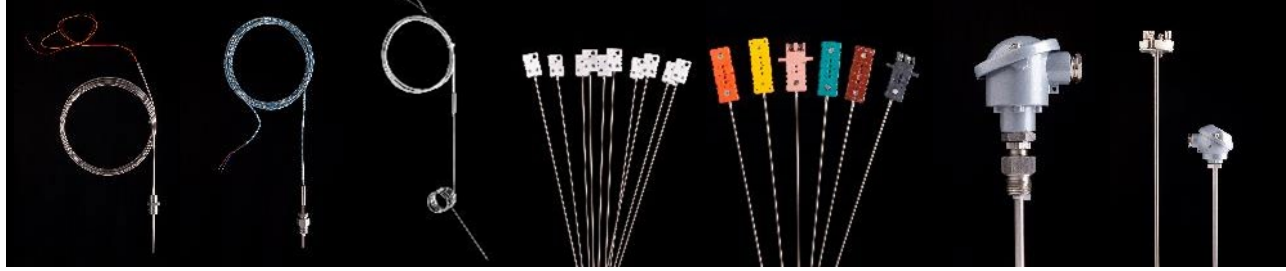
CONDUCTORS



The conductors that make up the cable may be of various nature and formation depending on the use, the application and the reference standards.

They can be made in plain copper, tinned copper or nickel-plated copper:

- Red copper for environments where there is no risk of the presence of corrosive substances (on shore) or where they could be present occasionally but where the joints are protected by the use of boxes with a good IP protection degree.
  Excellent resistance value ohm/Km according to the section.
- Tinned copper for environments where corrosive and oxidizing substances may be present (off shore) to the point that the use of junction boxes with a good IP protection value are not sufficient.
  Ohm/Km resistance value slightly worse than red copper.
- Nickel-plated copper suitable for use in cables with high operating temperatures such as cables with glass fiber or Teflon insulation.
- Extension or compensation alloy conductors for thermocouples.

The extension cables for thermocouples are made with the same conductors that make up the thermocouples so as not to create a hot joint at the connection point which would produce an electromotive force which would generate an error in the detected temperature

The compensation cables for thermocouples used exclusively in the case of K-type sensors called KCA or KCB are made using different conductors from those used in the sensor, therefore with a decidedly lower cost; a hot joint will be created at the junction point which will insert an error which, being known, will then be compensated by the conversion tool.

These cables are used in processes where a **high accuracy temperature reading** is not required.

CONDUCTORS

Instrumentation cable conductors are usually copper to facilitate signal transmission; alloys are preferred for thermocouples and compensation cables. The conductors are generally in accordance with the EN 60228 standard:

CLASS 1
Solid

CLASS 2
Stiff

CLASS 5
Flexible

The conductors are chosen based on the electrical characteristics and the required flexibility, as well as the type of installation and the installation conditions of the cable:

- in applications characterized by vibrations, oscillations and a reduced bending capacity, it is preferable to proceed with **CLASS 5** flexible conductors;
- in fixed applications where the cable, once laid, is no longer moved, it is preferable to opt for **CLASS 1**;
- in applications characterized by a corrosive atmosphere and high temperatures and if it is necessary to proceed with welding, the **CLASS 2** tinned conductor is preferable.

COPPER CONDUCTORS SQMM EN IEC 60228 standard

TECHNICAL TABLE

Nominal section (mm^2)	Min. nr wires in conductor Class 1	Min. nr wires in conductor Class 2	Max. wire dia. of conductor Class 5 (mm)	Max. wire dia. of conductor Class 6 (mm)	Max. Conductor Resistance at 20 °C in d.c.			
					class 1 and class 2		class 5 and class 6	
					Copper (ohm/km)	Tinned Copper (ohm/km)	Copper (ohm/km)	Tinned Copper (ohm/km)
0,5	1	7	0,21	0,16	36,000	36,700	39,000	40,100
0,75	1	7	0,21	0,16	24,500	24,800	26,000	26,700
1,0	1	7	0,21	0,16	18,100	18,200	19,500	20,000
1,5	1	7	0,26	0,16	12,100	12,200	13,300	13,700
2,5	1	7	0,26	0,16	7,410	7,560	7,980	8,210
4	1	7	0,31	0,16	4,610	4,700	4,950	5,090
6	1	7	0,31	0,21	3,080	3,110	3,300	3,390
10	1	7	0,41	0,21	1,830	1,840	1,910	1,950
16	1	7	0,41	0,21	1,150	1,160	1,210	1,240
25	-	7	0,41	0,21	0.727	0,734	0,780	0,795
35	-	7	0,41	0,21	0,524	0,529	0,554	0,565
50	-	19	0,41	0,31	0,387	0,391	0,386	0,393
70	-	19	0,51	0,31	0,268	0,270	0,272	0,277
95	-	19	0,51	0,31	0.193	0,195	0,206	0,210
120	-	37	0,51	0,31	0,153	0,154	0,161	0,164
150	-	37	0,51	0,31	0,124	0,126	0,129	0,132
185	-	37	0,51	0,41	0,099	0,100	0,106	0,108