LA TERMOTECNICA

FACTORY PROFILE

PRODUCTION AND SERVICE

LA TERMOTECNICA, an Italian company set up in 1976, is one of the leading companies in Italy in the production and design of temperature sensors based on proprietary thermocouple and RTD technology. Over the years, the quality and reliability of **LA TERMOTECNICA** products have secured the company a forefront position on the Italian and international marketplace. Since the company was set up, top flight product quality and efficient services have always been high on it' s list of priorities. These services include technical support and assistance able to solve any application problems, fast, certain delivery, R&D activities, issue of quality certification documents, in other words a complete suite of services that only a company with it' s sights firmly set on leadership can sustain. Obviously, all to the advantage of the customer who can always rely on a prompt, efficient partner at all times.

LA TERMOTECNICA s.r.l. Via Volvera, 74/1, 10090, Bruino (TO)
Tel. 011/9085288 - www.latermotecnica.it - info@latermotecnica.it

FACTORY PROFILE
PRODUCTION AND SERVICE

LA TERMOTECNICA

PRODUCTION

Our Bruino (TURIN) facility turns out RTD and thermocouple type temperature sensors. The thermocouples are available in the classical version with calibrated wires and insulators or with MgO (magnesium oxide) insulation both in base and noble metal. Assembled to DIN, ASTM, CTI-UNI specs. The RTD's in the 50-100-1000 Ohm series at °C assembled inside protective sheaths according to requirements of use and insulated with ceramic insulators or with MgO (magnesium oxide) insulation. Assembled to DIN, UNI specs. In both cases, product lines are available according to use (standard series, TSM series, MgO series for aerothermal recordings, full cable series, etc.). We are renowned for our versatility and flexibility and are able to supply custom designed products adapted to specific requirements and with the precision requested by the customer. All our products are subject to a process control system that makes it possible to apply a FULL TESTED procedure that guarantees functional testing of each single product before this is declared suitable.

DISTRIBUTION, SALES AND SERVICES

Our production activities are flanked by a set of services including the sale of instruments, Accessorieses such as extension cables for thermocouples and RTD's, compensating cables, Connection heads, linearized temperature and pressure transmitters, infrared measurement instruments. Our calibration laboratory means we can issue calibration certificates in the range –30 to + 1064°C with ACCREDIA traceability

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PRODUCTION AND SERVICE

STANDARDIZED TEMPERATURE PROBES

Different type of temperature probes for any industrial application, that is possible to order following the guidelines of our catalogue.

- **Standard thermocouple serie**
- **TSM sereies**
- **Mineral insulated serie, thermocouples**
- **Mineral insulated serie, RTD' s**
- **Mineral insulated serie, thermocouples with connecting head**
- **Mineral insulated serie, RTD's with connecting head**
- **Full cable serie, thermocouples**
- **Full cable serie, RTD' s**
- **Duct e pipe aerothermic probes**
- **Bayonet fitting thermocouples**
- **Bayonet fitting RTD' s**
- **Compression fittings**
- **Thermowells**
- **Micro thermocouples**
- **Extension for thermocouples and RTD' s**

And others more.

CUSTOM DESIGNED PRODUCTS

Thermocouples and RTD's for specific applications in the following sectors:

- **Automotive**
- **Avionics**
- **Marine**
- **Chemical**
- **Food**
- **Petrochemical**
- **Cement and klinker industry**

Most of these products are specifically designed to the ustomer's specifications and are produced according to the test standard based on the FULL TESTED procedure.

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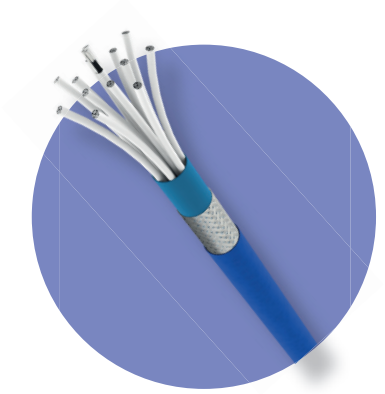
DISTRIBUTION AND SERVICES

1. TEMPERATURE SECTOR

1.1 EXTENSION CABLES FOR THERMOCOUPLES AND RTD' S PROBES, CONNECTORS MULTICHANNEL SWITCHS FOR THERMOCOUPLES AND RTD' S

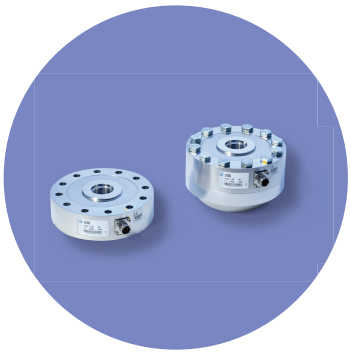


1.2 THERMOREGULATORS AND METERS, CONTROL AND REGULATION SYSTEMS. CONTROL AND PLANT MANAGEMENT SOFTWARE

1.3 PORTABLE OR BENCH THERMOMETERS FOR THERMOCOUPLES AND RTD' S, MEASUREMENT BRIDGES

1.4 PORTABLE AND FIXED CALIBRATION SYSTEMS, THERMOSTAT-CONTROLLE HIGH STABILITY INSTRUMENTS AND SOURCES OF HEAT. TURN-KEY CALIBRATION SYSTEMS.

1.5 TRADUCERS, SIGNAL CONDITIONERS WITH CURRENT LOOP OR VOLTAGE OUTPUTS FOR PANEL OR Connection HEAD ASSEMBLY.



FACTORY PROFILE

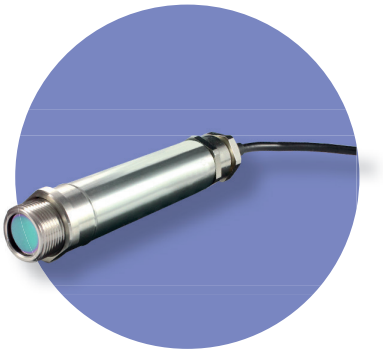
PRODUCTION AND SERVICE

1.6 MULTIFUNCTION PORTABLE AND BENCH TYPE CALIBRATORS FOR THERMOCOUPLES AND RTD'S

1.7 DOT OR TRACE LOGGERS, DATALOGGERS, PLOTTERS, DISK ENCODERS. TEMPERATURE PROFILER, WIRELESS SYSTEMS

1.8 PORTABLE AND FIXED INFRARED TEMPERATURE MEASUREMENT SYSTEMS FOR TEMPERATURES UP TO 3000°C, INFRARED PHOTOGRAPHIC SYSTEMS, METERS AND SENSORS.

1.9 ANALOG DIGITAL DATA ACQUISITION SYSTEMS THAT CAN BE CONNECTED TO PC FOR TEMPERATURES, CURRENTS, VOLTAGES, FREQUENCIES. MANAGEMENT AND DATA PROCESSING SOFTWARE. BOARDS FOR ISA, PC, XT, AT, PCMCIA BUSES FOR ANALOG-DIG/ DIG-ANALOG/DIG-DIG DATA ACQUISITION, MANAGEMENT AND DATA ACQUISITION SOFTWARE. TURN-KEY SYSTEMS



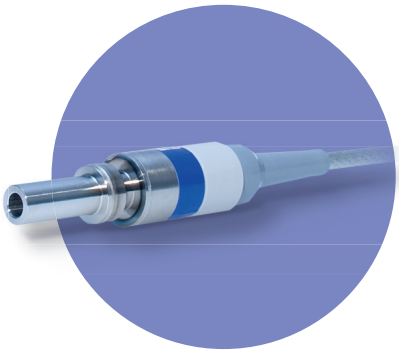
LA TERMOTECNICA

2. ELECTRONIC INSTRUMENTATION

2.1 PORTABLE AND BENCH TYPE MULTIMETERS. SCANNERS, MANAGEMENT AND PROCESSING SOFTWARE. IMPULSE METERS, FREQUENCY METERS, REV COUNTERS, POWER SUPPLIES. OSCILLOSCOPES.

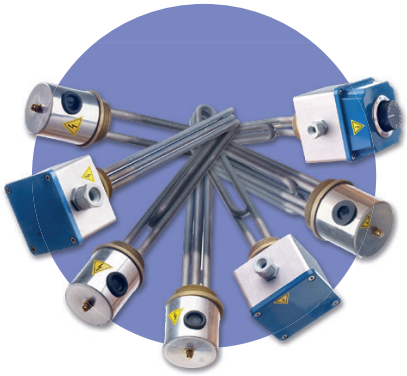
3. FORCE AND PRESSURE

3.1 ABSOLUTE, RELATIVE, VACUUM PRESSURE TRANSDUCERS WITH CURRENT LOOP OR VOLTAGE OUTPUT. METERS, PORTABLE AND PANEL TYPE READERS AND CALIBRATORS. STRAINGAUGES, LOAD CELLS.



4. RESISTOR HEATERS

4.1 ELECTRICAL RESISTORS FOR ALL TYPES OF ELECTRICAL FURNACES INDUSTRIAL FOR HEAT TREATMENT, ANNEALING, CASE-HARDENING, NITRIDING. IN KANTALL, NITROTAL, SILICON CARBIDE ALLOYS. ARMORED RESISTORS, CARTRIDGE TYPE FOR PLASTIC AND MOLDING SYSTEMS.



LA TERMOTECNICA

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International Thermocouple cables color coding

ORDER CODE EXAMPLE

Mineral insulated thermocouple (MgO), with standard type compensated connector

WITH PLASTIC CONNECTOR (MAX 220 °C)	G A
WITH CERAMIC CONNECTOR (MAX 550 °C)	G B

MODEL [ ][ ] A B C [ ][ ][ ][ ][ ] 0 0

- Type and class of tolerances
- Hot junction type
- Sheath quality
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr II	J	J
	E	E
	K	K
	N	N
	S	S
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr I	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungraunded	I
Grounded	M
Exposed	E

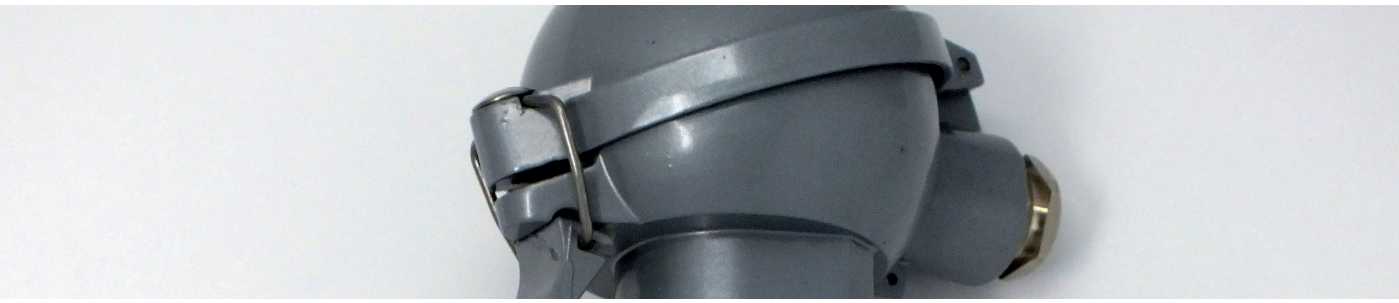
SHEATH QUALITY AND DIAMETER	C					
	Sheath diameter (mm)					
SS quality	2	3	3,17	4	4,5	6
Aisi 304	A	B	C	D	E	G
Aisi 316	K	J	I	L	M	O
Inconel 600	Q	R	S	T	U	Z

MODEL G A K I R 0 1 5 0 0 0 0

- Type and class of tolerances
- Hot junction type
- Sheath quality
- Length L (mm)

Code for: Mineral insulated thermocouple (MgO) type K diam. 3 mm, sheath quality inconell 600, lenght L=1500mm and ungrounded hot junction

Model GA KIR0150000



WITH STAINLESS STEEL PROTECTION TUBE

Models A0-A1-A2-A3-A4

With their simple but rugged construction, this series of thermocouples is suitable for all applications in which the protective barrier of the sensing element is of fundamental importance. Protection is assured by the quality of the external protection tubes (AISI series 400, 300 and INCONEL 600) that guarantee effective protection against gas corrosion even at high temperatures. According to the harshness of the environment, they are available with single or double protection tube (steel on the outside and ceramic inside), with the typical elements consisting of calibrated wires and ceramic insulators or with magnesium oxide insulators.

Tipical Applications:

- **Chemical and petrochemical industry**
- **Iron and steel industry**
- **Bulding material industry**

LA TERMOTECNICA, produce in according to internal higth quality standards, and in accordance with international standards

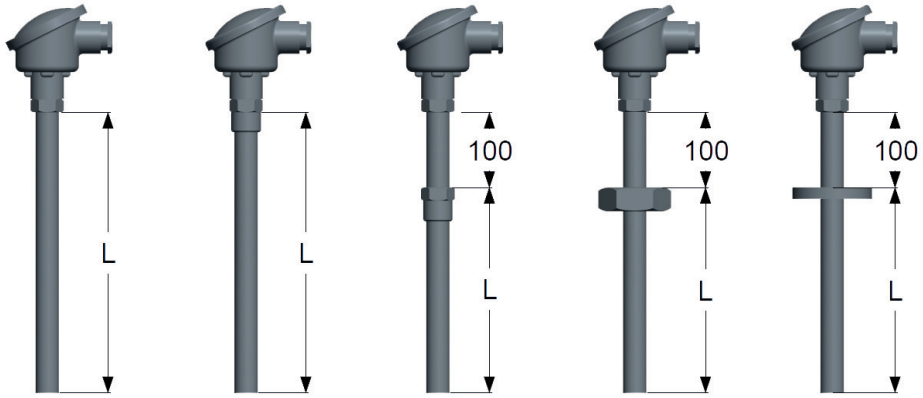
- **UNI 7938**
- **IEC 584**
- **ANSI / DIN**

Utilization of special productive plants as, microscopes, custom welding machines, micro-manipulators, and above all ,our high level staff, assure quality standard and precision. If requested we supply documentation and product certification.

LA TERMOTECNICA

STANDARD SERIE THERMOCOUPLES

WITH STAINLESS STEEL PROTECTION TUBE



MODEL	A 0	A 1	A 2	A 3	A 4

MODEL [ ][ ] A B C D E [ ][ ][ ][ ] F

- Type and class of tolerances — A
- Hot junction type — B
- Sheath quality — C
- Connecting head — D
- Fittings or flanges — E
- Length L (mm) — F
- Internal probe construnction — F

TECHNICAL DATA

- Temperature working range: 0 .. 1200 °C max (warning !! in reference of thermocouple type and protecting tube material, check technical notes)
- Accuracy: in reference of ANSI MC96.1/IEC 584
- Protection: IP55
- Electrical connection 1/2" gas

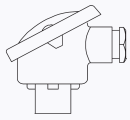
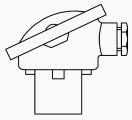
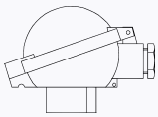
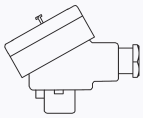
TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	E	E
	K	K
	N	N
	S	S
	R	R
Thermocouple,tolerances according to Ansi Gr II	E	3
	K	4
	N	5
	S	6
	R	7

HOT JUNTION TYPE	B	B
	Ungrounded	Exposed
One junction with ceramic insulators	1	3
Two junction with ceramic insulators	4	5
One junction mineral insulated	6	8
Two junction mineral insulated	9	A
Two junction mineral insulated	B	C
Two common junction mineral	D	F

SHEATH QUALITY								A
	Sheath diameter (mm)							
	12	14	15	16	3/8	20	1/2	3/4
Aisi 446					T			H
Aisi 446*								1
Aisi 310	I	L		C	M	N	O	P
Aisi 310*		2		E	3	4	5	6
Inconel 600			Q		R	S	U	
Inconel 600*			7		8	9		

*Whit added inner ceramics protection

Custom executions on request

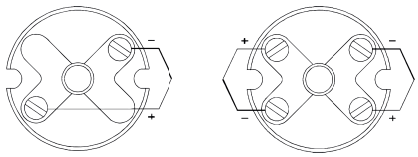
CONNECTING HEAD				D
				
DIN B Head	B	DIN A T1 Head	L	
				
BUS Head	P	Explosionproof Head	D	

FLANGES (UNI 2278 PN16) FOR MODEL A4				E
A	B	C	D	
90	60	12	14	Q
95	65	12	14	R
105	70	14	14	S

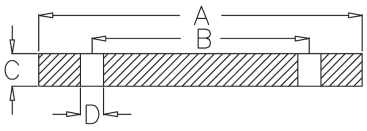
FLANGES (UNI 2278 PN16) FOR MODEL A0		E
A	C	
70	6	T
100	9	U

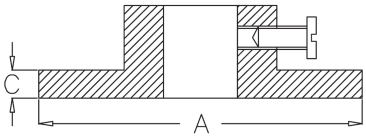
STAINLESS STEEL FITTINGS FOR MODEL A1-A2-A3								E
F (gas)	Sheath diameter (mm)							
	12	14	15	16	3/8	20	1/2	3/4
3/8	2							
1/2"	3	3	3	3				
3/4"	4	4	4	4	4	4		
1"	5	5	5	5	5	5	5	
1" 1/4	6	6	6	6	6	6	6	6
1" 1/2	7	7	7	7	7	7	7	7
2"	8	8	8	8	8	8	8	8

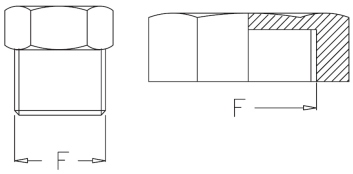
CONNECTION



INTERNAL PROBE CONSTRUCTION	F
Ceramic insulators and wire insert	A
Mineral insulated insert	B







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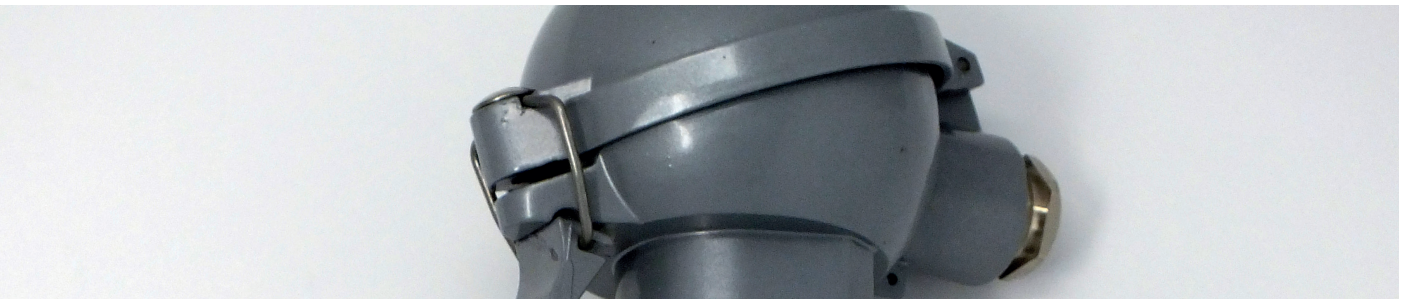


WITH CERAMIC PROTECTION TUBE

Models C1-C2-C3-C4

This series of thermocouples offers a wide variety of choice, allowing the designer to cater to a broad range of application requirements with the possibility of selecting ceramic protection tubes (in the various commercial diameters), the total number of protection tubes (from one to three) and also different solutions as regards the type of Connection head, fittings, the number and type of internal probes. These thermocouples are normally used in processes in which the operating temperature does not permit use of metal protection tubes. They are constructed mainly with noble metal internal probes (Platinum, type S, R, B). However, there are many applications in which base metal elements can be used but use of metal protection tubes is not recommended in view of the temperatures involved.

Tipical applications:

- **Glass industry**
- **Stacks, incenerators**
- **Ceramic industry**

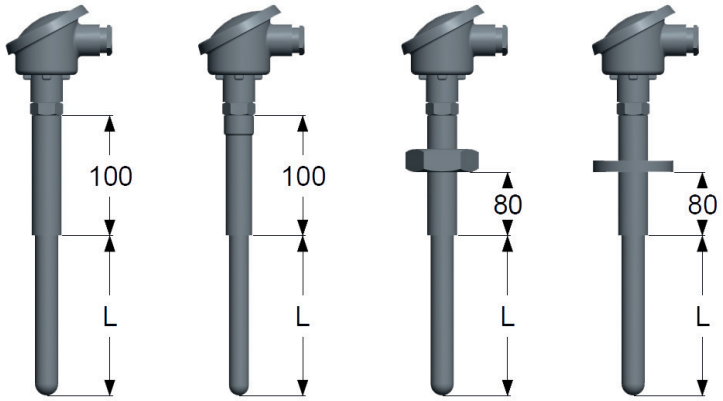
LA TERMOTECNICA, produce in according to internal higth quality standards, and in accordance with international standards

- **UNI 7938**
- **IEC 584**
- **ANSI / DIN**

Utilization of special productive plants as, microscopes, custom welding machines, micro-manipulators, and , above all our high level staff, assure quality standard and precision. If requested we supply documentation and product certification.

STANDARD SERIE THERMOCOUPLES

WITH CERAMIC PROTECTION TUBE

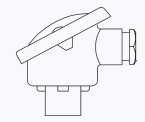
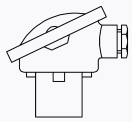
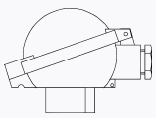
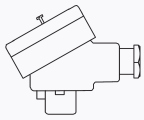


MODEL	C 1	C 2	C 3	C 6

MODEL			A	B	C	D	E					F

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- CONNECTING HEAD
- FITTINGS OR FLANGES
- LENGTH L (mm)
- INTERNAL PROBE CONSTRUNCTION

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	N	N
	K	K
	N	N
	S	S
	R	R
Thermocouple,tolerances according to Ansi Gr II	N	2
	K	4
	N	5
	S	6
	R	7

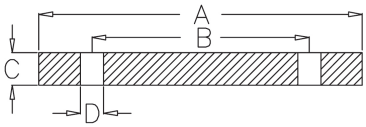
CONNECTING HEAD			D
			
DIN B Head	B	DIN A T1 Head	L
			
BUS Head	P	Explosionproof Head	D

ELEMENT TYPE	B
Single element	1
Double element	2

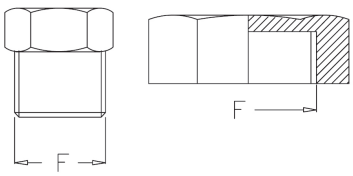
SHEATH QUALITY								C
Sheath diameter (mm)	6	8	10	15	16	17	20	26
Rod diameter (mm)	10	12	14	20	1/2"	1/2"	3/4"	32
1 Pitagoras (610)		A	B	C	D	E	F	
2 Pitagoras (610)				G	H	I	L	
1Pitagoras (610) 1Allumina (610)			M	N	O	P	Q	R
1Allumina (710)	R	S	T	U			V	
2 Allumina (710)				Z		1		
1 Sillimantin (530) 2 Pitagoras (610)								2
1 Sillimantin (530) 1 Pitagoras (610) 1 Allumina (710)								3
1 Sillimantin (530) 2 Allumina (710)								4

Custom executions on request

FLANGE (UNI 2278 PN16) FOR MODEL C6				E
A	B	C	D	
90	60	12	14	Q
95	65	12	14	R
105	70	14	14	S
115	75	14	14	T



STAINLESS STEEL FITTINGS FOR MODEL C2-C3							E
F (gas)	Sheath diameter (mm)						
	10	12	14	20	1/2	3/4	32
3/8	E						
1/2"	F	F					
3/4"	G	G	G	G			
1"	H	H	H	H	H		
1" 1/4	I	I	I	I	I	I	
1" 1/2	L	L	L	L	L	L	L
2"	M	M	M	M	M	M	M

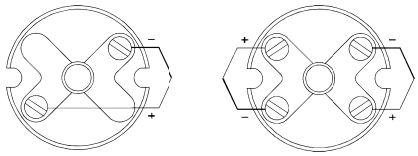


INTERNAL PROBE CONSTRUCTION	F
Ceramic insulators and wire insert	A
Mineral insulated insert	B

TECHNICAL DATA

- Temperature working range: 0 .. 1600 °C max (warning !! in reference of thermocouple type and protecting tube material, check technical notes)
- Accuracy: in reference of ANSI MC96.1/IEC 584
- Protection: IP55
- Electrical connection 1/2" gas

CONNECTION



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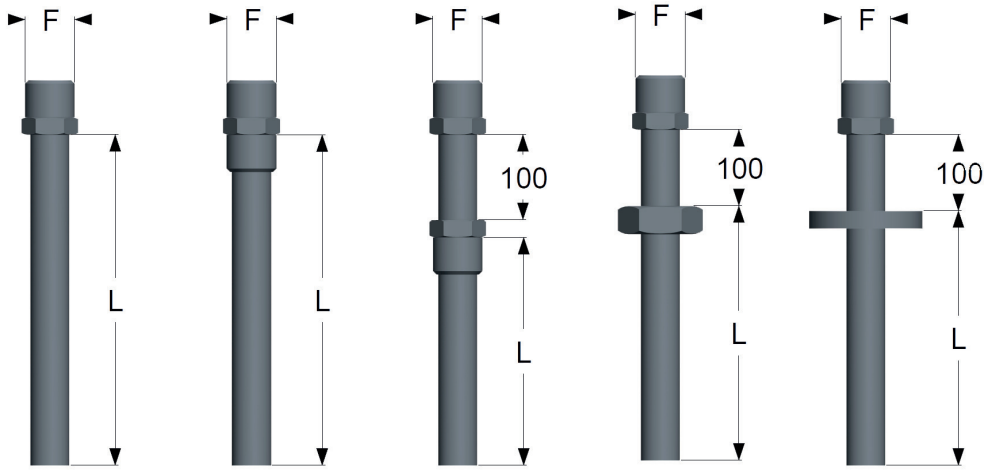


MODEL	A L	A R	A E	A G	A F

MODEL			A	B	C	1	0	0				

- SHEATH QUALITY
- THREAD F
- FITTINGS OR FLANGES
- STANDARD LENGTH
- LENGTH L (mm)

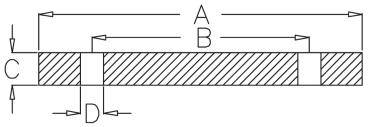
SHEATH QUALITY								A
	Sheath diameter (mm)							
	12	14	15	16	3/8	20	1/2	3/4
Aisi 446					T			H
Aisi 446*								1
Aisi 310	I	L		C	M	N	O	P
Aisi 310*		2		E	3	4	5	6
Inconel 600			Q		R	S	U	
Inconel 600*			7		8	9		

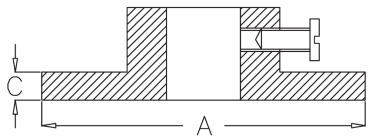
THREAD F1	B
1/2"	2
3/4"	4

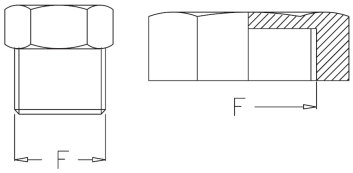
FLANGE (UNI 2278 PN16) FOR MODEL AF				C
A	B	C	D	
90	60	12	14	Q
95	65	12	14	R
105	70	14	14	S

FLANGE (UNI 2278 PN16) FOR MODEL AL		C
A	C	
70	6	T
100	9	U

STAINLESS STEEL FITTINGS FOR MODEL AR-AE-AG								C
F (gas)	Sheath diameter (mm)							
	12	14	15	16	3/8	20	1/2	3/4
1/2"	3	3	3	3				
3/4"	4	4	4	4	4	4		
1"	5	5	5	5	5	5	5	
1" 1/4	6	6	6	6	6	6	6	6
1" 1/2	7	7	7	7	7	7	7	7
2"	8	8	8	8	8	8	8	8







TECHNICAL DATA

- Temperature working range: 0 .. 1200 °C max (warning !! in reference of thermocouple type and protecting tube material, check technical notes)
- Accuracy: N/A
- Protection: IP54

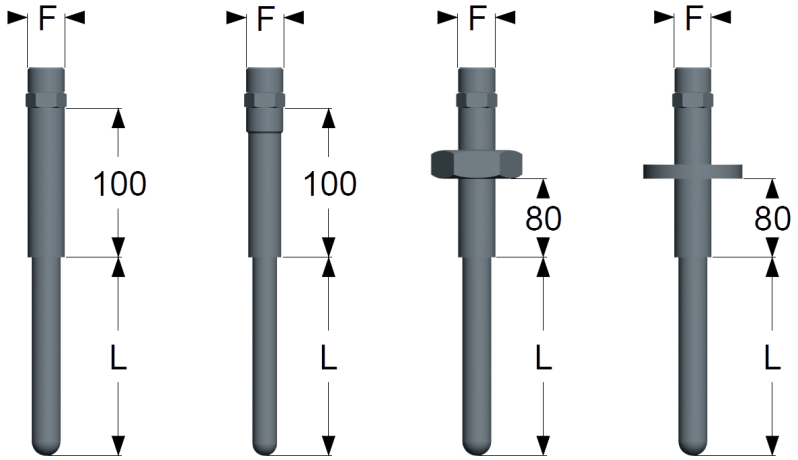
Custom executions on request

LA TERMOTECNICA

STANDARD SERIE THERMOCOUPLES

CERAMIC PROTECTION TUBE REPLACEMENTS

Modells C1-C2-C3-C6



MODEL	C L	C R	C G	C E

MODEL			A	B	C	1	0	0				

- SHEATH QUALITY
- THREAD F
- FITTINGS OR FLANGES
- STANDARD LENGTH
- LENGTH L (mm)

TECHNICAL DATA

- Temperature working range: 0 .. 1600 °C max (warning !! in reference of thermocouple type and protecting tube material, check technical notes)
- Accuracy: N/A
- Protection: IP54

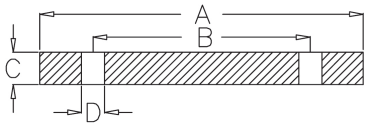
SHEATH QUALITY								A
Sheath diameter (mm)	6	8	10	15	16	17	20	26
Rod diameter (mm)	10	12	14	20	1/2"	1/2"	3/4"	32
1 Pitagoras (610)		A	B	C	D	E	F	
2 Pitagoras (610)				G	H	I	L	
1Pitagoras (610) 1Allumina (610)			M	N	O	P	Q	R
1Allumina (710)	R	S	T	U			V	
2 Allumina (710)				Z		1		
1 Sillimantin (530) 2 Pitagoras (610)								2
1 Sillimantin (530) 1 Pitagoras (610) 1 Allumina (710)								3
1 Sillimantin (530) 2 Allumina (710)								4

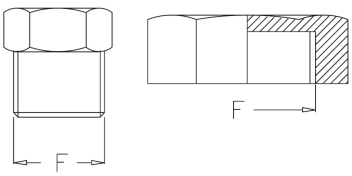
THREAD F1	B
1/2"	2
3/4"	4

STAINLESS STEEL FITTINGS FOR MODEL CR-CG							E
F (gas)	Sheath diameter (mm)						
	10	12	14	20	1/2	3/4	32
3/8	E						
1/2"	F	F					
3/4"	G	G	G	G			
1"	H	H	H	H	H		
1" 1/4	I	I	I	I	I	I	
1" 1/2	L	L	L	L	L	L	L
2"	M	M	M	M	M	M	M

Custom executions on request

FLANGE (UNI 2278 PN16) FOR MODEL CE				C
A	B	C	D	
90	60	12	14	Q
95	65	12	14	R
105	70	14	14	S
115	75	14	14	T





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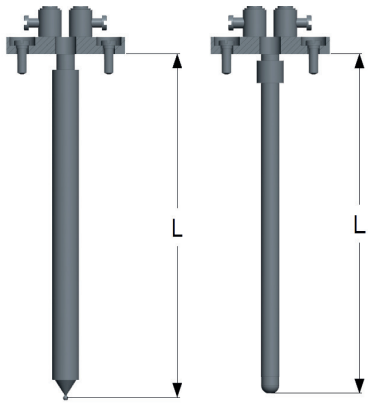


MODEL

A I A O

MODEL

A B C C D 0

- TYPE AND CLASS OF TOLERANCES
- INTERNAL PROBE CONSTRUCTION
- LENGTH L (mm)
- CERAMIC JUNCTION TYPE
- HOT JUNCTION TYPE

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

CERAMIC JUNCTION BLOCK	C	C
Whitout ceramics junction block	S	Z
For DIN B / BUS head	C	B
For DIN A T1 head	C	L
Per testina DIN A T2	C	P
Per testina Antideflagrante	C	D

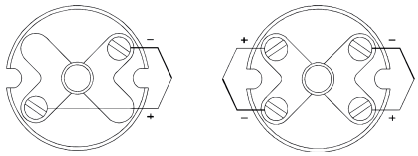
HOT JUNCTION TYPE		D
Single element	Double element	
Ungrounded	Ungrounded (for model A0)	I
	Separati isolati da massa(for model A0)	S
Graunded	Graunded (for model A0)	M
	Isolati esposi (for model A0-AI)	P
Exposed	Exposed (for model A0- AI	E

INTERNAL PROBE CONSTRUCTION		B
Ceramic insulators and wire insert		
Diameter wire	Element	
0.35	single	1
0.35	double	2
0.5	single	3
0.5	double	4
1.63	single	5
1.63	double	6
2.3	single	7
2.3	double	8
3.26	single	9
3.26	double	0
Mineral insulated insert		
Diameter Mgo	Element	
3	single	G
3	double	H
4	single	L
4	double	M
4.5	single	A
4.5	double	B
6	single	C
6	double	D
8	single	E
8	double	F

TECHNICAL DATA

- Temperature working range: 0 .. 1600 °C max (warning !! in reference of thermocouple type and protecting tube material, check technical notes)
- Accuracy: in reference of ANSI MC96.1/IEC 584
- Protection: N/A

CONNECTION



Custom executions on request

LA TERMOTECNICA

LA TERMOTECNICA

TSM SERIE

This series of simple but sturdy thermocouples and RTD' S is suitable for all applications in which the operating temperature permits use of protection tubes made of less noble materials than in the standard series (AISI 446- AISI 310-INCONEL 600).The protection materials of this series are made mainly of AISI 304 for general use and AISI 316 for applications in the food industry. This series can be constructed with thermocouple internal probe(K J E T configurations) or with RTD elements (Pt100) with 2-3-4 wire Connections.

Tipical applications:

- **Process**
- **Food indystry**
- **Chemical industry**

LA TERMOTECNICA, produce in according to internal higth quality standards, and in accordance with international standards :

- **UNI 7938/7937**
- **IEC 854/751**
- **ANSI DIN**

Utilization of special productive plants as, microscopes, custom welding machines, micro-manipulators, and above all our high level staff, assure quality standard and precision. If requested we supply documentation and product certification.

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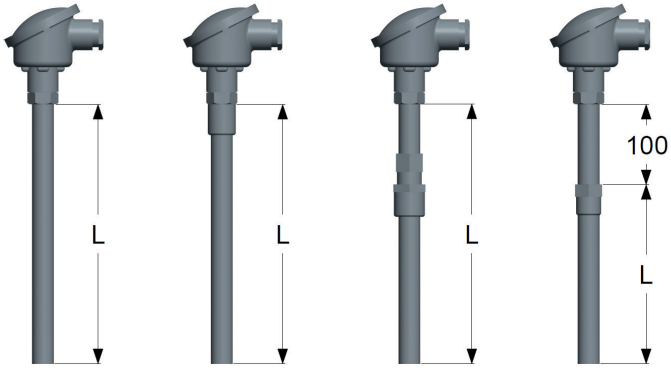
TSM SERIE

WITH STAINLESS STEEL PROTECTION TUBE



MODEL

M	1	M	2	M	3	M	4

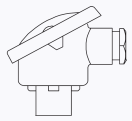
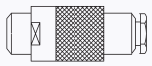
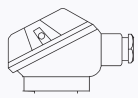
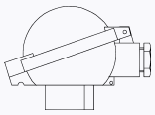
MODEL

		A	B	C	D	E					0

- Type and class of tolerances
- Hot junction type
- Connecting head
- Sheath quality
- Fittings
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple tolerances GR I Norme Ansi	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

HOT JUNCTION TYPE	B
Thermocouple	
Ungrounded (single element)	1
Ungraunded (double elements)	4
Graunded	2
RTD	
One element, 2 wire	1
One element, 3 wire	2
1 pt100 a 4 wire	3
2 pt100 a 2 wire	4
2 pt100 a 3 wire	5

CONNECTING HEAD	C		
			
DIN B Head	B	Mignon Head	V
			
Miniature Head	M	BUS Head	P

SHEATH QUALITY							D
	Sheath diameter (mm)						
s.s Quality	4	5	6	8	10	12	14
Aisi 304	1	2	3	B	E	F	G
Aisi 316	A	B	C	4	5	6	7

FITTINGS (A)						E
Stainless steel fittings for model M2-M4	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	A				
	1/4	B	B			
	3/8	C	C	C	C	
	1/2	D	D	D	D	D

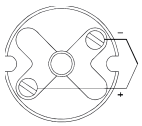
FITTINGS (B)						E
Stainless steel compression fittings for model M3	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	1				
	1/4	2	2			
	3/8	3	3	3	3	
	1/2	4	4	4	4	4

FITTINGS (C)						E
Brass compression fittings for model M3	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	5				
	1/4	6	6			
	3/8	7	7	7	7	
	1/2	8	8	8	8	8

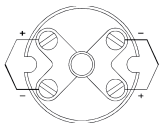
TECHNICAL DATA

- Temperature working range: -50 .. 450 °C (warning !! T type thermocouple 400 °C max.)
- Accuracy: ANSI MC96.1/IEC 584 (thermocouple probes) PIEC 751 (RTD probes)
- Protection: IP55
- Electrical connection 1/2" gas

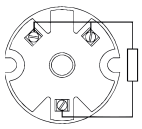
CONNECTION



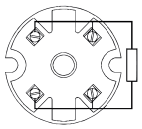
1xTC



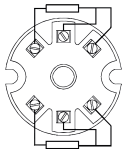
2xTC



1xPT100 3 wire

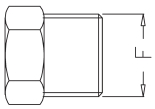


1xPT100 4 wire

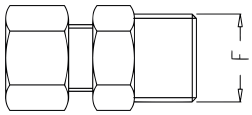


2xPT100 3+3 wire

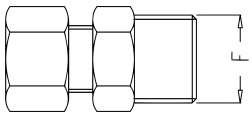
A



B



C



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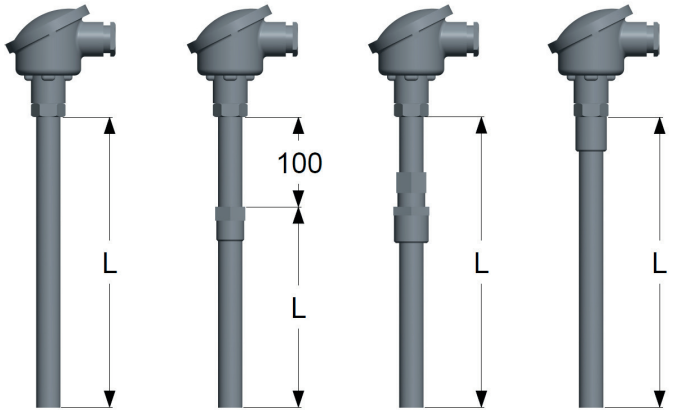
LA TERMOTECNICA

TSM SERIE

WITH STAINLESS STEEL PROTECTION TUBE AND SPRING LOADED INSERT



MODEL	M A	M B	M C	M D

MODEL			A	B	C	D					E	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- FITTINGS
- LENGTH L (mm)
- CONNECTING HEAD

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple tolerances Gr II Norme Ansi	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

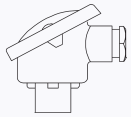
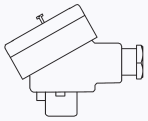
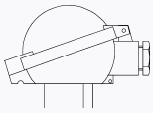
HOT JUNCTION TYPE	B
Thermocouple	
Ungrounded (single element)	1
Ungraunded (double elements)	4
Graunded	2
RTD	
One element, 2 wire	1
One element, 3 wire	2
1 pt100 a 4 wire	3
2 pt100 a 2 wire	4
2 pt100 a 3 wire	5

SHEATH QUALITY							C
	Sheath diameter (mm)						
s.s Quality	4	5	6	8	10	12	14
Aisi 304	1	2	3	B	E	F	G
Aisi 316	A	B	C	4	5	6	7

FITTINGS (A)						D
Stainless steel fittings for model MD-MB	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	A				
	1/4	B	B			
	3/8	C	C	C	C	
	1/2	D	D	D	D	D

FITTINGS (B)						D
Stainless steel compression fittings for model MC	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	1				
	1/4	2	2			
	3/8	3	3	3	3	
	1/2	4	4	4	4	4

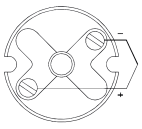
FITTINGS (C)						D
Brass compression fittings for model MC	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	5				
	1/4	6	6			
	3/8	7	7	7	7	
	1/2	8	8	8	8	8

CONNECTING HEAD				E
				
DIN B Head	B	Explosionproof Head	D	
				
BUS Head	P			

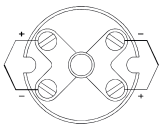
TECHNICAL DATA

- Temperature working range: -50 .. 450 °C (warning !! T type thermocouple 400 °C max.)
- Accuracy: ANSI MC96.1/IEC 584 (thermocouple probes) PIEC 751 (RTD probes)
- Protection: IP55
- Electrical connection 1/2" gas

CONNECTION



1xTC



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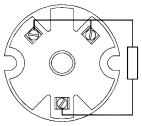
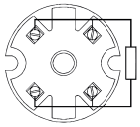
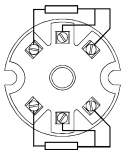


1xPT100 3 wire

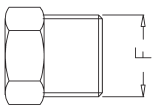


1xPT100 4 wire

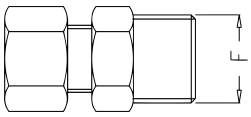


2xPT100 3+3 wire

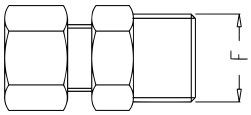
A



B



C



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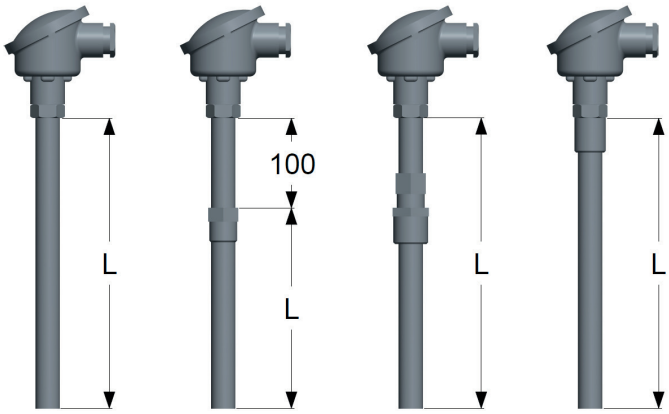
LA TERMOTECNICA

TSM SERIE

WITH STAINLESS STEEL PROTECTION TUBE AND TRANSMITTER



MODEL	M E	M G	M H	M I

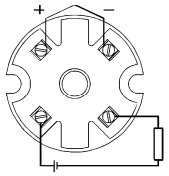
MODEL			A	B	C	D					E	F

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- FITTINGS
- LENGTH L (mm)
- CONNECTING HEAD
- TRANSMITTER TYPE

TECHNICAL DATA

- Temperature working range: -50 .. 450 °C (warning !! T type thermocouple 400 °C max.)
- Accuracy: ANSI MC96.1/IEC 584 (thermocouple probes) DIN 43760/ IEC 752/UNI 7937 (RTD probes)
- Protection: IP55
- Electrical Connection 1/2" gas
- Indicate temperature output range
- Power 18 .. 36 V
- Output 4 .. 20 mA

CONNECTION



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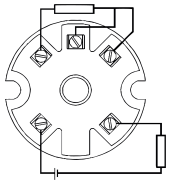
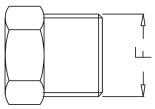
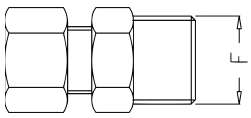


1xPT100

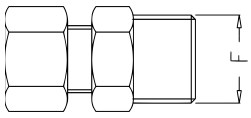
A



B



C



TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple tolerances Gr II Norme Ansi	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

HOT JUNCTION TYPE	B
Thermocouple	
Ungrounded	1
Graunded	2
RTD	
One element, 2 wire	1
One element, 3 wire	2

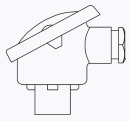
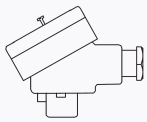
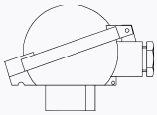
SHEATH QUALITY					C
Sheath diameter (mm)					
s.s Quality	6	8	10	12	14
Aisi 304	1	2	3	D	E
Aisi 316	A	B	C	4	5

FITTINGS (A)						D
Stainless steel fittings for model MG-MI	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	A				
	1/4	B	B			
	3/8	C	C	C	C	
	1/2	D	D	D	D	D

FITTINGS (B)						D
Stainless steel compression fittings for model MH	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	1				
	1/4	2	2			
	3/8	3	3	3	3	
	1/2	4	4	4	4	4

FITTINGS (C)						D
Brass compression fittings for model MH	Sheath diameter (mm)					
		6	8	10	12	14
Thread F	1/8	5				
	1/4	6	6			
	3/8	7	7	7	7	
	1/2	8	8	8	8	8

TRANSMITTER TYPE		F
Spring loaded insert with DAT 100 transmitter	Intrinsec safety	S
	Without intrinsec safety	T
Insert with DAT 100 transmitter	Intrinsec safety	R
	Without intrinsec safety	U
Spring loaded Insert with DAT 110 transmitter	Without intrinsec safety	V
Insert with DAT 110 transmitter	Without intrinsec safety	Z

CONNECTING HEAD	E
 DIN B Head	B
 Explosionproof Head	D
 BUS Head	P

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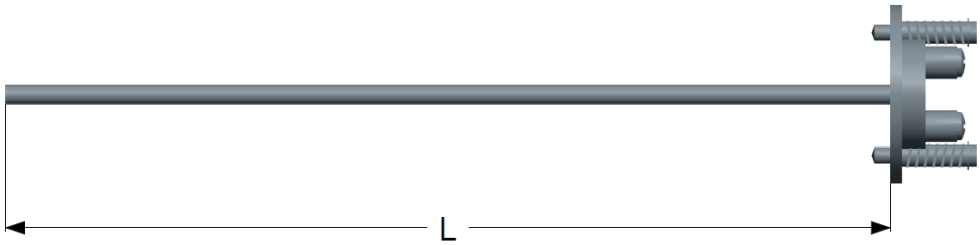
LA TERMOTECNICA

TSM SERIE

INLET REPLACEMENTS PROBE FOR TSM SERIE



MODEL	M	L	A	B	C					0	0	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH DIAMETER
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

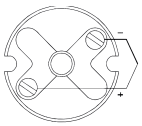
HOT JUNCTION TYPE	B
Thermocouple	
Ungrounded (single element)	1
Ungraunded (double elements)	4
Graunded	2
RTD	
One element, 2 wire	1
One element, 3 wire	2
1 pt100 a 4 wire	3
2 pt100 a 2 wire	4
2 pt100 a 3 wire	5

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi316	8

TECHNICAL DATA

- Temperature working range: -50 .. 450 °C (warning !! T type thermocouple 400 °C max.)
- Accuracy: ANSI MC96.1/IEC 584 (thermocouple probes) IEC 751(RTD probes)

CONNECTION



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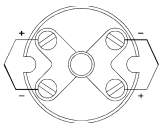
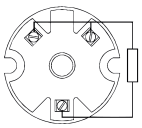
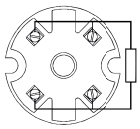


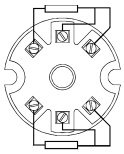
2xTC



1xPT100 3 wire



1xPT100 4 wire



2xPT100 3+3 wire

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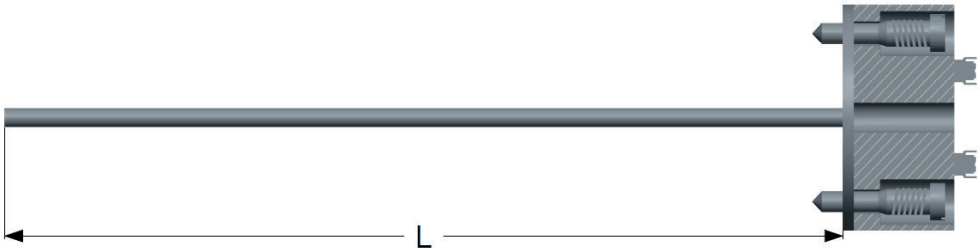
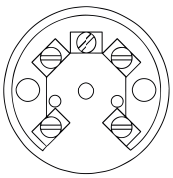


INTRINSIC SAFETY MODEL	M S
NO INTRINSIC SAFETY MODEL	M T



MODEL			A	B	C					D	0	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH DIAMETER
- LENGTH L (mm)
- TRANSMITTER TYPE

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

HOT JUNCTION TYPE	B
Thermocouple	
Ungrounded (single element)	1
Ungraunded (double elements)	4
Graunded	2
RTD	
Single pt 100 a 2 wire	1
Single pt 100 a 3 wire	2
Single pt100 a 4 wire	3
Double pt100 a 2 wire	4
Double pt100 a 3 wire	5

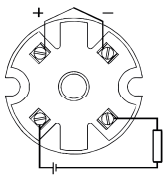
SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi316	8

TRANSMITTER TYPE		D
Insert with DAT 100 transmitter	Intrinsec safety	S
	Without intrinsec safety	T
Insert with DAT 110 transmitter	Without intrinsec safety	V

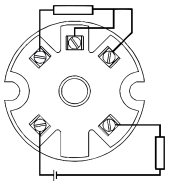
TECHNICAL DATA

- Temperature working range: -50 .. 450 °C (warning !! T type thermocouple 400 °C max.)
- Accuracy: ANSI MC96.1/IEC 584 (thermocouple probes) DIN 43760/IEC 752/ UNI 7937 (RTD probes)
- Protection: IP55
- Electrical connection 1/2" gas
- Indicate temperature output range
- Power 18 .. 32V
- Output 4 .. 20 mA

CONNECTION



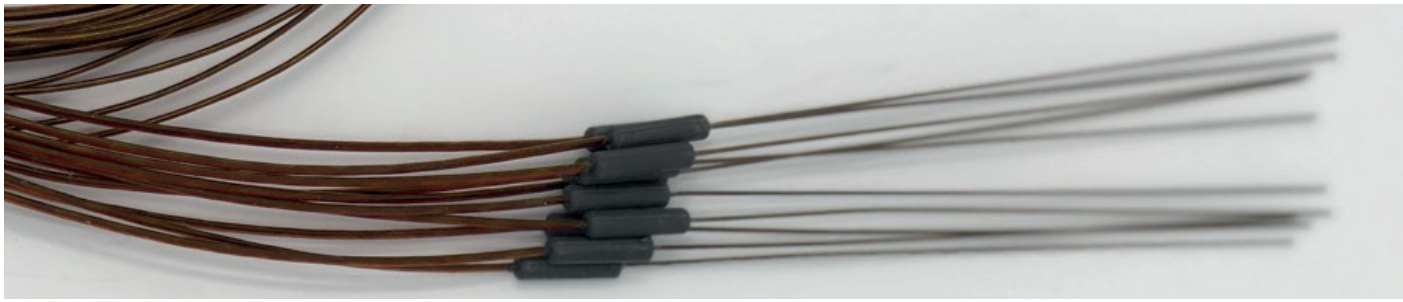
1xTC



1xPT100

Custom executions on request

LA TERMOTECNICA



MINERAL INSULATED SERIES (MGO)

This section covers thermocouples and RTD probes produced using mineral insulated (Magnesium oxide MgO) cables. The wide choice of solutions available means that this series can be used in an extensive range of applications, able to cater to all designer requirements. The external protection tubes are available in A304, A316, INC600, A321, etc. Features such as the integrated connector(permanently connected to the probe) or with integrated cable, both pressure and vibration resistant, and the ease of installation assured by the many types of fastening solutions, mean that this series always offers the right solution to any type of requirement. The 0.5-mm to 8-mm diameter thermocouples with J E K T N S configuration cover a measurement range of between – 200 to +1500°C. The RTD probes (Pt100, Ni100, Pt1000), produced according to the REVERSE or END CAP technique, are available in a diameter range from 3 mm to 8 mm and are particularly suited for applications affected by vibrations.

