	3.24	0.05	0.264	80
R4x-***-64-C5	6.40±0.05	4	0.72	0.64	3.46	0.04	0.236	80

Substitute "x" with required transducer type reference

Substitute *** with required sheath material reference



MICC GROUP
cables for life

Six core C6 configuration cable

Reference	Cable diameter	No of conductors	Conductor diameter	Sheath thickness	Conductors PCD	Nominal conductor resistance at 20 °C		Coil length
						Ohm/m	Ohm/m	
	mm		mm	mm	mm	R6C-	R6D-	m
	nom		min	min	min			nom
R6x-***-30-C6	3.00±0.03	6	0.34	0.30	1.62	0.19	1.057	300
R6x-***-32-C6	3.20±0.03	6	0.36	0.32	1.73	0.17	0.943	300
R6x-***-45-C6	4.50±0.03	6	0.50	0.45	2.43	0.09	0.489	140
R6x-***-48-C6	4.80±0.03	6	0.53	0.48	2.59	0.08	0.419	140
R6x-***-60-C6	6.00±0.05	6	0.68	0.60	3.24	0.05	0.264	80
R6x-***-64-C6	6.40±0.05	6	0.72	0.64	3.46	0.04	0.236	80

Substitute "x" with required transducer type reference

Substitute *** with required sheath material reference



MICC GROUP
cables for life

Thermocouple Tolerance Limits

Tolerance reference junction 0°C

Type	Temperature Range,	EN 60584-2		ASTM E230-03	
		Class 1	Class 2	Special Limit	Standard Limit
K	-40°C to 1000°C	±1.5°C or 0.004·t (whichever is greater)	±2.5°C or ±0.0075·t (whichever is greater)		
	0°C to 1260°C			±1.1°C or 0.004·t (whichever is greater)	±2.2°C or ±0.0075·t (whichever is greater)
N	-40°C to 1000°C	±1.5°C or 0.004·t (whichever is greater)	±2.5°C or ±0.0075·t (whichever is greater)		
	0°C to 1260°C			±1.1°C or 0.004·t (whichever is greater)	±2.2°C or ±0.0075·t (whichever is greater)
J	-40°C to 750°C	±1.5°C or 0.004·t (whichever is greater)	±2.5°C or ±0.0075·t (whichever is greater)		
	0°C to 760°C			±1.1°C or 0.004·t (whichever is greater)	±2.2°C or ±0.0075·t (whichever is greater)
E	-40°C to 800°C	±1.5°C or 0.004·t (whichever is greater)	±2.5°C or ±0.0075·t (whichever is greater)		
	0°C to 870°C			±1.0°C or 0.004·t (whichever is greater)	±1.7°C or ±0.005·t (whichever is greater)
T	-40°C to 350°C	±0.5°C or 0.004·t (whichever is greater)	±1.0°C or ±0.0075·t (whichever is greater)		
	0°C to 370°C			±0.5°C or 0.004·t (whichever is greater)	±1.0°C or ±0.0075·t (whichever is greater)

Thermocouple Tolerance Limits























Tolerance reference junction 0°C

Type	Temperature Range,	EN 60584-2		ASTM E230-03	
		Class 1	Class 2	Special Limit	Standard Limit
K	-40°C to 1000°C	±1.5°C or 0.004·t (whichever is greater)	±2.5°C or ±0.0075·t (whichever is greater)		
	0°C to 1260°C			±1.1°C or 0.004·t (whichever is greater)	±2.2°C or ±0.0075·t (whichever is greater)
N	-40°C to 1000°C	±1.5°C or 0.004·t (whichever is greater)	±2.5°C or ±0.0075·t (whichever is greater)		
	0°C to 1260°C			±1.1°C or 0.004·t (whichever is greater)	±2.2°C or ±0.0075·t (whichever is greater)
J	-40°C to 750°C	±1.5°C or 0.004·t (whichever is greater)	±2.5°C or ±0.0075·t (whichever is greater)		
	0°C to 760°C			±1.1°C or 0.004·t (whichever is greater)	±2.2°C or ±0.0075·t (whichever is greater)
E	-40°C to 800°C	±1.5°C or 0.004·t (whichever is greater)	±2.5°C or ±0.0075·t (whichever is greater)		
	0°C to 870°C			±1.0°C or 0.004·t (whichever is greater)	±1.7°C or ±0.005·t (whichever is greater)
T	-40°C to 350°C	±0.5°C or 0.004·t (whichever is greater)	±1.0°C or ±0.0075·t (whichever is greater)		
	0°C to 370°C			±0.5°C or 0.004·t (whichever is greater)	±1.0°C or ±0.0075·t (whichever is greater)



MICC GROUP
cables for life

Insulation Colour Coding for Flexible Thermocouple Tails

Conductor Configuration			Maximum Temperature. range	IEC 584 		ASTM E230 (ANSI MS96) 	
Type		Material		Sheath	Conductors	Sheath	Conductors
K	+	NiCr	-270°C to 1372°C				
	-	Ni					
N	+	NiCrSi	-270°C to 1300°C				
	-	NiSi					
J	+	Fe	-210°C to 1200°C				
	-	CuNi					
E	+	NiCr	-270°C to 1000°C				
	-	CuNi					
T	+	Cu	-270°C to 400°C				
	-	CuNi					