Tipical applications:

- **Furnaces**
- **Heating plants**
- **Avionics-Auotmotive**
- **Engines**

LA TERMOTECNICA, produce in according to internal higth quality standards, and in accordance with international standards

APPLICATIONS tipiche:

- **UNI 7938**
- **IEC 584**
- **ANSI / DIN**

Utilization of special productive plants as, microscopes, custom welding machines, micro-manipulators, and above all our high level staff, assure quality standard and precision. If requested we supply documentation and product certification.

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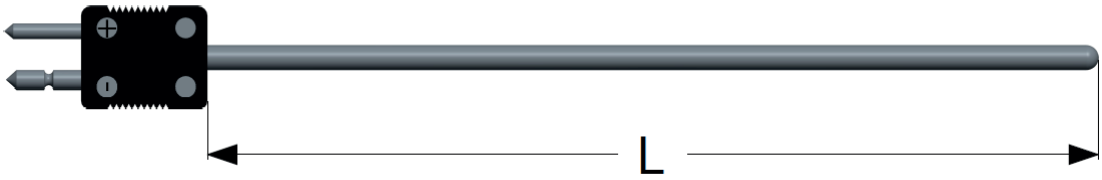
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH STANDARD TYPE COMPENSATED CONNECTOR



WITH PLASTIC CONNECTOR (MAX 220 °C)	G A
WITH CERAMIC CONNECTOR (MAX 550 °C)	G B

MODEL [ ][ ] A B C [ ][ ][ ][ ][ ] 0 0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

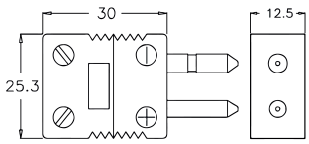
SHEATH QUALITY						C
	Sheath diameter (mm)					
SS Quality	2	3	3.17	4	4.5	6
Aisi 304	A	B	C	D	E	G
Aisi 316	K	J	I	L	M	O
Inconel 600	Q	R	S	T	U	Z

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter.(check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 outside diameter
- Maximum temperature of connector use: GA 220 °C - GB 550 °C

CONNECTION

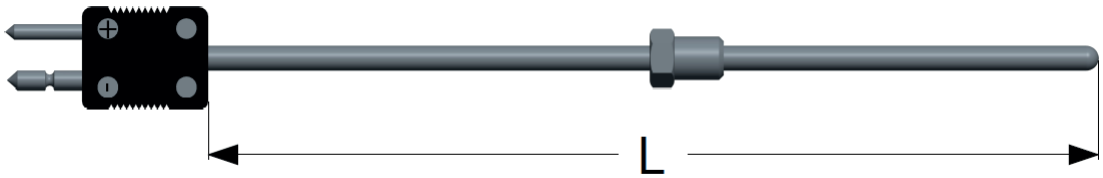
Standard type thermocouple connector



Custom executions on request

MINERAL INSULATED THERMOCOUPLES SERIES (MgO)

WITH STANDARD TYPE COMPENSATED CONNECTOR AND FIXED FITTING



WITH PLASTIC CONNECTOR (MAX 220 °C)	G C
WITH CERAMIC CONNECTOR (MAX 550 °C)	G D

MODEL [ ][ ] A B C [ ][ ][ ][ ][ ] 0 0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

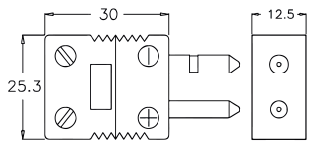
SHEATH QUALITY	C					
	Sheath diameter (mm)					
	2	3	3.17	4	4.5	6
Aisi 304	A	B	C	D	E	G
Aisi 316	K	J	I	L	M	O
Inconel 600	Q	R	S	T	U	Z

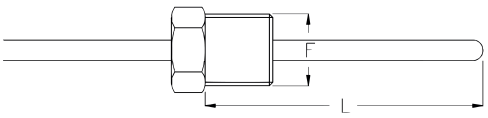
TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter.(check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 outside diameter
- Maximum temperature of connector use: GC 220C - GD550 °C

CONNECTION

Standard type thermocouple connector





MODEL M F A [ ][ ][ ][ ] 0 0 0 0 0

- THREAD F
- LENGTH L (mm)

THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F

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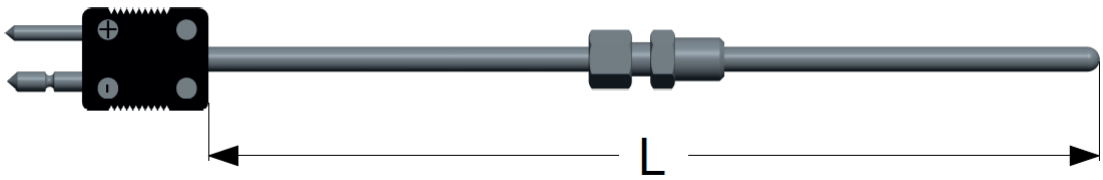


WITH PLASTIC CONNECTOR (MAX 220 °C)	G E
WITH CERAMIC CONNECTOR (MAX 550 °C)	G F

MODEL			A	B	C						0	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

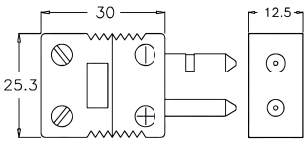
SHEATH QUALITY						C
	Sheath diameter (mm)					
SS Quality	2	3	3.17	4	4.5	6
Aisi 304	A	B	C	D	E	G
Aisi 316	K	J	I	L	M	O
Inconel 600	Q	R	S	T	U	Z

TECHNICAL DATA

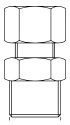
- Temperature working range: In reference of thermocouple type and diameter.(check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 outside diameter
- Maximum temperature of connector use: GE 220C - GF550 °C

CONNECTION

Standard type thermocouple connector



Adapter fittings with ogive pag. 79

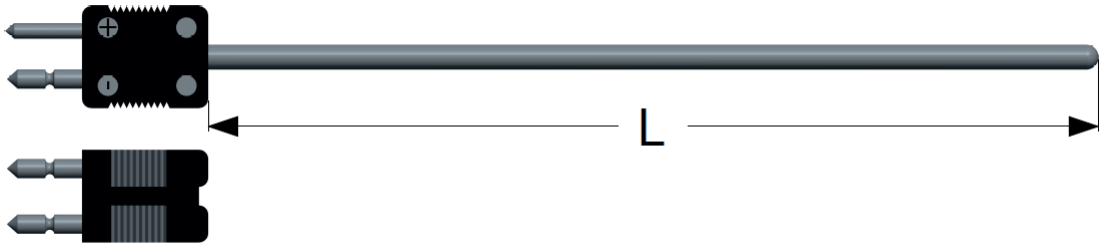


Custom executions on request

LA TERMOTECNICA

MINERAL INSULATED THERMOCOUPLES SERIES (MgO)

DOUBLE ELEMENT WITH STANDARD TYPE COMPENSATED CONNECTOR



MODEL	G	G	A	B	C						0	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY					C
	Sheath diameter (mm)				
SS Quality	3	3.17	4	4.5	6
Aisi 304	A	B	C	D	F
Aisi 316	H	K	J	I	M
Inconel 600	Q	R	S	T	O

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Double standard type thermocouple connector

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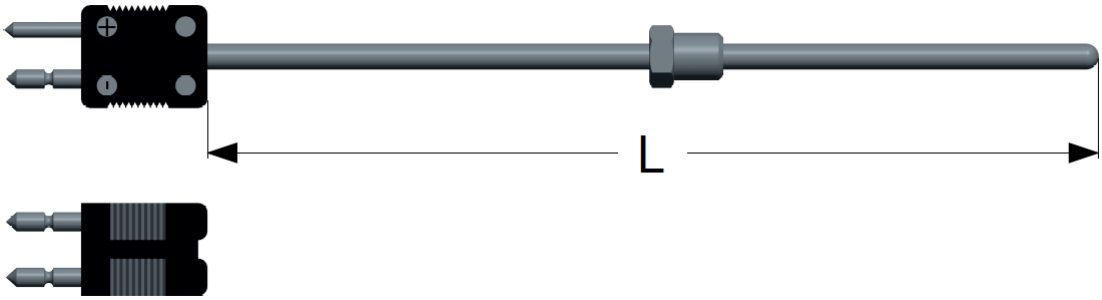
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

DOUBLE ELEMENT WITH STANDARD TYPE COMPENSATED CONNECTOR AND FIXED FITT.



MODEL

G	H	A	B	C						0	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

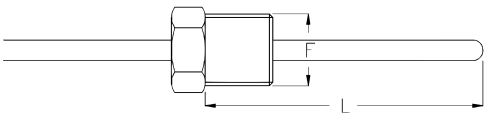
SHEATH QUALITY					C
	Sheath diameter (mm)				
SS Quality	3	3.17	4	4.5	6
Aisi 304	A	B	C	D	F
Aisi 316	H	K	J	I	M
Inconel 600	Q	R	S	T	O

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Double standard type thermocouple connector



MODEL

M	F	A					0	0	0	0	0

- THREAD F
- LENGTH L (mm)

THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F

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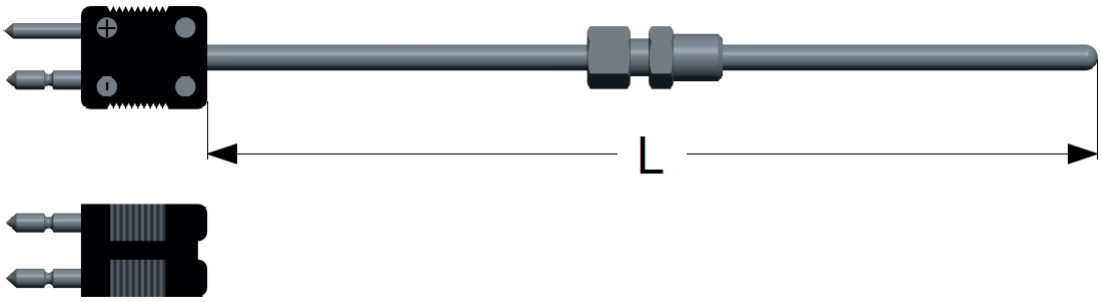
MINERAL INSULATED THERMOCOUPLES SERIES (MgO)

DOUBLE ELEMENT WITH STANDARD TYPE COMPENSATED CONNECTOR AND COMP. FITT.



MODEL G I A B C 0 0

- Type and class of tolerances
- Hot junction type
- Sheath quality
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY					C
	Sheath diameter (mm)				
SS Quality	3	3.17	4	4.5	6
Aisi 304	A	B	C	D	F
Aisi 316	H	K	J	I	M
Inconel 600	Q	R	S	T	O

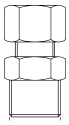
TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Double standard type thermocouple connector

Adapter fittings with ogive pag. 79



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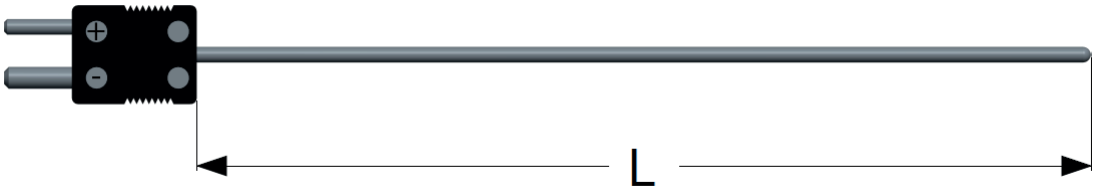
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH MINIATURE TYPE COMPENSATED CONNECTOR



MODEL G L A B C 0 0

- Type and class of tolerances
- Hot junction type
- Sheath quality
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

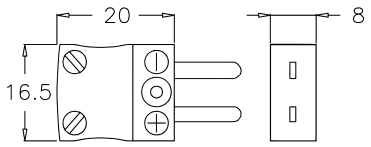
SHEATH QUALITY						C
	Sheath diameter (mm)					
SS Quality	0.5	1	1.5	2	3	3.17
Aisi 304	A	B	C	E	F	G
Aisi 316	H	K	J	L	M	N
Inconel 600	O	P	Q	S	T	U

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Miniature type thermocouple connector



Custom executions on request

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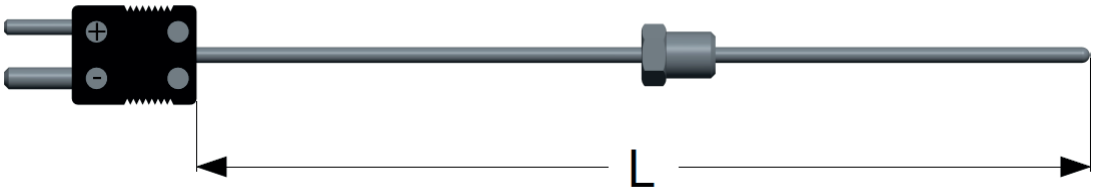
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH MINIATURE TYPE COMPENSATED CONNECTOR AND FIXED FITTING



MODEL G M A B C _ _ _ _ _ 0 0

- Type and class of tolerances
- Hot junction type
- Sheath quality
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

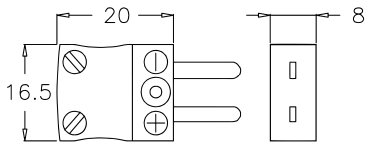
SHEATH QUALITY						C
	Sheath diameter (mm)					
SS Quality	0.5	1	1.5	2	3	3.17
Aisi 304	A	B	C	E	F	G
Aisi 316	H	K	J	L	M	N
Inconel 600	O	P	Q	S	T	U

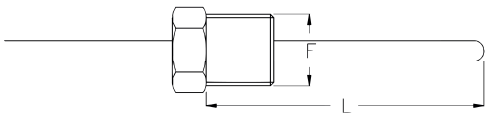
TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Miniature type thermocouple connector





MODEL M F A _ _ _ _ 0 0 0 0 0

- Thread F
- Length L (mm)

THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F

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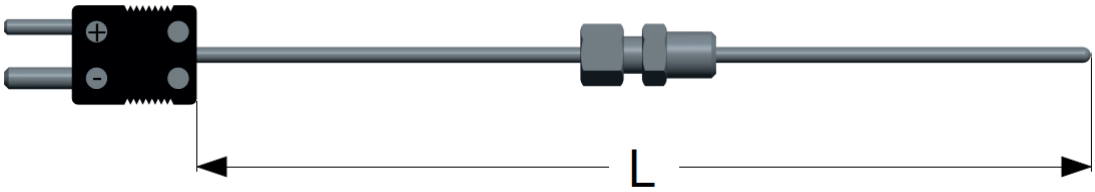


MODEL

G	N	A	B	C						0	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

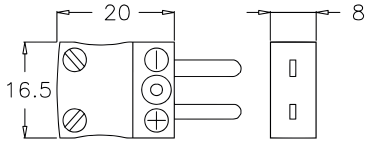
SHEATH QUALITY						C
	Sheath diameter (mm)					
SS Quality	0.5	1	1.5	2	3	3.17
Aisi 304	A	B	C	E	F	G
Aisi 316	H	K	J	L	M	N
Inconel 600	O	P	Q	S	T	U

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Miniature type thermocouple connector



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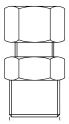
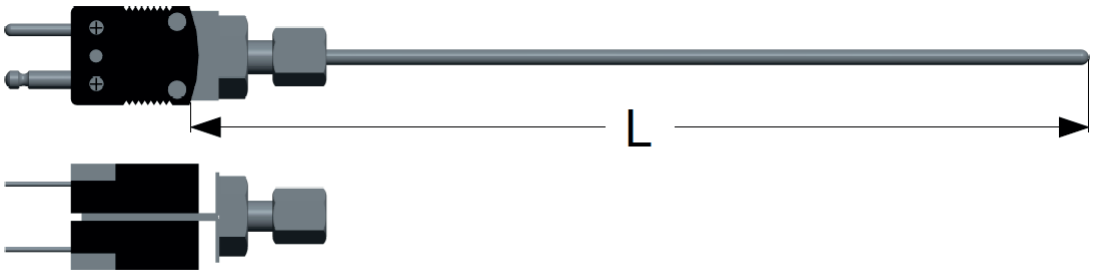


Custom executions on request

LA TERMOTECNICA

MINERAL INSULATED THERMOCOUPLES SERIES (MgO)

DOUBLE ELEMENT WITH MINIATURE TYPE COMPENSATED CONNECTOR



MODEL G O A B C _ _ _ _ _ 0 0

- Type and class of tolerances
- Hot junction type
- Sheath quality
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY			C
	Sheath diameter (mm)		
SS Quality	3	3.17	4
Aisi 304	E	F	G
Aisi 316	L	M	N
Inconel 600	S	T	U

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Double miniature type thermocouple connector

Custom executions on request

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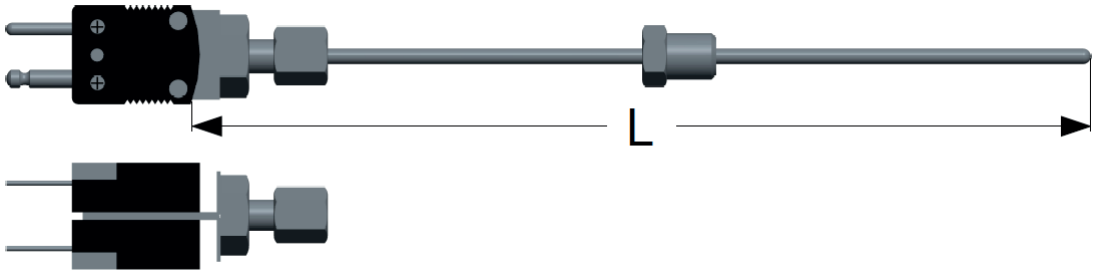
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

DOUBLE ELEMENT WITH MINIATURE TYPE COMPENSATED CONNECTOR AND FIXED FITT.



MODEL

G	P	A	B	C						0	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

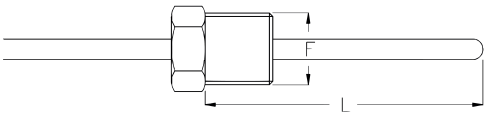
SHEATH QUALITY			C
	Sheath diameter (mm)		
SS Quality	3	3.17	4
Aisi 304	E	F	G
Aisi 316	L	M	N
Inconel 600	S	T	U

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Double miniature type thermocouple connector



MODEL

M	F	A					0	0	0	0	0

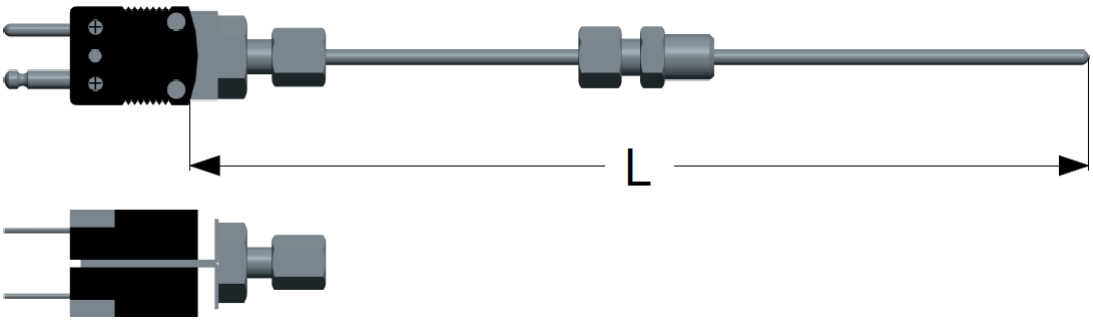
- THREAD F
- LENGTH L (mm)

THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F

Custom executions on request

MINERAL INSULATED THERMOCOUPLES SERIES (MgO)

DOUBLE ELEMENT WITH MINIATURE TYPE COMPENSATED CONNECTOR AND COMP.FITT.



MODEL	G	Q	A	B	C						0	0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	J	J
	E	E
	K	K
	N	N
	S	N
	R	R
	B	B
Thermocouple,tolerances according to Ansi Gr II	J	2
	E	3
	K	4
	N	5
	S	6
	R	7
	B	8

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY			C
	Sheath diameter (mm)		
SS Quality	3	3.17	4
Aisi 304	E	F	G
Aisi 316	L	M	N
Inconel 600	S	T	U

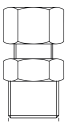
TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of connector use: 220 °C

CONNECTION

Double miniature type thermocouple connector

Adapter fittings with ogive pag. 79



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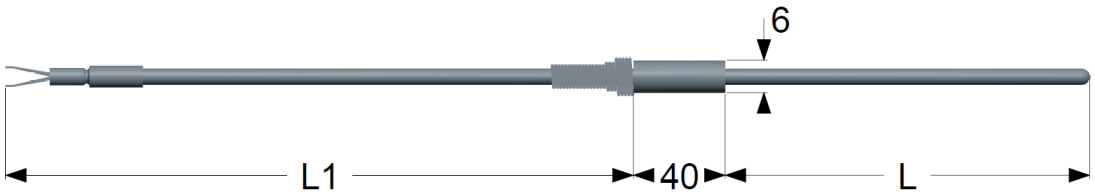
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH INTEGRATED EXTENSION CABLE

WITHOUT FITTINGS



MODEL

H	A	A	B	C	D						

- TYPE AND CLASS OF TOLERANCES
- EXTENSION CABLE
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)
- LENGHT L1 (dm) (EXTENSION CABLE)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
	S	S
	R	R
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	3
	E	4
	N	5
	S	6
	R	7

HOT JUNCTION TYPE	C
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY									D
	Sheath diameter (mm)								
SS Quality	1	1.5	2	3	3.17	4	4.5	6	8
Aisi 304	A	B	D	E	F	G	H	4	
Aisi 316	K	J	L	M	N	O	P	5	
Inconel 600	Q	R	T	U	W	Z	X	6	8

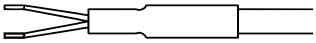
EXTENSION CABLE	B
2x0.24 mm², insulation pvc/braided tinned copper/pvc	A
2x0.22 mm², insulation teflon/braided tinned copper/teflon	B
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm², insulation extruded teflon/braided tinned copper/extruded teflon	D
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	E
2x0.19 mm², insulation teflon/teflon	F
2x0.19 mm², insulation siliconed glass braid/ siliconed glass braid	G
2x0.24 mm² ,insulation extruded teflon/extruded teflon/braided tinned copper	H
2x0.50 mm², insulation braided glass/braided glass/ braided tinned copper	I
2x0.50 mm²,insulation pvc/pvc	L
2x0.24 mm², insulation teflon/braided tinnet copper/teflon	M
2x0.35 mm², insulation teflon/teflon	N
2x0.19 mm², insulation teflon/braided tinnet copper/teflon	O
2x0.35 mm², insulation teflon/braided tinnet copper/teflon	P
2x0.24 mm²,insulation siliconed rubber/siliconed rubber	Q
2x0.19 mm², insulation teflon/teflon	R

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

CONNECTION

Stripped wire, respect polarity. (check color coding plan)



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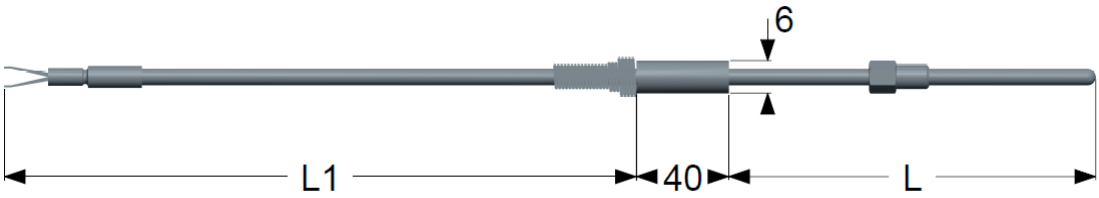
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH INTEGRATED EXTENSION CABLE

WITH FIXED FITTING



MODEL H B A B C D

- Type and class of tolerances
- Extension cable
- Hot junction type
- Sheath quality
- Length L (mm)
- Lenght L1 (dm) (extension cable)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
	S	S
	R	R
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	3
	E	4
	N	5
	S	6
	R	7

HOT JUNCTION TYPE	C
Ungrounded	I
Graunded	M
Exposed	E

EXTENSION CABLE	B
2x0.24 mm², insulation pvc/braided tinned copper/pvc	A
2x0.22 mm², insulation teflon/braided tinned copper/teflon	B
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm², insulation extruded teflon/braided tinned copper/extruded teflon	D
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	E
2x0.19 mm², insulation teflon/teflon	F
2x0.19 mm², insulation siliconed glass braid/siliconed glass braid	G
2x0.24 mm² ,insulation extruded teflon/extruded teflon/ braided tinned copper	H
2x0.50 mm², insulation braided glass/braided glass/ braided tinned copper	I
2x0.50 mm²,insulation pvc/pvc	L
2x0.24 mm², insulation teflon/braided tinnet copper/teflon	M
2x0.35 mm², insulation teflon/teflon	N
2x0.19 mm², insulation teflon/braided tinnet copper/teflon	O
2x0.35 mm², insulation teflon/braided tinnet copper/teflon	P
2x0.24 mm²,insulation siliconed rubber/siliconed rubber	Q
2x0.19 mm², insulation teflon/teflon	R

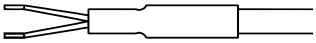
TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

SHEATH QUALITY									D
	Sheath diameter (mm)								
SS Quality	1	1.5	2	3	3.17	4	4.5	6	8
Aisi 304	A	B	D	E	F	G	H	4	
Aisi 316	K	J	L	M	N	O	P	5	
Inconel 600	Q	R	T	U	W	Z	X	6	8

CONNECTION

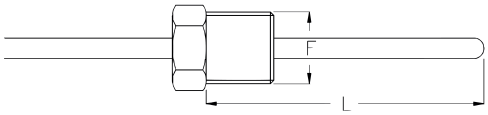
Stripped wire, respect polarity. (check color coding plan)



MODEL M F A 0 0 0 0 0

- Thread F
- Length L (mm)

THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F



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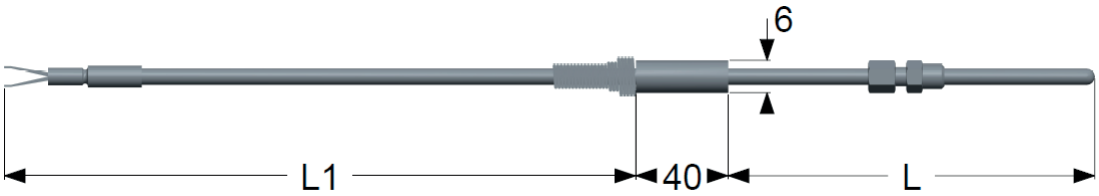
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH INTEGRATED EXTENSION CABLE

WITH COMPRESSION FITTING



MODEL H C A B C D

- Type and class of tolerances
- Extension cable
- Hot junction type
- Sheath quality
- Length L (mm)
- Lenght L1 (dm) (extension cable)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
	S	S
	R	R
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	3
	E	4
	N	5
	S	6
	R	7

HOT JUNCTION TYPE	C
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY									D
	Sheath diameter (mm)								
	1	1.5	2	3	3.17	4	4.5	6	8
Aisi 304	A	B	D	E	F	G	H	4	
Aisi 316	K	J	L	M	N	O	P	5	
Inconel 600	Q	R	T	U	W	Z	X	6	8

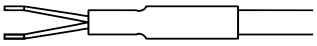
EXTENSION CABLE	B
2x0.24 mm², insulation pvc/braided tinned copper/pvc	A
2x0.22 mm², insulation teflon/braided tinned copper/teflon	B
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm², insulation extruded teflon/braided tinned copper/extruded teflon	D
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	E
2x0.19 mm², insulation teflon/teflon	F
2x0.19 mm², insulation siliconed glass braid/ siliconed glass braid	G
2x0.24 mm² ,insulation extruded teflon/extruded teflon/braided tinned copper	H
2x0.50 mm², insulation braided glass/braided glass/ braided tinned copper	I
2x0.50 mm²,insulation pvc/pvc	L
2x0.24 mm², insulation teflon/braided tinnet copper/teflon	M
2x0.35 mm², insulation teflon/teflon	N
2x0.19 mm², insulation teflon/braided tinnet copper/teflon	O
2x0.35 mm², insulation teflon/braided tinnet copper/teflon	P
2x0.24 mm²,insulation siliconed rubber/siliconed rubber	Q
2x0.19 mm², insulation teflon/teflon	R

TECHNICAL DATA

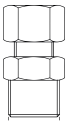
- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

CONNECTION

Stripped wire, respect polarity. (check color coding plan)



Adapter fittings with ogive pag. 79



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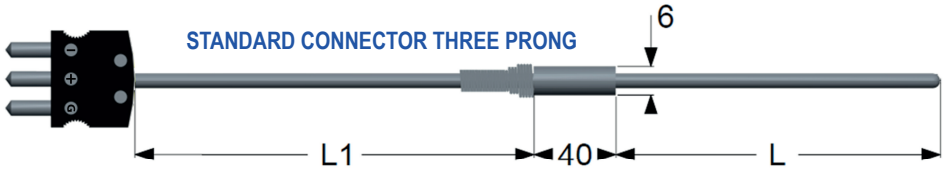
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH INTEGRATED EXTENSION CABLE

WITH COMPENSATED CONNECTOR

MODEL H D



MODEL H E

MODEL H F

MODEL H G

MODEL | | | A | B | C | D | | | | | | |

- TYPE AND CLASS OF TOLERANCES
- EXTENSION CABLE
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)
- LENGHT L1 (dm) (EXTENSION CABLE)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
	S	S
	R	R
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	3
	E	4
	N	5
	S	6
	R	7

HOT JUNCTION TYPE	C
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY									D
	Sheath diameter (mm)								
	1	1.5	2	3	3.17	4	4.5	6	8
Aisi 304	A	B	D	E	F	G	H	4	
Aisi 316	K	J	L	M	N	O	P	5	
Inconel 600	Q	R	T	U	W	Z	X	6	8

EXTENSION CABLE	B
2x0.24 mm², insulation pvc/braided tinned copper/pvc	A
2x0.22 mm², insulation teflon/braided tinned copper/teflon	B
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm², insulation extruded teflon/braided tinned copper/extruded teflon	D
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	E
2x0.19 mm², insulation teflon/teflon	F
2x0.19 mm², insulation siliconed glass braid/siliconed glass braid	G
2x0.24 mm²,insulation extruded teflon/extruded teflon/braided tinned copper	H
2x0.50 mm²,insulation braided glass/braided glass/ braided tinned copper	I
2x0.50 mm², insulation pvc/pvc	L
2x0.24 mm², insulation teflon/braided tinnet copper/teflon	M
2x0.35 mm², insulation teflon/teflon	N
2x0.19 mm², insulation teflon/braided tinnet copper/teflon	O
2x0.35 mm², insulation teflon/braided tinnet copper/teflon	P
2x0.24 mm², insulation siliconed rubber/siliconed rubber	Q
2x0.19 mm², insulation teflon/teflon	R

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

CONNECTION

Thermoouple connectors (see drow up)

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MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH INTEGRATED EXTENSION CABLE

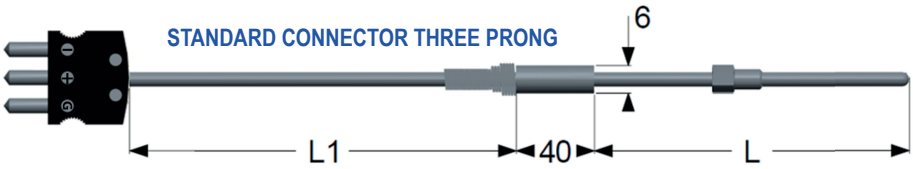
WITH COMPENSATED CONNECTOR AND FIXED FITTING

LA TERMOTECNICA

MODEL

H H

STANDARD CONNECTOR THREE PRONG



H I

CERAMIC STANDARD CONNECTOR

H L

MINIATURE CONNECTOR

H M

STANDARD CONNECTOR

MODEL

		A	B	C	D						

- Type and class of tolerances
- Extension cable
- Hot junction type
- Sheath quality
- Length L (mm)
- Lenght L1 (dm) (extension cable)

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
	S	S
	R	R
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	3
	E	4
	N	5
	S	6
	R	7

HOT JUNCTION TYPE	C
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY									D
	Sheath diameter (mm)								
	1	1.5	2	3	3.17	4	4.5	6	8
Aisi 304	A	B	D	E	F	G	H	4	
Aisi 316	K	J	L	M	N	O	P	5	
Inconel 600	Q	R	T	U	W	Z	X	6	8

EXTENSION CABLE	B
2x0.24 mm², insulation pvc/braided tinned copper/pvc	A
2x0.22 mm², insulation teflon/braided tinned copper/teflon	B
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm², insulation extruded teflon/braided tinned copper/extruded teflon	D
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	E
2x0.19 mm², insulation teflon/teflon	F
2x0.19 mm², insulation siliconed glass braid/ siliconed glass braid	G
2x0.24 mm² ,insulation extruded teflon/extruded teflon/braided tinned copper	H
2x0.50 mm², insulation braided glass/braided glass/ braided tinned copper	I
2x0.50 mm²,insulation pvc/pvc	L
2x0.24 mm², insulation teflon/braided tinnet copper/teflon	M
2x0.35 mm², insulation teflon/teflon	N
2x0.19 mm², insulation teflon/braided tinnet copper/teflon	O
2x0.35 mm², insulation teflon/braided tinnet copper/teflon	P
2x0.24 mm²,insulation siliconed rubber/siliconed rubber	Q
2x0.19 mm², insulation teflon/teflon	R

CONNECTION

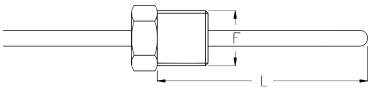
Thermoouple connectors (see drow up)

MODEL

M	F	A					0	0	0	0	0

- Thread F
- Length L (mm)

THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F



Custom executions on request

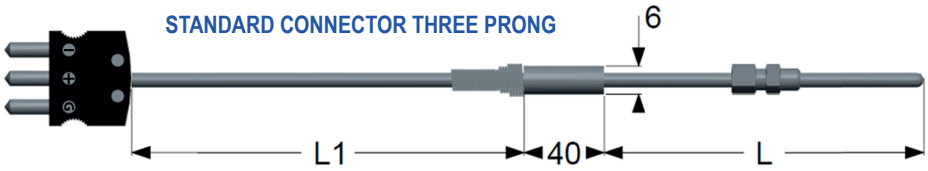
MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH INTEGRATED EXTENSION CABLE

WITH COMPENSATED CONNECTOR AND COMPRESSION FITTING

MODEL H N

STANDARD CONNECTOR THREE PRONG



MODEL H O

CERAMIC STANDARD CONNECTOR

MODEL H P

MINIATURE CONNECTOR

MODEL H Q

STANDARD CONNECTOR

MODEL | | A | B | C | D | | | | | | |

- TYPE AND CLASS OF TOLERANCES
- EXTENSION CABLE
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)
- LENGHT L1 (dm) (EXTENSION CABLE)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
	S	S
	R	R
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	3
	E	4
	N	5
	S	6
	R	7

HOT JUNCTION TYPE	C
Ungrounded	I
Graunded	M
Exposed	E

SHEATH QUALITY	D								
	Sheath diameter (mm)								
	1	1.5	2	3	3.17	4	4.5	6	8
Aisi 304	A	B	D	E	F	G	H	4	
Aisi 316	K	J	L	M	N	O	P	5	
Inconel 600	Q	R	T	U	W	Z	X	6	8

EXTENSION CABLE	B
2x0.24 mm², insulation pvc/braided tinned copper/pvc	A
2x0.22 mm², insulation teflon/braided tinned copper/teflon	B
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm², insulation extruded teflon/braided tinned copper/extruded teflon	D
2x0.25 mm², insulation braided glass/braided glass/ braided tinned copper	E
2x0.19 mm², insulation teflon/teflon	F
2x0.19 mm², insulation siliconed glass braid/ siliconed glass braid	G
2x0.24 mm² ,insulation extruded teflon/extruded teflon/braided tinned copper	H
2x0.50 mm², insulation braided glass/braided glass/ braided tinned copper	I
2x0.50 mm²,insulation pvc/pvc	L
2x0.24 mm², insulation teflon/braided tinnet copper/teflon	M
2x0.35 mm², insulation teflon/teflon	N
2x0.19 mm², insulation teflon/braided tinnet copper/teflon	O
2x0.35 mm², insulation teflon/braided tinnet copper/teflon	P
2x0.24 mm²,insulation siliconed rubber/siliconed rubber	Q
2x0.19 mm², insulation teflon/teflon	R

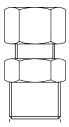
TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

CONNECTION

Thermoouple connectors (see drow up)

Adapter fittings with ogive pag. 79



Custom executions on request

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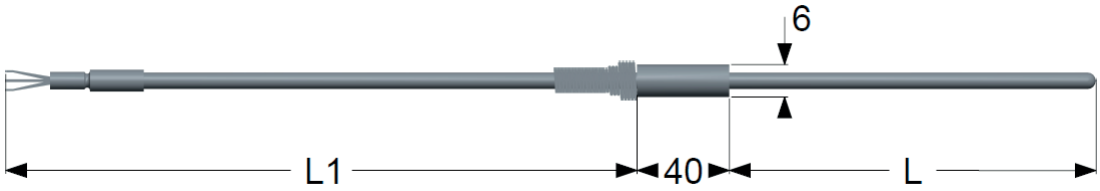
Tel. 011/9085288 - www.latermotecnica.it - info@latermotecnica.it

MINERAL INSULATED RTD'S PT100

WITH INTEGRATED EXTENSION CABLE

WITHOUT FITTINGS



MODEL H R A B C D

- Type and class of tolerances
- Extension cable
- Connection RTD
- Sheath diameter
- Length L (mm)
- Lenght L1 (dm) (extension cable)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

EXTENSION CABLE	B
2x0.24 mm² ,insulation pvc/braided tinned copper/pvc	A
2x0.24 mm² ,insulation siliconed rubber/siliconed rubber	B
2x0.25 mm² ,insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm² ,insulation extruded teflon/braided tinned copper/extruded teflon	D
2X0,22mm²,insulation teflon/teflon/braided tinner copper/copper conductor	E
2x0.22 mm² ,insulation teflon/braided tinnet copper/teflonl	F
2x0.35 mm² ,insulation braided glass/braided glass/ braided tinned copper	G
2x0.35 mm² ,insulation braided glass/braided glass	H

CONNECTION RTD	C
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

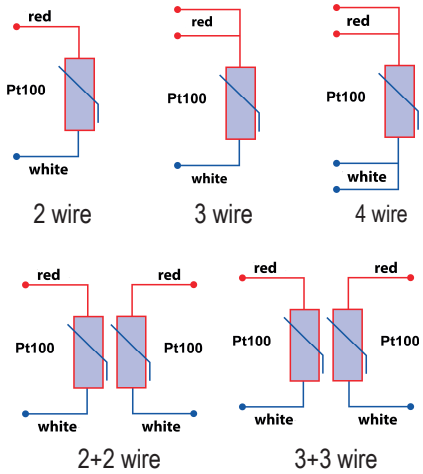
SHEATH DIAMETER (mm)	D
2	8
3	1
3.17	2
4	5
4.5	3
6	4

TECHNICAL DATA

- Temperature working range: -80 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

CONNECTION

Stripping



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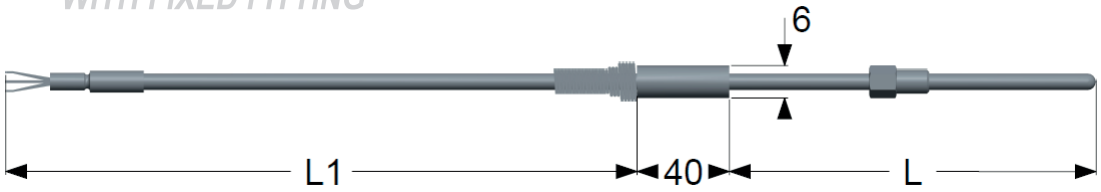
LA TERMOTECNICA

MINERAL INSULATED RTD'S PT100

WITH INTEGRATED EXTENSION CABLE

WITH FIXED FITTING



MODEL H S A B C D

- Type and class of tolerances
- Extension cable
- Connection RTD
- Sheath diameter
- Length L (mm)
- Lenght L1 (dm) (extension cable)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

EXTENSION CABLE	B
2x0.24 mm² ,insulation pvc/braided tinned copper/pvc	A
2x0.24 mm² ,insulation siliconed rubber/siliconed rubber	B
2x0.25 mm² ,insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm² ,insulation extruded teflon/braided tinned copper/ extruded teflon	D
2x0.24 mm²,insulation teflon/teflon/braided tinned copper	E
2x0.22 mm² ,insulation teflon/braided tinnet copper/teflonl	F
2x0.35 mm² ,insulation braided glass/braided glass/ braided tinned copper	G
2x0.35 mm² ,insulation braided glass/braided glass	H

CONNECTION RTD	C
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

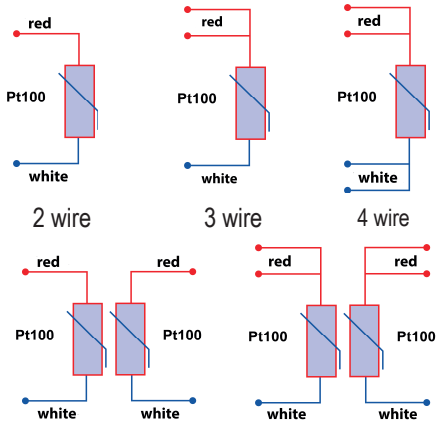
SHEATH DIAMETER (mm)	D
2	8
3	1
3.17	2
4	5
4.5	3
6	4

TECHNICAL DATA

- Temperature working range: -80 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

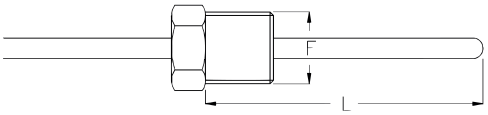
CONNECTION

Stripping



MODEL M F A 0 0 0 0 0

- Thread F
- Length L (mm)



THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F

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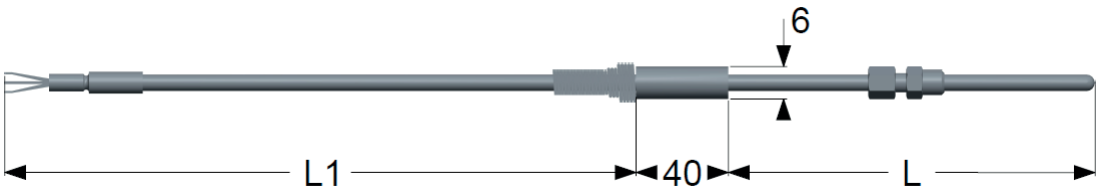
MINERAL INSULATED RTD'S PT100

WITH INTEGRATED EXTENSION CABLE

WITH COMPRESSION FITTING



MODEL H T A B C D

- Type and class of tolerances
- Extension cable
- Connection RTD
- Sheath diameter
- Length L (mm)
- Lenght L1 (dm) (extension cable)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

EXTENSION CABLE	B
2x0.24 mm² ,insulation pvc/braided tinned copper/pvc	A
2x0.24 mm² ,insulation siliconed rubber/siliconed rubber	B
2x0.25 mm² ,insulation braided glass/braided glass/ braided tinned copper	C
2x0.22 mm² ,insulation extruded teflon/braided tinned copper/extruded teflon	D
2x0.24 mm²,insulation teflon/teflon/braided tinned copper	E
2x0.22 mm² ,insulation teflon/braided tinnet copper/teflonl	F
2x0.35 mm² ,insulation braided glass/braided glass/ braided tinned copper	G
2x0.35 mm² ,insulation braided glass/braided glass	H

CONNECTION RTD	C
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

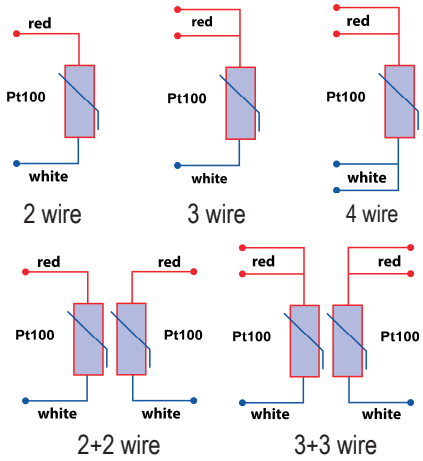
SHEATH DIAMETER (mm)	D
2	8
3	1
3.17	2
4	5
4.5	3
6	4

TECHNICAL DATA

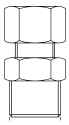
- Temperature working range: -80 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Maximum temperature of cable use: in refernce of insulation material (check the cable technical notes)
- Maximum temperature of transition use: 250 °C

CONNECTION

Stripping



Adapter fittings with ogive pag. 79



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LA TERMOTECNICA

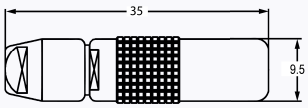
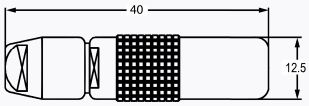
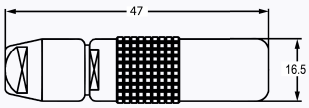
MINERAL INSULATED RTD'S PT100

WITH CONNECTOR TYPE "LEMO" B

WITHOUT FITTINGS

MODEL	G	R	A	B	C	D					0	0

- Connector dimension
- Type and class of tolerances
- Connection RTD
- Sheath diameter
- Length L (mm)

CONNECTOR DIMENSION	A
	1
	2
	3

TYPE AND CLASS OF TOLERANCES		B
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	C
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	D
2	8
3	1
3.17	2
4	5
4.5	3
6	4

TECHNICAL DATA

- Temperature working range: -80 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Maximum temperature of connector use: 250 °C

CONNECTION

PHG model, "LEMO" connector.

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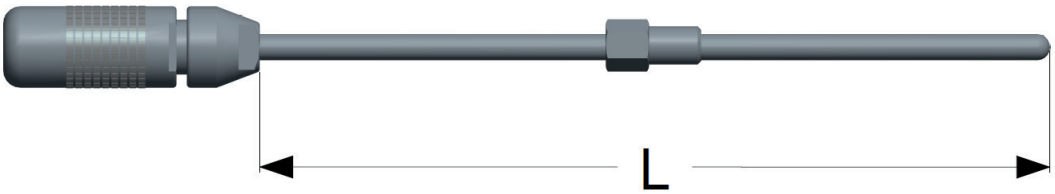
MINERAL INSULATED RTD'S PT100

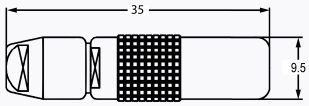
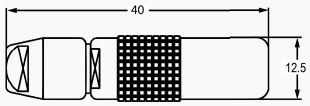
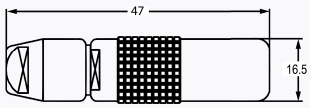
WITH CONNECTOR TYPE "LEMO" B

WITH FIXED FITTING



MODEL	G	S	A	B	C	D					0	0

- Connector dimension
- Type and class of tolerances
- Connection RTD
- Sheath diameter
- Length L (mm)

CONNECTOR DIMENSION	A
	1
	2
	3

CONNECTION RTD	C
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	D
2	8
3	1
3.17	2
4	5
4.5	3
6	4

TYPE AND CLASS OF TOLERANCES		B
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

TECHNICAL DATA

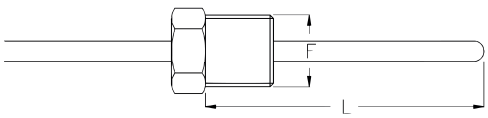
- Temperature working range: -80 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Maximum temperature of connector use: 250 °C

CONNECTION

PHG model, "LEMO" connector.

MODEL	M	F	A					0	0	0	0	0

- Thread F
- Length L (mm)



THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F

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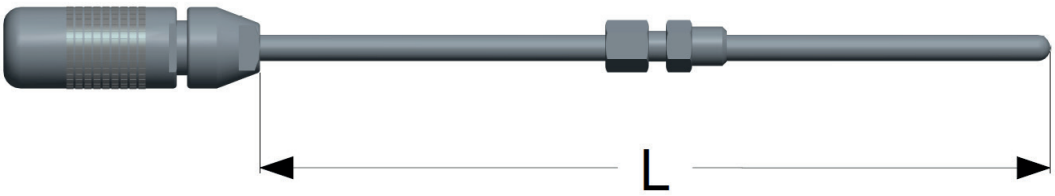
LA TERMOTECNICA

MINERAL INSULATED RTD'S PT100

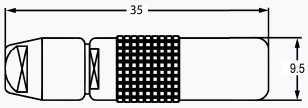
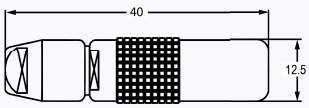
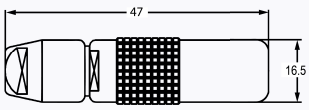
WITH CONNECTOR TYPE "LEMO" B

WITH COMPRESSION FITTING



MODEL	G	T	A	B	C	D					0	0

- CONNECTOR DIMENSION
- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH DIAMETER
- LENGTH L (mm)

CONNECTOR DIMENSION	A
	1
	2
	3

CONNECTION RTD	C
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	D
2	8
3	1
3.17	2
4	5
4.5	3
6	4

TYPE AND CLASS OF TOLERANCES		B
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

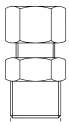
TECHNICAL DATA

- Temperature working range: -80 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Maximum temperature of connector use: 250 °C

CONNECTION

PHG model, "LEMO" connector.

Adapter fittings with ogive pag. 79



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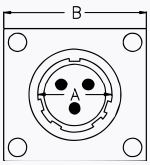
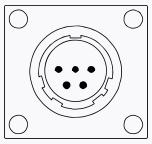
MODEL	H	U	A	B	C	D					0	0

- Connector dimension
- Type and class of tolerances
- Connection RTD
- Sheath diameter
- Length L (mm)

CONNECTOR DIMENSION	A
 A=13mm B=21mm CONNECTION FOR 2 OR 3 WIRE	3
 A=13mm B=21mm CONNECTION FOT 4 WIRE OR TWO RTD 2 WIRE	5

CONNECTION RTD	C
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	D
2	8
3	1
3.17	2
4	5
4.5	3
6	4

TYPE AND CLASS OF TOLERANCES		B
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

TECHNICAL DATA

- Temperature working range: -80 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Maximum temperature of connector use: 200 °C

CONNECTION

Connettore model JMR13 Amphenol

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Custom executions on request

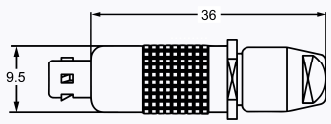
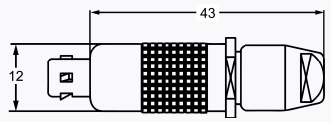
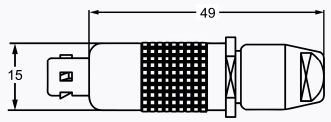
EXTENSIONS CABLES

WITH CONNECTOR TYPE "LEMO" B

MODEL	H	V	A				B	0	0	0	0	0

EXTENSION CABLE
LENGTH L dm
CONNECTOR DIMENSION

EXTENSION CABLE	A
2x0.24 mm² ,insulation pvc/braided tinned copper/pvc	A
2x0.24 mm² ,insulation siliconed rubber/siliconed rubber	B
2x0.25 mm² ,insulation braided glass/braided glass/ braided tinned copper	C

CONNECTOR DIMENSION	B
	1
	2
	3

TECHNICAL DATA

- Temperature working range: PVC insulated cable 105 °C/ Silicon rubber insulated cable 180 °C/ glass braid insulation cable 400 °C.
- Maximum temperature of connector use: 100 °C

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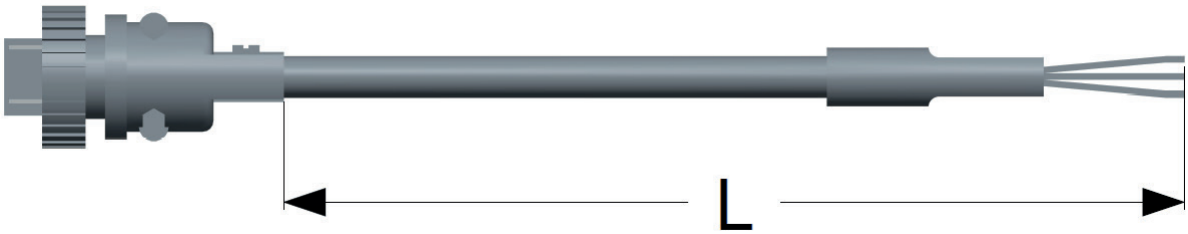
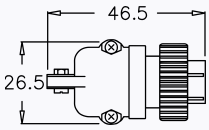
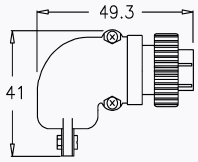
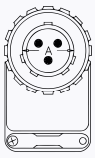
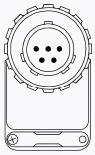
EXTENSIONS CABLES
WITH CONNECTOR TYPE "AMPHENOL"



MODEL H Z A B 0 0 0 0 0

- Extension cable
- Length L dm
- Connector dimension

EXTENSION CABLE	A
2x0.24 mm², insulation pvc/braided tinned copper/pvc	A
2x0.24 mm², insulation siliconed rubber/siliconed rubber	B
2x0.25 mm² i nsulation braided glass/braided glass/ braided tinned copper	C

CONNECTOR DIMENSION		B
	A=12.7	1
	A=12.7	2
	 A=12.7	3
	 A=12.7	4

TECHNICAL DATA

- Temperature working range: PVC insulated cable 105 °C/ Silicon rubber insulated cable 180 °C/ glass braid insulation cable 400 °C.
- Maximum temperature of connector use: 100 °C

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MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH CONNECTING HEAD

WITHOUT FITTINGS

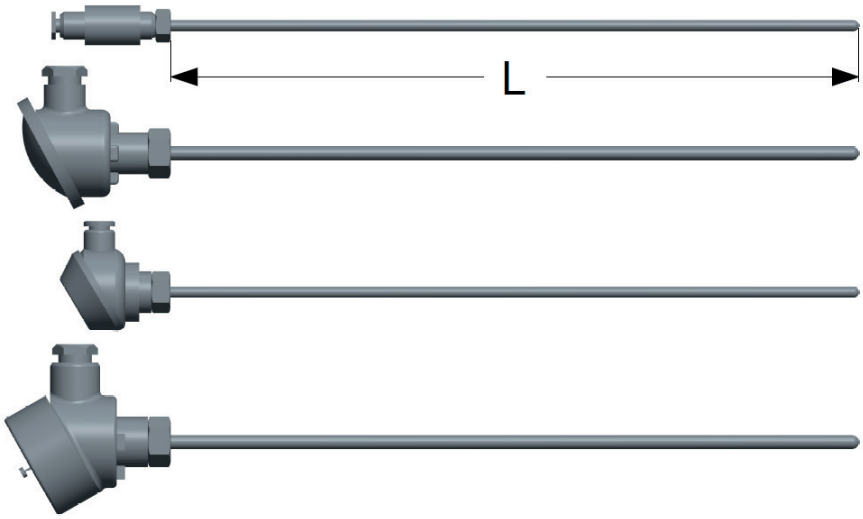
MODEL

G U

G V

G Z

G K



MODEL | | | A | B | C | | | | | | 0 | 0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
	N	5

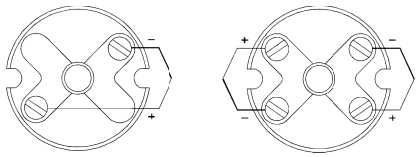
HOT JUNCTION TYPE		B
	Single	Double
Ungraunded	1	6
Graunded	2	7
Exposed	3	8

SHEATH QUALITY						C
	Sheath diameter (mm)					
SS Quality	3	3.17	4	4.5	6	8
Aisi 304	B	C	D	E	G	1
Aisi 316	J	I	L	M	O	2
Inconel 600	R	S	T	U	Z	3
Aisi 310	P	Q	V	W	4	5

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Protection: IP55
- Electrical connection 1/2" gas

CONNECTION



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MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH CONNECTING HEAD

WITH FIXED FITTING

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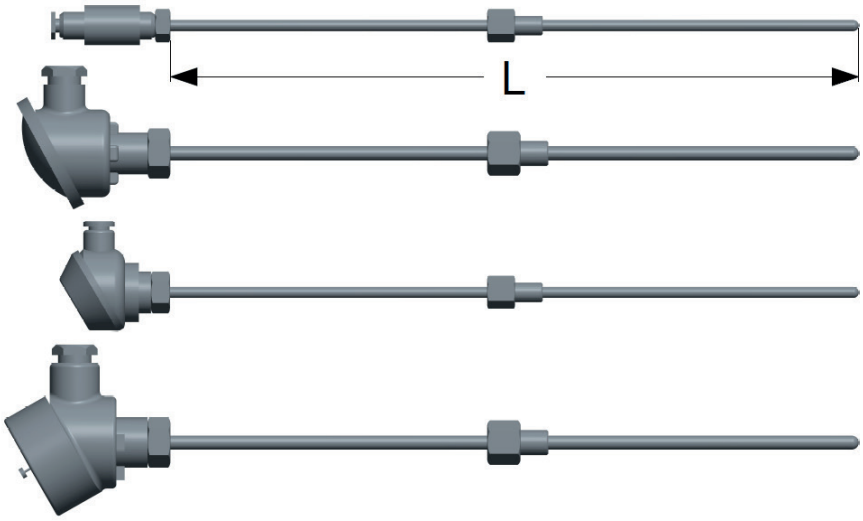
MODEL G X

G Y

G J

G W



MODEL | | | A | B | C | | | | | | 0 | 0

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
	N	5

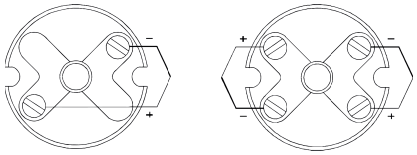
HOT JUNCTION TYPE		B
	Single	Double
Ungraunded	1	6
Graunded	2	7
Exposed	3	8

SHEATH QUALITY						C
	Sheath diameter (mm)					
SS Quality	3	3.17	4	4.5	6	8
Aisi 304	B	C	D	E	G	1
Aisi 316	J	I	L	M	O	2
Inconel 600	R	S	T	U	Z	3
Aisi 310	P	Q	V	W	4	5

TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Protection: IP55
- Electrical connection 1/2" gas

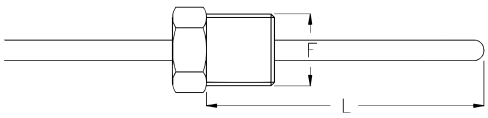
CONNECTION



MODEL M F A | | | | 0 0 0 0 0

- THREAD F
- LENGTH L (mm)

THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F



Custom executions on request

MINERAL INSULATED THERMOCOUPLES SERIES(MgO)

WITH CONNECTING HEAD

WITH COMPRESSION FITTING

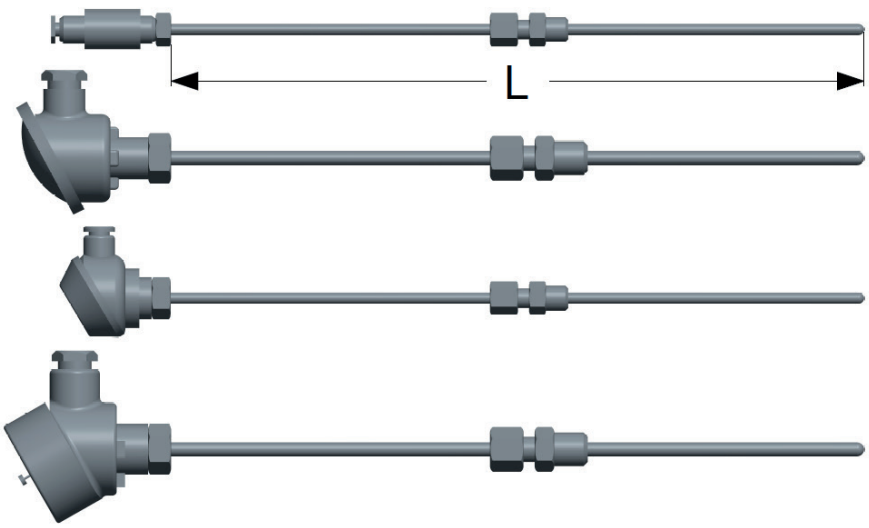
MODEL

G 1

G 2

G 3

G 4



MODEL | | | A | B | C | | | | | | 0 | 0

- Type and class of tolerances
- Hot junction type
- Sheath quality
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
	N	N
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
	N	5

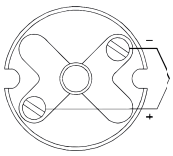
HOT JUNCTION TYPE		B
	Single	Double
Ungraunded	1	6
Graunded	2	7
Exposed	3	8

SHEATH QUALITY						C
	Sheath diameter (mm)					
SS Quality	3	3.17	4	4.5	6	8
Aisi 304	B	C	D	E	G	1
Aisi 316	J	I	L	M	O	2
Inconel 600	R	S	T	U	Z	3
Aisi 310	P	Q	V	W	4	5

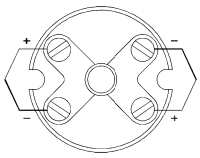
TECHNICAL DATA

- Temperature working range: In reference of thermocouple type and diameter. (check technical notes)
- Accuracy: ANSI MC96.1/IEC 584
- Bending diameter: 3 x outside diameter
- Protection: IP55
- Electrical connection 1/2" gas

CONNECTION

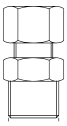


1xTC



2xTC

Adapter fittings with ogive pag. 79



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MINERAL INSULATED RTD'S PT100

WITH CONNECTING HEAD

WITHOUT FITTINGS

LA TERMOTECNICA

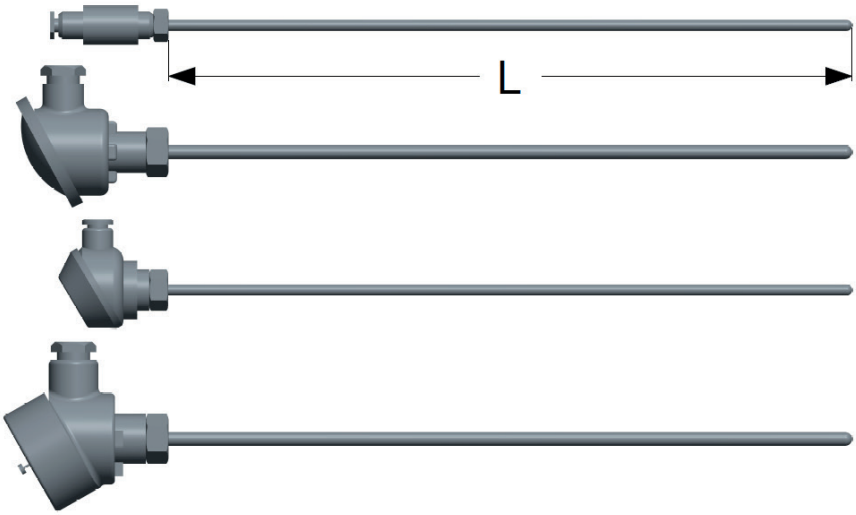
MODEL

G 5

G 6

G 7

G 8



MODEL | | | A | B | C | | | | | | 0 | 0

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

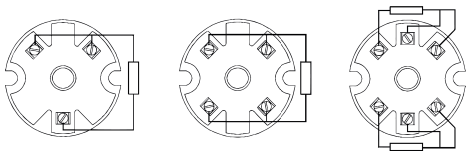
CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH QUALITY				C
	Sheath diameter (mm)			
SS Quality	3	3.17	4.5	6
Aisi 304	1	2	3	4

TECHNICAL DATA

- Temperature working range: -50 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Protection: IP55
- Electrical connection 1/2" gas

CONNECTION



1xPT100 3 wire | 1xPT100 4 wire | 2xPT100 3+3 wire

Custom executions on request

MINERAL INSULATED RTD'S PT100

WITH CONNECTING HEAD

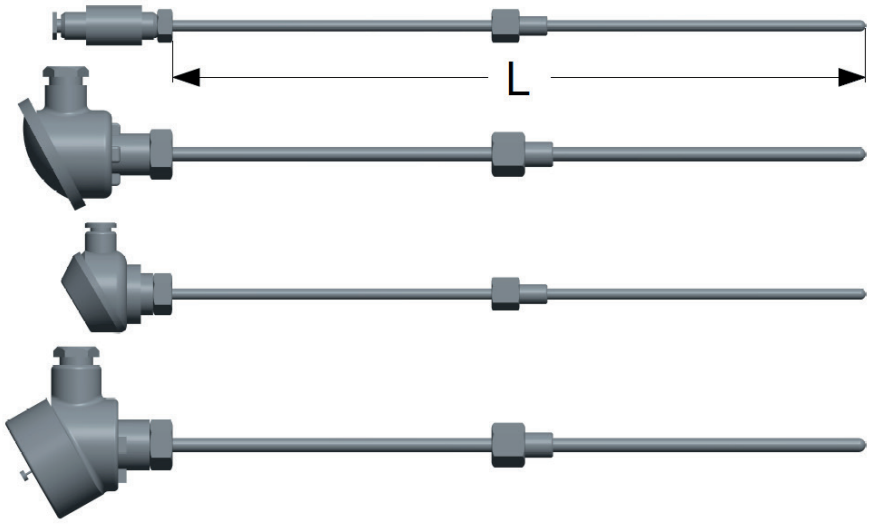
WITH FIXED FITTING

MODEL H Z

H K

H X

H J



MODEL | | | A | B | C | | | | | | 0 | 0

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

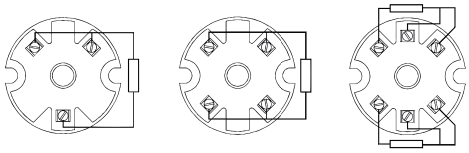
CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH QUALITY				C
	Sheath diameter (mm)			
SS Quality	3	3.17	4.5	6
Aisi 304	1	2	3	4

TECHNICAL DATA

- Temperature working range: -50 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Protection: IP55
- Electrical connection 1/2" gas

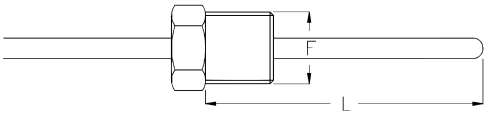
CONNECTION



1xPT100 3 wire | 1xPT100 4 wire | 2xPT100 3+3 wire

MODEL M F | A | | | | | 0 0 0 0 0

- THREAD F
- LENGTH L (mm)



THREAD F	A
8 MA	A
10MA	B
1/8 Gas	C
1/4 Gas	D
3/8 Gas	E
1/2 Gas	F

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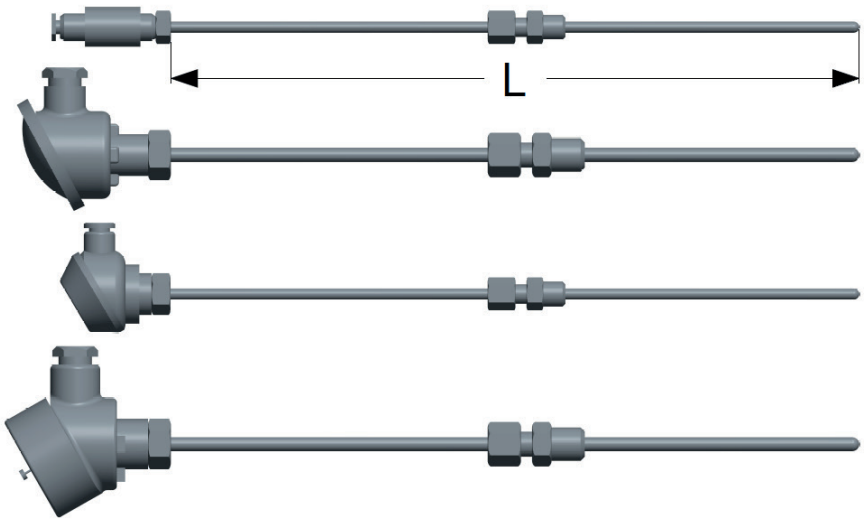
LA TERMOTECNICA

MODEL

H	W
H	Y
H	1
H	2



MODEL

		A	B	C						0	0

- Type and class of tolerances
- Connection RTD
- Sheath quality
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

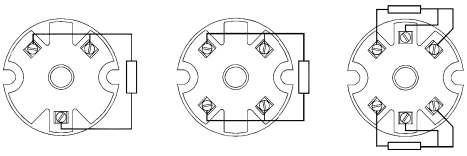
CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH QUALITY				C
	Sheath diameter (mm)			
SS Quality	3	3.17	4.5	6
Aisi 304	1	2	3	4

TECHNICAL DATA

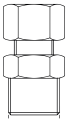
- Temperature working range: -50 .. +500 °C
- Accuracy: IEC 751
- Bending diameter: 3 x outside diameter, do not bend near sensing zone (50 mm from tip)
- Protection: IP55
- Electrical connection 1/2" gas

CONNECTION

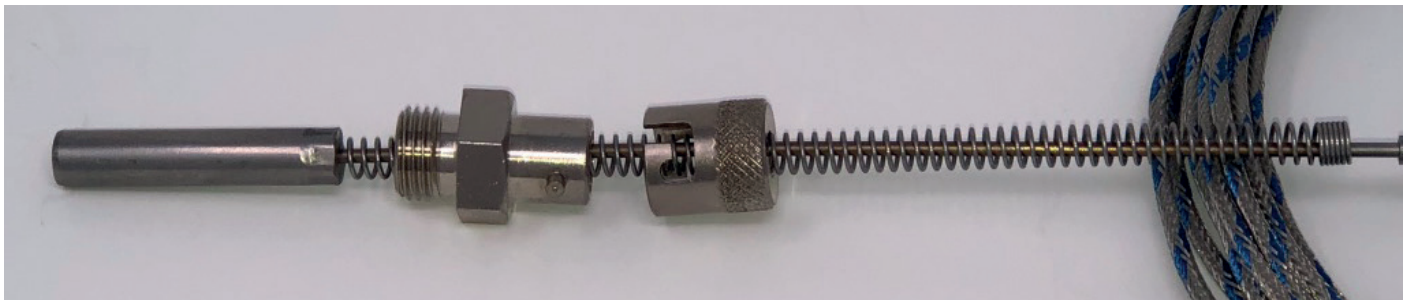


1xPT100 3 wire | 1xPT100 4 wire | 2xPT100 3+3 wire

Adapter fittings with ogive pag. 79



Custom executions on request



FULL CABLE SERIES

In more than 20 years' business in the sector, during which it has designed and produced hundreds of thousands of probes for the plastics industry and other 0 to 400°C medium-low temperature applications, **LA TERMOTECNICA** has acquired unmatched experience and stepped up its quality and controls and is now able to propose and unmatched range of thermocouples and RTD probes.LE ed a TERMORESISTANCE.

- **Customized sheath lenght**
- **Customized cable lenght**
- **Type of insulation: Glass braid, teflon, PVC silicon rubber**
- **Grounded or ungrounded hot junction**
- **Srew , clamp , spade, bayonet etc. fastening**
- **Type J,K,T,E or PT100, single or double element**
- **FULL CABLE (thermocouples or RTD' s)**
- **Thermocouples or RTD's for aerothermy**
- **Thermocouples or RTD's with bayonet fittings**
- **Micro-thermocouples**

The considerable variety of this series covers applications in many different sectors of industry:

- **Plastic industry**
- **Food processing equipment**
- **Residential and industrial heating plants**
- **Packaging equipment**
- **Refrigeration and conditioning**
- **Process industy**
- **Medical instrument**

and many other areas of applications

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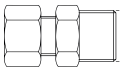
THERMOCOUPLES

WITH BRAIDED GLASS INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U A

U B

ROTATING SCREW (GAS thread)

U C

BRAZED SCREW (watertight)

MODEL

A B C D E

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)
- TERMINATION STYLE

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi	T	T
	J	J
	K	K
Thermocouple,tolerances according to DIN	T	A
	J	C
	K	F

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 316	6
8 Aisi 316	8

FITTING	D
For modelUA	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model UB-UC	
Sainless steel compression fitting 1/8 (gas thread)	1
Sainless steel compression fitting 1/4 (gas thread)	2
Sainless steel compression fitting 3/8 (gas thread)	3
Sainless steel compression fitting 1/2 (gas thread)	4
Sainless steel compression fitting 3/4 (gas thread)	5
Sainless steel compression fitting M8x1	6

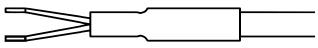
TERMINATION STYLE	E
Stripping	0
Standard male connector	A
Standard female connector	B
Miniature male connector	C
Miniature female connector	D

TECHNICAL DATA

- Temperature working range: -50 .. 400 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



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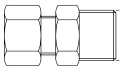
LA TERMOTECNICA

FULL CABLE SERIES THERMOCOUPLES

WITH TEFLON INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U D

U E

ROTATING SCREW (GAS thread)

U F

BRAZED SCREW (watertight)

MODEL

A B C D E

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)
- TERMINATION STYLE

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi	T	T
	J	J
	K	K
Thermocouple,tolerances according to DIN	T	A
	J	C
	K	F

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 316	6
8 Aisi 316	8

FITTING	D
For modelUD	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model UE-UF	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

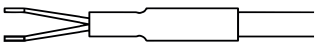
TERMINATION STYLE	E
Stripping	0
Standard male connector	A
Standard female connector	B
Miniature male connector	C
Miniature female connector	D

TECHNICAL DATA

- Temperature working range: -50 .. 250 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



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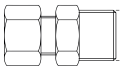
THERMOCOUPLES

WITH SILICON RUBBER INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U G

U H

ROTATING SCREW (GAS thread)

U I

BRAZED SCREW (watertight)

MODEL

A B C D E

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)
- TERMINATION STYLE

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi	T	T
	J	J
	K	K
Thermocouple,tolerances according to DIN	T	A
	J	C
	K	F

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 316	6
8 Aisi 316	8

FITTING	D
For modelUG	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model UH-UI	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

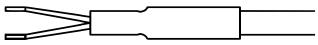
TERMINATION STYLE	E
Stripping	0
Standard male connector	A
Standard female connector	B
Miniature male connector	C
Miniature female connector	D

TECHNICAL DATA

- Temperature working range: -50 .. 180 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



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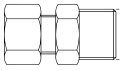
FULL CABLE SERIES THERMOCOUPLES

WITH PVC INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

V Y

V K

ROTATING SCREW (GAS thread)

V 8

BRAZED SCREW (watertight)

MODEL A B C D E

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)
- TERMINATION STYLE

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi	T	T
	J	J
	K	K
Thermocouple,tolerances according to DIN	T	A
	J	C
	K	F

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 316	6
8 Aisi 316	8

FITTING	D
For modelVY	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model VK-V8	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

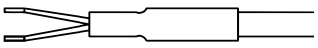
TERMINATION STYLE	E
Stripping	0
Standard male connector	A
Standard female connector	B
Miniature male connector	C
Miniature female connector	D

TECHNICAL DATA

- Temperature working range: -50 .. 100 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



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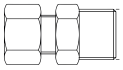
FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U L

U M

ROTATING SCREW (GAS thread)

U N

BRAZED SCREW (watertight)

MODEL

A B C D

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

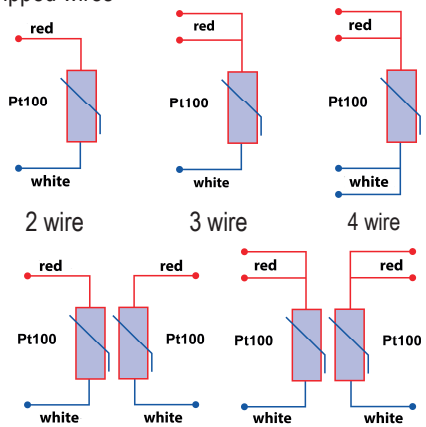
FITTING	D
For modelUL	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model UM-UN	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

- Temperature working range: -50 .. 400 °C
- Accuracy: IEC 751

CONNECTION

Stripped wires



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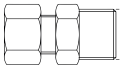
LA TERMOTECNICA

FULL CABLE SERIES RTD'S

WITH TEFLON INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U O

U P

ROTATING SCREW (GAS thread)

U Q

BRAZED SCREW (watertight)

MODEL

A B C D

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

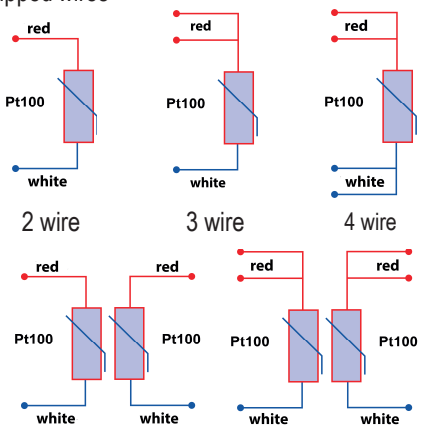
FITTING	D
For model UO	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model UP-UQ	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

- Temperature working range: -50 .. 250
- Accuracy: IEC 751

CONNECTION

Stripped wires



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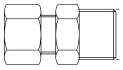
FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U V

U Z

ROTATING SCREW (GAS thread)

U K

BRAZED SCREW (watertight)

MODEL

A B C D

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

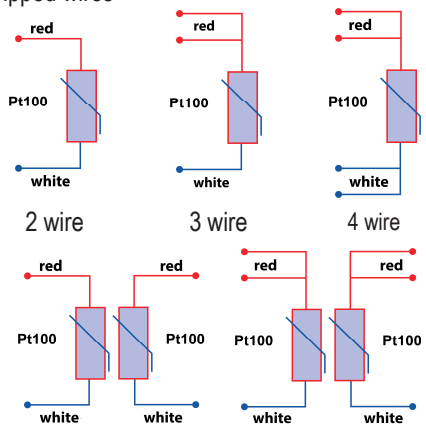
FITTING	D
For modelUV	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model UZ-UK	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

- .-Temperature working range: -50 .. 100 °C
- -Accuracy: IEC 751

CONNECTION

Stripped wires



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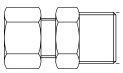
LA TERMOTECNICA

FULL CABLE SERIES RTD'S

WITH PVC INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U X

U J

ROTATING SCREW (GAS thread)

U Y

BRAZED SCREW (watertight)

MODEL

		A	B	C				D		

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

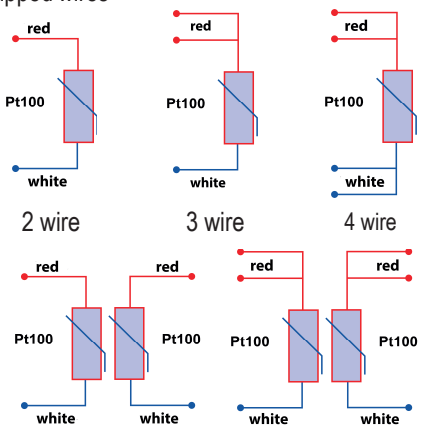
FITTING	D
For modelUX	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model UJ-UY	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

- Temperature working range: -50 .. 180 °C
- Accuracy: IEC 751

CONNECTION

Stripped wires



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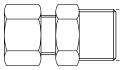
FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U 1

U 2

ROTATING SCREW (GAS thread)

U 3

BRAZED SCREW (watertight)

MODEL

		A	B	C				D		

- Type and class of tolerances
- Connection RTD
- Sheath quality
- Length L1 (dm)
- Fitting
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	C
3 Aisi 304	3
3.17 Aisi 304	B
4 Aisi 304	4
4.5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

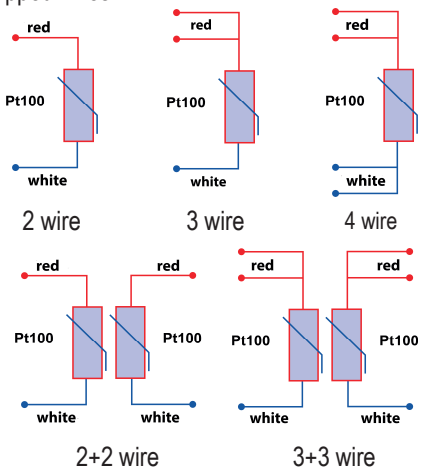
FITTING	D
For modelU1	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model U2-U3	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

- Temperature working range: -50 .. 500 °C
- Accuracy: IEC 751
- Maximum temperature of cable use: 100 °C
- Maximum temperature of transition use: 200 °C

CONNECTION

Stripped wires



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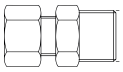
LA TERMOTECNICA

FULL CABLE STYLE RTD'S PT100

WITH TRANSITION, FOR UP TO 500 °C

WITH SILICON RUBBER INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

U 4

U 5

ROTATING SCREW (GAS thread)

U 6

BRAZED SCREW (watertight)

MODEL

		A	B	C				D		

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	C
3 Aisi 304	3
3.17 Aisi 304	B
4 Aisi 304	4
4.5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

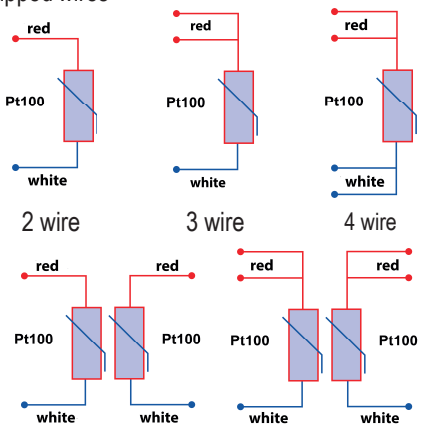
FITTING	D
For modelU4	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model U5-U6	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

- Temperature working range: -50 .. 500 °C
- Accuracy: IEC 751
- Maximum temperature of cable use: 180 °C
- Maximum temperature of transition use: 200 °C

CONNECTION

Stripped wires



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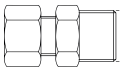
FULL CABLE STYLE
RTD'S PT100
WITH TRANSITION, FOR UP TO 500 °C
WITH BRAIDED GLASS INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL U 7

U 8

ROTATING SCREW (GAS thread)

U 9

BRAZED SCREW (watertight)

MODEL A B C D

- TYPE AND CLASS OF TOLERANCES — A
- CONNECTION RTD — B
- SHEATH QUALITY — C
- LENGTH L1 (dm) — D
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4
Double element, 3 wire	5

SHEATH DIAMETER (mm)	C
3 Aisi 304	3
3.17 Aisi 304	B
4 Aisi 304	4
4.5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

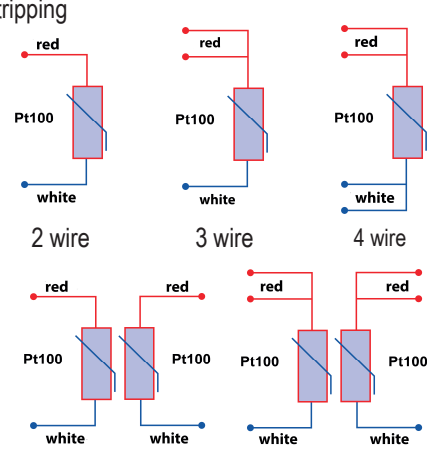
FITTING	D
For modelU7	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model U8-U9	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

- Temperature working range: -50 .. 500 °C
- Accuracy: IEC 751
- Maximum temperature of cable use: 400
- Maximum temperature of transition use: 200°

CONNECTION

Stripping



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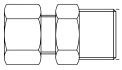
LA TERMOTECNICA

FULL CABLE STYLE PROBES
FOR AEROTHERMAL RELIEF
WITH PVC INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

V A

V B

ROTATING SCREW (GAS thread)

V C

BRAZED SCREW (watertight)

MODEL | | | A | B | C | | | | D | | | |

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Exposed junction (thermocouple)	E

SHEATH DIAMETER (mm)	C
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

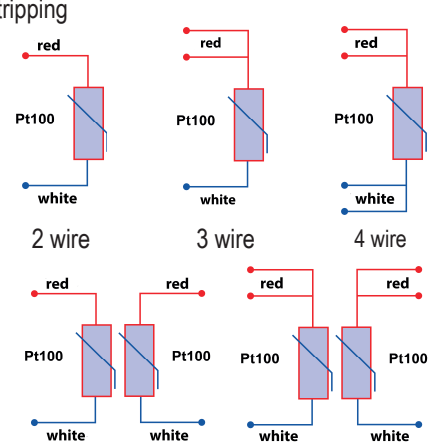
FITTING	D
For modelVA	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model VB-VC	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

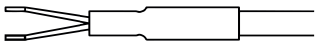
- Temperature working range: -50 .. 100 °C
- Accuracy: ANSI MC96.1/IEC 584 (thermocouple probes) IEC 751 (RTD probes)

CONNECTION

Stripping



Stripped wire, respect polarity.
(check color coding plan)



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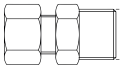
FULL CABLE STYLE PROBES

FOR AEROTHERMAL RELIEF

WITH SILICON RUBBER INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL

T A

T B

ROTATING SCREW (GAS thread)

T C

BRAZED SCREW (watertight)

MODEL

		A	B	C				D			

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Exposed junction (thermocouple)	E

SHEATH DIAMETER (mm)	C
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

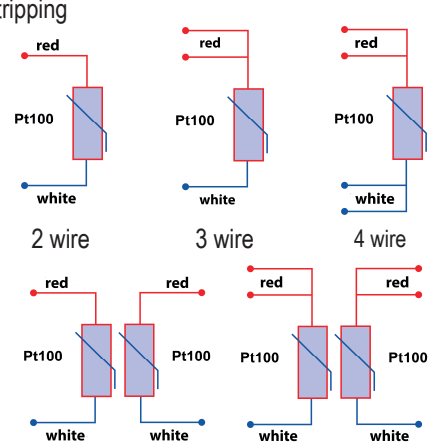
FITTING	D
For modelTA	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model TB-TC	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

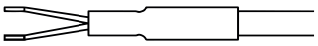
- Temperature working range: -50 .. 180 °C
- Accuracy: ANSI MC96.1/IEC 584 (thermocouple probes) IEC 751 (RTD probes)

CONNECTION

Stripping



Stripped wire, respect polarity.
(check color coding plan)



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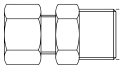
LA TERMOTECNICA

FULL CABLE STYLE PROBES
FOR AEROTHERMAL RELIEF
WITH BRAIDED GLASS INSULATED CABLE

FOR COMPRESSION FITTING SEE PAGE 79



MODEL T L

T M

ROTATING SCREW (GAS thread)

T N

BRAZED SCREW (watertight)

MODEL A B C D

- TYPE AND CLASS OF TOLERANCES
- CONNECTION RTD
- SHEATH QUALITY
- LENGTH L1 (dm)
- FITTING
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Exposed junction (thermocouple)	E

SHEATH DIAMETER (mm)	C
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

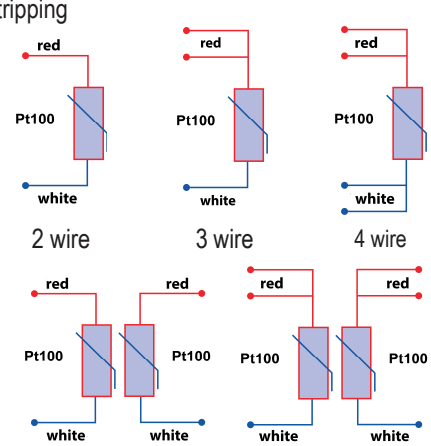
FITTING	D
For modelTL	
Whitout fitting	0
Brass compression fitting 1/8(gas thread)	1
Brass compression fitting 1/4(gas thread)	2
Brass compression fitting 3/8(gas thread)	3
For model TM-TN	
Sainless steel compression fitting 1/8(gas thread)	1
Sainless steel compression fitting 1/4(gas thread)	2
Sainless steel compression fitting 3/8(gas thread)	3
Sainless steel compression fitting 1/2(gas thread)	4
Sainless steel compression fitting 3/4(gas thread)	5
Sainless steel compression fitting M8x1	6

TECHNICAL DATA

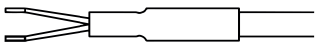
- Temperature working range: -50 .. 400 °C
- Accuracy: ANSI MC96.1/IEC 584 (thermocouple probes) IEC 751 (RTD probes)

CONNECTION

Stripping



Stripped wire, respect polarity.
(check color coding plan)



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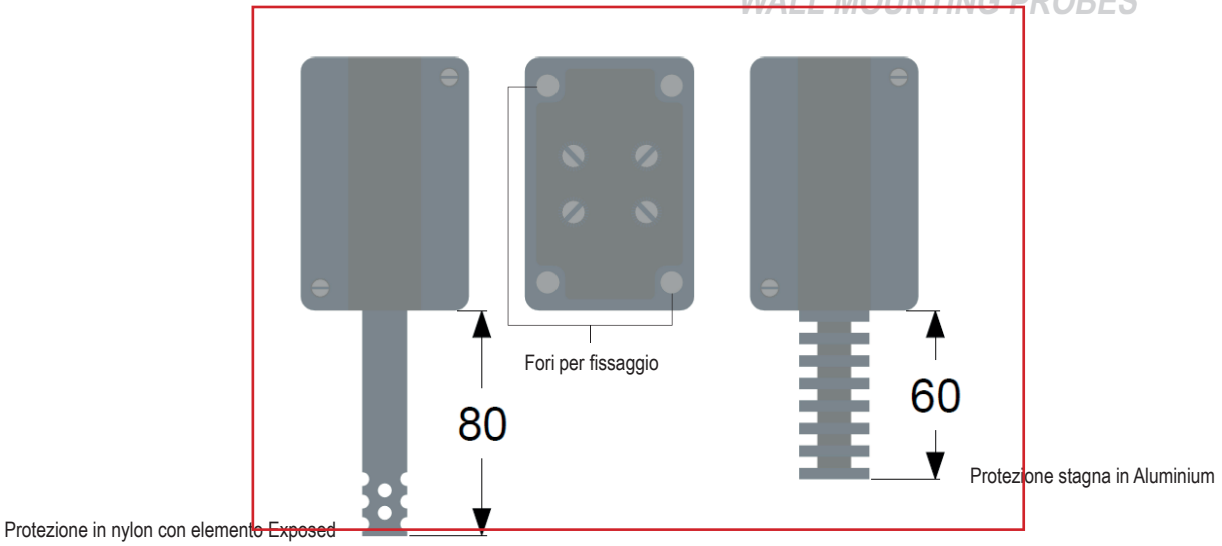


MODEL	H	5									H	6

MODEL			A	B	C	0	0	0	0	0	0	0

TYPE AND CLASS OF TOLERANCES
CONNECTION RTD
TRANSMITTER TYPE

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

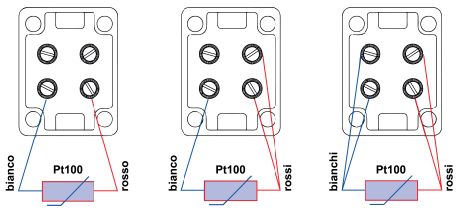
CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4

TRANSMITTER TYPE		C
Mosettiera		0
Trasmettitore DAT 1010	Intrinsec safety	S
	Without intrinsec safety	T

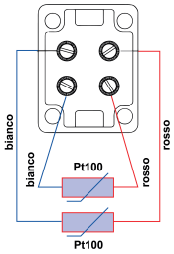
TECHNICAL DATA

- Temperature range: -50 .. 120 °C
- Accuracy: IEC 751
- Wall mounting box IP54
- Dimensions: 60x80x38 mm
- In case of transmission equiped vesion, indicate desired transmitter range.
- Power: 18 .. 32 V
- Output: 4 .. 20 Ma

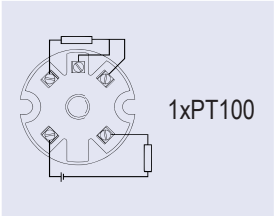
CONNECTION



Pt100 2 wire Pt100 3 wire Pt100 4 wire



Pt100 2+2 wire

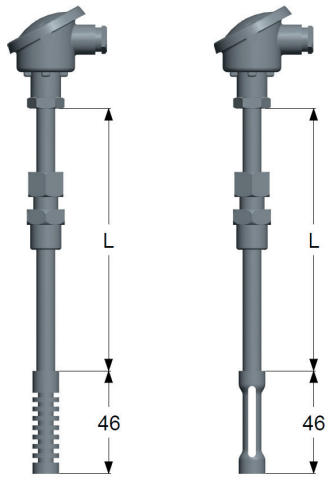


Pt100 3 wire
with converter

Custom executions on request

LA TERMOTECNICA

FULL CABLE STYLE PROBES
FOR AEROTHERMAL RELIEF
DUCT & PIPE MOUNTING PROBES



MODEL H 7 H 8

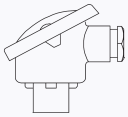
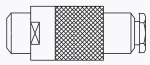
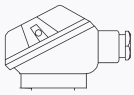
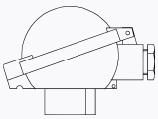
MODEL A B C D E 0

- Type and class of tolerances
- Connection RTD
- Fitting
- Connecting head
- Length L (mm)
- Transmitter type

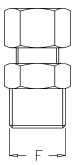
TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2
One element, 4 wire	3
Double element, 2 wire	4

FITTING	C
Brass compression fitting 1/4 (gas thread)	A
Brass compression fitting 3/8 (gas thread)	B
Brass compression fitting 1/2 (gas thread)	C
Whitout fitting	0

CONNECTING HEAD			D
			
DIN B Head	B	Mignon Head	V
			
Miniature Head	M	BUS Head	P

TRANSMITTER TYPE		E
Mosettiera		0
Trasmettitore DAT 1010	Intrinsec safety	S
	Without intrinsec safety	T

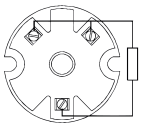


Custom executions on request

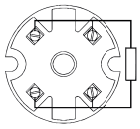
TECHNICAL DATA

- Temperature range: -50 .. 250 °C
- Accuracy: IEC 751
- Connection head :Type DIN B IP55
- Conduit ½”
- In case of transmission equiped vesion, indicate desired transmitter range.
- Power: 18 .. 32 V
- Output: 4 .. 20 mA

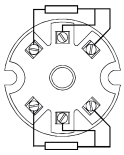
CONNECTION



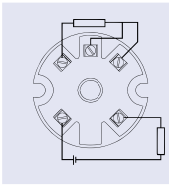
1xPT100 3 wire



1xPT100 4 wire



2xPT100 3+3 wire



Pt100 3 wire with converter

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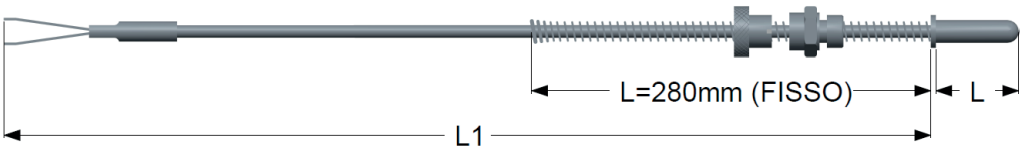
Tel. 011/9085288 - www.latermotecnica.it - info@latermotecnica.it



MODEL

U R A B C D

- TYPE AND CLASS OF TOLERANCES
- HOT JUNCTION TYPE
- SHEATH DIAMETER
- LENGTH L1 (dm)
- THREAD F
- LENGTH L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

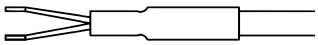
THREAD F	D
1/4 Gas	A
12 MA	B
14 MA	C
12 MB	D

TECHNICAL DATA

- Temperature working range: -50 .. 400 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



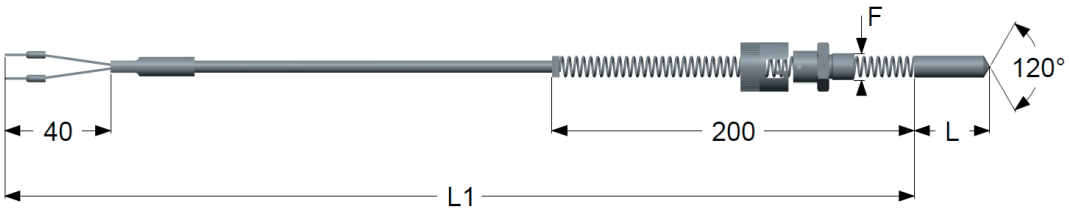
LA TERMOTECNICA

Custom executions on request

FULL CABLE STYLE THERMOCOUPLES

WITH MALE BAYONET FITTING

WITH FEMALE BAYONET FITTING



MODEL U T A B C D

- Type and class of tolerances
- Hot junction type
- Sheath diameter
- Length L1 (dm)
- Thread F
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple, tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple, tolerances according to Ansi Gr II	T	1
	J	2
	K	4

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

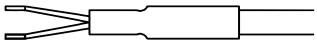
THREAD F	D
1/4 Gas	A
1/4 Gas	B
3/8 Gas	C
M10x1	D
12 MA	F
14 MA	G
12 MB	H

TECHNICAL DATA

- Temperature working range: -50 .. 400 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



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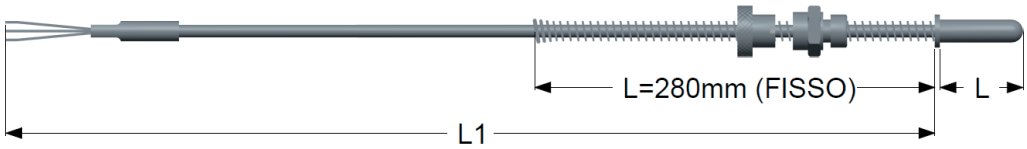


MODEL

U	W	A	B	C				D			

- Type and class of tolerances
- Hot junction type
- Sheath diameter
- Length L1 (dm)
- Thread F
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

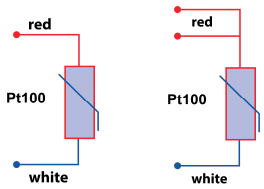
THREAD F	D
1/4 Gas	A
12 MA	B
14 MA	C
12 MB	D

TECHNICAL DATA

- Temperature working range: -50 .. 400 °C
- Accuracy: IEC 751

CONNECTION

Stripping



2 wire 3 wire

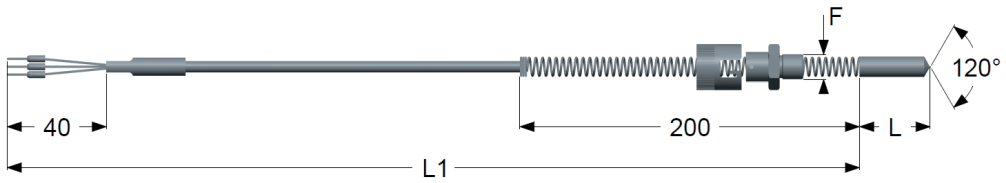
Custom executions on request

LA TERMOTECNICA

FULL CABLE STYLE RTD'S PT100

WITH MALE BAYONET FITTING

WITH FEMALE BAYONET FITTING



MODEL U S A B C D

- Type and class of tolerances
- Hot junction type
- Sheath diameter
- Length L1 (dm)
- Thread F
- Length L (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	E	E
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	E	3
	K	4
RTD pt100 OHM a 0 °C 1 DIN		A
RTD pt100 OHM a 0 °C 1/2 DIN		B
RTD pt100 OHM a 0 °C 1/3 DIN		C
RTD pt100 OHM a 0 °C 1/5 DIN		D
RTD pt100 OHM a 0 °C 1/10 DIN		E

CONNECTION RTD	B
One element, 2 wire	1
One element, 3 wire	2

SHEATH DIAMETER (mm)	C
4 Aisi 304	4
5 Aisi 304	5
6 Aisi 304	6
8 Aisi 316	8

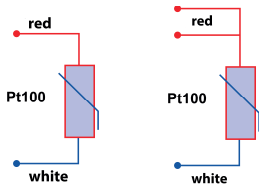
THREAD F	D
1/4 Gas	A
1/4 Gas	B
3/8 Gas	C
M10x1	D
12 MA	F
14 MA	G
12 MB	H

TECHNICAL DATA

- Temperature working range: -50 .. 400 °C
- Accuracy: IEC 751

CONNECTION

Stripping



2 wire 3 wire

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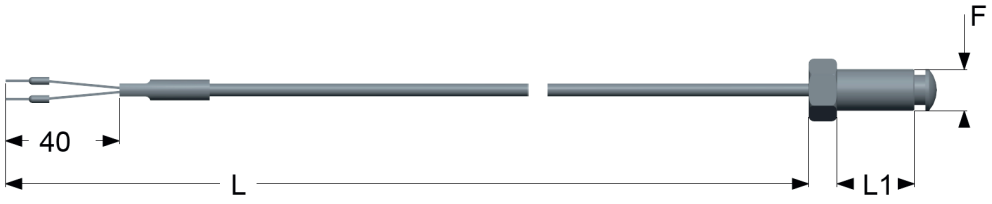


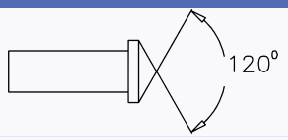
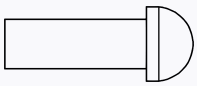
MODEL

U	U	A				B			C	D	0

- Type and class of tolerances
- Length L (dm)
- Thread F
- Length L1 (mm)
- Point type
- Intestazione cable

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4

THREAD F	B
6 MA	A
M 8x1	B
8 MA	C
M 10x1	D
10 MA	E
1/8 GAS	F
1/4 GAS	G

POINT TYPE	C
	1
	2

CABLE TERMINATION	D
Compass terminal	1
NO compass terminal	2

TECHNICAL DATA

- Temperature working range: -50 .. 400 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

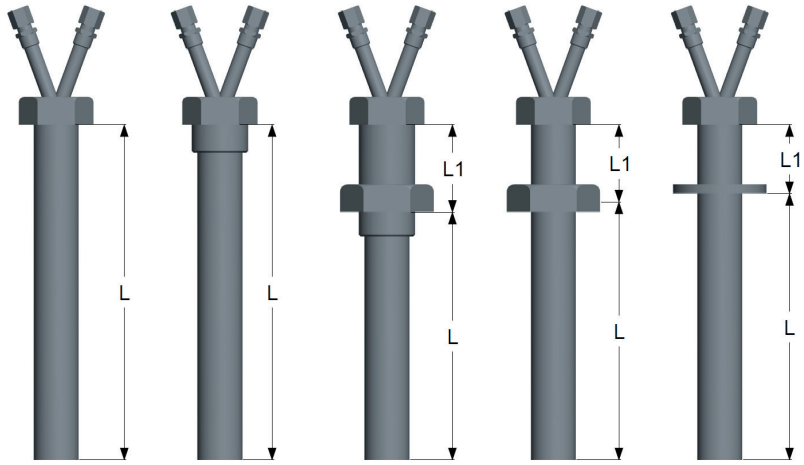
Stripped wire, respect polarity.
(check color coding plan)

LA TERMOTECNICA

Custom executions on request

THERMOWELLS FOR MgO SERIES PROBE

WITH STAINLESS STEEL PROTECTION TUBE



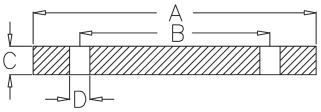
MODEL	PH	PE	PR	PG	PF

MODEL [ ][ ] A [ ][ ][ ][ ][ ][ ][ ][ ] B 0

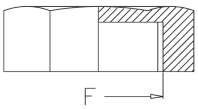
- SHEATH QUALITY
- LENGTH L (mm)
- LENGTH L1 (mm)
- FITTINGS OR FLANGES

SHEATH QUALITY			A
	Sheath diameter (mm)		
S.S. Quality	3/8	20	1/2
Aisi 446	A		
Aisi 310	B	C	D
Aisi 310*	E	F	G
Inconel 600	H	I	L
Inconel 600*	M	N	O

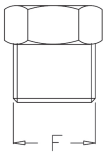
FLANGE (UNI 2278 PN16) FOR MODEL AF				B
A	B	C	D	
90	60	12	14	Q
95	65	12	14	R



THREAD F1	B
1/2"	1
3/4"	2
1"	3
1" 1/4"	4



FITTING MALE FOR MODEL PE	B
1/2"	1
3/4"	2
1"	3



TECHNICAL DATA

- Temperature working range: 0 .. 1200 °C max (warning !! in reference of thermocouple type and protecting tube material, check technical notes)
- For select compatile sensors suitable for use with P series thermowells, consult catalogue in refernce of following models: GA-GB-GG-GV-GZ-GK

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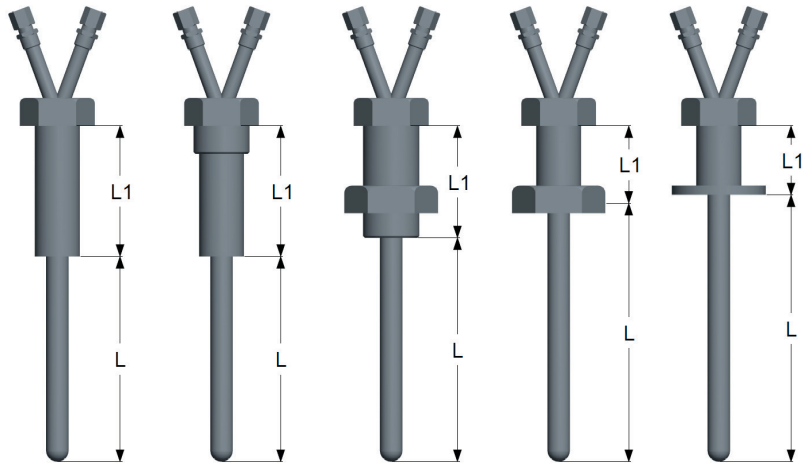
THERMOWELLS FOR MgO SERIES PROBE

WITH CERAMIC PROTECTION TUBE



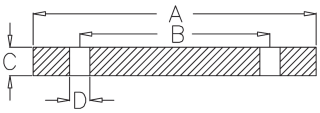
MODEL T H | T E | T R | T G | T F

MODEL [ ][ ] A [ ][ ][ ][ ][ ][ ] B 0

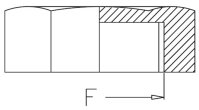
- SHEATH QUALITY
- LENGTH L (mm)
- LENGTH L1 (mm)
- FITTINGS OR FLANGES

SHEATH QUALITY			A
Diametro cannotto	Diametro ceramica	Pitagoras 610	Allumina 710
3/8	10	1	A
20	16	2	B
1/2	17	3	C

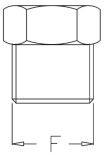
FLANGE (UNI 2278 PN16) FOR MODEL AF				B
A	B	C	D	
90	60	12	14	Q
95	65	12	14	R



THREAD F1	B
1/2"	1
3/4"	2
1"	3
1" 1/4"	4



FITTING MALE FOR MODEL PE	C
1/2"	1
3/4"	2
1"	3



TECHNICAL DATA

- Temperature working range: 0 .. 1600 °C max (warning !! in reference of thermocouple type and protecting tube material, check technical notes)
- For select compatile sensors suitable for use with P series thermowells, consult catalogue in refernce of following models: GA-GB-GG-GV-GZ-GK

LA TERMOTECNICA

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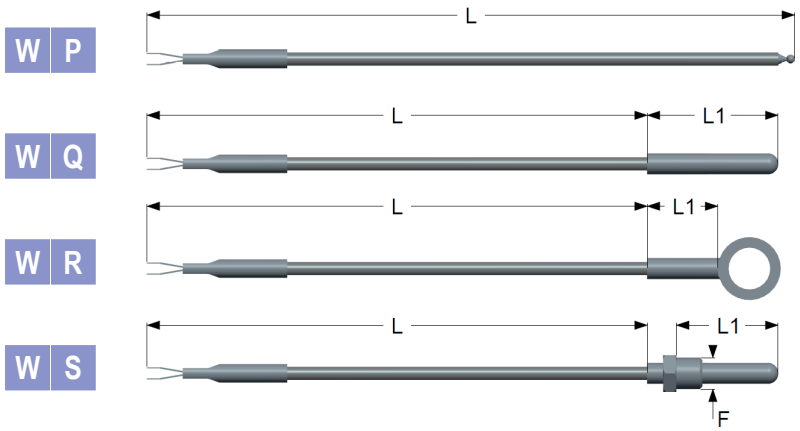
MICRO THERMOCOUPLES

WITH SILICON RUBBER INSULATED CABLE

LA TERMOTECNICA

MODEL



MODEL

		A	B			C				D
		1	2	3	4					

- Type and class of tolerances
- Hot junction type
- Length L (cm)
- Dimension cable
- Termination style

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

DIMENSION CABLE	C
30 AWG	A
28 AWG	B
24 AWG	C

TERMINATION STYLE	D
Outles wire	0
Miniature Male connector	S
Miniature Female connector	P
Miniature Male and Female connector	M

MODEL WP

1	2	3	4
0	0	0	0

MODEL WQ

1	2	3	4
A			

- Sheath diameter
- Length L1 (mm)

SHEATH DIAMETER (mm)	A
1.5 (cable 30 AWG)	A
2 (cable 28 AWG)	B
2.5 (cable 24 AWG)	C
3 (cable 30 AWG)	D

MODEL WR

1	2	3	4
A	B	0	0

- Washer type
- Washer diameter

WASHER TYPE	A
Copper	R
Stanless steel	I

WASHER DIAMETER	B
For screw 3 ma	A
For screw 4 ma	B
For screw 5 ma	C
For screw 6 ma	D
For screw 8 ma	E
For screw 10 ma	F

MODEL WS

1	2	3	4
		B	0

- Length L1 (mm)
- Thread F

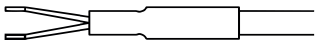
THREAD F	B
3 ma	A
4 ma	B
5 ma	C
6 ma	D
8 ma	E

TECHNICAL DATA

- Temperature working range: -50 .. 180 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



Custom executions on request

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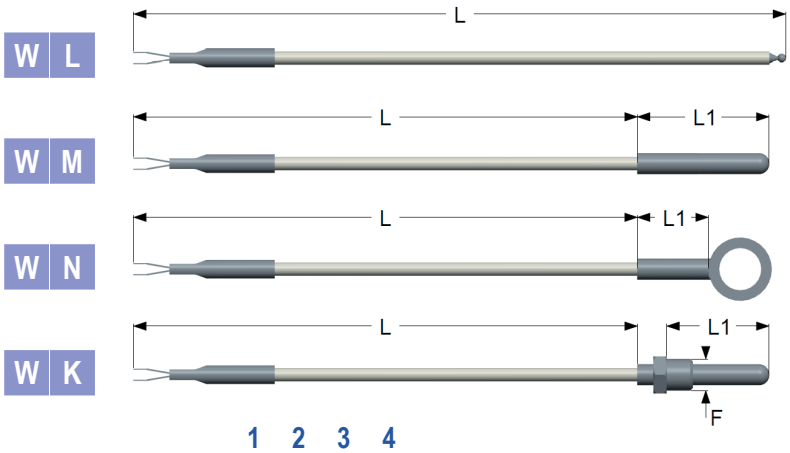
MICRO THERMOCOUPLES

WITH PVC INSULATED CABLE



MODEL

		A	B			C			D
		1	2	3	4				

- Type and class of tolerances
- Hot junction type
- Length L (cm)
- Dimension cable
- Termination style

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

DIMENSION CABLE	C
30 AWG	A
28 AWG	B
24 AWG	C

TERMINATION STYLE	D
Stripping	0
Miniature Male connector	S
Miniature Female connector	P
Miniature Male and Female connector	M

MODEL WL

1	2	3	4
0	0	0	0

MODEL WM

1	2	3	4
A			

- Sheath diameter
- Length L1 (mm)

SHEATH DIAMETER (mm)	A
1.5 (cable 30 AWG)	A
2 (cable 28 AWG)	B
2.5 (cable 24 AWG)	C
3 (cable 30 AWG)	D

MODEL WN

1	2	3	4
A	B	0	0

- Washer type
- Washer diameter

WASHER TYPE	A
Copper	R
Stanless steel	I

WASHER DIAMETER	B
For screw 3 ma	A
For screw 4 ma	B
For screw 5 ma	C
For screw 6 ma	D
For screw 8 ma	E
For screw 10 ma	F

MODEL WK

1	2	3	4
		B	0

- Length L1 (mm)
- Thread F

THREAD F	B
3 ma	A
4 ma	B
5 ma	C
6 ma	D
8 ma	E

TECHNICAL DATA

- Temperature working range: -50 .. 100 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)

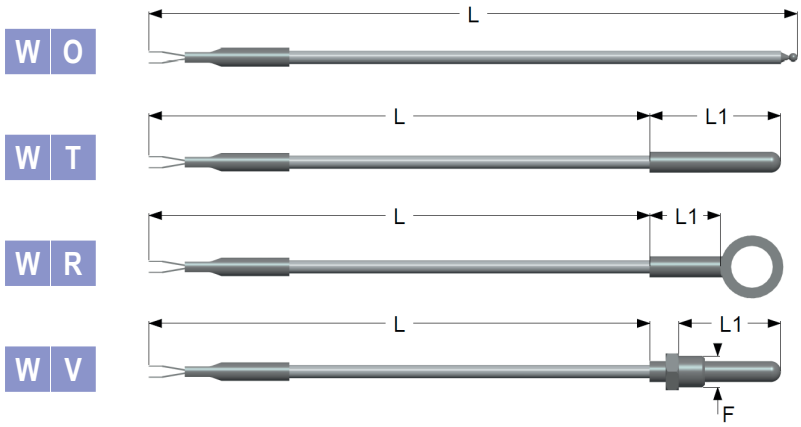
Custom executions on request

MICRO THERMOCOUPLES

WITH BRAIDED GLASS INSULATED CABLE

LA TERMOTECNICA

MODEL



MODEL

		A	B			C				D
		1	2	3	4					

- Type and class of tolerances
- Hot junction type
- Length L (cm)
- Dimension cable
- Termination style

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

DIMENSION CABLE	C
30 AWG	A
28 AWG	B
24 AWG	C

TERMINATION STYLE	D
Stripping	0
Miniature Male connector	S
Miniature Female connector	P
Miniature Male and Female connector	M

MODEL WO

1	2	3	4
0	0	0	0

MODEL WT

1	2	3	4
A			

- Sheath diameter
- Length L1 (mm)

SHEATH DIAMETER (mm)	A
1.5 (cable 30 AWG)	A
2 (cable 28 AWG)	B
2.5 (cable 24 AWG)	C
3 (cable 30 AWG)	D

MODEL WR

1	2	3	4
A	B	0	0

- Washer type
- Washer diameter

WASHER TYPE	A
Copper	R
Stanless steel	I

WASHER DIAMETER	B
For screw 3 ma	A
For screw 4 ma	B
For screw 5 ma	C
For screw 6 ma	D
For screw 8 ma	E
For screw 10 ma	F

MODEL WV

1	2	3	4
		B	0

- Length L1 (mm)
- Thread F

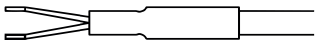
THREAD F	B
3 ma	A
4 ma	B
5 ma	C
6 ma	D
8 ma	E

TECHNICAL DATA

- Temperature working range: -50 .. 400 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



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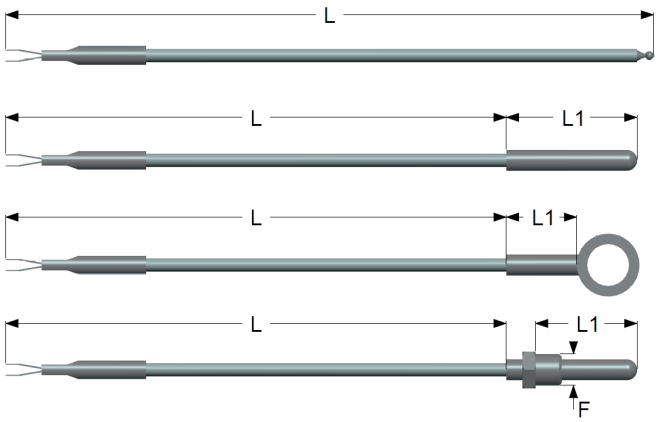
MICRO THERMOCOUPLES

WITH TEFLON INSULATED CABLE

LA TERMOTECNICA

MODEL



MODEL

		A	B			C			D
		1	2	3	4				

- Type and class of tolerances
- Hot junction type
- Length L (cm)
- Dimension cable
- Termination style

MODEL ZO	1	2	3	4
	0	0	0	0

MODEL ZT	1	2	3	4
	A			

- Sheath diameter
- Length L1 (mm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple,tolerances according to Ansi Gr I	T	T
	J	J
	K	K
Thermocouple,tolerances according to Ansi Gr II	T	1
	J	2
	K	4

HOT JUNCTION TYPE	B
Ungrounded	I
Graunded	M
Exposed	E

DIMENSION CABLE	C
30 AWG	A
28 AWG	B
24 AWG	C

TERMINATION STYLE	D
Stripping	0
Miniature Male connector	S
Miniature Female connector	P
Miniature Male and Female connector	M

SHEATH DIAMETER (mm)	A
1.5 (cable 30 AWG)	A
2 (cable 28 AWG)	B
2.5 (cable 24 AWG)	C
3 (cable 30 AWG)	D

MODEL ZR	1	2	3	4
	A	B	0	0

- Washer type
- Washer diameter

WASHER TYPE	A
Copper	R
Stanless steel	I

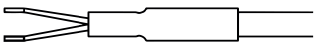
WASHER DIAMETER	B
For screw 3 ma	A
For screw 4 ma	B
For screw 5 ma	C
For screw 6 ma	D
For screw 8 ma	E
For screw 10 ma	F

TECHNICAL DATA

- Temperature working range: -50 .. 250 °C
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



MODEL ZV	1	2	3	4
			B	0

- Length L1 (mm)
- Thread F

THREAD F	B
3 ma	A
4 ma	B
5 ma	C
6 ma	D
8 ma	E

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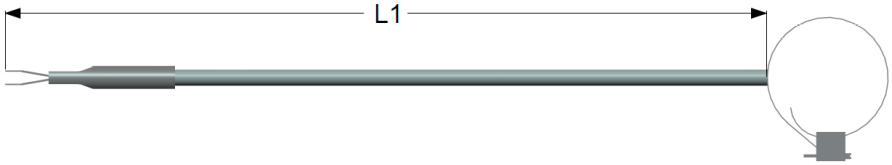
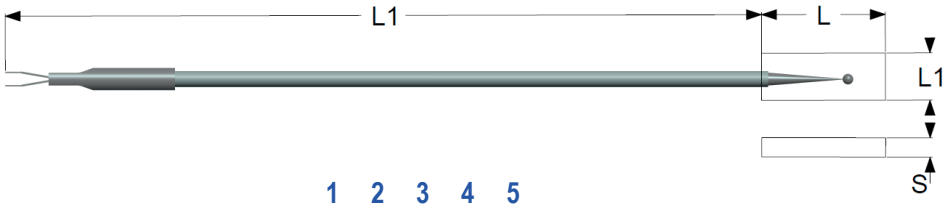
FULL CABLE STYLE THERMOCOUPLES FOR PIPE OR PLATE

S T



P S



MODEL

		A	B						
		1	2	3	4	5			

- Type and class of tolerances
- Extension cable
- Lenght cable L1 (dm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple, tolerances Norme Ansi	T	T
	J	J
	K	K
Thermocouple, tolerances Norme DIN	T	A
	J	C
	K	F

EXTENSION CABLE	B
2x0.22 mm² insulation pvc/braided tinned copper/pvc	A
2x0.22 mm² insulation siliconed rubber/siliconed rubber	B
2x0.25 mm² insulation braided glass/braided glass/ braided tinned copper	C

MODEL ST

1	2	3	4	5
			0	0

- Pipe diameter (mm)

MODEL PS

1	2	3	4	5

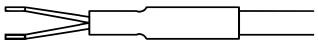
- Length L (mm)
- Length L1 (mm)
- Lenght S (mm)

TECHNICAL DATA

- Temperature working range: PVC insulated cable 100 °C/ Teflon 250 °C /glass braid insulation cable 400 °C.
- Accuracy: ANSI MC96.1/IEC 584

CONNECTION

Stripped wire, respect polarity.
(check color coding plan)



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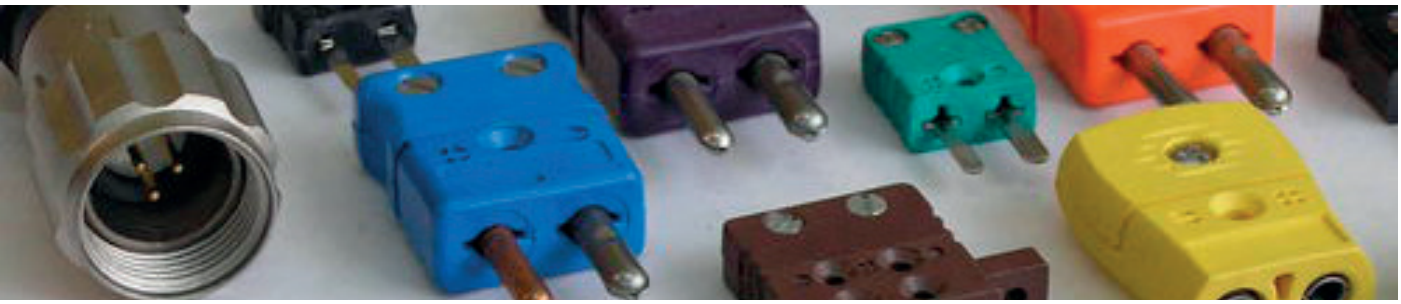
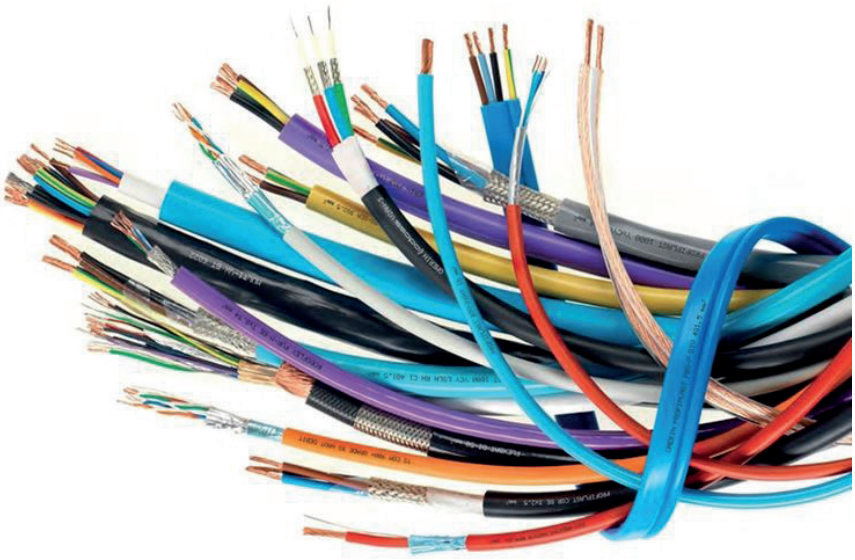


In many cases, top performance depends on combining the temperature probe with the right accessories. **LA TERMOTECNICA** has therefore developed an ever more extensive and complete range of accessories, connectors, extensions, fasteners, converters, cables, etc. so as to always offer the right solution in terms of reliability, ease of use and sturdiness of the measurement system.

In this section:

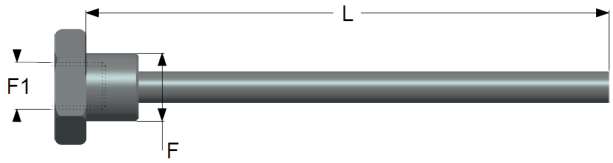
- **Fittings**
- **Thermowells**
- **Extensions**
- **Connectors**
- **Cables**



ACCESSORIES

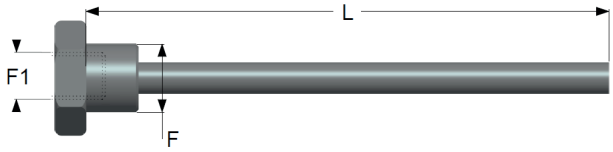
THERMOWELLS IN BRASS OR STAINLESS STEEL

1 1



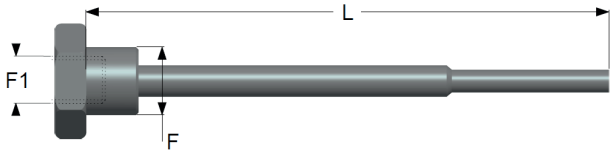
TUBE MADE

1 2



MACHINED MADE

1 3



MACHINED MADE WITH REDUCED TIP

MODEL

P	M	1	A	B					C	0	0

- THREAD
- DIAMETER (mm)
- LENGTH L (mm)
- SHEATH QUALITY

THREAD		A
Thread F	Thread F1	
1/4	1/8	A
3/8	1/8	B
3/8	1/4	C
1/2	1/4	D
3/4	1/4	E
1/2	3/8	F
3/4	3/8	G
3/4	1/2	H
1/2	1/2	I

DIAMETER (mm)		B
Outside diameter	Inside diameter	
6	5	A
8	6	B
10	8	C
12	10	D
14	12	E
16	13	F
20	17	G

SHEATH QUALITY	C
Brass	A
Aisi 304	B
Aisi 316	C
Aisi 310	D
Inconel 600	E

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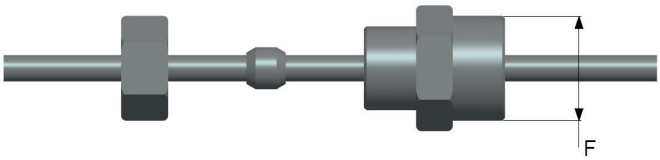

MODEL F T A A B C C C 0

- Fitting material
- Ogive material
- Sheath diameter in 1/100 d imm
- Thread F

FITTING MATERIAL	A	A
Brass	O	T
Nickel brass	O	N
Inox Stainless	I	N

OGIVE MATERIAL	B
Brass	I
Nickel brass	O
Inox Stainless	T
Steel	A

THREAD F	C	C	C
8 MA	8	M	A
1/8 GAS	1	/	8
1/4 GAS	1	/	4
3/8 GAS	3	/	8
1/2 GAS	1	/	2

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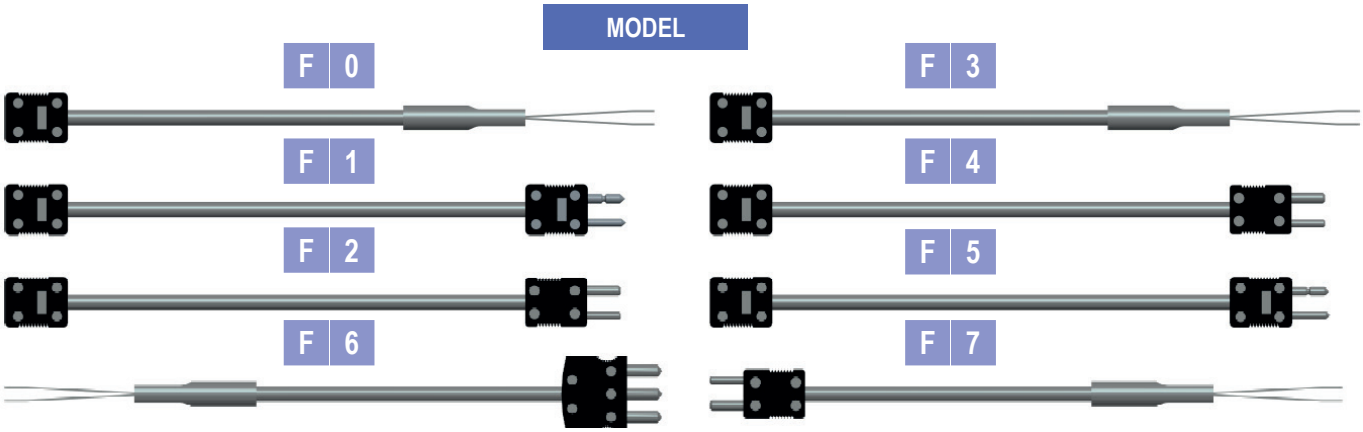
ACCESSORIES

EXTENSION FOR THERMOCOUPLES WITH INTEGRATED CONNECTORS



MODEL [ ][ ] A B [ ][ ][ ][ ] 0 0 0 0

- Type and class of tolerances
- Extension cable
- Lenght cable L1 (dm)

TYPE AND CLASS OF TOLERANCES		A
Thermocouple tolerance according to Ansi	T	T
	J	J
	E	E
	K	K
	N	N
	S	S
	R	R

EXTENSION CABLE	B
2x0.24 mm² insulation pvc/braided tinned copper/pvc	A
2x0.22 mm² insulation teflon/braided tinned copper/ teflon	B
2x0.22 mm² braided glass/ braided glass/braided tinned copper	C
2x0.22 mm² insulation teflon/teflon	F
2x0.19 mm² insulation glass braid/glass braid	G
2x0.24 mm² insulation teflon/teflon/braided tinned copper	H
2x0.24 mm² siliconed rubber/siliconed rubber	I
2x0.05 mm² (30AWG) Insulation glass braid/glass	M
2x0.08 mm² (28AWG) Insulation glass braid/glass	N

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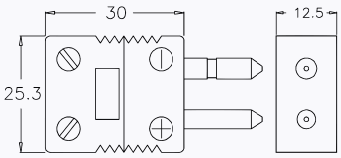
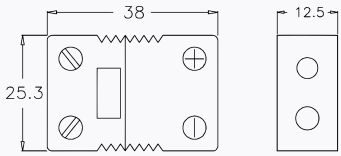


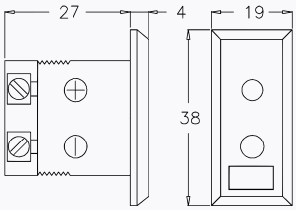
MALE THERMOCOUPLE CONNECTOR STANDARD VERSION:

Type	Code
K	1F28SK1LB
J	1F24SJ1LB
S	1F33SS1LB
T	1F36ST1LB



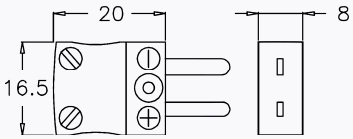
FEMALE THERMOCOUPLE CONNECTOR STANDARD VERSION:

Type	Code
K	1F30SK2LB
J	1F25SJ2LB
S	1F34SS2LB
T	1F37ST2LB



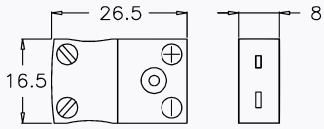
PAMEL JACKS STANDARD FEMALE VERSION TYP

Type	Code
K	1F32SK4LB
J	1F27SJ4LB
S	1F35SS4LB
T	1F39ST4LB



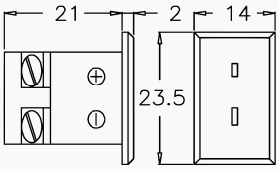
MALE THERMOCOUPLE CONNECTOR MINIATURE VERSION:

Type	Code
K	1F12MK1LB
J	1F07MJ1LB
S	1F17MS1LB
T	1F21MT1LB



FEMALE THERMOCOUPLE CONNECTOR MINIATURE VERSION:

Type	Code
K	1F13MK2LB
J	1F09MJ2LB
S	1F18MS2LB
T	1F22MT2LB



PANEL JACKS MINIATURE FEMALE VERSION

Type	Code
K	1F16MK4LB
J	1F11MJ4LB
S	1F20MS4LB
T	1F23MT4LB

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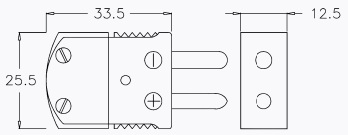
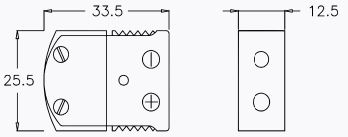
ACCESSORIES

COMPENSATED CONNECTORS FOR THERMOCOUPLES



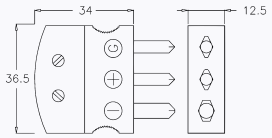
MALE THERMOCOUPLE CONNECTOR STANDARD VERSION:

Type	Code
K	51SK1OM
J	71SJ1OM
S	73SS1OM
T	50ST1OM



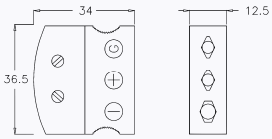
FEMALE THERMOCOUPLE CONNECTOR STANDARD VERSION:

Type	Code
K	40SK2OM
J	72SJ2OM
S	74SS2OM
T	70ST2OM



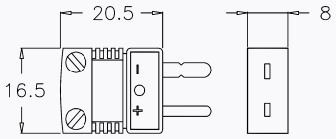
MALE THERMOCOUPLE CONNECTOR 3 PRON

Type	Code
K	063K1OM
J	473J1OM
S	773S1OM
T	753T1OM



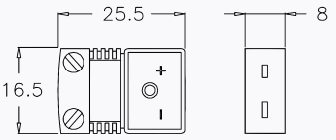
FEMALE THERMOCOUPLE CONNECTOR 3 PRONG

Type	Code
K	033K2OM
J	533J2OM
S	783S2OM
T	763T2OM



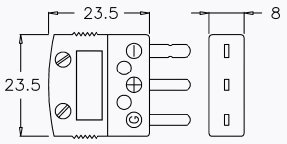
MALE THERMOCOUPLE CONNECTOR MINIATURE VERSION:

Type	Code
K	52MK1OM
J	64MJ1OM
S	68MS1OM
T	66MT1OM



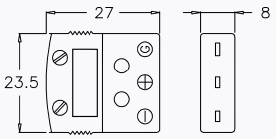
FEMALE THERMOCOUPLE CONNECTOR MINIATURE VERSION:

Type	Code
K	57MK2OM
J	65MJ2OM
S	69MS2OM
T	67MT2OM



MALE THERMOCOUPLE CONNECTOR 3 PRONG MINIATURE

Type	Code
K	79CK1OM
J	81CJ1OM
S	85CS1OM
T	83CT1OM



FEMALE THERMOCOUPLE CONNECTOR 3 PRONG MINIATURE

Type	Code
K	80CK1OM
J	82CJ1OM
S	86CS1OM
T	84CT1OM

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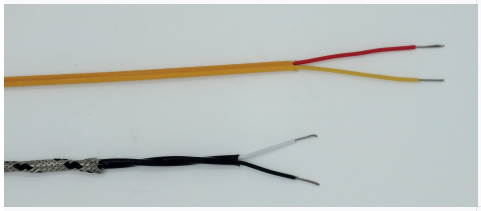
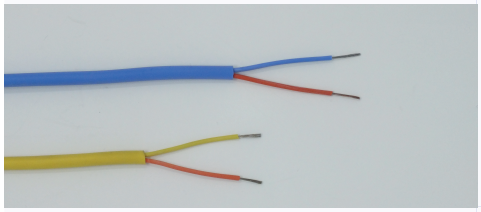
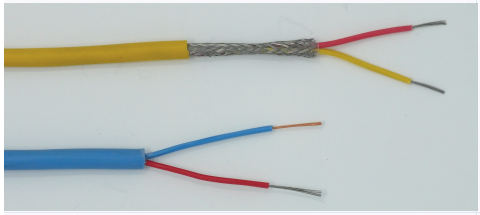
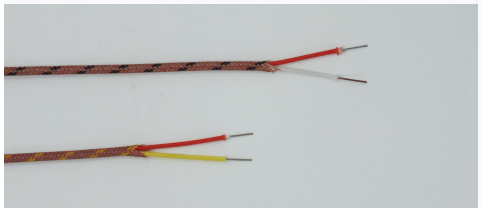
INSULATION	WORKING TEMPERATURE	ABRASION RESISTANCE	FLEXIBILITY	WATER SUBMISSION	MOISTURE RESISTANCE	AVAILABLE FOR THERMOCOUPLES	AVAILABLE FOR RTD' S
Teflon/Teflon or Teflon/Teflon/Overbraid 	--70 .. +250 °C	Excellent	Good	Excellent	Excellent	Yes	Yes
Siliconed rubber/Siliconed rubber. 	--50 .. +200 °C	Fair	Good	Good	Good	Yes	Yes
PVC/PVC o PVC/PVC/Overbraid 	--50 .. +105 °C	Good	Excellent	Good	Good	Yes	Yes
Glass/Glass/Overbraid	--30 .. +400 °C	Poor	Good	Poor	Poor	Yes	Yes
Glass/Glass 	--60 .. +400 °C	Poor	Good	Poor	Poor	Yes	No

Custom executions on request

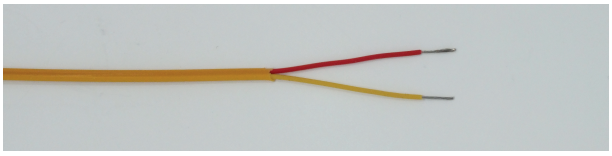
ACCESSORIES

TEFLON INSULATED CABLES

- **Excellent resistance to chemical and atmospheric agents**
- **High level resistance to high temperature**
- **High level resistance to abrasion even at high temperatures**
- **Non-flammable**
- **Operating range -70 .. +250 °C**

GENERAL REMARKS

The use of fluoropolymers (Teflon) in cable insulation makes it possible to obtain an end product with excellent properties that remain constant in a broad range of temperatures with more or less unchanged physical characteristics. Mechanical and electrical resistance and resistance to chemical agents means that these cables can be used in conditions not compatible with most conventional cables.



Primary insulation teflon
Conductor insulation teflon
Color coding according to ANSI MC96.1

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (mt.)
J	3,2x1,8	2x0,35	05 09EBRO 0PS	J ANSI 2x0,35 Tfe-Tfe	300
J	2,7x1,6	24 AWG	05 AIF2FO 0PW	J ANSI special 24 AWG Tfe-Tfe	100/300
J	1,4x0,8	30 AWG	05 91F2AO 0PW	J ANSI special 30AWG Tfe- Tfe	100/300
K	3,2x1,8	2x0,34	05 74NBRO 0PS	K ANSI 2x0,35 Tfe-Tfe	300
K	2,7x1,6	24 AWG	05 B7O 2FO 0PW	K ANSI special 24 AWG Tfe-Tfe	100/300
K	3,2x1,8	30 AWG	05 650 2AO 0PW	K ANSI special 30AWG Tfe-Tfe	100/300
In stock availabe cables, custom execution on request					

Primary insulation teflon
Conductor insulation teflon
Tinned copper overbraid
Color coding in according to ANSI MC96.1

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (mt.)
J	3x2	2x0,24	05 79EBIQ1PS	J ANSI 2x0,24 Tfe-Tfe-Sch	300
K	3x2	2x2,24	05 80NBIQ1PS	K ANSI 2x0,24 Tfe-Tfe-Sch	300
In stock availabe cables, custom execution on request					

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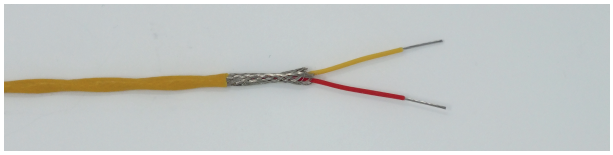
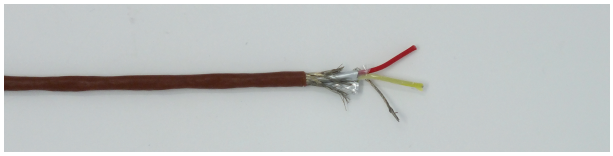


Primary insulation teflon
Tinned copper overbraid
Secondary insulation teflon
Color coding acording to ANSI MC96.1

TYPE	DIM.	SEZIONE	PRODUCT CODE	DESCRIPTION	SPOOL (MT.)
J	d. 3,2	2x0,24	05 AFEBIP1TS	Cable J ANSI 2x0,24 Tfe-Sch-Tfe	300
K	d. 3,2	2x2,24	05 95NBIP1TS	Cable K ANSI 2x0,24 Tfe-Sch-Tfe	300
In stock availabe cables, custom execution on request					



Primary insulation teflon, aluminum steep, Nylon streep, tinned copper braid, secondary insulation teflon
Color coding according to ANSI MC96.1

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (mt.)
K	d. 3,5	2x0,24	05 ATOBIP7TS	J ANSI 2x0,24 Tfe-Sch-Tfe	300
In stock availabe cables, custom execution on request.					

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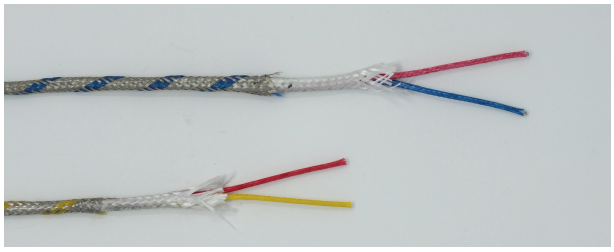
ACCESSORIES

GLASS BRAID INSULATED CABLES

- **Excellent resistance to high temperatures**
- **Reduced weight and dimensions**
- **Also available with shielding**
- **Non-flammable**
- **Operating range - 30 .. + 400°C**

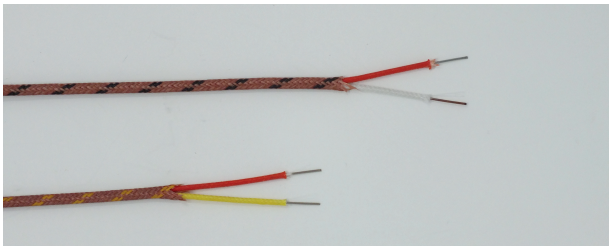
GENERAL REMARKS

I Cables with fiberglass sheath insulation assure excellent resistance at high temperatures as they are able to operate in normal conditions at 400°C for short periods or in static conditions up to 500°C. As excellent resistance to abrasion cannot be guaranteed, models with metal protective sheath should be selected for particular applications.



Primary insulation, braided glass
Secondary insulation, braided glass
Tinned copper overbraid
Color coding ANSI MC96.1/DIN 43710

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (MT.)
J	d. 3,2	2x0,25	05 14DBJM1TS	J DIN 2x0,25 V.sil-V.sil-Sch	300
J	d. 4	2x0,50	05 72DBLM1TS	J DIN 2x0,50 V.sil-V.sil-Sch	300
K	d. 3,2	2x0,25	05 59NBJM1TS	K ANSI 2x0,25 V.sil-V.sil-Sch	300
K	d. 4	2x0,50	05 61NBLM1TS	K ANSI 2x0,50 V.sil-V.sil-Sch	300
In stock availabe cables, custom execution on request					



Primary insulation braided glass
Secondary insulation braided glass
Color coding according to ANSI MC96.1

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (MT.)
J	3x2	2x0,35	05 11EBFI0PS	J ANSI 2x0,19 V.sil-V.sil	300
J	1,8x1,2	24 AWG	05 24E2FI0PW	J ANSI 24 AWG V.sil-V.sil	100/300
J	1,2x0,9	30 AWG	05 66F2AI0PW	J ANSI 30AWG V.sil-V.sil	100/300
K	3,2x1,8	2x0,34	05 50N2FI0PS	K ANSI 2x0,19 V.sil-V.sil	300
K	2,7x1,6	24 AWG	05 49N2FI0PW	K ANSI 24 AWG V.sil-V.sil	100/300
K	3,2x1,8	30 AWG	05 64O 2AI0PW	K ANSI 30AWG V.sil-V.sil	100/300
In stock availabe cables, custom execution on request					

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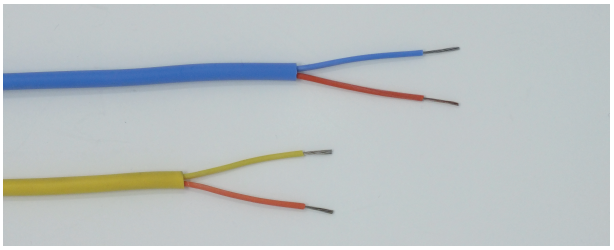
- **Excellent flexibility**
- **Good resistance to abrasion**
- **Compatibility with HVAC applications**
- **Self-extinguishing**
- **Operating range - 50 .. + 200°C**

GENERAL REMARKS

Cables with silicone rubber insulation can be used in high temperature applications with continuous use up to 180-200°C. These cables feature good resistance and high level flexibility even at temperatures of around –50°C whereas brittleness and stiffening may occur at lower temperatures. These cables also feature fairly good resistance to chemical agents except for acids, alkalis and hydrocarbons.



Primary insulation silicone rubber
Secondary insulation silicone rubber
Color coding according to ANSI MC96.1/DIN 43710

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (MT.)
J	d. 4,2	2x0,24	05 12DBIE0TS	J DIN 2x0,24 G.sil-G.sil	300
K	d. 4,2	2x0,24	05 70NBIE0TS	K ANSI 2x0,24 G.sil-G.sil	300
In stock availabe cables, custom execution on request					

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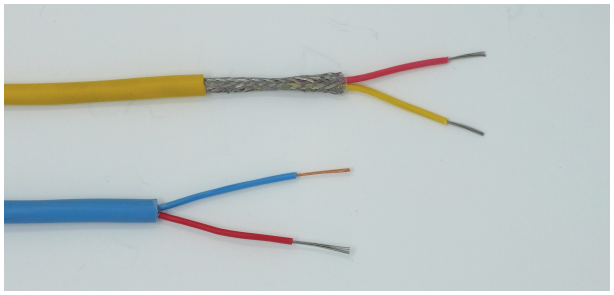
- **Good flexibility**
- **Good resistance to abrasion**
- **Self-extinguishing**
- **Operating range - 50 .. + 105°C**

GENERAL REMARKS

Cables with PVC (polyvinylchloride) insulation are the ideal solution in almost all applications characterized by Connection in normal conditions. Despite everything, the PVC guarantees medium level performance as regards resistance to chemical and environmental agents combined with good mechanical strength and abrasion resistance.



Primary insulation, PVC Braided tinned copper Secondary insulation, PVC Color coding according to ANSI MC96.1

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (MT.)
J	d. 4,2	2x0,24	05 132EBIC1TS	J ANSI 2x0,24 PVC-Sch-PVC	300
J	d. 4,2	2x0,24	05 57NBIC1TS	K ANSI 2x0,24 PVC-Sch-PVC	300
In stock availabe cables, custom execution on request					

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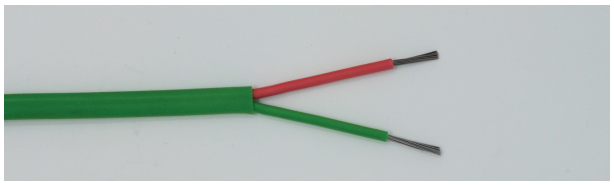
- **For the installation of long Connection lines**
- **Available for J, K, R, S, B type thermocouples**

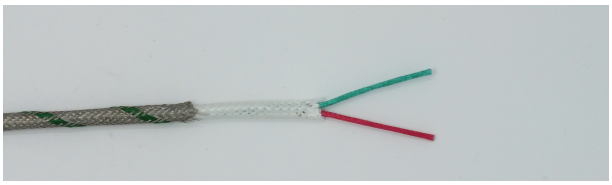
GENERAL REMARKS

Compensating cables are used to connect thermocouple sensors and although the alloys forming the thermo-electric pairs of each type of thermocouple are not used, they assure good transmission of the signal.



Primary insulation, PVC
Secondary insulation, PVC
Color coding according to DIN 43710

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (MT.)
JX	7x4	2x1,3	06 ARDBOB0PS	JX DIN 2x1,3 PVC-PVC	300
WX	7x4	2x1,3	06 04ZBOB0PS	WX DIN 2x1,3 PVC-PVC	300
In stock availabe cables, custom execution on request					



Primary insulation, braided galss
Secondary insulation, braided glass
Braided tinned copper.
Color coding according to DIN 43710

TYPE	DIM.	COND.	PRODUCT CODE	DESCRIPTION	SPOOL (MT.)
WX	d. 4,1	2x0,50	06 06ZBLM1TS	WX DIN 2x0,5 V.sil-V.sil-Sch	300
S/R/B X	4,2x2,9	2x1	06 02QBNM1PS	SX ANSI 2x1 V.sil-V.sil.Sch	300
In stock availabe cables, custom execution on request					

LA TERMOTECNICA

- **Available inputs for RTD, TC, mV, V, mA ...**
- **Current or voltage output**
- **Galvanic insulation**
- **Easy setting by using PC**
- **High precision and stability**
- **Compatibilita' elettromagnetica (marcatura CE)**
- **Available in version for in head or DIN rail mounting**
- **Is possible to supply custom configuration without add cost**

Transitter/converter for thermocouples E J N K S T end RTD' s. Avaliable in two models, for DIN rail mounting or for connecting head. It is possible to connect probes directly to a PLC system whit current or voltage imputs (0-20 mA 4-20 mA 0.10 V). All signals availables with 2 or 3 wire tecnique, input output insulation up to 1500 V or intrinsec safety execution.

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FEATURES

- Configurable input for RTD, mV, Resistance and Potentiometer
- Damping function on output
- 4 ÷ 20 mA configurable output on current loop
- Configurable by Personal Computer by cable CVPROG
- High accuracy
- On-field reconfigurable
- EMC compliant – CE mark
- Suitable for DIN B in-head mounting
- Option for DIN rail mounting in compliance with EN 50022 (DIN RAIL Option)

DAT 1010

Two wire transmitter for RTD programmable by PC

GENERAL DESCRIPTION

The transmitter DAT 1010 is able to execute many functions such as : measure and linearisation of the temperature characteristic of RTDs sensors, conversion of a linear resistance variation, conversion of a voltage signal even coming from a potentiometer connected on its input. The measured values are converted in a 4÷20 mA current signal . The device guarantees high accuracy and performances stability both in time and in temperature. The programming of the DAT 1010 is made by a Personal Computer using the software PROSOFT and the cable CVPROG, both developed and provided by DATEXEL. By PROSOFT , that runs under the operative system "WindowsTM ", it is possible to configure the transmitter to interface it with the most used sensors . In case of sensors with a no-standard output characteristic, it is possible to execute, via software, a "Custom" linearisation (per step) to obtain an output linearised signal . For Resistance and RTDs sensors it is possible to program the cable compensation with 3 or 4 wires. It is possible to set the minimum and maximum values of input and output ranges in any point of the scale, keeping the minimum span shown in the table below. Moreover it is available the option of alarm for signal interruption (burn-out) that allows to set the output value as high or low out of scale . On the device is provided the function "Damping" that allows the user to set a programmable filter up to 30 seconds to reduce eventual sudden variations of the input signal. It is housed in a self-extinguish plastic enclosure suitable for DIN B in-head mounting. Moreover (by proper mounting kit) it is possible to mount the DAT 1010 on DIN rail.

USER INSTRUCTIONS

The transmitter DAT 1010 must be powered by a direct voltage between 10 to 32 V and applied to the terminals +V and -V. The 4÷20 mA output signal is measurable in the power loop as shown in the section "Output/Power supply connections"; Rload is the input impedance of instruments on the current loop; to obtain a correct measure, the value of Rload will be calculated as function of the power supply value (see section "Technical specification – Load characteristic"). The input connections must be made as shown in the section "Input connections". To configure, calibrate and install the transmitter refer to sections " DAT1010: configuration and calibration" and "Installation Instructions".

TECHNICAL SPECIFICATIONS (Typical at 25 °C and in nominal conditions)

Input type	Min	Max	Min. span
RTD(*) 2,3,4 wires			
Pt100	-200°C	850°C	50°C
Pt1000	-200°C	200°C	50°C
Ni100	-60°C	180°C	50°C
Ni1000	-60°C	150°C	50°C
Voltage			
mV	-100mV	+700mv	2mV
Potentiometer			
(Nominal value)	0Ω	200Ω	10%
	200Ω	500Ω	10%
	0.5 KΩ	50KΩ	10%
RES. 2,3,4 wires			
Low	0Ω	300Ω	10Ω
High	0Ω	2000Ω	200Ω

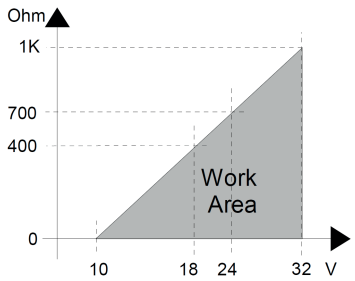
Output type	Min	Max	Min. span
Direct current	4mA	20mA	4mA
Reverse current	20mA	4mA	4mA

Input calibration (1)	
RTD	> of ±0.1% f.s. or ±0.2°C
Low res.	> of ±0.1% f.s. or ±0.15 Ω
High res.	> of ±0.2% f.s. or ±1 Ω
mV	> of ±0.1% f.s. or ±18 uV
Output calibration	
Current	± 7 uA
Input impedance	
mV	>= 10 MΩ
Linearity (1)	
RTD	± 0.1 % f.s.
Line resistance influence	
mV	<=0.8 uV/Ohm
RTD 3 wires	0.05%/Ω (50 Ω balanced max.)
RTD 4 wires	0.005%/Ω (100 Ω balanced max.)
RTD excitation current	
Typical	0.350 mA
Thermal drift (1)	
Full scale	± 0.01% / °C
Burn-out values	
Max. output value about	20,5 mA
Min. output value about	3,8 mA
Max. fault value about	21,6 mA
Min. fault value about	3,5 mA
Damping time constant	
Selectable from 0.3 to 30 s.	
Value 0: function not active.	

(1) referred to input Span (difference between max. and min. values)

Response time (10÷ 90%)	about 400 ms
Power supply	
Power supply voltage	10 .. 32 Vcc
Reverse polarity protection	60 Vcc max

Load characteristic - Rload (maximum loadvalue on current loop per power supply value)



Temperature & humidity	
Operative temperature	-40°C .. +85°C
Storage temperature	-40°C .. +85°C
Humidity (not condensed)	0 .. 90 %
Housing	
Material	PC + ABS V0
Mounting	DIN B head or bigger
Weight	about 50 g.
Dimensions	Ø = 43 mm ; H = 24 mm
EMC (for industrial environments)	
Immunity	EN 61000-6-2
Emission	EN 61000-6-4

*(*) For temperature sensors it is possible to set the input range also in F degrees; to made the conversion use the formula: °F = (°C*9/5)+32)*

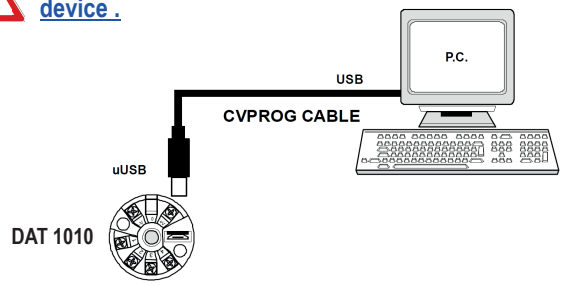
DAT 1010: CONFIGURATION

Notice: before to execute the next operations, check that the drivers of the cable CVPROG in use have been previously installed in the Personal Computer.

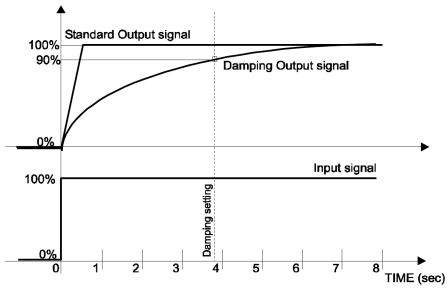
1)Remove the protection plastic cap onl DAT 1010.
2Connect the two plugs of cable CVPROG to the Personal Computer (USB plug) and to the device (uUSB plug) .
3) ARun the software PROSOFT. Set the COM port assigned to the CVPROG cable by the Operative System.
4) Set the parameters of configuration .
5) Program the device.

CONFIGURATION BY CABLE CVPROG

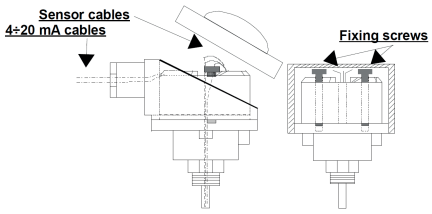
Notice, during this operation don't power on the device .



DAMPING FUNCTION



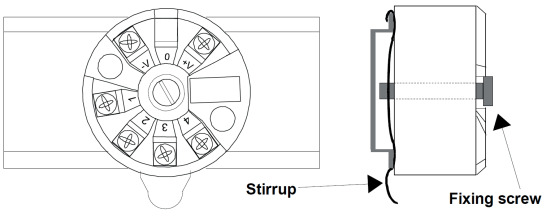
DIN B IN-HEAD MOUNTING



INSTALLATION INSTRUCTIONS

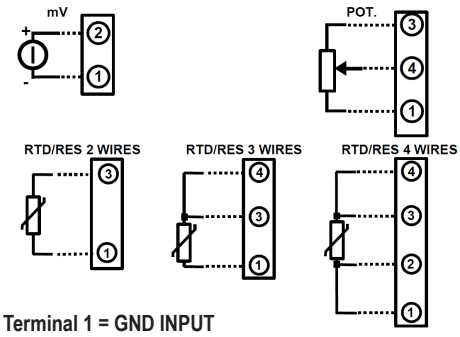
The device DAT1010 is suitable for direct DIN B in-head mounting. The transmitter must be fixed inside the probe by the proper kit. By apposite stirrup, provided on request, it is possible to mount the device on DIN rail in compliance with EN-50022. It is necessary to install the device in a place without vibrations; avoid to routing conductors near power signal cables .

DIN RAIL MOUNTING (DIN RAIL OPTION)



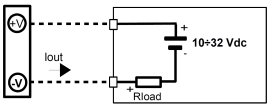
DAT1010: CONNECTIONS

INPUT CONNECTIONS

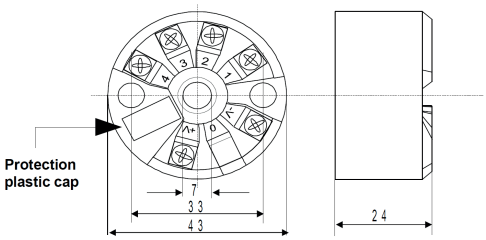


Terminal 1 = GND INPUT

OUTPUT/POWER SUPPLY CONNECTIONS



MECHANICAL DIMENSIONS (mm)



HOW TO ORDER

The DAT1010 is provided as requested on the Customer's order. Refer to the section "Technical specification" to determine input and output ranges. The mounting kit for DIN rail is provided only on request with code DIN RAIL. In case of the configuration is not specified, the parameters must be set by the user.

ORDER CODE EXAMPLE:

DAT 1010 / Pt100 / 3wires / 0 ÷ 20 mA / L.S. / 4 ÷ 20 mA / Burn-out up

- Input type
- Sensor options : RTD/RES:2,3,4 wires
- Input range
- (*) Linearisation options:
  S.L.: standard linearisation.
  N.L.: no linearisation.
  C.L.: linearisation by step (Custom): specify input curve
- Output range
- High or low Out of scale

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FEATURES

- Configurable input for RTD, TC, mV, Resistance and Potentiometer
- Damping function on output
- 4 ÷ 20 mA configurable output on current loop
- Configurable by Personal Computer by cable CVPROG
- High accuracy
- On-field reconfigurable
- EMC compliant – CE mark
- Suitable for DIN B in-head mounting
- Option for DIN rail mounting in compliance with EN 50022 (DIN RAIL Option)

DAT 1015

Two wire universal transmitter programmable by PC

GENERAL DESCRIPTION

The transmitter DAT 1015 is able to execute many functions such as : measure and linearisation of the temperature characteristic of RTDs sensors, conversion of a linear resistance variation, conversion of a voltage signal even coming from a potentiometer connected on its input. Moreover the DAT 1015 is able to measure and linearise the standard thermocouples with internal cold junction compensation. The measured values are converted in a 4÷20 mA current signal . The device guarantees high accuracy and performances stability both in time and in temperature. The programming of the device is made by a Personal Computer using the software PROSOFT and the cable CVPROG, both developed and provided by DATEXEL. By PROSOFT , that runs under the operative system "WindowsTM ", it is possible to configure the transmitter to interface it with the most used sensors . In case of sensors with a no-standard output characteristic, it is possible to execute, via software, a "Custom" linearisation (per step) to obtain an output linearised signal . For Resistance and RTDs sensors it is possible to program the cable compensation with 3 or 4 wires; for Thermocouples it is possible to program the Cold Junction Compensation (CJC) as internal or external. It is possible to set the minimum and maximum values of input and output ranges in any point of the scale, keeping the minimum span shown in the table below. On the device is provided the function "Damping" that allows the user to set a programmable filter up to 30 seconds to reduce eventual sudden variations of the input signal. It is housed in a self-extinguish plastic enclosure suitable for DIN B in-head mounting. Moreover (by proper mounting kit) it is possible to mount the DAT 1015 on DIN rail.

USER INSTRUCTIONS

The transmitter DAT 1015 must be powered by a direct voltage between 10 to 32 V and applied to the terminals +V and -V. The 4÷20 mA output signal is measurable in the power loop as shown in the section "Output/Power supply connections"; Rload is the input impedance of instruments on the current loop; to obtain a correct measure, the value of Rload will be calculated as function of the power supply value (see section "Technical specification – Load characteristic"). The input connections must be made as shown in the section "Input connections". To configure, calibrate and install the transmitter refer to sections " DAT1015: configuration and calibration" and "Installation Instructions".

TECHNICAL SPECIFICATIONS (Typical at 25 °C and in nominal conditions)

Input type	Min	Max	Min. span
TC(*) CJC int./est.			
J	-200°C	1200°C	100 °C
K	-200°C	1370°C	100 °C
S	-50°C	1760°C	400 °C
R	-50°C	1760°C	400 °C
B	400°C	1820°C	400 °C
E	-200°C	1000°C	100 °C
T	-200°C	400°C	100 °C
N	-200°C	1300°C	100 °C
RTD(*) 2,3,4 wires			
Pt100	-200°C	850°C	50°C
Pt1000	-200°C	200°C	50°C
Ni100	-60°C	180°C	50°C
Ni1000	-60°C	150°C	50°C
Voltage			
mV	-100mV	+700mv	2mV
Potentiometer			
(Nominal value)	0Ω	200Ω	10%
	200Ω	500Ω	10%
	0.5 KΩ	50KΩ	10%
RES. 2,3,4 wires			
Low	0Ω	300Ω	10Ω
High	0Ω	2000Ω	200Ω

Output type	Min	Max	Min. span
Direct current	4mA	20mA	4mA
Reverse current	20mA	4mA	4mA

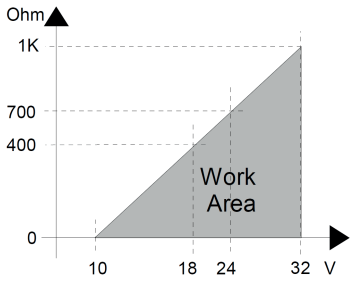
Input calibration (1)	
RTD	> of ±0.1% f.s. or ±0.2°C
Low res.	> of ±0.1% f.s. or ±0.15 Ω
High res.	> of ±0.2% f.s. or ±1 Ω
mV,TC	> of ±0.1% f.s. or ±18 uV
Output calibration	
Current	± 7 uA
Input impedance	
mV	>= 10 MΩ
Linearity (1)	
TC	± 0.2 % f.s.
RTD	± 0.1 % f.s.
Line resistance influence	
mV	<=0.8 uV/Ohm
RTD 3 wires	0.05%/Ω (50 Ω balanced max.)
RTD 4 wires	0.005%/Ω (100 Ω balanced max.)
RTD excitation current	
Typical	0.350 mA
Comp. CJC	± 0,5°C
Thermal drift (1)	
Full scale	± 0.01% / °C
CJC	± 0,01% / °C
Burn-out values	
Max. output value about	20,5 mA
Min. output value about	3,8 mA
Max. fault value about	21,6 mA
Min. fault value about	3,5 mA
Damping time constant	
Selectable from 0.3 to 30 s.	
Value 0: function not active.	

(1) referred to input Span (difference between max. and min. values)

Response time (10÷ 90%) about 400 ms

Power supply	
Power supply voltage	10 .. 32 Vcc
Reverse polarity protection	60 Vcc max

Load characteristic - Rload (maximum load value on current loop per power supply value)



Temperature & humidity	
Operative temperature	-40°C .. +85°C
Storage temperature	-40°C .. +85°C
Humidity (not condensed)	0 .. 90 %
Housing	
Material	PC + ABS V0
Mounting	DIN B head or bigger
Weight	about 50 g.
Dimensions	Ø = 43 mm ; H = 24 mm
EMC (for industrial environments)	
Immunity	EN 61000-6-2
Emission	EN 61000-6-4

*(*) For temperature sensors it is possible to set the input range also in F degrees; to made the conversion use the formula: °F = (°C*9/5)+32)*

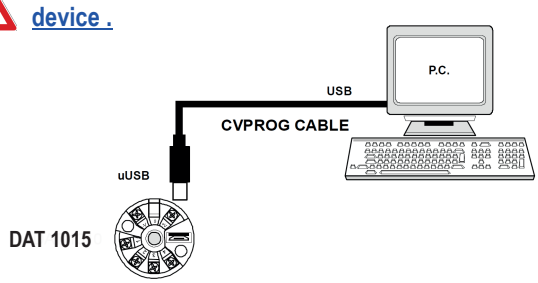
DAT 1015: CONFIGURATION

Notice: before to execute the next operations, check that the drivers of the cable CVPROG in use have been previously installed in the Personal Computer.

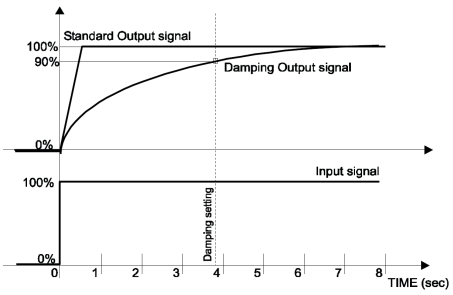
1)Remove the protection plastic cap on DAT 1015.
2) Connect the two plugs of cable CVPROG to the Personal Computer (USB plug) and to the device (uUSB plug) .
3) ARun the software PROSOFT. Set the COM port assigned to the CVPROG
cable by the Operative System.
4) Set the parameters of configuration ..
5) Program the device.

CONFIGURATION BY CABLE CVPROG

Notice, during this operation don't power on the device .



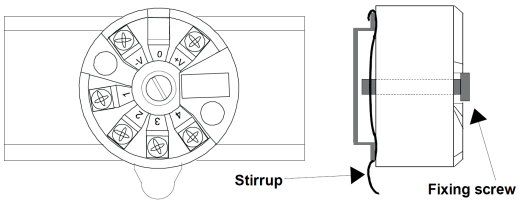
DAMPING FUNCTION



INSTALLATION INSTRUCTIONS

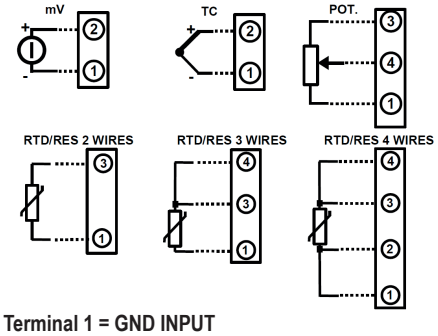
The device DAT1015 is suitable for direct DIN B in-head mounting. The transmitter must be fixed inside the probe by the proper kit. By apposite stirrup, provided on request, it is possible to mount the device on DIN rail in compliance with EN-50022. It is necessary to install the device in a place without vibrations; avoid to routing conductors near power signal cables .

DIN RAIL MOUNTING (DIN RAIL OPTION)



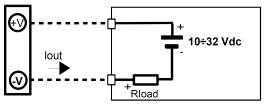
CONNECTIONS DAT1015

INPUT CONNECTIONS

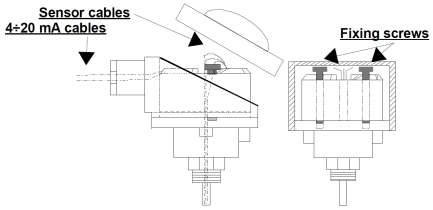


Terminal 1 = GND INPUT

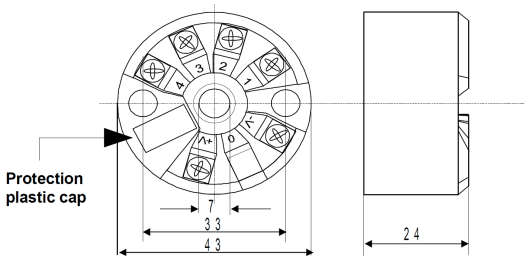
OUTPUT/POWER SUPPLY CONNECTIONS



DIN B IN-HEAD MOUNTING



MECHANICAL DIMENSIONS (mm)



HOW TO ORDER

Il DAT1015 is provided as requested on the Customer's order. Refer to the section "Technical specification" to determine input and output ranges. The mounting kit for DIN rail is provided only on request with code DIN RAIL. In case of the configuration is not specified, the parameters must be set by the user.

ORDER CODE EXAMPLE:

DAT 1015 / Pt100 / 3wires / 0 ÷ 20 mA / L.S. / 4 ÷ 20 mA / Burn-out up

- Pt100: Input type
- 3wires: Sensor options : RTD/RES:2,3,4 wires
- 0 ÷ 20 mA: Input range
- L.S.: (*) Linearisation options:
  S.L.: standard linearisation.
  N.L.: no linearisation.
  C.L.: linearisation by step (Custom): specify input curve
- 4 ÷ 20 mA: Output range
- Burn-out up: High or low Out of scale

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DAT 1066

Isolated two wire universal transmitter programmable by PC

FEATURES

- Configurable input for RTD, TC, mV, Resistance and Potentiometer
- Insulation galvanico a 1500 Vca
-Damping function on output
- 4 ÷ 20 mA configurable output on current loop
- Configurable by Personal Computer by cable CVPROG.
- High accuracy
- On-field reconfigurable
- EMC compliant – CE mark
- Suitable for DIN B in-head mounting
- Option for DIN rail mounting in compliance with EN 50022 (DIN RAIL Option)

GENERAL DESCRIPTION

The isolated transmitter DAT 1066 is able to execute many functions such as : measure and linearisation of the temperature characteristic of RTDs sensors, conversion of a linear resistance variation, conversion of a voltage signal even coming from a potentiometer connected on its input. Moreover the DAT 1066 is able to measure and linearise the standard thermocouples with internal cold junction compensation. The measured values are converted in a 4÷20 mA current signal . The device guarantees high accuracy and performance stability both in time and in temperature. The programming of the device is made by a Personal Computer using the software PROSOFT and the cable CVPROG, both developed and provided by DATEXEL. By PROSOFT , that runs under the operative system “WindowsTM “, it is possible to configure the transmitter to interface it with the most used sensors . In case of sensors with a no-standard output characteristic, it is possible to execute, via software, a “Custom” linearisation (per step) to obtain an output linearised signal . For Resistance and RTDs sensors it is possible to program the cable compensation with 3 or 4 wires; for Thermocouples it is possible to program the Cold Junction Compensation (CJC) as internal or external. It is possible to set the minimum and maximum values of input and output ranges in any point of the scale, keeping the minimum span shown in the table below. Moreover it is available the option of alarm for signal interruption (burn-out) that allows to set the output value as high or low out of scale . On the device is provided the function “Damping” that allows the user to set a programmable filter up to 30 seconds to reduce eventual sudden variations of the input signal. The 1500 Vac isolation between input and power supply/output eliminates the effects of all ground loops eventually existing and allows the use of the transmitter in heavy environmental conditions found in industrial applications. It is housed in a self-extinguish plastic enclosure suitable for DIN B in-head mounting. Moreover (by proper mounting kit) it is possible to mount the DAT 1066 on DIN rail.

USER INSTRUCTIONS

The transmitter DAT 1066 must be powered by a direct voltage between 7 to 32 V and applied to the terminals +V and -V. The 4÷20 mA output signal is measurable in the power loop as shown in the section “Output/Power supply connections”; Rload is the input impedance of instruments on the current loop; to obtain a correct measure, the value of Rload will be calculated as function of the power supply value (see section “Technical specification – Load characteristic”). The input connections must be made as shown in the section “Input connections”. To configure, calibrate and install the transmitter refer to sections “ DAT1066: configuration and calibration” and “Installation Instructions”.

TECHNICAL SPECIFICATIONS (Typical at 25 °C and in nominal conditions)

Input type	Min	Max	Min. span
TC(*) CJC int./est.			
J	-200°C	1200°C	100 °C
K	-200°C	1370°C	100 °C
S	-50°C	1760°C	400 °C
R	-50°C	1760°C	400 °C
B	400°C	1820°C	400 °C
E	-200°C	1000°C	100 °C
T	-200°C	400°C	100 °C
N	-200°C	1300°C	100 °C
RTD(*) 2,3,4 wires			
Pt100	-200°C	850°C	50°C
Pt1000	-200°C	200°C	50°C
Ni100	-60°C	180°C	50°C
Ni1000	-60°C	150°C	50°C
Voltage			
mV	-100mV	+700mv	2mV
Potentiometer			
(Nominal value)	0Ω	200Ω	10%
	200Ω	500Ω	10%
	0.5 KΩ	50KΩ	10%
RES. 2,3,4 wires			
Low	0Ω	300Ω	10Ω
High	0Ω	2000Ω	200Ω

Output type	Min	Max	Min. span
Direct current	4mA	20mA	4mA
Reverse current	20mA	4mA	4mA

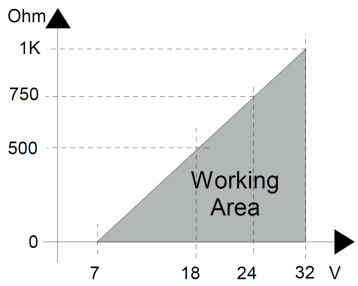
Input calibration (1)	
RTD	> of ±0.1% f.s. or ±0.2°C
Low res.	> of ±0.1% f.s. or ±0.15 Ω
High res.	> of ±0.2% f.s. or ±1 Ω
mV,TC	> of ±0.1% f.s. or ±18 uV
Output calibration	
Current	± 7 uA
Input impedance	
mV	>= 10 MΩ
Linearity (1)	
TC	± 0.2 % f.s.
RTD	± 0.1 % f.s.
Line resistance influence	
mV	<=0.8 uV/Ohm
RTD 3 wires	0.05%/Ω (50 Ω balanced max.)
RTD 4 wires	0.005%/Ω (100 Ω balanced max.)
RTD excitation current	
Typical	0.350 mA
Comp. CJC	± 0,5°C
Thermal drift (1)	
Full scale	± 0.01% / °C
CJC	± 0,01% / °C
Burn-out values	
Max. output value about	20,5 mA
Min. output value about	3,8 mA
Max. fault value about	21,6 mA
Min. fault value about	3,5 mA
Damping time constant	
Selectable from 0.3 to 30 s.	
Value 0: function not active.	

(1) referred to input Span (difference between max. and min. values)

Response time (10÷ 90%) about 400 ms

Power supply	
Power supply voltage	7 .. 32 Vcc
Reverse polarity protection	60 Vcc max

Load characteristic - Rload (maximum load value on current loop per power supply value)



Temperature & humidity	
Operative temperature	-40°C .. +85°C
Storage temperature	-40°C .. +85°C
Humidity (not condensed)	0 .. 90 %
Housing	
Material	PC + ABS V0
Mounting	DIN B head or bigger
Weight	about 50 g.
Dimensions	Ø = 43 mm ; H = 24 mm
EMC (for industrial environments)	
Immunity	EN 61000-6-2
Emission	EN 61000-6-4

*(*) For temperature sensors it is possible to set the input range also in F degrees; to made the conversion use the formula: °F = (°C*9/5)+32)*

DAT 1066: CONFIGURATION

Notice: before to execute the next operations, check that the drivers of the cable CVPROG in use have been previously installed in the Personal Computer.

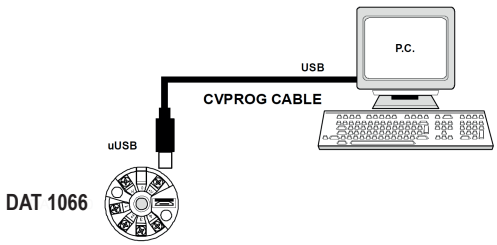
1)Remove the protection plastic cap on DAT 1066.
2) Connect the two plugs of cable CVPROG to the Personal Computer (USB plug) and to the device (uUSB plug) .
3) Run the software PROSOFT. Set the COM port assigned to the CVPROG cable by the Operative System.
4) Set the parameters of configuration ..
5) Program the device.

- CALIBRATION CONTROL

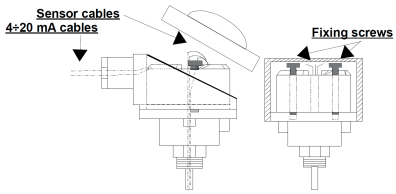
With software PROSOFT running and device powered:

1) Connect on the input a calibrator setted with minimum and maximum values referred to the electric signal or to the temperature sensor to measure.
2) Set the calibrator at the minimum value.
3) Verify that the device provides on output the minimum setted value.
4) Set the calibrator at the maximum value.
5) Verify that the device provides on output the maximum setted value.
6) In case of regulation of value obtained in the step 3 and 5, use the ZERO and SPAN regulators of software PROSOFT. The variation introduced from these regulators must be calculated as percentage of the input range .
7) Program the device with the new parameters .

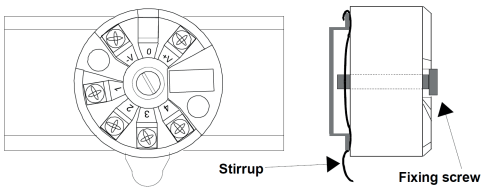
CONFIGURATION BY CABLE CVPROG



DIN B IN-HEAD MOUNTING



DIN RAIL MOUNTING (DIN RAIL OPTION)

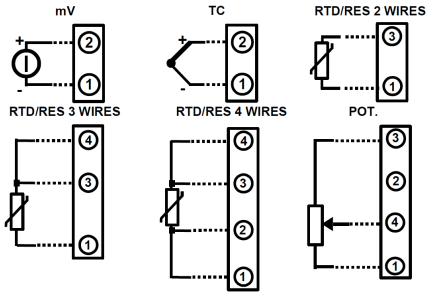


INSTALLATION INSTRUCTIONS

The device DAT1066 is suitable for direct DIN B in-head mounting. The transmitter must be fixed inside the probe by the proper kit. By apposite stirrup, provided on request, it is possible to mount the device on DIN rail in compliance with EN-50022. It is necessary to install the device in a place without vibrations; avoid to routing conductors near power signal cables .

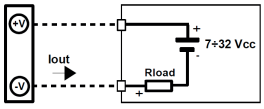
DAT 1066: CONNECTIONS

INPUT CONNECTIONS

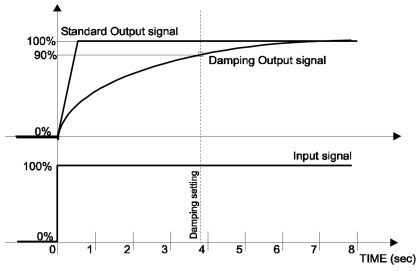


Terminal 1 = GND INPUT INPUT

OUTPUT/POWER SUPPLY CONNECTIONS

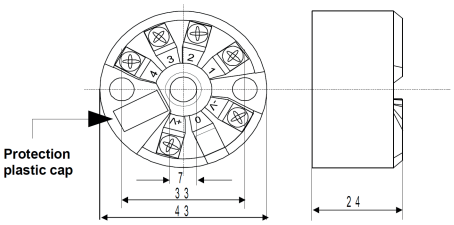


DAMPING FUNCTION



ISOLATIONS STRUCTURE

MECHANICAL DIMENSIONS (mm)



HOW TO ORDER

The DAT1066 is provided as requested on the Customer's order. Refer to the section "Technical specification" to determine input and output ranges. The mounting kit for DIN rail is provided only on request with code DIN RAIL. In case of the configuration is not specified, the parameters must be set by the user.

ORDER CODE EXAMPLE:

DAT 1066 / Pt100 / 3wires / 0 ÷ 20 °C / L.S. / 4 ÷ 20 mA / Burn-out up

- Input type: Pt100
- Sensor options : RTD/RES:2,3,4 wires: 3wires
- Input range: 0 ÷ 20 °C
- (*) Linearisation options: S.L.: standard linearisation. N.L.: no linearisation. C.L.: linearisation by step (Custom): specify input curve: L.S.
- Output range: 4 ÷ 20 mA
- High or low Out of scale: Burn-out up

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DAT 1135

Isolated converter with Output 0÷10 V programmable by PC

FEATURES

- Configurable input for RTD, TC, mV, Resistance and Potentiometer
- Insulation galvanico a 1500 Vca
- OUTPUT configurabile in Voltage da 0 a 10 V
- Configurable by Personal Computer by cable CVPROG
- High accuracy
- On-field reconfigurable
- EMC compliant – CE mark
- Suitable for DIN B in-head mounting
- Option for DIN rail mounting in compliance with EN 50022 (DIN RAIL Option)

GENERAL DESCRIPTION

The isolated converter DAT1135 is able to execute many functions such as: measure and linearisation of the temperature characteristic of RTDs sensors, conversion of a linear resistance variation, conversion of a voltage signal even coming from a potentiometer connected on its input. The DAT1135 is able to measure and linearise the standard thermocouples with internal cold junction compensation. The measured values are converted in a 0÷10 V signal . The device guarantees high accuracy and performance stability both in time and in temperature. The programming of the DAT1135 is made by a Personal Computer using the software DATESOFT and the cable CVPROG, both developed and provided by DATEXEL. By DATESOFT , that runs under the operative system "WindowsTM ", it is possible to configure the transmitter to interface it with the most used sensors. For Resistance and RTDs sensors it is possible to program the cable compensation with 3 or 4 wires; for Thermocouples it is possible to program the Cold Junction Compensation (CJC) as internal or external. It is possible to set the minimum and maximum values of input and output ranges in any point of the scale, keeping the minimum span shown in the table below. It is available the option of alarm for signal interruption (burn-out) that allows to set the output value as high or low out of scale. On the device is provided a function that allows the user to set a programmable filter up to 30 seconds to reduce eventual sudden variations of the input signal. The 1500 Vac isolation between input and power supply/output eliminates the effects of all ground loops eventually existing and allows the use of the converter in heavy environmental conditions found in industrial applications. It is housed in a self-extinguish plastic enclosure suitable for DIN B in-head mounting. Moreover (by proper mounting kit) it is possible to mount the DAT1135 on DIN rail. USER INSTRUCTIONS

USER INSTRUCTIONS

The converter DAT1135 must be powered by a direct voltage from 18 up to 30V applied to the terminals +V and -V. The output signal 0÷10 V is measurable between the terminals O(OUT) and -V. The input connections must be made as shown in the section "Input connections". To configure, calibrate and install the converter refer to sections " DAT1135: configuration and calibration" and "Installation Instructions".

TECHNICAL SPECIFICATIONS (Typical at 25 °C and in nominal conditions)

Input type	Min	Max	Min. span
TC(*) CJC int./est.			
J	-200°C	1200°C	100 °C
K	-200°C	1300°C	100 °C
S	0°C	1750°C	400 °C
R	0°C	1750°C	400 °C
B	0°C	1800°C	400 °C
E	-200°C	1000°C	100 °C
T	-200°C	400°C	100 °C
N	-200°C	1300°C	100 °C
RTD(*) 2,3,4 wires			
Pt100	-200°C	850°C	50°C
Pt1000	-200°C	185°C	30°C
Ni100	-60°C	180°C	50°C
Ni1000	-60°C	150°C	30°C
Voltage			
mV	-100mV	+90mv	5mV
mV	-100mV	+200mV	10mV
mV	-100mV	+800mV	20mV
Potentiometer			
(R nom. < 50 KΩ)	0%	100%	50%
RES. 2,3,4 wires			
	0Ω	500Ω	50Ω
	0Ω	2000Ω	500Ω

Output type	Min	Max	Min. span
Direct current	0 V	10 V	1 V
Reverse current	10 V	0 V	1 V

Input calibration (1)	
RTD	> of ±0.1% f.s. or ±0.2°C
Low res.	> of ±0.1% f.s. or ±0.15 Ω
High res.	> of ±0.2% f.s. or ±1 Ω
mV,TC	> di ±0.1% f.s. or ±10 uV
Output calibration	
Voltage	± 5 mV
Input impedance	
TC, mV	>= 10 MΩ
Linearity (1)	
TC	± 0.2 % f.s.
RTD	± 0.1 % f.s.
Line resistance influence	
TC, mV	<=0.8 uV/Ohm
RTD 3 wires	0.05%/Ω (50 Ω balanced max.)
RTD 4 wires	0.005%/Ω (100 Ω balanced max.)
RTD excitation current	
Typical	0.350 mA
Comp. CJC	± 0,5°C
Thermal drift (1)	
Full scale	± 0.01% / °C
CJC	± 0,01% / °C
Burn-out values	
Max. fault value about	11,1 V
Min. fault value about	-0,65 V

(1) referred to input Span (difference between max. and min. values)

Output Load resistance – Rload	
Voltage output	>/= 5 KΩ
Short-circuit current	26 mA max
Response time (10÷ 90%)	about 200 ms
Output filter programmability	
Selectable	from 0.2 to 30 s.
Power supply	
Power supply voltage	18 .. 30 Vdc
Current consumption	10 mA max.
Reverse polarity protection	60 Vcc max
Isolation voltage	
Input – Pow. supply/Output	1500 Vca, 50 Hz,1 min.
Temperature & humidity	
Operative temperature	-40°C .. +85°C
Storage temperature	-40°C .. +85°C
Humidity (not condensed)	0 .. 90 %
Housing	
Material	PC + ABS V0
Mounting	DIN B head or bigger
Weight	about 50 g.
Dimensions	Ø = 43 mm ; H = 24 mm
EMC (for industrial environments)	
Immunity	EN 61000-6-2
Emission	EN 61000-6-4

*(*) For temperature sensors it is possible to set the input range also in F degrees; to made the conversion use the formula: °F = (°C*9/5)+32)*

DAT 1135 CONFIGURATION:

Notice: before to execute the next operations, check that the drivers of the cable CVPROG in use have been previously installed in the Personal Computer.

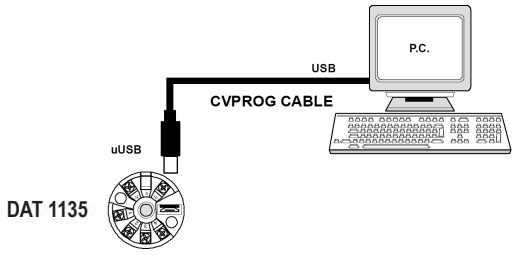
1)Remove the protection plastic cap on DAT1135.
2Connect the two plugs of cable CVPROG to the Personal Computer (USB plug) and to the device (uUSB plug) .
3) Aprire il programma di CONFIGURATION DATESOFT. Impostare la porta COM assegnata dal sistema operativo al cavo CVPROG.
4) Set the parameters of configuration ..
5) Program the device.

- CALIBRATION CONTROL

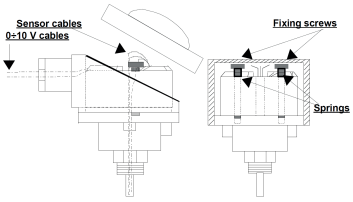
With software PROSOFT running and device powered:

1) Connect on the input a calibrator setted with minimum and maximum values referred to the electric signal or to the temperature sensor to measure.
2) Set the calibrator at the minimum value.
3) Verify that the device provides on output the minimum setted value.
4) Set the calibrator at the maximum value.
5) Verify that the device provides on output the maximum setted value.
6) In case of regulation of value obtained in the step 3 and 5, use the ZERO and SPAN regulators of software PROSOFT. The variation introduced from these regulators must be calculated as percentage of the input range .
7) Program the device with the new parameters .

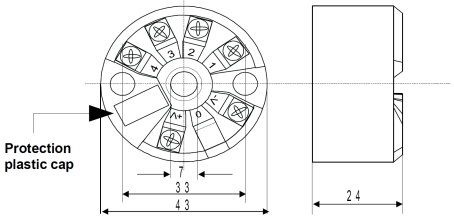
PROGRAMMAZIONE DAT1135 CON CAVO CVPROG



DIN B IN-HEAD MOUNTING



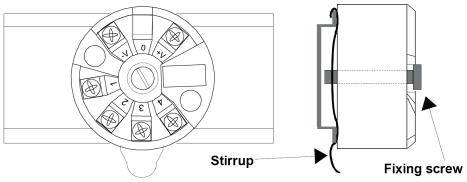
MECHANICAL DIMENSIONS (mm)



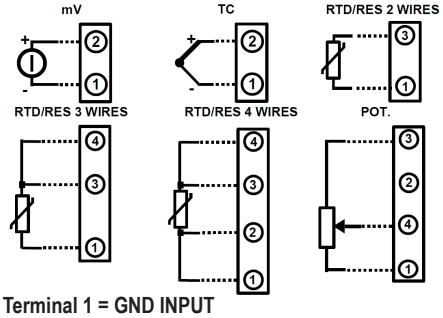
INSTALLATION INSTRUCTIONS

The device DAT1135 is suitable for direct DIN B in-head mounting. The transmitter must be fixed inside the probe by the proper kit. By apposite stirrup, provided on request, it is possible to mount the device on DIN rail in compliance with EN-50022. It is necessary to install the device in a place without vibrations; avoid to routing conductors near power signal cables .

DIN RAIL MOUNTING (DIN RAIL OPTION)

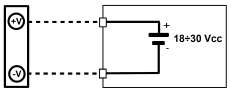


DAT1135 CONNECTIONS
INPUT CONNECTIONS



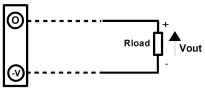
Terminal 1 = GND INPUT

CONNECTIONS LATO Power supply



Terminal -V = GND POWER SUPPLY

CONNECTIONS LATO OUTPUT



Terminal -V = GND OUTPUT

ISOLATIONS STRUCTURE

HOW TO ORDER

The DAT1135 is provided as requested on the Customer's order. Refer to the section "Technical specification" to determine input and output ranges. The mounting kit for DIN rail is provided only on request with code DIN RAIL. In case of the configuration is not specified, the parameters must be set by the user.

ORDER CODE EXAMPLE:

DAT 1135 / Pt100 / 3wires / 0 ÷ 200 mA / 4 ÷ 20 mA / Burn-out up

- Pt100: Input type
- 3wires: Sensor options : RTD/RES:2,3,4 wires
- 0 ÷ 200 mA: Input range
- 4 ÷ 20 mA: Output range
- Burn-out up: High or low Out of scale

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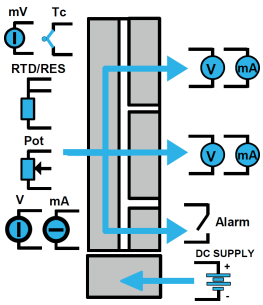
Universal isolated converter configurable by Dip-Switch or PC double output & trip amplifier

DAT 4530

FEATURES

- Universal configurable input for:
mV, Tc, RTD, Res, Potentiometer, V and mA
- Two outputs configurable in current or voltage
- Trip alarm
- Configurable by dip-switch or PC
- High accuracy
- On-field reconfigurable
- Galvanic isolation among all the ways
- EMC compliant – CE mark
- Suitable for DIN rail mounting in compliance with EN-50022 and EN-50035



GENERAL DESCRIPTION

The universal isolated converter DAT 4530 is able to measure and linearise voltage, current and resistance signals, potentiometers and the standard thermocouples and RTDs with, if required, the cold junction compensation, the wires compensation. For mV, V and mA input it is possible to set an option for the fast sampling (option HS) or to extract the square root of the measured signal (option SQRT). In function of programming, the measured values are converted in a current or voltage signal on the two outputs. Moreover an output contact is available as trip alarm. The device guarantees high accuracy and performances stability both versus time and temperature. The programming is made by the dip-switch located in the window on the side of the enclosure. By means of dip-switches it is possible to select the input type and range and the output type without recalibrate the device. Moreover, by Personal Computer the user can program all of the device's parameters for his own necessity; the programming by PC allows to set the two outputs with independent settings and the parameters of the Trip Alarm. The 1500 Vac galvanic isolation on all ways (input, outputs and power supply) eliminates the effects of all ground loops eventually existing and allows the use of the converter in heavy environmental conditions found in industrial applications. The DAT 4530 is in compliance with the Directive 2004/108/EC on the Electromagnetic Compatibility. It is housed in a plastic enclosure of 12.5 mm thickness suitable for DIN rail mounting in compliance with EN-50022 and EN-50035 standards.

USER INSTRUCTIONS

The converter must be powered by a direct voltage applied to the terminals U and V. The analogue channel measures the value from the sensor connected to the terminals C-D-E-F-G-H-I-L and transmits the output measures on the terminals M-N-O-P (OUT A) and the terminals Q-R-S-T (OUT B). A contact for the trip alarm is available on the terminals A-B. The input and output connections must be made as shown in the section "Connections". It is possible to configure the converter on field by dip-switch or Personal Computer as shown in the section " Programming ". The configuration by dipswitches can be made also if the device is powered (note: after the configuration the device takes some seconds to provide the right output measure).

TECHNICAL SPECIFICATIONS (Typical at 25 °C and in nominal conditions)

Input type	Min	Max	Min. span
TC CJC int./est.			
J	-200°C	1200°C	100°C
K	-200°C	1300°C	100°C
S	0°C	1750°C	400°C
R	0°C	1750°C	400°C
B	0°C	1850°C	400°C
E	-200°C	1000°C	100°C
T	-200°C	400°C	100°C
N	-200°C	1300°C	100°C
RTD 2,3,4 wires			
Pt100	-200°C	850°C	50°C
Pt1000	-85°C	185°C	30°C
Ni100	-60°C	180°C	50°C
Ni1000	-60°C	150°C	30°C
Voltage			
mV	-100mV	+90mV	5mV
mV	-100mV	+200mV	10mV
mV	-100mV	+800mV	20mV
Pot. (Rnom. < 50 KΩ)	0%	100%	10%
RES. 2,3,4 wires			
	0 Ω	500 Ω	50 Ω
	0 Ω	2000 Ω	500 Ω
Voltage	-10 V	10 v	1 V
Current	0 Ma	20 mA	1 mA

Calibrazione (1)

mV, TC	the higher of ±0.1% and ±12 uV
RTD	the higher of ±0.1% and ±0.2°C
Res.	the higher of ±0.1% and ±0.15
Potentiometer	± 0.05 % f.s.
Volt	the higher of ±0.1% and ± 2 mV
mA	the higher of ±0.1% and ± 6 uA
mV, V, mA	± 0,5 % f.s (opz. HS)

(1) referred to input Span (difference between max. and min. values)

Linearity(1)

TC, RTD	± 0.1 % f.s.
mV, V, mA	± 0.05 % f.s.

Input impedance

TC, mV	>= 10 MΩ
mA	~22 Ω

Current di eccitazione sensore

RTD, Res	400 uA
Voltage Aux.	>18V @ 20mA

Line resistance influence

TC, mV	<=0.8 uV/Ohm
RTD 3 wires	0.05%/Ω (50Ω balanced max.)
RTD 4 wires	0.005%/Ω (100Ω balanced max.)

Thermal drift (1)

Full scale	± 0.01% / °C
CJC	± 0.01% / °C
Comp.CJC	± 0.5°C

OUTPUT (2 CHANNELS)

Output type	Min	Max	Min. span
Current	0 mA	20 mA	4mA
Voltage	0 V	10 V	1 V

Aux. Voltage

Current	± 7 uA
Voltage	± 5 mV
Voltage Aux.	>12V @ 20mA

Valori fuori scala

Max. output value	22 mA or 11 V
Min. output value	0 mA or -0.6 V

Output Load resistance – Rload

Current output	< 500 Ω
Voltage output	> 10 KΩ
Short-circuit current	30 mA max.
Response time (10÷ 90%)	about 400 ms 100 ms (opz.HS)

ALARM TRIP

Contact	SPST
Max Load (resistive) :	
Voltage	48 V (ca/cc)
Current	0.4 A

POWER SUPPLY

Power supply voltage	20 .. 30 Vcc
Reverse polarity protection	60 Vcc max

Current consumption

Current output	90 mA max.
Voltage output	30 mA max

ISOLATION

Among all the ways	1500 Vca, 50 Hz, 1 min

TEMPERATURE AND HUMIDITY

Operative temperature	-20°C .. +60°C
Storage temperature	-40°C.. +85°C
Humidity (not condensed)	0 .. 90 %

HOUSING

Material	Plastica auto-estinguente
Mounting	su binario DIN conforme a EN-50022 e EN-50035
Weight	90 g. circa

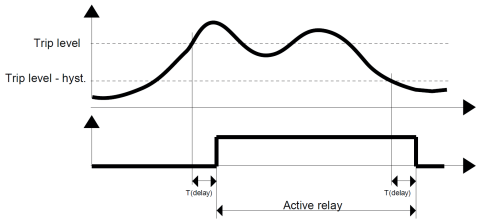
EMC (for industrial environments)

Immunity	EN 61000-6-2
Emission	EN 61000-6-4

*(*) For temperature sensors it is possible to set the input range also in F degrees; to made the conversion use the formula: °F = (°C*9/5)+32)*

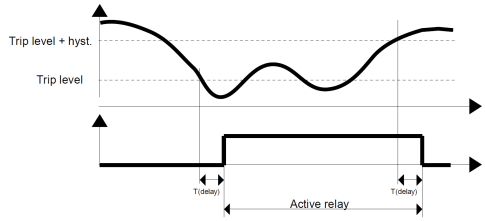
THRESHOLD OPERATION

HIGH ALARM THRESHOLD



For the high alarm the relay goes on when the input signal is higher than the trip level and after the delay time. The relay goes off only when the input signal is lower than the trip level minus the hysteresis value or when reaches the minimum value of the input scale and after the delay time.

LOW ALARM THRESHOLD



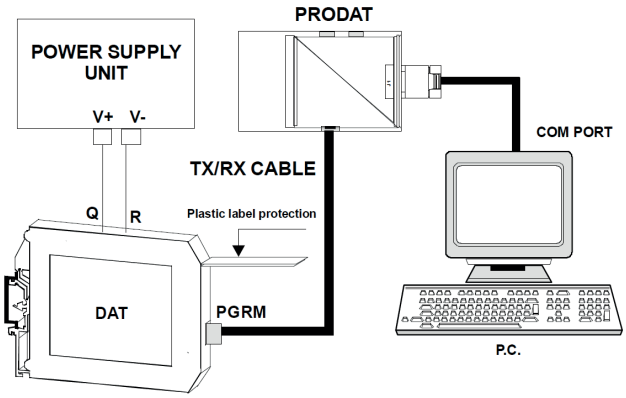
For the low alarm the relay goes on when the input signal is lower than the trip level and after the delay time. The relay goes off only when the input signal is higher than the trip level plus the hysteresis value or when reaches the maximum value of the input scale and after the delay time.

PROGRAMMING

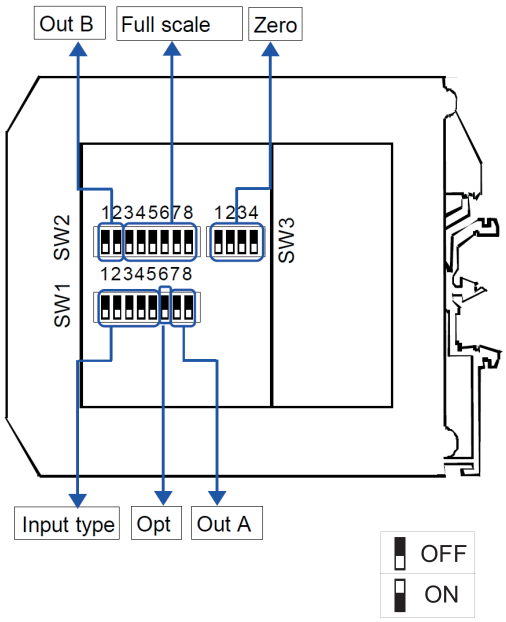
CONFIGURATION TRAMITE PC

By software DATESOFT it is possible to:
- set the default programming of the device;
- program the options not available with the dip-switch;
(burn-out level, CJC offset, trip alarm settings, fast sampling, etc...);
- read, in real time, the input and output measures;
- follow the dip-switches configuration wizard.

To configure the device follow the next steps:
1) Power-on the device.
2) Open the protection plastic label on the front of the device.
3) Connect the interface PRODAT to the PC (COM port) and to the device (PGRM connector).
4) Open DATESOFT.
5) Select the COM port in use.
6) Click on “Open COM”.
7) Click on the icon “Program”.
8) Set the programming data.
9) Click on the icon “Write” to send the programming data to the device.

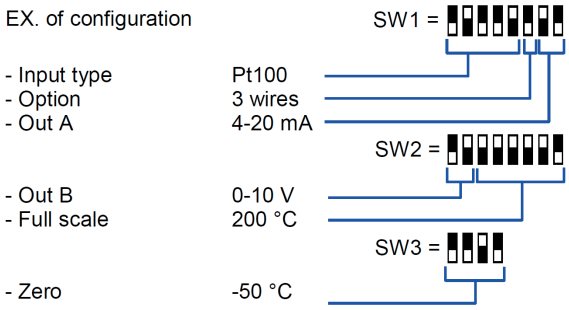


Warning: during these operations the device must always be powered and the TX/RX cable always connected. For information about DATESOFT refer to the software’s user guide.



CONFIGURATION BY DIP-SWITCHES

1) Open the suitable door on the side of the device.
2) Set the input type by the dip-switch SW1 [1..5] (see TAB.1)
3) Set the output A type by the dip-switch SW1 [7..8] and SW2 [1..2] (see TAB.2)
4) Set, if available, the input option by the dip-switch SW1 [6] (see TAB.3)
5) Set the minimum input scale value (Zero) by the dip-switch SW3 [1..4] (see TAB.4)*
6) Set the maximum input value (Full scale) by the dip-switch SW2 [3..8] (see TAB.4)*



NOTE:
- It is also possible to set the dip-switches using the wizard of the configuration software following the procedure described in the section ”Configuration by PC” until the step 6 and clicking on icon “Switch”.

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DIP-SWITCH CONFIGURATION TABLES

TAB.1 – Input type settings

SW1 1 2 3 4 5		SW1 1 2 3 4 5		SW1 1 2 3 4 5	
	EPROM *		Tc J		Res. 2KΩ
	90 mV		Tc K		Res. 500Ω
	200 mV		Tc R		Pt100
	800 mV		Tc S		Ni100
	10 V		Tc T		Pt 1K
	20 mA		Tc B		Ni 1K
			Tc E		Pot. <500Ω
			Tc N		Pot. <2KΩ

TAB.2

Out A

SW1 7 8	
	0-20 mA
	4-20 mA
	0-10 V
	0-5 V

Out B

SW2 1 2	
	0-20 mA
	4-20 mA
	0-10 V
	0-5 V

TAB.3

Options

SW1 6	CJC	RTD/RES
	External	3 wires
	Internal	2/4 wires

NOTES:

* To set the input range refer to the TAB.4 (next pages) referred to the input type selected by the TAB.1.
* If the dip-switches SW1 [1..5] are all set in the position 0 ("EPROM"), the device will follow the configuration programmed by PC (input type and range, output type and range, trip alarm 's settings and options).
* If the dip-switches SW2 [3..8] and SW3 [1..4] are all set in the position 0 ("Default"), the device will follow the input scale programmed by PC for the input type selected by the dip-switches SW1 [1..5]
* Eventual wrong dip-switches settings will be signalled by the blinking of the led "PWR".
* If the dip-switch SW1 [6] is set in the ON position and is in progress a measure by Resistance or RTD 2 wires sensor, it is necessary to connect the

TAB.4a – mV, Tc input scale settings

Zero		Full scale							
SW3 1 2 3 4	mV-°C	SW2 3 4 5 6 7 8	mV-°C	SW2 3 4 5 6 7 8	mV-°C	SW2 3 4 5 6 7 8	mV-°C	SW2 3 4 5 6 7 8	mV-°C
	Default		Default		75		225		700
	-200		0		80		250		750
	-100		5		85		255		800
	-80		10		90		275		850
	-60		15		95		300		900
	-50		20		100		325		950
	-40		25		110		350		1000
	-30		30		120		375		1100
	-20		35		130		400		1200
	-10		40		140		425		1300
	0		45		150		450		1400
	10		50		160		475		1500
	20		55		170		500		1600
	50		60		180		550		1750
	100		65		190		600		1800
	150		70		200		650		1850

TAB.4b – Pt100, Pt1K, Ni100, Ni1K input scale settings

Zero		Full scale							
SW3 1 2 3 4	°C	SW2 3 4 5 6 7 8	°C	SW2 3 4 5 6 7 8	°C	SW2 3 4 5 6 7 8	°C	SW2 3 4 5 6 7 8	°C
	Default		Default		75		210		370
	-200		0		80		220		380
	-150		5		85		230		390
	-100		10		90		240		400
	-50		15		95		250		425
	-40		20		100		260		450
	-30		25		110		270		475
	-20		30		120		280		500
	-10		35		130		290		525
	0		40		140		300		550
	5		45		150		310		600
	10		50		160		320		650
	20		55		170		330		700
	30		60		180		340		750
	50		65		190		350		800
	100		70		200		360		850

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TAB.4c – Resistance < 2 Kohm input scale settings.

Zero		Full Scale							
SW3 1 2 3 4	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω
	Default		Default		800		1150		1600
	0		500		820		1175		1650
	150		520		840		1200		1700
	200		540		860		1225		1750
	250		560		880		1250		1800
	300		580		900		1275		1850
	350		600		920		1300		1900
	400		620		940		1325		1950
	450		640		960		1350		2000
	500		660		980		1375		2000
	550		680		1000		1400		2000
	600		700		1025		1425		2000
	650		720		1050		1450		2000
	700		740		1075		1475		2000
	750		760		1100		1500		2000
	800		780		1125		1550		2000

TAB.4d – Resistance < 500 ohm input scale settings

Zero		Full Scale							
SW3 1 2 3 4	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω	SW2 3 4 5 6 7 8	Ω
	Default		Default		125		210		370
	0		50		130		220		380
	10		55		135		230		390
	20		60		140		240		400
	30		65		145		250		410
	40		70		150		260		420
	50		75		155		270		430
	75		80		160		280		440
	100		85		165		290		450
	125		90		170		300		460
	150		95		175		310		470
	175		100		180		320		480
	200		105		185		330		490
	225		110		190		340		500
	250		115		195		350		500
	300		120		200		360		500

TAB.4e – Potentiometer input scale settings

Zero		Full Scale							
SW3 1 2 3 4	%	SW2 3 4 5 6 7 8	%	SW2 3 4 5 6 7 8	%	SW2 3 4 5 6 7 8	%	SW2 3 4 5 6 7 8	%
	Default		Default		34		66		98
	0		5		36		68		100
	15		6		38		70		100
	20		8		40		72		100
	25		10		42		74		100
	30		12		44		76		100
	35		14		46		78		100
	40		16		48		80		100
	45		18		50		82		100
	50		20		52		84		100
	55		22		54		86		100
	60		24		56		88		100
	65		26		58		90		100
	70		28		60		92		100
	75		30		62		94		100
	80		32		64		96		100

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TAB.4f – Impostazione campo scala mA

Zero		Fondo Scala							
SW3 1 2 3 4	mA	SW2 3 4 5 6 7 8	mA	SW2 3 4 5 6 7 8	mA	SW2 3 4 5 6 7 8	mA	SW2 3 4 5 6 7 8	mA
	Default		Default		8		11,5		16
	0		5		8,2		11,75		16,5
	1,5		5,2		8,4		12		17
	2		5,4		8,6		12,25		17,5
	2,5		5,6		8,8		12,5		18
	3		5,8		9		12,75		18,5
	3,5		6		9,2		13		19
	4		6,2		9,4		13,25		19,5
	4,5		6,4		9,6		13,5		20
	5		6,6		9,8		13,75		20
	5,5		6,8		10		14		20
	6		7		10,25		14,25		20
	6,5		7,2		10,5		14,5		20
	7		7,4		10,75		14,75		20
	7,5		7,6		11		15		20
	8		7,8		11,25		15,5		20

TAB.4g – Impostazione campo scala Volt

Zero		Fondo Scala							
SW3 1 2 3 4	Volt	SW2 3 4 5 6 7 8	Volt	SW2 3 4 5 6 7 8	Volt	SW2 3 4 5 6 7 8	Volt	SW2 3 4 5 6 7 8	Volt
	Default		Default		3,4		6,6		9,8
	0		0,5		3,6		6,8		10
	1,5		0,6		3,8		7		10
	2		0,8		4		7,2		10
	2,5		1		4,2		7,4		10
	3		1,2		4,4		7,6		10
	3,5		1,4		4,6		7,8		10
	4		1,6		4,8		8		10
	4,5		1,8		5		8,2		10
	5		2		5,2		8,4		10
	5,5		2,2		5,4		8,6		10
	6		2,4		5,6		8,8		10
	6,5		2,6		5,8		9		10
	7		2,8		6		9,2		10
	7,5		3		6,2		9,4		10
	8		3,2		6,4		9,6		10

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INSTALLATION INSTRUCTIONS

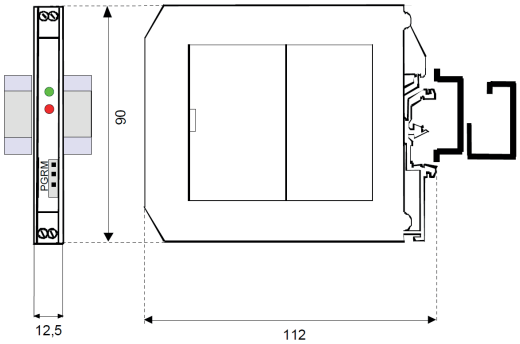
The device is suitable for fitting to DIN rails in the vertical position.
For optimum operation and long life follow these instructions:

When the devices are installed side by side it may be necessary to separate them by at least 5 mm in the following cases:
- If panel temperature exceeds 45°C.
- Use of high power supply value (> 27 Vdc).
- Use of one or both current outputs.
- Use of active current input..

Make sure that sufficient air flow is provided for the device avoiding to place raceways or other objects which could obstruct the ventilation slits. Moreover it is suggested to avoid that devices are mounted above appliances generating heat; their ideal place should be in the lower part of the panel. Install the device in a place without vibrations. Moreover it is suggested to avoid routing conductors near power signal cables (motors, induction ovens, inverters etc...) and to use shielded cable for connecting signals.

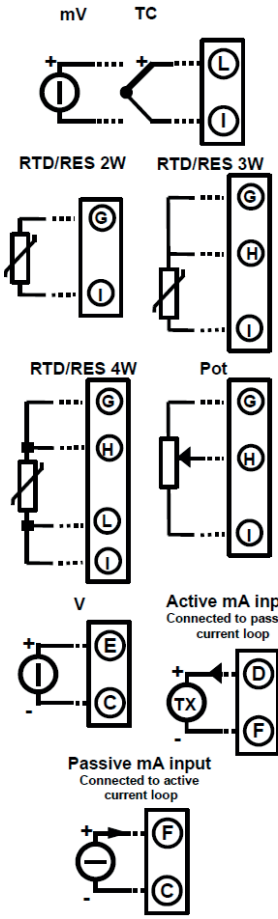
ISOLATION STRUCTURE

MECHANICAL DIMENSIONS (mm)

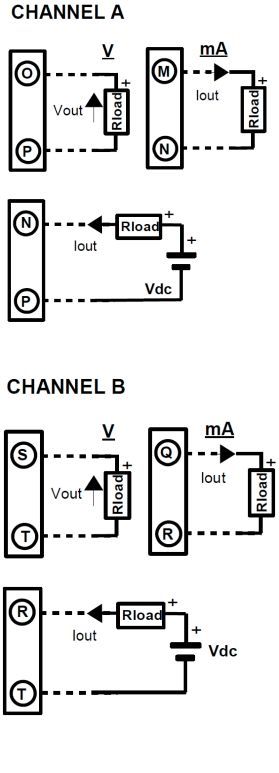


CONNECTIONS

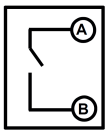
INPUT SIDE



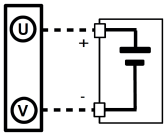
OUTPUT SIDE



TRIP ALARM



POWER SUPPLY



HOW TO ORDER

The device is provided as requested on the Customer's order. Refer to the section "Programming" to determine the input and output ranges. In case of the configuration is not specified, the parameters must be set by the user.

LIGHT SIGNALLING

LED	COLOUR	STATE	DESCRIPTION
PWR	GREEN	ON	Device powered
		OFF	Device not powered
		BLINKING	Wrong dip-switches settings
ALARM	RED	ON	Trip alarm active
		OFF	Trip alarm not active

ORDER CODE EXAMPLE:

DAT 4530 / Pt100 / 0 ÷ 20 °C / 4 ÷ 20 mA / 4 ÷ 20 mA / 3wires

- Input type → Pt100
- Input range → 0 ÷ 20 °C
- Output range A → 4 ÷ 20 mA
- Output range B → 4 ÷ 20 mA
- Options → 3wires

Datexel reserves its rights to modify totally or in part the characteristics of its products without warning at any time

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LT CAL®

The certifications and calibrations program for:

- **Thermocouples and RTD's**
- **Thermometric measurement chains, sensor plus indicator**
- **Temperature calibrators**
- **Indicators**
- **Plants, thermal mapping, thermal profiles**

Company quality assurance systems were set up in accordance with ISO 9001, 9002, 9003 specifications starting from 1987. Other guidance regulations are applied to specific industrial sectors such as GMP (pharmaceutical and medical technologies) or QS9000 (automotive), etc. However, any company, also engaged in supplying services (banks, insurance companies, hospitals, etc.) can apply ISO quality assurance systems.

All ISO guidelines and specifications specifically require the introduction and maintenance
of calibration or testing systems at the companies.

The **LT cal®** calibration certificates are fully compliant with the criteria established by QS regulations

- **ISO 9001**
- **ISO 10012-1**
- **GMP**
- **FDA**
- **QS 9000**

LT cal® is the best compromise between quality and cost that the **LA TERMOTECNICA** calibration laboratories are able to offer.

LT cal® are available in Italian and English as they are valid and recognized in all countries where ISO standards are in force and applied.

LT CAL®

Are low cost calibration certificates, an alternative to **ACCREDIA** certificates. However, the calibration procedures have been carried out in accordance with EAL-R2 (European cooperation for Accreditation of Laboratories) guidelines and with UNI CEI EN 45000 specifications (general criteria for the operation of testing laboratories).

- **Calibrations based on comparison with master samples in the temperature range from –40 to +1064°C.**

Single element thermopouples

RANGE	N°POINTS	TABULATION	ORDER CODE
0 .. 1064 °C	5	yes	XS TC51SSR
0 .. 600 °C	4	yes	XS TC42SSR
0 .. 250 °C	3	yes	XS TC33SSR
0 .. 100 °C	3	yes	XS TC34SSR
-40 .. 40 °C	3	yes	XS TC35SSR

Additional points on request.
Temperature points must be indicated when ortering.

Single element RTD' s

RANGE	N°POINTS	TABULATION	ORDER CODE
0 .. 400°C	4	yes	XS P46SSR
0 .. 250 °C	3	yes	XS P43SSR
0 .. 100 °C	3	yes	XS P34SSR
-40 .. 40 °C	3	yes	XS P35SSR

Additional points on request.
Temperature points must be indicated when ortering.

The calibrations are carried out by specialized personnel in our thermometric laboratory according to the following procedures

- **-40 .. +40 °C** In liquid thermostat for comparison with platinum resistance master temperature sensor
- **+40 .. +250 °C** in silicone fluid thermostat for comparison with platinum resistance master temperature sensor
- **+250 .. +600 °C** In termostato a sali fusi per confronto con termometro campione a Resistance di Platinum
- **+600 .. +1064 °C** In oven with comparison block for comparison with platinum resistance master thermocouple

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- **Calibrations based on comparison with master samples in the temperature range from –40 to +1064°C.**

The measurement chain is the thermometric system consisting of a temperature detector system plus sensor (recorder indicator temperature detector, etc.) Temperature detectors and sensors of any brand or model can be certified provided they are sent to our laboratories accompanied by any instructions for use manuals. The certificate indicates the values measured, the actual values and the deviation in °C recorded at each measurement point in a table.

RANGE	N°POINTS	TABULATION	ORDER CODE
0 .. 1064 °C	5	non. disp	XC 5TCRS
0 .. 600 °C	4	non. disp	XC 4TCRS
0 .. 250 °C	3	non. disp	XC 3TCRS
0 .. 100 °C	3	non. disp	XC 3TCRS
-40 .. 40 °C	3	non. disp	XC 3TCRS

Additional points on request.
Temperature points must be indicated when ordering.

The calibrations are carried out by specialized personnel in our thermometric laboratory according to the following procedures

- **-40 .. +40 °C** In liquid thermostat for comparison with platinum resistance master temperature sensor
- **+40 .. +250 °C** in silicone fluid thermostat for comparison with platinum resistance master temperature sensor
- **+250 .. +600 °C** IIn melted salt thermostat for comparison with platinum resistance master temperature sensor
- **+600 .. +1064 °C** In oven with comparison block for comparison with platinum resistance master thermocouple

LT cal® TEMPERATURE CALIBRATORS

Are low cost calibration certificates, an alternative to **ACCREDIA** certificates. However, the calibration procedures have been carried out in accordance with EAL-R2 (European cooperation for Accreditation of Laboratories) guidelines and with UNI CEI EN 45000 specifications (general criteria for the operation of testing laboratories).

Certification of calibration systems for thermocouple sensors consists in running of tests which assess the performance of the calibration instrument both as regards measurement of thermoelectromotive forces (EMF) and as measurement of these.

To do this, voltage calibrators set by the national center "ISTITUTO NAZIONALE G. FERRARIS" are used which assures traceability of the master samples used.

Usually, it is sufficient to calibrate an instrument on one or two scales (where scale means a type of linearization, for example TC K and/or TC J). However, the calibrators can be certified on any scale and for any type of thermocouple (J K T R S B C G D U L N E F) on request

MEASUREMENT/ SIMULATION	N°POINTS	TABULATION	ORDER CODE
1 scale (any type of thermocouple)	10	no.	XC 10TCRN
2 scale (any type of thermocouple)	10	no.	XC 12TCRN
additional scale (any type of thermocpuple)	6	no.	

Additional scale on request.
Temperature points must be indicate when ordering.

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LT CAL® INDICATORS

Are low cost calibration certificates, an alternative to **ACCREDIA** certificates. However, the calibration procedures have been carried out in accordance with EAL-R2 (European cooperation for Accreditation of Laboratories) guidelines and with UNI CEI EN 45000 specifications (general criteria for the operation of testing laboratories).

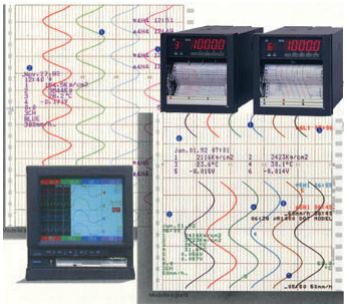
Any type of temperature indicator, thermo-regulators, recorders, dataloggers, both portable and fixed can be calibrated provided they are preset for thermocouple input (J K T R S B C G D U L N E F) or RTD's (PT100-PT1000- PT25-Ni1000-Ni10).

To do this, voltage calibrators set by the national center "ISTITUTO NAZIONALE G. FERRARIS" are used which assures traceability of the master samples used.

MEASUREMENT	N°POINTS	TABULATION	ORDER CODE
1 scale (any type of thermocouple)	10	no.	XC 10TIRN
2 scale (any type of thermocouple)	10	no.	XC 12TIRN
additional scale (any type of thermocpuple)	6	no.	

Additional scale on request.
Temperature points must be indicate when ordering.

HAND HEALD TERMOMETERS



RECORDERS

REGULATORS

LT cal® SYSTEM

Are low cost calibration certificates, an alternative to **ACCREDIA** certificates. However, the calibration procedures have been carried out in accordance with EAL-R2 (European cooperation for Accreditation of Laboratories) guidelines and with UNI CEI EN 45000 specifications (general criteria for the operation of testing laboratories).

In view of the particular characteristics of each installation, on-site checking of systems requires a specific approach to each individual case. Certain types of tests that can be considered common and applicable in most cases can however be identified.

THERMAL MAPPING

In closed process plants (chamber furnaces, muffle furnaces, crucible furnaces, incinerators, etc.), uniformity of the temperature inside the hot or treatment chamber must be checked. In these cases, up to 20 sensors can be positioned inside to perform a typical cycle. The related data are stored in the form of graphs and/or digital data using an acquisition system connected to a PC that permits customized post-processing.

THERMAL PROFILES

In pass-through systems (tunnel, carpet, bogie type furnaces, etc.), a check must be made on conformity of the temperature reached by the material to be treated both as regards absolute value (value reached) and in terms of dwell time. Where possible, probes (fastened to the drive system or to the material) that pass through the entire plant are used connected to an acquisition system with a PC that permits graphic or digital processing. Alternatively, where this is not possible due to the winding path followed, wireless systems also resistant to high temperatures are used which, when connected subsequently to a PC; provide the data saved in an internal memory.

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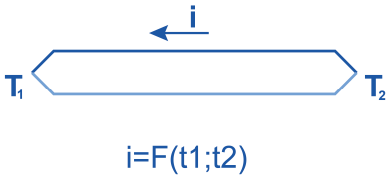
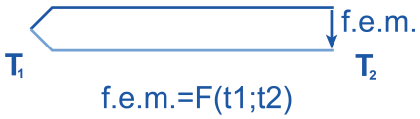
PRINCIPLE OF OPERATION

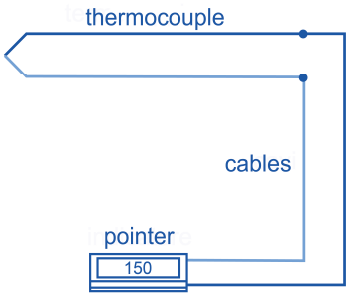
A thermocouple is a passive electric transducer (as it does not require powering). The physical principle on which it is based is known as the Seebeck effect (from the name of the scientist who discovered it). Thermocouples are made of two dissimilar metal wires joined at their measuring end. If the two junctions are at a different temperature, a current proportional to the difference in temperature between the two junctions will start to flow in the circuit.



Obviously, when the circuit is interrupted, a thermoelectromotive force is generated, the polarity and intensity of this force depends (t1-t2 being equal) only on the nature of the two metals used. The junction that senses the temperature is known as the hot junction and the measurement junction is known as the cold or reference junction.



From a practical point of view, to measure the absolute value of a temperature, the temperature of the cold junction must be known so as to calculate the value of the temperature of the hot junction according to difference between these. In an industrial environment, this task is usually performed automatically by the measurement system, whether this is a thermo-regulator, a digital thermometer, a recorder or other. It is important to note that the Connection cables must be made of the same material as the sensor and also that Connections must be made complying with polarity.



MAIN TYPE OF THERMOCOUPLES

TYPE	MATERIAL	RANGE [°C]	DESCRIPTION
S	Pt vs. Pt10%Rh	-50 .. +1760	Noble metal thermocouple. Resistence to high temperature, inert or oxidizing atmosphere.
R	Pt vs. Pt13%Rh	-50 .. +1760	Noble metal thermocouple. Resistence to high temperature, inert or oxidizing atmosphere.
B	Pt6%Rh vs. Pt30%Rh	0 .. +1820	Noble metal thermocouple. Resistence to high temperature, inert or oxidizing atmosphere.
J	Fe vs. Co	-200 .. +760	Base metal thermocouple. For average range temperature in reducing, vacuum and inert atmosphere.
K	Cr. vs. Al	-270 .. +1370	Base metal thermocouple, thank to wide range and low cost, result the most used in industry. Do not use in reducent atmosphere.
T	Cu vs. Co	-270 .. +400	Base metal thermocouple. for precise measurement at average low temperature, in oxidizing or reducent atmosphere.
N	Nicrosil vs. Nisil	-270 .. +1300	Base metal thermocouple. In option to K type, were more precision is needed.
E	Cr. vs. Co	-270 .. +1000	Base metal thermocouple.Highest EMF change per degree, to be used in oxidizing or inert atmosphere, limited use in vacuum or inert.

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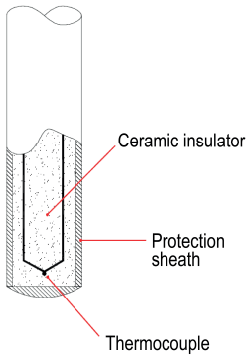
CONSTRUCTION

Two ways may be used to construct a thermocouple

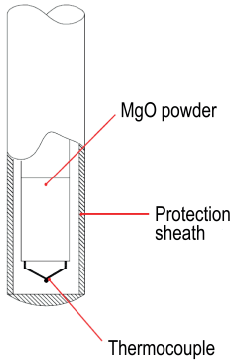
WITH MINERAL INSULATION

Magnesium oxide insulated cables are used which consist of an exter nal metal sheath housing the wires which are insulated from each other and in relation to the outer sheath with compressed MgO powder. With this system, sturdy sensors are obtained featuring high level tolerance to shock and vibrations and much higher performance than those constructed according to the classical method. They can also be bent thus adapting readily to housings with winding paths. Speed of response, possibility of miniaturization and service life are other particular characteristics of mineral insulated sensors.

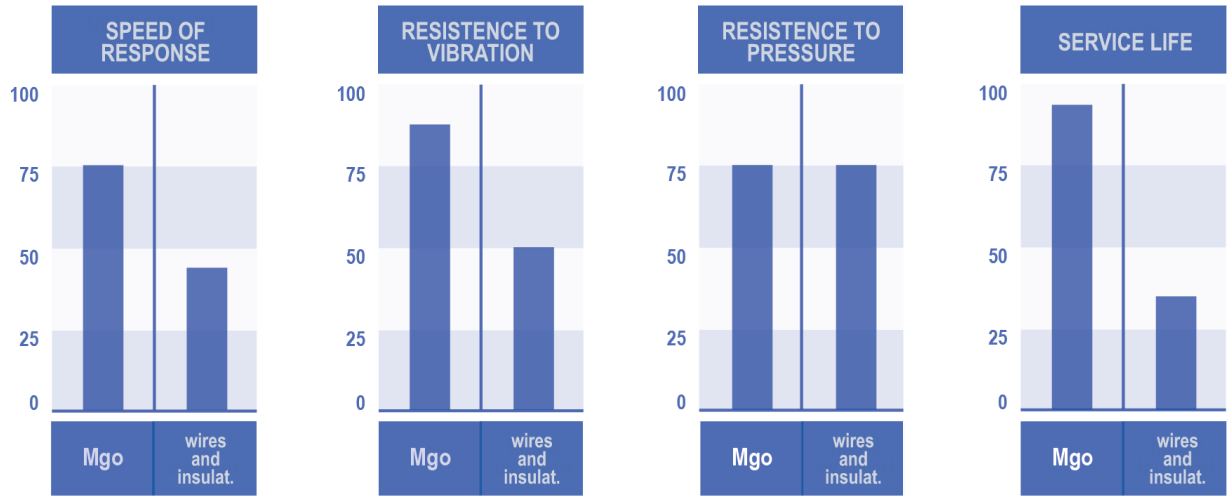


WITH CALIBRATED WIRES AND INSULATORS

The wires are insulated by an external rigid sheath using ceramic in sulators. The external sheath protect the wires against gases or corrosive agents that may be present in the measurement environment. Selection of wires of suitable diameter and type according to harsh ness of the environment is also important while ceramic or fiberglass insulators can be used according to the maximum service tempera ture to be reached.



A PERFORMANCE COMPARISON



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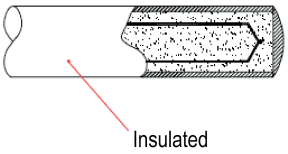
TYPES OF JUNCTION

There are three possible versions of the hot or sensing junction:

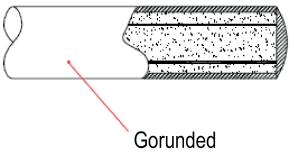
HOT JUNCTION UNGROUNDED HOT JUNCTION

The junction is not in contact with the external sheath. This means that it is generally immune to disturbances cause by stray currents generated by magnetic fields or equipment working under voltage. It is a good compromise between protection against disturbances and speed of response.



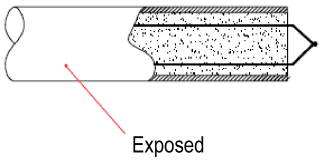
GROUNDED HOT JUNCTION

The junction is an integral part of the weld that seals the sensing tip of the thermocouple. These thermocouples have the fastest response times but, because of the ground Connection of the junction, they may be affected by distur bances on the output signal. In some cases, this type of junction cannot be used if the measure ment system is not insulated.



EXPOSED HOT JUNCTION

The junction is exposed to the atmosphere of the measurement area. Response time is by far the highest of the three solutions with the same diameter of the outer sheath. It is not suitable for measurements at high temperatures and in aggres sive environments.

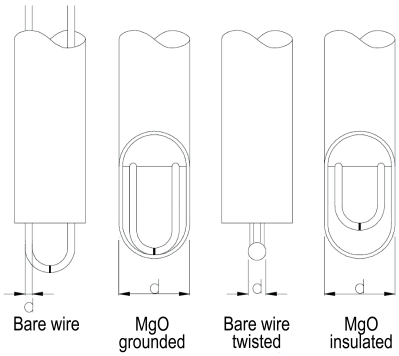


RESPONSE TIME

The results of a study carried out in laboratory conditions intended to establish the response times of thermocouple sensors are provided below.

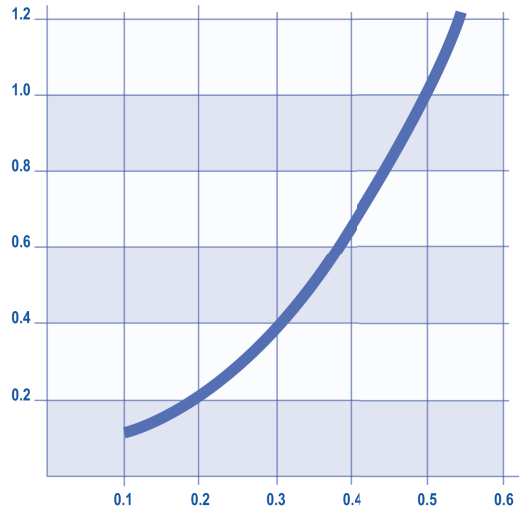
The time constant refers to the study in ambient pressure and temperature conditions in a flow of air moving at 20 m/s for the thermocouple shown in figure TR1.

The time constant or response time is defined as the time taken by the sensor to reach 63% of an instantaneous temperature variation. The time constant is not tied to the difference in temperature of a specific thermal gradient.

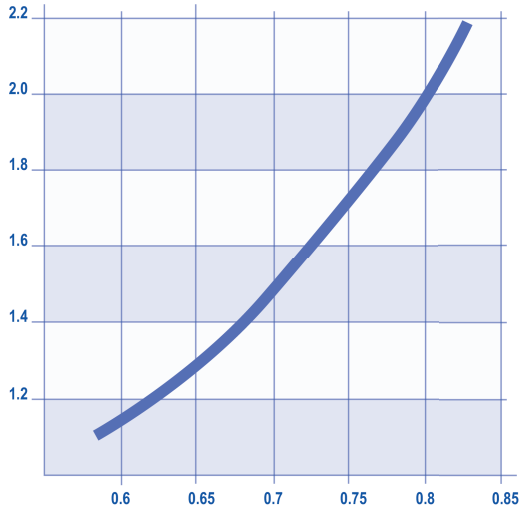


The data are presented in the form of graphs in the table below. Knowing the diameter of a sensor, it is easy to estimate the corresponding time constant and, assuming the response time expected from a thermocouple, it is equally simple to calculate the diameter able to comply with this condition.

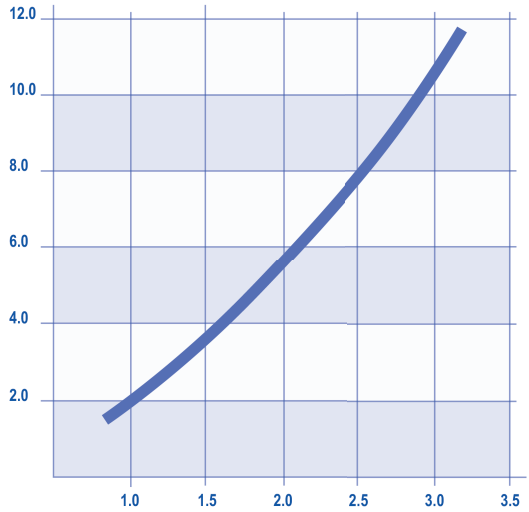
Note: the data indicated refer to thermocouples with type A or type B junctions (ref. fig. TR1); to estimate the response time of type C or D junction sensors (ref. Fig. TR1), the time constant is higher and must be corrected multiplying by a factor of 1.5.



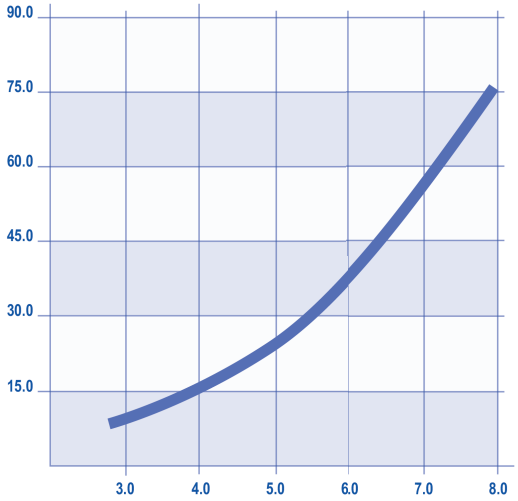
Wires or sheath diameter [mm]



Wires or sheath diameter [mm]



Wires or sheath diameter [mm]



Wires or sheath diameter [mm]

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PERECISIONE E CLASSI DI TOLERANCES

LA TERMOTECNICA, produces in accordance with various reference standards, that is to say:

- **UNI 7938**
- **ANSI MC96**
- **IEC 584**

There are two precision classes:

- **Class 1 (special)**
- **Class 2 (standard)**

The permissible tolerance values for the various types of thermocouple at the various temperatures are indicated in the table below:

	CLASS 1	CLASS 2
	SPECIAL	STANDARD
THERMOCOUPLE T	0,5 °C o 0.004x|t|	1 °C o 0.0075x|t|
	Temperature range in witch the tollerance is valid	
	-40 .. +350 °C	-40 .. +350 °C
THERMOCOUPLE E J K	1,5 °C o 0.004x|t|	25 °C o 0.0075x|t|
	temperature range in witch the tollerance is valid	
	-40 .. +800 °C -40 .. +750 °C -40 .. +1000 °C	-40 .. +900 °C -40 .. +750 °C -40 .. +1200 °C
THERMOCOUPLE R / S B	1 °C o [1+ 0.003(t-1100)] °C	1,5 °C o 0.0025x|t|
	temperature range in witch the tollerance is valid	
	0 .. +1600 °C -	0 .. +1600 °C +600 .. 1700 °C

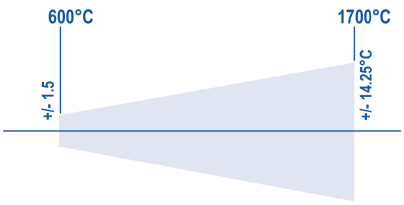
As can be noted, the maximum and minimum error that a sensor must not exceed to be considered in tolerance is expressed as absolute value in °C or as percentage value of the temperature to be measured; obviously, the larger of the two is applied (according to the temperature).

Example1: if we measure 184°C with a class 2 type K sensor, the maximum measurement error may be:

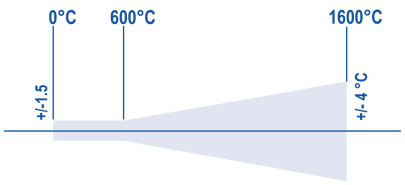
+/- 2.5°C (as 2.5 is larger than 0.0075 [184] = 1.38°C).

Example: if we measure 981°C with a class 1 type K sensor, the maximum measurement error may be:

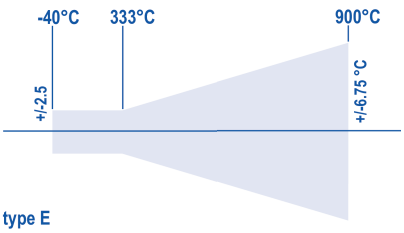
+/- (0.004[981]) = +/- 3.92°C (as 3.92 is higher than 1.5°C).



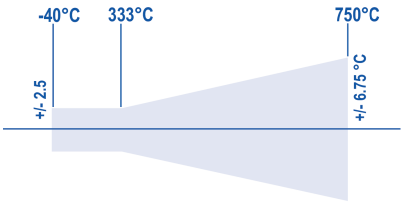
type B



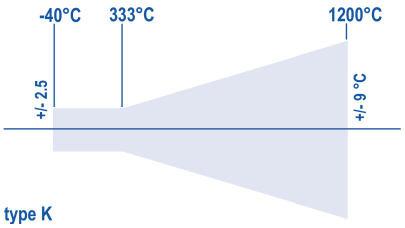
type R/S



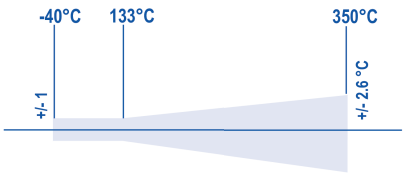
type E



type J



type K



type T

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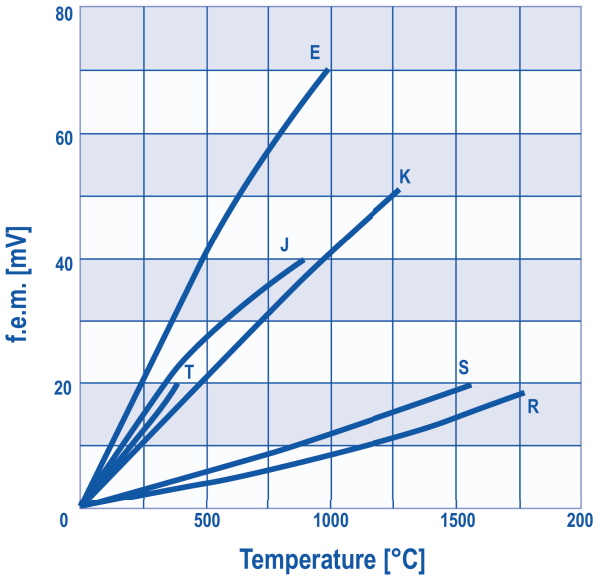
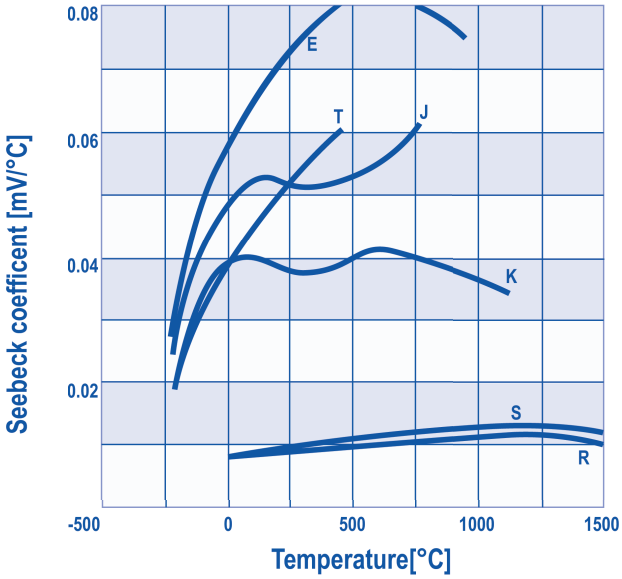
LINEARITY AND CONVERSION TABLES

According to the reference standard, there are polynomial linear functions that provide the mathematical relationship that links temperature and thermoelectromotive force (EMF). Each TC, as defined by the tables, complies with a mathematical relationship which is generally of the following type:

$$E = \sum_{i=1}^{n} a_i (t_{90})^i$$

Where ai are calculated coefficients and t90 is the temperature measured (t90 indicates that the STI 90 temperature scale is used). Usually the scale range of a thermocouple cannot be reproduced using a single polynomial curve; this means that there are several polynomial curves for the same thermocouple.





For further information check conversion tables f.e.m. [mV] vs. Temperature [°C].

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PRINCIPIO DI FUNZIONAMENTO

The physical principle on which RTD's are based is the variation in resistance as temperature varies, a common characteristics of all metals. In industry, the two most frequently used metals are Nickel and Platinum due to their high level sensitivity (variation in resistance for each °C) and stability in time. Compared with almost all other electric transducers (thermocouples, thermistors) RTD's offer considerable advantages as regards measurement precision and repeatability.

There are three categories of platinum thermometers according to the type of construction techniques used.

- Ceramic (max T 750°C)

A platinum wire is wound and encapsulated in a ceramic coating. Used to construct high precision thermometers or where RTD's must be used to measure high temperatures.

- Glass (max T 600°C)

A platinum wire is wound on a glass support and then encapsulated in an external protective sheath also made of glass. Use in applications where precision and repeatability are indispensable (master thermometers).)

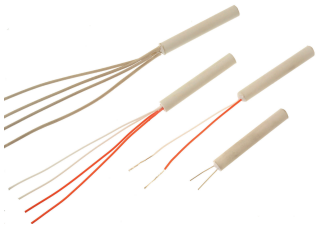
- Thin film (Max T 450°C)

A microfilm of platinum is deposited by diffusion on a ceramic support; an electric circuit with suitable electrical resistance characteristics is created subsequently using laser technology.

CERAMIC RTD

GLASS RTD

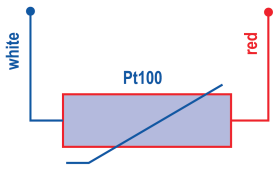
THIN FILM RTD



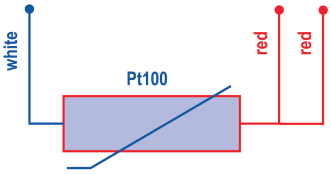
CONNECTIONS AND MEASUREMENT METHOD

An RTD is a traducer that must be powered as, in order to read the value of the resistance, the measurement system requires a fixed value current that is made to flow inside the measurement circuit while the voltage drop must be read at the same time. At this point, the resistance value is calculated according to Ohm's law.

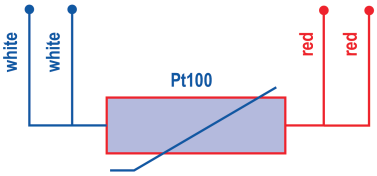
There are three ways of Connection the measurement circuit and therefore three possible configurations of RTD sensors:



Two wire Connection



Three wire Connection



Four wire Connection

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- **TWO-WIRE TECHNIQUE**

This is the least precise solution as the measurement system is unable to compensate the error introduced by the length of the Connection cable (line resistance). In an industrial environment, it is usually restricted to applications requiring very low preci sion and it is good practice not to consider this technique even for general applications.

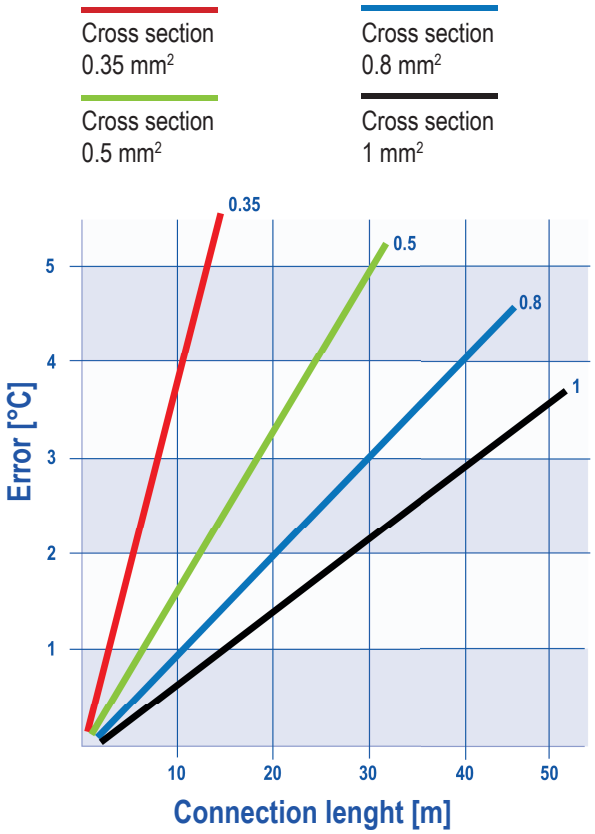
- **THREE-WIRE TECHNIQUE**

Most industrial applications use the three-wire technique as it represents the best compromise between cost and perfor mance. From a more practical point of view, the three-wire Connection makes it possible to eliminate the line resistance error as the voltage drop from which the resistance value is obtained is measured independently.

- **FOUR-WIRE TECHNIQUE**

This is the Connection method that affords the best reading precision and is used mainly for laboratory measurements or where high level reliability is required (primary or secondary master thermometers).

evaluating the eror due to the resistance of wire using the two wire Connection tecnique.

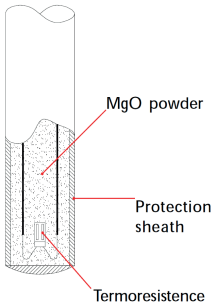


CONSTRUCTION

As for thermocouple sensors, there are two possible methods of construction:

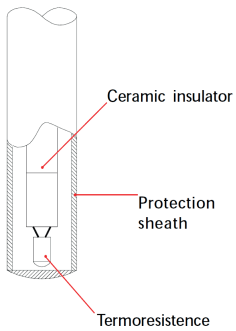
- **WITH MINERAL INSULATION**

Magnesium oxide insulated cables are used consisting of an external metal sheath housing the wires which are insulated from each other and in relation to the outer sheath with compressed MgO powder. This system makes it possible to obtain rugged sensors with high level tolerance to shock and vibrations and with much higher performance than those constructed using the classical method. They can also be bent thus adapting readily to housings with windng paths. Speed of response, possibility of miniaturization and service life are other particular characteristics of mineral insulated sensors.



- **WITH CALIBRATED WIRES AND INSULATORS**

The wires are insulated by an external rigid sheath using ceramic insulators. The outside sheath must afford suitable protection of the wires against gases or corrosive agents that may be present in the mea surement environment. Selection of wires of suitable diameter and type according to harshness of the environment is also important while ceramic or fiberglass insulators can be used according to the maximum service temperature to be reached.



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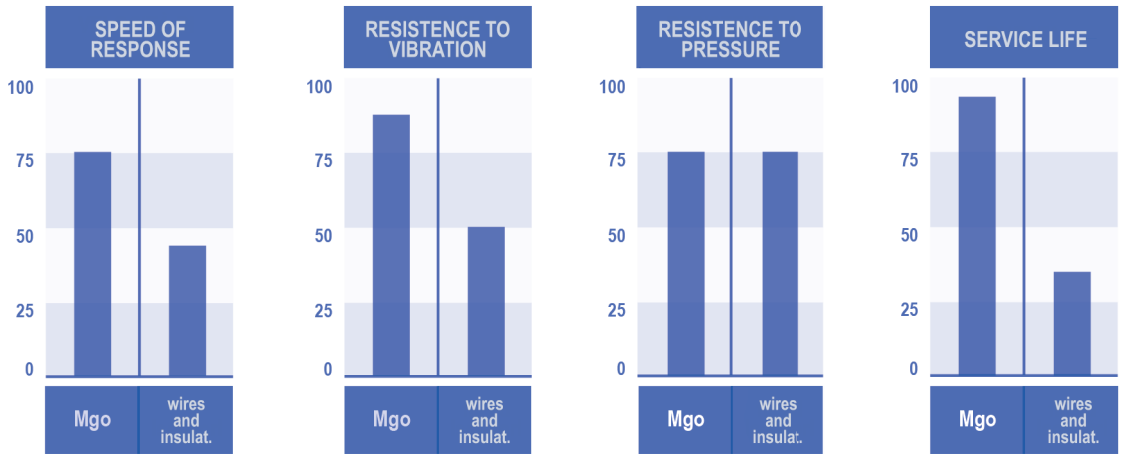
A PERFORMANCE COMPARISON



PERECISION AND CLASS OF TOLERANCE

LA TERMOTECNICA, produces in accordance with various reference standards, namely:

- **UNI 7937**
- **DIN 43760**
- **IEC 751**
-

There are five precision classes:

- **Classe B**
- **Classe A**
- **Classe 1/3B**
- **Classe 1/5B**
- **Classe 1/10B**

The standards establish that it must be possible to calculate the maximum and minimum error that a sensor must not exceed to be considered in tolerance at each temperature measured. The absolute value of the error at each measurement temperature is obtained using the following formulas

error class B	=+/- (0.30+0.005|T|)
error class A	=+/- (0.15+0.002|T|)
error class 1/3B	=+/- (0.10+0.0016|T|)
error class 1/5B	=+/- (0.06+0.0010|T|)
error class 1/10B	=+/- (0.03+0.0005|T|)

|T| is the absolute value of the temperature in ° Centigrade.

Example: if we measure 125°C with a class A sensor, the maximum measurement error is:

+/- (0.15+0.002|125|) = +/- 0.4 °C

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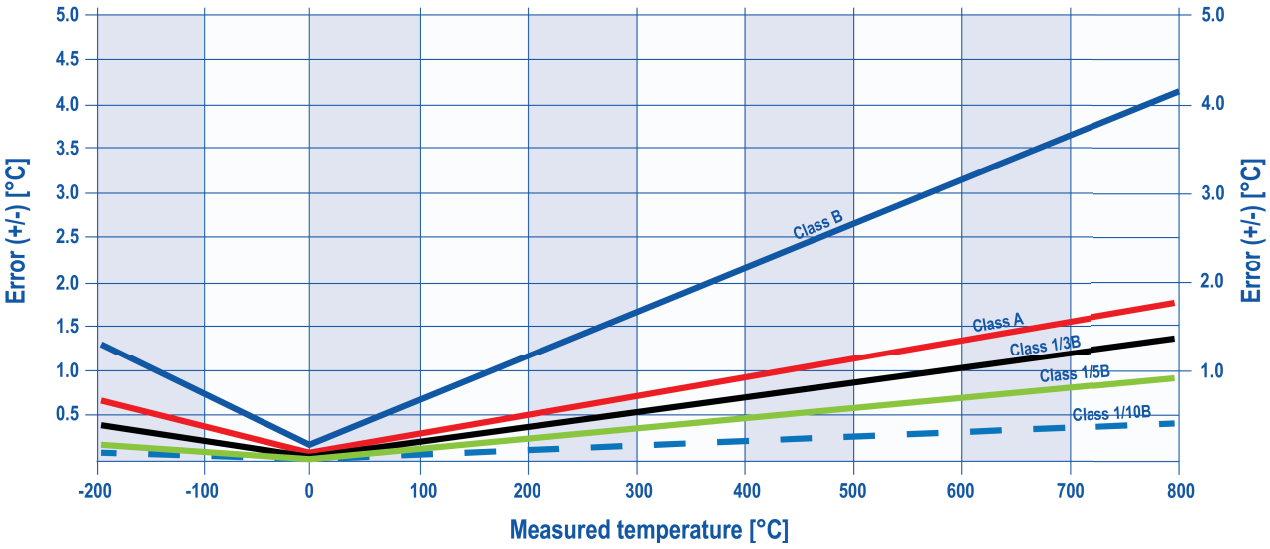
The error values in °C and in Ohm are indicated in the table below for a number of temperatures for all the tolerance classes established.

TEMP. [°C]	CLASS B		CLASS A		CLASS 1/3B		CLASS 1/5B		CLASS 1/10B	
	°C	Ohm	°C	Ohm	°C	Ohm	°C	Ohm	°C	Ohm
-200	1,3	0,56	0,55	0,24	0,42	0,16	0,26	0,10	0,13	0,05
-100	0,8	0,32	0,35	0,14	0,26	0,10	0,16	0,06	0,08	0,03
0	0,3	0,12	0,15	0,06	0,10	0,04	0,06	0,02	0,03	0,01
100	0,8	0,30	0,35	0,13	0,26	0,10	0,16	0,06	0,08	0,03
200	1,3	0,48	0,55	0,20	0,42	0,16	0,26	0,10	0,13	0,05
300	1,8	0,64	0,75	0,27	0,58	0,22	0,36	0,14	0,18	0,07
400	2,3	0,79	0,95	0,33	0,74	0,29	0,46	0,18	0,23	0,09
500	2,8	0,93	1,15	0,38	0,90	0,35	0,56	0,21	0,28	0,11
600	3,3	1,06	1,35	0,43	1,06	0,41	0,66	0,25	0,33	0,13
650	3,6	1,13	1,45	0,46	1,14	0,44	0,71	0,27	0,36	0,14



LINEARITY AND CONVERSION TABLES

According to the reference standard, sensors with a nominal resistance at 0°C that varies between 5 and 1000 Ohm have been catalogued; however, the most widely used in an industrial environment are those with a resistance of 100 Ohm (Pt100) and those with resistance of between 500 and 1000 Ohm.
The mathematical relationship that links nominal resistance R_0 and resistance at a temperature t, R_t is as follows:

- **For temperatures in the range –200 .. 0°C** $R_t/R_0 = 1 + At + Bt^2 + C(t-100)t^3$
- **For temperatures in the range 0 .. 850°C** $R_t/R_0 = 1 + At + Bt^2$

Where the constants A, B and C have the following values:

$A = 3{,}90802 \times 10^{-3}$ [$°C^{-1}$]

$B = -5{,}80200 \times 10^{-7}$ [$°C^{-2}$]

$C = -4{,}27350 \times 10^{-12}$ [$°C^{-4}$]

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CRITERIA FOR SELECTING THE PROTECTION SHEATH

As already mentioned, selection of the right type of protective sheath is extremely important in assuring correct functioning and long service life of the sensor regardless of whether this is a thermocouple or RTD. In some cases, if the material of the sheath is not selected correctly, this may result in downgrading of the initial calibration of the sensor during functioning at high temperature with therefore a significant measurement error. The most frequently used material for high and medium temperatures is stainless steel and this usually represents an excellent choice for most applications. However, specific materials may have to be used for certain particular applications in specific sectors of industry (oil industry, atomic industry, aircraft-marine, energy). In these cases, the standards to be referred to in order to make a suitable assessment of costs and quantity limits to be produced must be provided. The characteristics of the most widely used materials are described below

- **AISI 304**

300 series stainless steel: is the ideal solution for medium temperatures for both thermocouples and RTD's. Good resistance to nitric acids, poor resistance to halogenated acids, moderate resistance to sulfuric acids.

Temperatura: max 650 °C
Applications:
- Food and drink processes
- Chemical processes
- Pharmaceuticals
- Containers of corrosive mixes
- Medical appliances

- **AISI 316**

300 series stainless steel: widely used as an alternative to AISI 304 as it performs well at higher temperatures (1000°C) and in particular due to its greater resistance to corrosive attack. Sensitive to the presence of sulfides, good resistance to phosphoric and acetic acids

Temperatura: max 850 °C
Applications:
- Parts of furnaces
- Oil refining
- Heat exchangers
- Heaters

- **AISI 310**

300 series stainless steel of the refractory steels category: is suitable for applications in which the main problems are dwell time at high temperature and oxidation. Sensitive to the presence of sulfides.

Temperatura: max 1100°C
Applications:
- Parts of furnaces
- Incinerators
- Supports for heaters
- Sintered products

- **AISI 446**

400 series stainless steel with excellent corrosion resistance at very high temperatures. Its main characteristic is its resistance to sulfurous environments.

Temperatura: max 1100°C
Applications:
- Parts of furnaces
- Chemical industry
- Pipes
- Incinerators

- **AISI 600**

Nickel and chromium based stainless steel, ideal for wide-scale use at high temperatures, resistant to corrosion by acids even at high temperatures. Excellent mechanical strength at high temperatures, not to be used in sulfurous atmospheres

Temperatura: max 1150°C
Applications:
- Parts of furnaces
- Nuclear power plants
- Chemical and petrochemical
- Machines for food products

TECHNICAL NOTES

GENERAL

Recommended protective sheaths according to application The following information is based on the long-term hands-on experience of our technicians. The table should be considered a general guide. In specific situations (on any type of system), unforeseen situations may occur such as the effective presence of aggressive and corrosive agents, vibrations, thermal cycles, etc.

Heat treatements	
Annealing	
up to 700 °C	AISI 316/AISI 310
above 700 °C	AISI 446/Inc. 600
Case-hardening	
up to 820 °C	AISI 446/AISI 310
above 820 °C	Inc. 600
Nitriding	Inc. 600/AISI 446
Salt bath	
Cyanohydrides	Nikel
Neutral	AISI 446
hight speed	Ceramic
Non Ironus material	
Aluminum	
Melting furnaces	Steel/Cast iron
Heat treatements	AISI 316/AISI 304
Brass/Bronze	AISI 316
Magnesium	AISI 316/AISI 304
Zinc	Steel
Cements	
Furnaces	Inc. 600/AISI 446
Klinker	Inc. 600
Ceramic	
Furnaces	Ceramic
Dryers	SiC/Ceramic
Glass	
Melting furnaces	Platinum
Heat treatements and firing	Ceramica/AISI 446
	Inc. 600
Paper	
Printing machines	AISI 316/AISI 446
Oil	
Refining towers	AISI 304/AISI 316
Ducts	AISI 304/AISI 316
Fractionating columns	AISI 304/AISI 316
Energy	
Hot air	AISI 304
Liquid gases	AISI 446/Inc. 600
Heaters	Inc 600/AISI 310
Steam	AISI 316
Boilers	AISI 316
Incineritors	
Up to 1100 °C	AISI 446
Above 1100 °C	Ceramic/SiC
Food	
Cooking ovens	AISI 304/AISI 316
Vegetable treatement	AISI 304
Pasturization	AISI 316

Chemical	
Acetic acid 50% (100°C)	AISI 316
Alcohol	
Ethylic(100 °C)	AISI 304
Methylic (100 °C)	AISI 316
Ammonium	
Nitrates	AISI 310/AISI 304
Sulfides	AISI 310/AISI 304
Hydrochlorides	AISI 310/AISI 304
Barium	
Hydrochloride	MONEL
Iodide	Steel
Solfite	Inc. 600
Butyl	Copper
Calcium	
Chlorate	AISI 316
Iodide	AISI 316
Cromic acid	AISI 316
Copper nitrate	AISI 304
Formaldehyde	AISI 316
Formic acid	AISI 316
Gasoline	AISI 304/AISI 316
Glucose	AISI 304
Glycerin	AISI 304
Glycol	AISI 304
Hydrogen oeroxide (100 °C)	AISI 316
Lactic acid	
<5% (100 °C)	AISI 316
>10% (100 °C)	Tantalio
Natural gases	AISI 304
Nitric acid	
<50% (20 °C)	AISI 304
<50% (100 °C)	AISI 316
>50% (100 °C)	Tantalio
Mineral oils	AISI 316
Oxigen	AISI 304
Phenoles	AISI 304
Xylene	Copper
Toluene	AISI 316
Sodium	
Bicarbonate	AISI 316
Carbonate	AISI 316
Hydrochloryde	AISI 316
Potassium	
Sulfate	AISI 304/AISI 316
Permanganate	AISI 304/AISI 316
Nitrate	AISI 304/AISI 316
Chlorate	AISI 304/AISI 316
Carbonate	AISI 304/AISI 316

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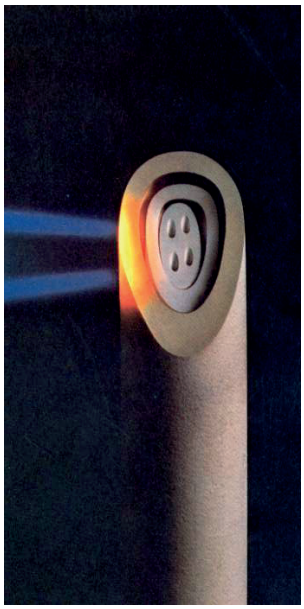
CERAMIC PROTECTION SHEATHS

Ceramic protection sheaths are used mainly to protect noble metal thermocouple sensors in very high temperature applications (>1200°C) or as an alternative to the metal sheaths also for base metal thermocouples where the atmosphere is incompatible with use use of these. In addition to their resistance to very high temperatures, they are chemically inert and also feature good anti-abrasion characteristics and excellent di-electric rigidity. They are however not recommended for the following applications:



- dipping in molten metal or salts
- For overhanging assembly exceeding 1000 mm (vertical) or 600 mm (horizontal)
- In pressurized or vacuum systems

The materials used to construct standard sensors are listed below:

- **Sillimantin (DIN VDE 0335 / 530)**

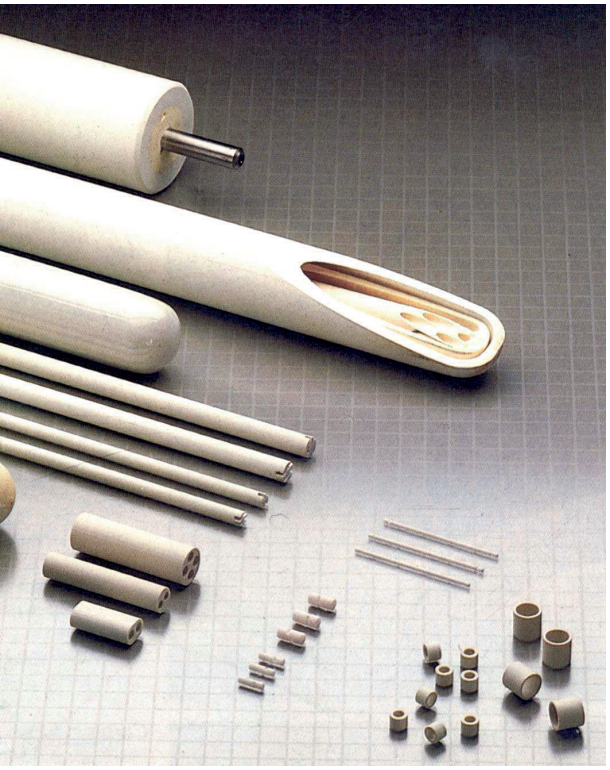
Refractory containing 75% alumina, is porous to gases and can operate up to temperatures of 1600°C. Good resistance to thermal shocks, to be used as main sheath or as internal protection.

- **Pitagoras (DIN VDE 0335 / 610)**

One of the most economical gas-proof refractory materials with an alumina content of 60%; can be used up to temperatures of 1500°C in corrosive environments; it however sensitive to the presence of hydrogen fluoride. To be used as external and internal protection.

- **Allumina (DIN VDE / 799)**

High quality refractory with very high content of Alumina (99.7%); excellent di-electric characteristics, resistance to aggressive reducing gases such as nitrogen, acids and alkalis, to nuclear radiation, to X-rays and UV rays. Chemically inert and non degassing in vacuum. Maximum recommended temperature 1800°C.



CERAMIC SHEATH SELECTION TABLE	
Operating condition and maximum temperatre	Raccomende material
Gaseous atmosphere without hydrofluoric acid or alkalis, up to1400 °	Pitagoras (interno) Pitagoras (esterno)
Up to 1800 °C in the absence of corrosive attack, in the presence of alkaline vapors (glass baths and ovens for ceramic) up to 1600 °C	Allumina (interno) Allumina (esterno)
In the presence of very high thermal stress and up to 1600 °C	Allumina (interno) Sillimantin (esterno)

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TECHNICAL NOTES

GENERAL

Fill in the form to requeste a quote for a non-standard or customized product.

Company style (Name, address, Tel)	Drawing

Application

Date	Quantity	Parts/year

Thermocouple (cross with an X)

B	E	J	K	N	R	S	T			
Junction:				grounded		insulated		exposed		
Class of tolerance:				standard		special				
Element:				single		double				

RTD' s (cros with an X)

Pt100	Pt1000	Pt500	Ni100	Ni1000
other, specify :				
Connection:	2 wire	3 wire	4 wire	
Class of tolerances	B	A	1/2B	1/3B
Element:	Single	Double		

Connection cable (if present)

Lenght (mt):	color code:	ANSI	IEC	DIN
Cross section and munber of wires:				
Primary insulation:	glass	teflon	silicone rubber.	Pvc	other:
Insulation secondario:	glass	teflon	silicone rubber.	Pvc	other:
Shielding:	tinned copper	stainless steel	other:	

Sheath quality and insulation

Insulation:	MgO	wires+insulators	other:	Sheath quality:	304SS	316SS	310SS	Inc. 600	other:

Indicate the type of electrical Connection (connectors, faston etc.)	Indicate the Connectiong system (fittings, flanges etc.)

Working enviroment (cross with an X)

Temperature:	minimum[		°C]	maximum[		°C]	continuos[		°C]
Atmosphere:	inert	oxidizing	riducing	vacuum					
Plant features:	vibration	thermal shocks	other:						

notes:

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THERMOCOUPLE

K

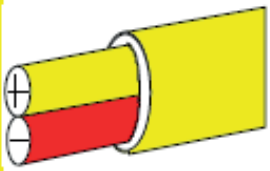
F.E.M. output of a K type thermocouple(Nikel/Cromium Vs.Copper/Nikel). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-200	-5,891	-5,907	-5,922	-5,936	-5,951	-5,965	-5,980	-5,994	-6,007	-6,021	-6,035
-190	-5,730	-5,747	-5,763	-5,780	-5,797	-5,813	-5,829	-5,845	-5,861	-5,876	-5,891
-180	-5,550	-5,569	-5,588	-5,606	-5,624	-5,642	-5,660	-5,678	-5,695	-5,713	-5,730
-170	-5,354	-5,374	-5,395	-5,415	-5,435	-5,454	-5,474	-5,493	-5,512	-5,531	-5,550
-160	-5,141	-5,163	-5,185	-5,207	-5,228	-5,250	-5,271	-5,292	-5,313	-5,333	-5,354
-150	-4,913	-4,936	-4,960	-4,983	-5,006	-5,029	-5,052	-5,074	-5,097	-5,119	-5,141
-140	-4,669	-4,694	-4,719	-4,744	-4,768	-4,793	-4,817	-4,841	-4,865	-4,889	-4,913
-130	-4,411	-4,437	-4,463	-4,490	-4,516	-4,542	-4,567	-4,593	-4,618	-4,644	-4,669
-120	-4,138	-4,166	-4,194	-4,221	-4,249	-4,276	-4,303	-4,330	-4,357	-4,384	-4,411
-110	-3,852	-3,882	-3,911	-3,939	-3,968	-3,997	-4,025	-4,054	-4,082	-4,110	-4,138
-100	-3,554	-3,584	-3,614	-3,645	-3,675	-3,705	-3,734	-3,764	-3,794	-3,823	-3,852
-90	-3,243	-3,274	-3,306	-3,337	-3,368	-3,400	-3,431	-3,462	-3,492	-3,523	-3,554
-80	-2,920	-2,953	-2,986	-3,018	-3,050	-3,083	-3,115	-3,147	-3,179	-3,211	-3,243
-70	-2,587	-2,620	-2,654	-2,688	-2,721	-2,755	-2,788	-2,821	-2,854	-2,887	-2,920
-60	-2,243	-2,278	-2,312	-2,347	-2,382	-2,416	-2,450	-2,485	-2,519	-2,553	-2,587
-50	-1,889	-1,925	-1,961	-1,996	-2,032	-2,067	-2,103	-2,138	-2,173	-2,208	-2,243
-40	-1,527	-1,564	-1,600	-1,637	-1,673	-1,709	-1,745	-1,782	-1,818	-1,854	-1,889
-30	-1,156	-1,194	-1,231	-1,268	-1,305	-1,343	-1,380	-1,417	-1,453	-1,490	-1,527
-20	-0,778	-0,816	-0,854	-0,892	-0,930	-0,968	-1,006	-1,043	-1,081	-1,119	-1,156
-10	-0,392	-0,431	-0,470	-0,508	-0,547	-0,586	-0,624	-0,663	-0,701	-0,739	-0,778
0	0,000	-0,039	-0,079	-0,118	-0,157	-0,197	-0,236	-0,275	-0,314	-0,353	-0,392
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10

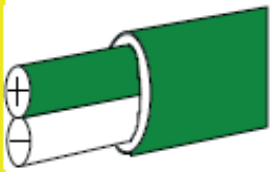
°C	0	1	2	3	4	5	6	7	8	9	10
0	0,000	0,039	0,079	0,119	0,158	0,198	0,238	0,277	0,317	0,357	0,397
10	0,397	0,437	0,477	0,517	0,557	0,597	0,637	0,677	0,718	0,758	0,798
20	0,798	0,838	0,879	0,919	0,960	1,000	1,041	1,081	1,122	1,163	1,203
30	1,203	1,244	1,285	1,326	1,366	1,407	1,448	1,489	1,530	1,571	1,612
40	1,612	1,653	1,694	1,735	1,776	1,817	1,858	1,899	1,941	1,982	2,023
50	2,023	2,064	2,106	2,147	2,188	2,230	2,271	2,312	2,354	2,395	2,436
60	2,436	2,478	2,519	2,561	2,602	2,644	2,685	2,727	2,768	2,810	2,851
70	2,851	2,893	2,934	2,976	3,017	3,059	3,100	3,142	3,184	3,225	3,267
80	3,267	3,308	3,350	3,391	3,433	3,474	3,516	3,557	3,599	3,640	3,682
90	3,682	3,723	3,765	3,806	3,848	3,889	3,931	3,972	4,013	4,055	4,096
100	4,096	4,138	4,179	4,220	4,262	4,303	4,344	4,385	4,427	4,468	4,509
110	4,509	4,550	4,591	4,633	4,674	4,715	4,756	4,797	4,838	4,879	4,920
120	4,920	4,961	5,002	5,043	5,084	5,124	5,165	5,206	5,247	5,288	5,328
130	5,328	5,369	5,410	5,450	5,491	5,532	5,572	5,613	5,653	5,694	5,735
140	5,735	5,775	5,815	5,856	5,896	5,937	5,977	6,017	6,058	6,098	6,138
150	6,138	6,179	6,219	6,259	6,299	6,339	6,380	6,420	6,460	6,500	6,540
160	6,540	6,580	6,620	6,660	6,701	6,741	6,781	6,821	6,861	6,901	6,941
170	6,941	6,981	7,021	7,060	7,100	7,140	7,180	7,220	7,260	7,300	7,340
180	7,340	7,380	7,420	7,460	7,500	7,540	7,579	7,619	7,659	7,699	7,739
190	7,739	7,779	7,819	7,859	7,899	7,939	7,979	8,019	8,059	8,099	8,138
200	8,138	8,178	8,218	8,258	8,298	8,338	8,378	8,418	8,458	8,499	8,539
210	8,539	8,579	8,619	8,659	8,699	8,739	8,779	8,819	8,860	8,900	8,940
220	8,940	8,980	9,020	9,061	9,101	9,141	9,181	9,222	9,262	9,302	9,343
230	9,343	9,383	9,423	9,464	9,504	9,545	9,585	9,626	9,666	9,707	9,747
240	9,747	9,788	9,828	9,869	9,909	9,950	9,991	10,031	10,072	10,113	10,153
250	10,153	10,194	10,235	10,276	10,316	10,357	10,398	10,439	10,480	10,520	10,561
260	10,561	10,602	10,643	10,684	10,725	10,766	10,807	10,848	10,889	10,930	10,971
270	10,971	11,012	11,053	11,094	11,135	11,176	11,217	11,259	11,300	11,341	11,382
280	11,382	11,423	11,465	11,506	11,547	11,588	11,630	11,671	11,712	11,753	11,795
290	11,795	11,836	11,877	11,919	11,960	12,001	12,043	12,084	12,126	12,167	12,209
300	12,209	12,250	12,291	12,333	12,374	12,416	12,457	12,499	12,540	12,582	12,624
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1370 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



LA TERMOTECNICA

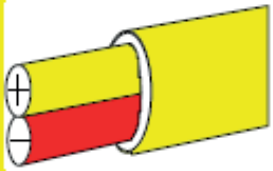
THERMOCOUPLE K

F.E.M. output of a K type thermocouple(Nikel/Cromium Vs.Copper/Nikel). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

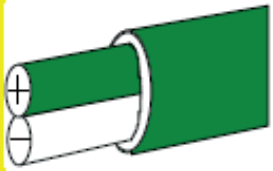
°C	0	1	2	3	4	5	6	7	8	9	10
300	12,209	12,250	12,291	12,333	12,374	12,416	12,457	12,499	12,540	12,582	12,624
310	12,624	12,665	12,707	12,748	12,790	12,831	12,873	12,915	12,956	12,998	13,040
320	13,040	13,081	13,123	13,165	13,206	13,248	13,290	13,331	13,373	13,415	13,457
330	13,457	13,498	13,540	13,582	13,624	13,665	13,707	13,749	13,791	13,833	13,874
340	13,874	13,916	13,958	14,000	14,042	14,084	14,126	14,167	14,209	14,251	14,293
350	14,293	14,335	14,377	14,419	14,461	14,503	14,545	14,587	14,629	14,671	14,713
360	14,713	14,755	14,797	14,839	14,881	14,923	14,965	15,007	15,049	15,091	15,133
370	15,133	15,175	15,217	15,259	15,301	15,343	15,385	15,427	15,469	15,511	15,554
380	15,554	15,596	15,638	15,680	15,722	15,764	15,806	15,849	15,891	15,933	15,975
390	15,975	16,017	16,059	16,102	16,144	16,186	16,228	16,270	16,313	16,355	16,397
400	16,397	16,439	16,482	16,524	16,566	16,608	16,651	16,693	16,735	16,778	16,820
410	16,820	16,862	16,904	16,947	16,989	17,031	17,074	17,116	17,158	17,201	17,243
420	17,243	17,285	17,328	17,370	17,413	17,455	17,497	17,540	17,582	17,624	17,667
430	17,667	17,709	17,752	17,794	17,837	17,879	17,921	17,964	18,006	18,049	18,091
440	18,091	18,134	18,176	18,218	18,261	18,303	18,346	18,388	18,431	18,473	18,516
450	18,516	18,558	18,601	18,643	18,686	18,728	18,771	18,813	18,856	18,898	18,941
460	18,941	18,983	19,026	19,068	19,111	19,154	19,196	19,239	19,281	19,324	19,366
470	19,366	19,409	19,451	19,494	19,537	19,579	19,622	19,664	19,707	19,750	19,792
480	19,792	19,835	19,877	19,920	19,962	20,005	20,048	20,090	20,133	20,175	20,218
490	20,218	20,261	20,303	20,346	20,389	20,431	20,474	20,516	20,559	20,602	20,644
500	20,644	20,687	20,730	20,772	20,815	20,857	20,900	20,943	20,985	21,028	21,071
510	21,071	21,113	21,156	21,199	21,241	21,284	21,326	21,369	21,412	21,454	21,497
520	21,497	21,540	21,582	21,625	21,668	21,710	21,753	21,796	21,838	21,881	21,924
530	21,924	21,966	22,009	22,052	22,094	22,137	22,179	22,222	22,265	22,307	22,350
540	22,350	22,393	22,435	22,478	22,521	22,563	22,606	22,649	22,691	22,734	22,776
550	22,776	22,819	22,862	22,904	22,947	22,990	23,032	23,075	23,117	23,160	23,203
560	23,203	23,245	23,288	23,331	23,373	23,416	23,458	23,501	23,544	23,586	23,629
570	23,629	23,671	23,714	23,757	23,799	23,842	23,884	23,927	23,970	24,012	24,055
580	24,055	24,097	24,140	24,182	24,225	24,267	24,310	24,353	24,395	24,438	24,480
590	24,480	24,523	24,565	24,608	24,650	24,693	24,735	24,778	24,820	24,863	24,905
600	24,905	24,948	24,990	25,033	25,075	25,118	25,160	25,203	25,245	25,288	25,330
610	25,330	25,373	25,415	25,458	25,500	25,543	25,585	25,627	25,670	25,712	25,755
620	25,755	25,797	25,840	25,882	25,924	25,967	26,009	26,052	26,094	26,136	26,179
630	26,179	26,221	26,263	26,306	26,348	26,390	26,433	26,475	26,517	26,560	26,602
640	26,602	26,644	26,687	26,729	26,771	26,814	26,856	26,898	26,940	26,983	27,025
650	27,025	27,067	27,109	27,152	27,194	27,236	27,278	27,320	27,363	27,405	27,447
660	27,447	27,489	27,531	27,574	27,616	27,658	27,700	27,742	27,784	27,826	27,869
670	27,869	27,911	27,953	27,995	28,037	28,079	28,121	28,163	28,205	28,247	28,289
680	28,289	28,332	28,374	28,416	28,458	28,500	28,542	28,584	28,626	28,668	28,710
690	28,710	28,752	28,794	28,835	28,877	28,919	28,961	29,003	29,045	29,087	29,129
700	29,129	29,171	29,213	29,255	29,297	29,338	29,380	29,422	29,464	29,506	29,548
710	29,548	29,589	29,631	29,673	29,715	29,757	29,798	29,840	29,882	29,924	29,965
720	29,965	30,007	30,049	30,090	30,132	30,174	30,216	30,257	30,299	30,341	30,382
730	30,382	30,424	30,466	30,507	30,549	30,590	30,632	30,674	30,715	30,757	30,798
740	30,798	30,840	30,881	30,923	30,964	31,006	31,047	31,089	31,130	31,172	31,213
750	31,213	31,255	31,296	31,338	31,379	31,421	31,462	31,504	31,545	31,586	31,628
760	31,628	31,669	31,710	31,752	31,793	31,834	31,876	31,917	31,958	32,000	32,041
770	32,041	32,082	32,124	32,165	32,206	32,247	32,289	32,330	32,371	32,412	32,453
780	32,453	32,495	32,536	32,577	32,618	32,659	32,700	32,742	32,783	32,824	32,865
790	32,865	32,906	32,947	32,988	33,029	33,070	33,111	33,152	33,193	33,234	33,275
800	33,275	33,316	33,357	33,398	33,439	33,480	33,521	33,562	33,603	33,644	33,685
810	33,685	33,726	33,767	33,808	33,848	33,889	33,930	33,971	34,012	34,053	34,093
820	34,093	34,134	34,175	34,216	34,257	34,297	34,338	34,379	34,420	34,460	34,501
830	34,501	34,542	34,582	34,623	34,664	34,704	34,745	34,786	34,826	34,867	34,908
840	34,908	34,948	34,989	35,029	35,070	35,110	35,151	35,192	35,232	35,273	35,313
850	35,313	35,354	35,394	35,435	35,475	35,516	35,556	35,596	35,637	35,677	35,718
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1370 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

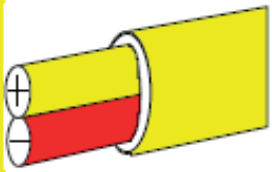
K

F.E.M. output of a K type thermocouple(Nikel/Cromium Vs.Copper/Nikel). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

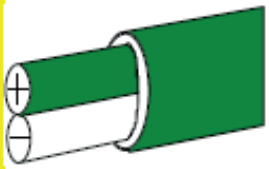
°C	0	1	2	3	4	5	6	7	8	9	10
850	35,313	35,354	35,394	35,435	35,475	35,516	35,556	35,596	35,637	35,677	35,718
860	35,718	35,758	35,798	35,839	35,879	35,920	35,960	36,000	36,041	36,081	36,121
870	36,121	36,162	36,202	36,242	36,282	36,323	36,363	36,403	36,443	36,484	36,524
880	36,524	36,564	36,604	36,644	36,685	36,725	36,765	36,805	36,845	36,885	36,925
890	36,925	36,965	37,006	37,046	37,086	37,126	37,166	37,206	37,246	37,286	37,326
900	37,326	37,366	37,406	37,446	37,486	37,526	37,566	37,606	37,646	37,686	37,725
910	37,725	37,765	37,805	37,845	37,885	37,925	37,965	38,005	38,044	38,084	38,124
920	38,124	38,164	38,204	38,243	38,283	38,323	38,363	38,402	38,442	38,482	38,522
930	38,522	38,561	38,601	38,641	38,680	38,720	38,760	38,799	38,839	38,878	38,918
940	38,918	38,958	38,997	39,037	39,076	39,116	39,155	39,195	39,235	39,274	39,314
950	39,314	39,353	39,393	39,432	39,471	39,511	39,550	39,590	39,629	39,669	39,708
960	39,708	39,747	39,787	39,826	39,866	39,905	39,944	39,984	40,023	40,062	40,101
970	40,101	40,141	40,180	40,219	40,259	40,298	40,337	40,376	40,415	40,455	40,494
980	40,494	40,533	40,572	40,611	40,651	40,690	40,729	40,768	40,807	40,846	40,885
990	40,885	40,924	40,963	41,002	41,042	41,081	41,120	41,159	41,198	41,237	41,276
1000	41,276	41,315	41,354	41,393	41,431	41,470	41,509	41,548	41,587	41,626	41,665
1010	41,665	41,704	41,743	41,781	41,820	41,859	41,898	41,937	41,976	42,014	42,053
1020	42,053	42,092	42,131	42,169	42,208	42,247	42,286	42,324	42,363	42,402	42,440
1030	42,440	42,479	42,518	42,556	42,595	42,633	42,672	42,711	42,749	42,788	42,826
1040	42,826	42,865	42,903	42,942	42,980	43,019	43,057	43,096	43,134	43,173	43,211
1050	43,211	43,250	43,288	43,327	43,365	43,403	43,442	43,480	43,518	43,557	43,595
1060	43,595	43,633	43,672	43,710	43,748	43,787	43,825	43,863	43,901	43,940	43,978
1070	43,978	44,016	44,054	44,092	44,130	44,169	44,207	44,245	44,283	44,321	44,359
1080	44,359	44,397	44,435	44,473	44,512	44,550	44,588	44,626	44,664	44,702	44,740
1090	44,740	44,778	44,816	44,853	44,891	44,929	44,967	45,005	45,043	45,081	45,119
1100	45,119	45,157	45,194	45,232	45,270	45,308	45,346	45,383	45,421	45,459	45,497
1110	45,497	45,534	45,572	45,610	45,647	45,685	45,723	45,760	45,798	45,836	45,873
1120	45,873	45,911	45,948	45,986	46,024	46,061	46,099	46,136	46,174	46,211	46,249
1130	46,249	46,286	46,324	46,361	46,398	46,436	46,473	46,511	46,548	46,585	46,623
1140	46,623	46,660	46,697	46,735	46,772	46,809	46,847	46,884	46,921	46,958	46,995
1150	46,995	47,033	47,070	47,107	47,144	47,181	47,218	47,256	47,293	47,330	47,367
1160	47,367	47,404	47,441	47,478	47,515	47,552	47,589	47,626	47,663	47,700	47,737
1170	47,737	47,774	47,811	47,848	47,884	47,921	47,958	47,995	48,032	48,069	48,105
1180	48,105	48,142	48,179	48,216	48,252	48,289	48,326	48,363	48,399	48,436	48,473
1190	48,473	48,509	48,546	48,582	48,619	48,656	48,692	48,729	48,765	48,802	48,838
1200	48,838	48,875	48,911	48,948	48,984	49,021	49,057	49,093	49,130	49,166	49,202
1210	49,202	49,239	49,275	49,311	49,348	49,384	49,420	49,456	49,493	49,529	49,565
1220	49,565	49,601	49,637	49,674	49,710	49,746	49,782	49,818	49,854	49,890	49,926
1230	49,926	49,962	49,998	50,034	50,070	50,106	50,142	50,178	50,214	50,250	50,286
1240	50,286	50,322	50,358	50,393	50,429	50,465	50,501	50,537	50,572	50,608	50,644
1250	50,644	50,680	50,715	50,751	50,787	50,822	50,858	50,894	50,929	50,965	51,000
1260	51,000	51,036	51,071	51,107	51,142	51,178	51,213	51,249	51,284	51,320	51,355
1270	51,355	51,391	51,426	51,461	51,497	51,532	51,567	51,603	51,638	51,673	51,708
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1370 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

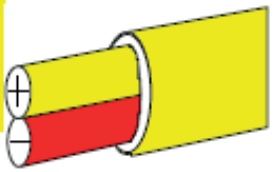
K

F.E.M. output of a K type thermocouple(Nikel/Cromium Vs.Copper/Nikel). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	1	2	3	4	5	6	7	8	9	10
1270	51,355	51,391	51,426	51,461	51,497	51,532	51,567	51,603	51,638	51,673	51,708
1280	51,708	51,744	51,779	51,814	51,849	51,885	51,920	51,955	51,990	52,025	52,060
1290	52,060	52,095	52,130	52,165	52,200	52,235	52,270	52,305	52,340	52,375	52,410
1300	52,410	52,445	52,480	52,515	52,550	52,585	52,620	52,654	52,689	52,724	52,759
1310	52,759	52,794	52,828	52,863	52,898	52,932	52,967	53,002	53,037	53,071	53,106
1320	53,106	53,140	53,175	53,210	53,244	53,279	53,313	53,348	53,382	53,417	53,451
1330	53,451	53,486	53,520	53,555	53,589	53,623	53,658	53,692	53,727	53,761	53,795
1340	53,795	53,830	53,864	53,898	53,932	53,967	54,001	54,035	54,069	54,104	54,138
1350	54,138	54,172	54,206	54,240	54,274	54,308	54,343	54,377	54,411	54,445	54,479
1360	54,479	54,513	54,547	54,581	54,615	54,649	54,683	54,717	54,751	54,785	54,819
1370	54,819	54,852	54,886	54,920	54,954	54,988	55,022	55,056	55,089	55,123	55,157
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE
(-270 +1370 °C)

CABLE COLOR
CODING ANSI



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THERMOCOUPLE J

F.E.M. output of a J type thermocouple(Iron/Copper Vs. Iron). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

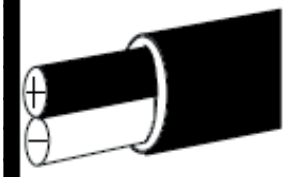
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-200	-7,890										
-190	-7,659	-7,683	-7,707	-7,731	-7,755	-7,778	-7,801	-7,824	-7,846	-7,868	-7,890
-180	-7,403	-7,429	-7,456	-7,482	-7,508	-7,534	-7,559	-7,585	-7,610	-7,634	-7,659
-170	-7,123	-7,152	-7,181	-7,209	-7,237	-7,265	-7,293	-7,321	-7,348	-7,376	-7,403
-160	-6,821	-6,853	-6,883	-6,914	-6,944	-6,975	-7,005	-7,035	-7,064	-7,094	-7,123
-150	-6,500	-6,533	-6,566	-6,598	-6,631	-6,663	-6,695	-6,727	-6,759	-6,790	-6,821
-140	-6,159	-6,194	-6,229	-6,263	-6,298	-6,332	-6,366	-6,400	-6,433	-6,467	-6,500
-130	-5,801	-5,838	-5,874	-5,910	-5,946	-5,982	-6,018	-6,054	-6,089	-6,124	-6,159
-120	-5,426	-5,465	-5,503	-5,541	-5,578	-5,616	-5,653	-5,690	-5,727	-5,764	-5,801
-110	-5,037	-5,076	-5,116	-5,155	-5,194	-5,233	-5,272	-5,311	-5,350	-5,388	-5,426
-100	-4,633	-4,674	-4,714	-4,755	-4,796	-4,836	-4,877	-4,917	-4,957	-4,997	-5,037
-90	-4,215	-4,257	-4,300	-4,342	-4,384	-4,425	-4,467	-4,509	-4,550	-4,591	-4,633
-80	-3,786	-3,829	-3,872	-3,916	-3,959	-4,002	-4,045	-4,088	-4,130	-4,173	-4,215
-70	-3,344	-3,389	-3,434	-3,478	-3,522	-3,566	-3,610	-3,654	-3,698	-3,742	-3,786
-60	-2,893	-2,938	-2,984	-3,029	-3,075	-3,120	-3,165	-3,210	-3,255	-3,300	-3,344
-50	-2,431	-2,478	-2,524	-2,571	-2,617	-2,663	-2,709	-2,755	-2,801	-2,847	-2,893
-40	-1,961	-2,008	-2,055	-2,103	-2,150	-2,197	-2,244	-2,291	-2,338	-2,385	-2,431
-30	-1,482	-1,530	-1,578	-1,626	-1,674	-1,722	-1,770	-1,818	-1,865	-1,913	-1,961
-20	-0,995	-1,044	-1,093	-1,142	-1,190	-1,239	-1,288	-1,336	-1,385	-1,433	-1,482
-10	-0,501	-0,550	-0,600	-0,650	-0,699	-0,749	-0,798	-0,847	-0,896	-0,946	-0,995
0	0,000	-0,050	-0,101	-0,151	-0,201	-0,251	-0,301	-0,351	-0,401	-0,451	-0,501
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10

°C	0	1	2	3	4	5	6	7	8	9	10
0	0,000	0,050	0,101	0,151	0,202	0,253	0,303	0,354	0,405	0,456	0,507
10	0,507	0,558	0,609	0,660	0,711	0,762	0,814	0,865	0,916	0,968	1,019
20	1,019	1,071	1,122	1,174	1,226	1,277	1,329	1,381	1,433	1,485	1,537
30	1,537	1,589	1,641	1,693	1,745	1,797	1,849	1,902	1,954	2,006	2,059
40	2,059	2,111	2,164	2,216	2,269	2,322	2,374	2,427	2,480	2,532	2,585
50	2,585	2,638	2,691	2,744	2,797	2,850	2,903	2,956	3,009	3,062	3,116
60	3,116	3,169	3,222	3,275	3,329	3,382	3,436	3,489	3,543	3,596	3,650
70	3,650	3,703	3,757	3,810	3,864	3,918	3,971	4,025	4,079	4,133	4,187
80	4,187	4,240	4,294	4,348	4,402	4,456	4,510	4,564	4,618	4,672	4,726
90	4,726	4,781	4,835	4,889	4,943	4,997	5,052	5,106	5,160	5,215	5,269
100	5,269	5,323	5,378	5,432	5,487	5,541	5,595	5,650	5,705	5,759	5,814
110	5,814	5,868	5,923	5,977	6,032	6,087	6,141	6,196	6,251	6,306	6,360
120	6,360	6,415	6,470	6,525	6,579	6,634	6,689	6,744	6,799	6,854	6,909
130	6,909	6,964	7,019	7,074	7,129	7,184	7,239	7,294	7,349	7,404	7,459
140	7,459	7,514	7,569	7,624	7,679	7,734	7,789	7,844	7,900	7,955	8,010
150	8,010	8,065	8,120	8,175	8,231	8,286	8,341	8,396	8,452	8,507	8,562
160	8,562	8,618	8,673	8,728	8,783	8,839	8,894	8,949	9,005	9,060	9,115
170	9,115	9,171	9,226	9,282	9,337	9,392	9,448	9,503	9,559	9,614	9,669
180	9,669	9,725	9,780	9,836	9,891	9,947	10,002	10,057	10,113	10,168	10,224
190	10,224	10,279	10,335	10,390	10,446	10,501	10,557	10,612	10,668	10,723	10,779
200	10,779	10,834	10,890	10,945	11,001	11,056	11,112	11,167	11,223	11,278	11,334
210	11,334	11,389	11,445	11,501	11,556	11,612	11,667	11,723	11,778	11,834	11,889
220	11,889	11,945	12,000	12,056	12,111	12,167	12,222	12,278	12,334	12,389	12,445
230	12,445	12,500	12,556	12,611	12,667	12,722	12,778	12,833	12,889	12,944	13,000
240	13,000	13,056	13,111	13,167	13,222	13,278	13,333	13,389	13,444	13,500	13,555
250	13,555	13,611	13,666	13,722	13,777	13,833	13,888	13,944	13,999	14,055	14,110
260	14,110	14,166	14,221	14,277	14,332	14,388	14,443	14,499	14,554	14,609	14,665
270	14,665	14,720	14,776	14,831	14,887	14,942	14,998	15,053	15,109	15,164	15,219
280	15,219	15,275	15,330	15,386	15,441	15,496	15,552	15,607	15,663	15,718	15,773
290	15,773	15,829	15,884	15,940	15,995	16,050	16,106	16,161	16,216	16,272	16,327
300	16,327	16,383	16,438	16,493	16,549	16,604	16,659	16,715	16,770	16,825	16,881
310	16,881	16,936	16,991	17,046	17,102	17,157	17,212	17,268	17,323	17,378	17,434
320	17,434	17,489	17,544	17,599	17,655	17,710	17,765	17,820	17,876	17,931	17,986
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-200 +760 °C)

CABLE COLOR CODING ANSI

CABLE COLOR CODING ANSI 584-3



LA TERMOTECNICA

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THERMOCOUPLE

J

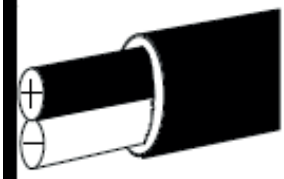
F.E.M. output of a J type thermocouple(Iron/Copper Vs. Iron). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	1	2	3	4	5	6	7	8	9	10
330	17,986	18,041	18,097	18,152	18,207	18,262	18,318	18,373	18,428	18,483	18,538
340	18,538	18,594	18,649	18,704	18,759	18,814	18,870	18,925	18,980	19,035	19,090
350	19,090	19,146	19,201	19,256	19,311	19,366	19,422	19,477	19,532	19,587	19,642
360	19,642	19,697	19,753	19,808	19,863	19,918	19,973	20,028	20,083	20,139	20,194
370	20,194	20,249	20,304	20,359	20,414	20,469	20,525	20,580	20,635	20,690	20,745
380	20,745	20,800	20,855	20,911	20,966	21,021	21,076	21,131	21,186	21,241	21,297
390	21,297	21,352	21,407	21,462	21,517	21,572	21,627	21,683	21,738	21,793	21,848
400	21,848	21,903	21,958	22,014	22,069	22,124	22,179	22,234	22,289	22,345	22,400
410	22,400	22,455	22,510	22,565	22,620	22,676	22,731	22,786	22,841	22,896	22,952
420	22,952	23,007	23,062	23,117	23,172	23,228	23,283	23,338	23,393	23,449	23,504
430	23,504	23,559	23,614	23,670	23,725	23,780	23,835	23,891	23,946	24,001	24,057
440	24,057	24,112	24,167	24,223	24,278	24,333	24,389	24,444	24,499	24,555	24,610
450	24,610	24,665	24,721	24,776	24,832	24,887	24,943	24,998	25,053	25,109	25,164
460	25,164	25,220	25,275	25,331	25,386	25,442	25,497	25,553	25,608	25,664	25,720
470	25,720	25,775	25,831	25,886	25,942	25,998	26,053	26,109	26,165	26,220	26,276
480	26,276	26,332	26,387	26,443	26,499	26,555	26,610	26,666	26,722	26,778	26,834
490	26,834	26,889	26,945	27,001	27,057	27,113	27,169	27,225	27,281	27,337	27,393
500	27,393	27,449	27,505	27,561	27,617	27,673	27,729	27,785	27,841	27,897	27,953
510	27,953	28,010	28,066	28,122	28,178	28,234	28,291	28,347	28,403	28,460	28,516
520	28,516	28,572	28,629	28,685	28,741	28,798	28,854	28,911	28,967	29,024	29,080
530	29,080	29,137	29,194	29,250	29,307	29,363	29,420	29,477	29,534	29,590	29,647
540	29,647	29,704	29,761	29,818	29,874	29,931	29,988	30,045	30,102	30,159	30,216
550	30,216	30,273	30,330	30,387	30,444	30,502	30,559	30,616	30,673	30,730	30,788
560	30,788	30,845	30,902	30,960	31,017	31,074	31,132	31,189	31,247	31,304	31,362
570	31,362	31,419	31,477	31,535	31,592	31,650	31,708	31,766	31,823	31,881	31,939
580	31,939	31,997	32,055	32,113	32,171	32,229	32,287	32,345	32,403	32,461	32,519
590	32,519	32,577	32,636	32,694	32,752	32,810	32,869	32,927	32,985	33,044	33,102
600	33,102	33,161	33,219	33,278	33,337	33,395	33,454	33,513	33,571	33,630	33,689
610	33,689	33,748	33,807	33,866	33,925	33,984	34,043	34,102	34,161	34,220	34,279
620	34,279	34,338	34,397	34,457	34,516	34,575	34,635	34,694	34,754	34,813	34,873
630	34,873	34,932	34,992	35,051	35,111	35,171	35,230	35,290	35,350	35,410	35,470
640	35,470	35,530	35,590	35,650	35,710	35,770	35,830	35,890	35,950	36,010	36,071
650	36,071	36,131	36,191	36,252	36,312	36,373	36,433	36,494	36,554	36,615	36,675
660	36,675	36,736	36,797	36,858	36,918	36,979	37,040	37,101	37,162	37,223	37,284
670	37,284	37,345	37,406	37,467	37,528	37,590	37,651	37,712	37,773	37,835	37,896
680	37,896	37,958	38,019	38,081	38,142	38,204	38,265	38,327	38,389	38,450	38,512
690	38,512	38,574	38,636	38,698	38,760	38,822	38,884	38,946	39,008	39,070	39,132
700	39,132	39,194	39,256	39,318	39,381	39,443	39,505	39,568	39,630	39,693	39,755
710	39,755	39,818	39,880	39,943	40,005	40,068	40,131	40,193	40,256	40,319	40,382
720	40,382	40,445	40,508	40,570	40,633	40,696	40,759	40,822	40,886	40,949	41,012
730	41,012	41,075	41,138	41,201	41,265	41,328	41,391	41,455	41,518	41,581	41,645
740	41,645	41,708	41,772	41,835	41,899	41,962	42,026	42,090	42,153	42,217	42,281
750	42,281	42,344	42,408	42,472	42,536	42,599	42,663	42,727	42,791	42,855	42,919
760	42,919										
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +760 °C)

CABLE COLOR CODING ANSI

CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

T

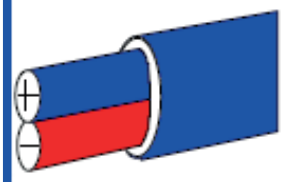
F.E.M. output of a T type thermocouple(Copper Vs. Copper/Nikel). Temperature[°C] vs. F.e.m. [mV]
IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-270	-6,258										
-260	-6,232	-6,236	-6,239	-6,242	-6,245	-6,248	-6,251	-6,253	-6,255	-6,256	-6,258
-250	-6,180	-6,187	-6,193	-6,198	-6,204	-6,209	-6,214	-6,219	-6,223	-6,228	-6,232
-240	-6,105	-6,114	-6,122	-6,130	-6,138	-6,146	-6,153	-6,160	-6,167	-6,174	-6,180
-230	-6,007	-6,017	-6,028	-6,038	-6,049	-6,059	-6,068	-6,078	-6,087	-6,096	-6,105
-220	-5,888	-5,901	-5,914	-5,926	-5,938	-5,950	-5,962	-5,973	-5,985	-5,996	-6,007
-210	-5,753	-5,767	-5,782	-5,795	-5,809	-5,823	-5,836	-5,850	-5,863	-5,876	-5,888
-200	-5,603	-5,619	-5,634	-5,650	-5,665	-5,680	-5,695	-5,710	-5,724	-5,739	-5,753
-190	-5,439	-5,456	-5,473	-5,489	-5,506	-5,523	-5,539	-5,555	-5,571	-5,587	-5,603
-180	-5,261	-5,279	-5,297	-5,316	-5,334	-5,351	-5,369	-5,387	-5,404	-5,421	-5,439
-170	-5,070	-5,089	-5,109	-5,128	-5,148	-5,167	-5,186	-5,205	-5,224	-5,242	-5,261
-160	-4,865	-4,886	-4,907	-4,928	-4,949	-4,969	-4,989	-5,010	-5,030	-5,050	-5,070
-150	-4,648	-4,671	-4,693	-4,715	-4,737	-4,759	-4,780	-4,802	-4,823	-4,844	-4,865
-140	-4,419	-4,443	-4,466	-4,489	-4,512	-4,535	-4,558	-4,581	-4,604	-4,626	-4,648
-130	-4,177	-4,202	-4,226	-4,251	-4,275	-4,300	-4,324	-4,348	-4,372	-4,395	-4,419
-120	-3,923	-3,949	-3,975	-4,000	-4,026	-4,052	-4,077	-4,102	-4,127	-4,152	-4,177
-110	-3,657	-3,684	-3,711	-3,738	-3,765	-3,791	-3,818	-3,844	-3,871	-3,897	-3,923
-100	-3,379	-3,407	-3,435	-3,463	-3,491	-3,519	-3,547	-3,574	-3,602	-3,629	-3,657
-90	-3,089	-3,118	-3,148	-3,177	-3,206	-3,235	-3,264	-3,293	-3,322	-3,350	-3,379
-80	-2,788	-2,818	-2,849	-2,879	-2,910	-2,940	-2,970	-3,000	-3,030	-3,059	-3,089
-70	-2,476	-2,507	-2,539	-2,571	-2,602	-2,633	-2,664	-2,695	-2,726	-2,757	-2,788
-60	-2,153	-2,186	-2,218	-2,251	-2,283	-2,316	-2,348	-2,380	-2,412	-2,444	-2,476
-50	-1,819	-1,853	-1,887	-1,920	-1,954	-1,987	-2,021	-2,054	-2,087	-2,120	-2,153
-40	-1,475	-1,510	-1,545	-1,579	-1,614	-1,648	-1,683	-1,717	-1,751	-1,785	-1,819
-30	-1,121	-1,157	-1,192	-1,228	-1,264	-1,299	-1,335	-1,370	-1,405	-1,440	-1,475
-20	-0,757	-0,794	-0,830	-0,867	-0,904	-0,940	-0,976	-1,013	-1,049	-1,085	-1,121
-10	-0,383	-0,421	-0,459	-0,496	-0,534	-0,571	-0,608	-0,646	-0,683	-0,720	-0,757
0	0,000	-0,039	-0,077	-0,116	-0,154	-0,193	-0,231	-0,269	-0,307	-0,345	-0,383
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10

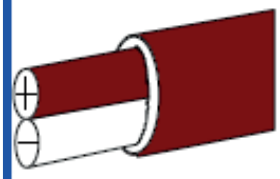
°C	0	1	2	3	4	5	6	7	8	9	10
0	0,000	0,039	0,078	0,117	0,156	0,195	0,234	0,273	0,312	0,352	0,391
10	0,391	0,431	0,470	0,510	0,549	0,589	0,629	0,669	0,709	0,749	0,790
20	0,790	0,830	0,870	0,911	0,951	0,992	1,033	1,074	1,114	1,155	1,196
30	1,196	1,238	1,279	1,320	1,362	1,403	1,445	1,486	1,528	1,570	1,612
40	1,612	1,654	1,696	1,738	1,780	1,823	1,865	1,908	1,950	1,993	2,036
50	2,036	2,079	2,122	2,165	2,208	2,251	2,294	2,338	2,381	2,425	2,468
60	2,468	2,512	2,556	2,600	2,643	2,687	2,732	2,776	2,820	2,864	2,909
70	2,909	2,953	2,998	3,043	3,087	3,132	3,177	3,222	3,267	3,312	3,358
80	3,358	3,403	3,448	3,494	3,539	3,585	3,631	3,677	3,722	3,768	3,814
90	3,814	3,860	3,907	3,953	3,999	4,046	4,092	4,138	4,185	4,232	4,279
100	4,279	4,325	4,372	4,419	4,466	4,513	4,561	4,608	4,655	4,702	4,750
110	4,750	4,798	4,845	4,893	4,941	4,988	5,036	5,084	5,132	5,180	5,228
120	5,228	5,277	5,325	5,373	5,422	5,470	5,519	5,567	5,616	5,665	5,714
130	5,714	5,763	5,812	5,861	5,910	5,959	6,008	6,057	6,107	6,156	6,206
140	6,206	6,255	6,305	6,355	6,404	6,454	6,504	6,554	6,604	6,654	6,704
150	6,704	6,754	6,805	6,855	6,905	6,956	7,006	7,057	7,107	7,158	7,209
160	7,209	7,260	7,310	7,361	7,412	7,463	7,515	7,566	7,617	7,668	7,720
170	7,720	7,771	7,823	7,874	7,926	7,977	8,029	8,081	8,133	8,185	8,237
180	8,237	8,289	8,341	8,393	8,445	8,497	8,550	8,602	8,654	8,707	8,759
190	8,759	8,812	8,865	8,917	8,970	9,023	9,076	9,129	9,182	9,235	9,288
200	9,288	9,341	9,395	9,448	9,501	9,555	9,608	9,662	9,715	9,769	9,822
210	9,822	9,876	9,930	9,984	10,038	10,092	10,146	10,200	10,254	10,308	10,362
220	10,362	10,417	10,471	10,525	10,580	10,634	10,689	10,743	10,798	10,853	10,907
230	10,907	10,962	11,017	11,072	11,127	11,182	11,237	11,292	11,347	11,403	11,458
240	11,458	11,513	11,569	11,624	11,680	11,735	11,791	11,846	11,902	11,958	12,013
250	12,013	12,069	12,125	12,181	12,237	12,293	12,349	12,405	12,461	12,518	12,574
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE
(-270 +400 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

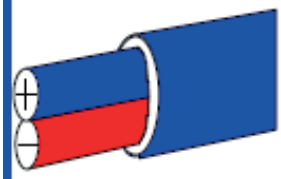
T

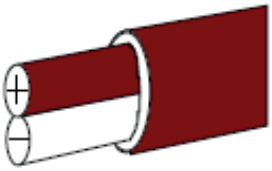
F.E.M. output of a T type thermocouple(Copper Vs. Copper/Nikel). Temperature[°C] vs. F.e.m. [mV]
IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	1	2	3	4	5	6	7	8	9	10
250	12,013	12,069	12,125	12,181	12,237	12,293	12,349	12,405	12,461	12,518	12,574
260	12,574	12,630	12,687	12,743	12,799	12,856	12,912	12,969	13,026	13,082	13,139
270	13,139	13,196	13,253	13,310	13,366	13,423	13,480	13,537	13,595	13,652	13,709
280	13,709	13,766	13,823	13,881	13,938	13,995	14,053	14,110	14,168	14,226	14,283
290	14,283	14,341	14,399	14,456	14,514	14,572	14,630	14,688	14,746	14,804	14,862
300	14,862	14,920	14,978	15,036	15,095	15,153	15,211	15,270	15,328	15,386	15,445
310	15,445	15,503	15,562	15,621	15,679	15,738	15,797	15,856	15,914	15,973	16,032
320	16,032	16,091	16,150	16,209	16,268	16,327	16,387	16,446	16,505	16,564	16,624
330	16,624	16,683	16,742	16,802	16,861	16,921	16,980	17,040	17,100	17,159	17,219
340	17,219	17,279	17,339	17,399	17,458	17,518	17,578	17,638	17,698	17,759	17,819
350	17,819	17,879	17,939	17,999	18,060	18,120	18,180	18,241	18,301	18,362	18,422
360	18,422	18,483	18,543	18,604	18,665	18,725	18,786	18,847	18,908	18,969	19,030
370	19,030	19,091	19,152	19,213	19,274	19,335	19,396	19,457	19,518	19,579	19,641
380	19,641	19,702	19,763	19,825	19,886	19,947	20,009	20,070	20,132	20,193	20,255
390	20,255	20,317	20,378	20,440	20,502	20,563	20,625	20,687	20,748	20,810	20,872
400	20,872										
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +400 °C)

CABLE COLOR CODING ANSI





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THERMOCOUPLE

N

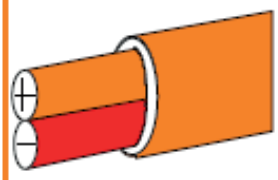
F.E.M. output of a N type thermocouple(Nicrosil Vs. Nisill). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-270	-4,345										
-260	-4,336	-4,337	-4,339	-4,340	-4,341	-4,342	-4,343	-4,344	-4,344	-4,345	-4,345
-250	-4,313	-4,316	-4,319	-4,321	-4,324	-4,326	-4,328	-4,330	-4,332	-4,334	-4,336
-240	-4,277	-4,281	-4,285	-4,289	-4,293	-4,297	-4,300	-4,304	-4,307	-4,310	-4,313
-230	-4,226	-4,232	-4,238	-4,243	-4,248	-4,254	-4,258	-4,263	-4,268	-4,273	-4,277
-220	-4,162	-4,169	-4,176	-4,183	-4,189	-4,196	-4,202	-4,209	-4,215	-4,221	-4,226
-210	-4,083	-4,091	-4,100	-4,108	-4,116	-4,124	-4,132	-4,140	-4,147	-4,154	-4,162
-200	-3,990	-4,000	-4,010	-4,020	-4,029	-4,038	-4,048	-4,057	-4,066	-4,074	-4,083
-190	-3,884	-3,896	-3,907	-3,918	-3,928	-3,939	-3,950	-3,960	-3,970	-3,980	-3,990
-180	-3,766	-3,778	-3,790	-3,803	-3,815	-3,827	-3,838	-3,850	-3,862	-3,873	-3,884
-170	-3,634	-3,648	-3,662	-3,675	-3,688	-3,702	-3,715	-3,728	-3,740	-3,753	-3,766
-160	-3,491	-3,506	-3,521	-3,535	-3,550	-3,564	-3,578	-3,593	-3,607	-3,621	-3,634
-150	-3,336	-3,352	-3,368	-3,384	-3,400	-3,415	-3,431	-3,446	-3,461	-3,476	-3,491
-140	-3,171	-3,188	-3,205	-3,221	-3,238	-3,255	-3,271	-3,288	-3,304	-3,320	-3,336
-130	-2,994	-3,012	-3,030	-3,048	-3,066	-3,084	-3,101	-3,119	-3,136	-3,153	-3,171
-120	-2,808	-2,827	-2,846	-2,865	-2,883	-2,902	-2,921	-2,939	-2,958	-2,976	-2,994
-110	-2,612	-2,632	-2,652	-2,672	-2,691	-2,711	-2,730	-2,750	-2,769	-2,789	-2,808
-100	-2,407	-2,428	-2,448	-2,469	-2,490	-2,510	-2,531	-2,551	-2,571	-2,592	-2,612
-90	-2,193	-2,215	-2,237	-2,258	-2,280	-2,301	-2,322	-2,344	-2,365	-2,386	-2,407
-80	-1,972	-1,995	-2,017	-2,039	-2,062	-2,084	-2,106	-2,128	-2,150	-2,172	-2,193
-70	-1,744	-1,767	-1,790	-1,813	-1,836	-1,859	-1,882	-1,905	-1,927	-1,950	-1,972
-60	-1,509	-1,533	-1,557	-1,580	-1,604	-1,627	-1,651	-1,674	-1,698	-1,721	-1,744
-50	-1,269	-1,293	-1,317	-1,341	-1,366	-1,390	-1,414	-1,438	-1,462	-1,485	-1,509
-40	-1,023	-1,048	-1,072	-1,097	-1,122	-1,146	-1,171	-1,195	-1,220	-1,244	-1,269
-30	-0,772	-0,798	-0,823	-0,848	-0,873	-0,898	-0,923	-0,948	-0,973	-0,998	-1,023
-20	-0,518	-0,544	-0,569	-0,595	-0,620	-0,646	-0,671	-0,696	-0,722	-0,747	-0,772
-10	-0,260	-0,286	-0,312	-0,338	-0,364	-0,390	-0,415	-0,441	-0,467	-0,492	-0,518
0	0,000	-0,026	-0,052	-0,078	-0,104	-0,131	-0,157	-0,183	-0,209	-0,234	-0,260
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10

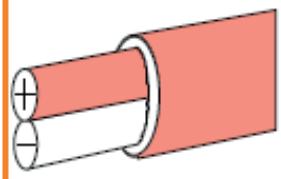
°C	0	1	2	3	4	5	6	7	8	9	10
0	0,000	0,026	0,052	0,078	0,104	0,130	0,156	0,182	0,208	0,235	0,261
10	0,261	0,287	0,313	0,340	0,366	0,393	0,419	0,446	0,472	0,499	0,525
20	0,525	0,552	0,578	0,605	0,632	0,659	0,685	0,712	0,739	0,766	0,793
30	0,793	0,820	0,847	0,874	0,901	0,928	0,955	0,983	1,010	1,037	1,065
40	1,065	1,092	1,119	1,147	1,174	1,202	1,229	1,257	1,284	1,312	1,340
50	1,340	1,368	1,395	1,423	1,451	1,479	1,507	1,535	1,563	1,591	1,619
60	1,619	1,647	1,675	1,703	1,732	1,760	1,788	1,817	1,845	1,873	1,902
70	1,902	1,930	1,959	1,988	2,016	2,045	2,074	2,102	2,131	2,160	2,189
80	2,189	2,218	2,247	2,276	2,305	2,334	2,363	2,392	2,421	2,450	2,480
90	2,480	2,509	2,538	2,568	2,597	2,626	2,656	2,685	2,715	2,744	2,774
100	2,774	2,804	2,833	2,863	2,893	2,923	2,953	2,983	3,012	3,042	3,072
110	3,072	3,102	3,133	3,163	3,193	3,223	3,253	3,283	3,314	3,344	3,374
120	3,374	3,405	3,435	3,466	3,496	3,527	3,557	3,588	3,619	3,649	3,680
130	3,680	3,711	3,742	3,772	3,803	3,834	3,865	3,896	3,927	3,958	3,989
140	3,989	4,020	4,051	4,083	4,114	4,145	4,176	4,208	4,239	4,270	4,302
150	4,302	4,333	4,365	4,396	4,428	4,459	4,491	4,523	4,554	4,586	4,618
160	4,618	4,650	4,681	4,713	4,745	4,777	4,809	4,841	4,873	4,905	4,937
170	4,937	4,969	5,001	5,033	5,066	5,098	5,130	5,162	5,195	5,227	5,259
180	5,259	5,292	5,324	5,357	5,389	5,422	5,454	5,487	5,520	5,552	5,585
190	5,585	5,618	5,650	5,683	5,716	5,749	5,782	5,815	5,847	5,880	5,913
200	5,913	5,946	5,979	6,013	6,046	6,079	6,112	6,145	6,178	6,211	6,245
210	6,245	6,278	6,311	6,345	6,378	6,411	6,445	6,478	6,512	6,545	6,579
220	6,579	6,612	6,646	6,680	6,713	6,747	6,781	6,814	6,848	6,882	6,916
230	6,916	6,949	6,983	7,017	7,051	7,085	7,119	7,153	7,187	7,221	7,255
240	7,255	7,289	7,323	7,357	7,392	7,426	7,460	7,494	7,528	7,563	7,597
250	7,597	7,631	7,666	7,700	7,734	7,769	7,803	7,838	7,872	7,907	7,941
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1300 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



LA TERMOTECNICA

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THERMOCOUPLE

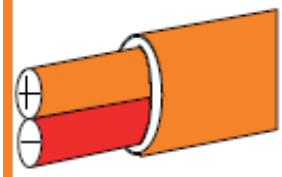
N

F.E.M. output of a N type thermocouple(Nicrosil Vs. Nisill). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

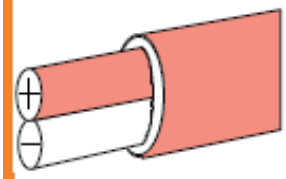
°C	0	1	2	3	4	5	6	7	8	9	10
250	7,597	7,631	7,666	7,700	7,734	7,769	7,803	7,838	7,872	7,907	7,941
260	7,941	7,976	8,010	8,045	8,080	8,114	8,149	8,184	8,218	8,253	8,288
270	8,288	8,323	8,358	8,392	8,427	8,462	8,497	8,532	8,567	8,602	8,637
280	8,637	8,672	8,707	8,742	8,777	8,812	8,847	8,882	8,918	8,953	8,988
290	8,988	9,023	9,058	9,094	9,129	9,164	9,200	9,235	9,270	9,306	9,341
300	9,341	9,377	9,412	9,448	9,483	9,519	9,554	9,590	9,625	9,661	9,696
310	9,696	9,732	9,768	9,803	9,839	9,875	9,910	9,946	9,982	10,018	10,054
320	10,054	10,089	10,125	10,161	10,197	10,233	10,269	10,305	10,341	10,377	10,413
330	10,413	10,449	10,485	10,521	10,557	10,593	10,629	10,665	10,701	10,737	10,774
340	10,774	10,810	10,846	10,882	10,918	10,955	10,991	11,027	11,064	11,100	11,136
350	11,136	11,173	11,209	11,245	11,282	11,318	11,355	11,391	11,428	11,464	11,501
360	11,501	11,537	11,574	11,610	11,647	11,683	11,720	11,757	11,793	11,830	11,867
370	11,867	11,903	11,940	11,977	12,013	12,050	12,087	12,124	12,160	12,197	12,234
380	12,234	12,271	12,308	12,345	12,382	12,418	12,455	12,492	12,529	12,566	12,603
390	12,603	12,640	12,677	12,714	12,751	12,788	12,825	12,862	12,899	12,937	12,974
400	12,974	13,011	13,048	13,085	13,122	13,159	13,197	13,234	13,271	13,308	13,346
410	13,346	13,383	13,420	13,457	13,495	13,532	13,569	13,607	13,644	13,682	13,719
420	13,719	13,756	13,794	13,831	13,869	13,906	13,944	13,981	14,019	14,056	14,094
430	14,094	14,131	14,169	14,206	14,244	14,281	14,319	14,356	14,394	14,432	14,469
440	14,469	14,507	14,545	14,582	14,620	14,658	14,695	14,733	14,771	14,809	14,846
450	14,846	14,884	14,922	14,960	14,998	15,035	15,073	15,111	15,149	15,187	15,225
460	15,225	15,262	15,300	15,338	15,376	15,414	15,452	15,490	15,528	15,566	15,604
470	15,604	15,642	15,680	15,718	15,756	15,794	15,832	15,870	15,908	15,946	15,984
480	15,984	16,022	16,060	16,099	16,137	16,175	16,213	16,251	16,289	16,327	16,366
490	16,366	16,404	16,442	16,480	16,518	16,557	16,595	16,633	16,671	16,710	16,748
500	16,748	16,786	16,824	16,863	16,901	16,939	16,978	17,016	17,054	17,093	17,131
510	17,131	17,169	17,208	17,246	17,285	17,323	17,361	17,400	17,438	17,477	17,515
520	17,515	17,554	17,592	17,630	17,669	17,707	17,746	17,784	17,823	17,861	17,900
530	17,900	17,938	17,977	18,016	18,054	18,093	18,131	18,170	18,208	18,247	18,286
540	18,286	18,324	18,363	18,401	18,440	18,479	18,517	18,556	18,595	18,633	18,672
550	18,672	18,711	18,749	18,788	18,827	18,865	18,904	18,943	18,982	19,020	19,059
560	19,059	19,098	19,136	19,175	19,214	19,253	19,292	19,330	19,369	19,408	19,447
570	19,447	19,485	19,524	19,563	19,602	19,641	19,680	19,718	19,757	19,796	19,835
580	19,835	19,874	19,913	19,952	19,990	20,029	20,068	20,107	20,146	20,185	20,224
590	20,224	20,263	20,302	20,341	20,379	20,418	20,457	20,496	20,535	20,574	20,613
600	20,613	20,652	20,691	20,730	20,769	20,808	20,847	20,886	20,925	20,964	21,003
610	21,003	21,042	21,081	21,120	21,159	21,198	21,237	21,276	21,315	21,354	21,393
620	21,393	21,432	21,471	21,510	21,549	21,588	21,628	21,667	21,706	21,745	21,784
630	21,784	21,823	21,862	21,901	21,940	21,979	22,018	22,058	22,097	22,136	22,175
640	22,175	22,214	22,253	22,292	22,331	22,370	22,410	22,449	22,488	22,527	22,566
650	22,566	22,605	22,644	22,684	22,723	22,762	22,801	22,840	22,879	22,919	22,958
660	22,958	22,997	23,036	23,075	23,115	23,154	23,193	23,232	23,271	23,311	23,350
670	23,350	23,389	23,428	23,467	23,507	23,546	23,585	23,624	23,663	23,703	23,742
680	23,742	23,781	23,820	23,860	23,899	23,938	23,977	24,016	24,056	24,095	24,134
690	24,134	24,173	24,213	24,252	24,291	24,330	24,370	24,409	24,448	24,487	24,527
700	24,527	24,566	24,605	24,644	24,684	24,723	24,762	24,801	24,841	24,880	24,919
710	24,919	24,959	24,998	25,037	25,076	25,116	25,155	25,194	25,233	25,273	25,312
720	25,312	25,351	25,391	25,430	25,469	25,508	25,548	25,587	25,626	25,666	25,705
730	25,705	25,744	25,783	25,823	25,862	25,901	25,941	25,980	26,019	26,058	26,098
740	26,098	26,137	26,176	26,216	26,255	26,294	26,333	26,373	26,412	26,451	26,491
750	26,491	26,530	26,569	26,608	26,648	26,687	26,726	26,766	26,805	26,844	26,883
760	26,883	26,923	26,962	27,001	27,041	27,080	27,119	27,158	27,198	27,237	27,276
770	27,276	27,316	27,355	27,394	27,433	27,473	27,512	27,551	27,591	27,630	27,669
780	27,669	27,708	27,748	27,787	27,826	27,866	27,905	27,944	27,983	28,023	28,062
790	28,062	28,101	28,140	28,180	28,219	28,258	28,297	28,337	28,376	28,415	28,455
800	28,455	28,494	28,533	28,572	28,612	28,651	28,690	28,729	28,769	28,808	28,847
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1300 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



LA TERMOTECNICA s.r.l. Via Volvera, 74/1, 10090, Bruino (TO)
Tel. 011/9085288 - www.latermotecnica.it - info@latermotecnica.it

THERMOCOUPLE

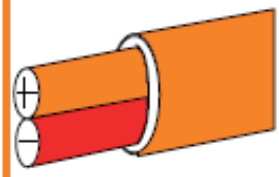
N

F.E.M. output of a N type thermocouple(Nicrosil Vs. Nisill). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

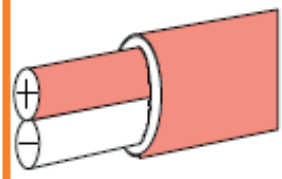
°C	0	1	2	3	4	5	6	7	8	9	10
800	28,455	28,494	28,533	28,572	28,612	28,651	28,690	28,729	28,769	28,808	28,847
810	28,847	28,886	28,926	28,965	29,004	29,043	29,083	29,122	29,161	29,200	29,239
820	29,239	29,279	29,318	29,357	29,396	29,436	29,475	29,514	29,553	29,592	29,632
830	29,632	29,671	29,710	29,749	29,789	29,828	29,867	29,906	29,945	29,985	30,024
840	30,024	30,063	30,102	30,141	30,181	30,220	30,259	30,298	30,337	30,376	30,416
850	30,416	30,455	30,494	30,533	30,572	30,611	30,651	30,690	30,729	30,768	30,807
860	30,807	30,846	30,886	30,925	30,964	31,003	31,042	31,081	31,120	31,160	31,199
870	31,199	31,238	31,277	31,316	31,355	31,394	31,433	31,473	31,512	31,551	31,590
880	31,590	31,629	31,668	31,707	31,746	31,785	31,824	31,863	31,903	31,942	31,981
890	31,981	32,020	32,059	32,098	32,137	32,176	32,215	32,254	32,293	32,332	32,371
900	32,371	32,410	32,449	32,488	32,527	32,566	32,605	32,644	32,683	32,722	32,761
910	32,761	32,800	32,839	32,878	32,917	32,956	32,995	33,034	33,073	33,112	33,151
920	33,151	33,190	33,229	33,268	33,307	33,346	33,385	33,424	33,463	33,502	33,541
930	33,541	33,580	33,619	33,658	33,697	33,736	33,774	33,813	33,852	33,891	33,930
940	33,930	33,969	34,008	34,047	34,086	34,124	34,163	34,202	34,241	34,280	34,319
950	34,319	34,358	34,396	34,435	34,474	34,513	34,552	34,591	34,629	34,668	34,707
960	34,707	34,746	34,785	34,823	34,862	34,901	34,940	34,979	35,017	35,056	35,095
970	35,095	35,134	35,172	35,211	35,250	35,289	35,327	35,366	35,405	35,444	35,482
980	35,482	35,521	35,560	35,598	35,637	35,676	35,714	35,753	35,792	35,831	35,869
990	35,869	35,908	35,946	35,985	36,024	36,062	36,101	36,140	36,178	36,217	36,256
1000	36,256	36,294	36,333	36,371	36,410	36,449	36,487	36,526	36,564	36,603	36,641
1010	36,641	36,680	36,718	36,757	36,796	36,834	36,873	36,911	36,950	36,988	37,027
1020	37,027	37,065	37,104	37,142	37,181	37,219	37,258	37,296	37,334	37,373	37,411
1030	37,411	37,450	37,488	37,527	37,565	37,603	37,642	37,680	37,719	37,757	37,795
1040	37,795	37,834	37,872	37,911	37,949	37,987	38,026	38,064	38,102	38,141	38,179
1050	38,179	38,217	38,256	38,294	38,332	38,370	38,409	38,447	38,485	38,524	38,562
1060	38,562	38,600	38,638	38,677	38,715	38,753	38,791	38,829	38,868	38,906	38,944
1070	38,944	38,982	39,020	39,059	39,097	39,135	39,173	39,211	39,249	39,287	39,326
1080	39,326	39,364	39,402	39,440	39,478	39,516	39,554	39,592	39,630	39,668	39,706
1090	39,706	39,744	39,783	39,821	39,859	39,897	39,935	39,973	40,011	40,049	40,087
1100	40,087	40,125	40,163	40,201	40,238	40,276	40,314	40,352	40,390	40,428	40,466
1110	40,466	40,504	40,542	40,580	40,618	40,655	40,693	40,731	40,769	40,807	40,845
1120	40,845	40,883	40,920	40,958	40,996	41,034	41,072	41,109	41,147	41,185	41,223
1130	41,223	41,260	41,298	41,336	41,374	41,411	41,449	41,487	41,525	41,562	41,600
1140	41,600	41,638	41,675	41,713	41,751	41,788	41,826	41,864	41,901	41,939	41,976
1150	41,976	42,014	42,052	42,089	42,127	42,164	42,202	42,239	42,277	42,314	42,352
1160	42,352	42,390	42,427	42,465	42,502	42,540	42,577	42,614	42,652	42,689	42,727
1170	42,727	42,764	42,802	42,839	42,877	42,914	42,951	42,989	43,026	43,064	43,101
1180	43,101	43,138	43,176	43,213	43,250	43,288	43,325	43,362	43,399	43,437	43,474
1190	43,474	43,511	43,549	43,586	43,623	43,660	43,698	43,735	43,772	43,809	43,846
1200	43,846	43,884	43,921	43,958	43,995	44,032	44,069	44,106	44,144	44,181	44,218
1210	44,218	44,255	44,292	44,329	44,366	44,403	44,440	44,477	44,514	44,551	44,588
1220	44,588	44,625	44,662	44,699	44,736	44,773	44,810	44,847	44,884	44,921	44,958
1230	44,958	44,995	45,032	45,069	45,105	45,142	45,179	45,216	45,253	45,290	45,326
1240	45,326	45,363	45,400	45,437	45,474	45,510	45,547	45,584	45,621	45,657	45,694
1250	45,694	45,731	45,767	45,804	45,841	45,877	45,914	45,951	45,987	46,024	46,060
1260	46,060	46,097	46,133	46,170	46,207	46,243	46,280	46,316	46,353	46,389	46,425
1270	46,425	46,462	46,498	46,535	46,571	46,608	46,644	46,680	46,717	46,753	46,789
1280	46,789	46,826	46,862	46,898	46,935	46,971	47,007	47,043	47,079	47,116	47,152
1290	47,152	47,188	47,224	47,260	47,296	47,333	47,369	47,405	47,441	47,477	47,513
1300	47,513										
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1300 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

S

F.E.M. output of a S type thermocouple(Platinum Vs. Platinum/10%Rhodium). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

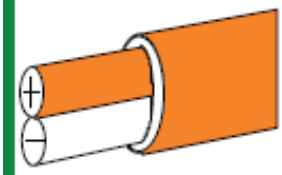
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-50	-0,236										
-40	-0,194	-0,199	-0,203	-0,207	-0,211	-0,215	-0,219	-0,224	-0,228	-0,232	-0,236
-30	-0,150	-0,155	-0,159	-0,164	-0,168	-0,173	-0,177	-0,181	-0,186	-0,190	-0,194
-20	-0,103	-0,108	-0,113	-0,117	-0,122	-0,127	-0,132	-0,136	-0,141	-0,146	-0,150
-10	-0,053	-0,058	-0,063	-0,068	-0,073	-0,078	-0,083	-0,088	-0,093	-0,098	-0,103
0	0,000	-0,005	-0,011	-0,016	-0,021	-0,027	-0,032	-0,037	-0,042	-0,048	-0,053
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10

°C	0	1	2	3	4	5	6	7	8	9	10
0	0,000	0,005	0,011	0,016	0,022	0,027	0,033	0,038	0,044	0,050	0,055
10	0,055	0,061	0,067	0,072	0,078	0,084	0,090	0,095	0,101	0,107	0,113
20	0,113	0,119	0,125	0,131	0,137	0,143	0,149	0,155	0,161	0,167	0,173
30	0,173	0,179	0,185	0,191	0,197	0,204	0,210	0,216	0,222	0,229	0,235
40	0,235	0,241	0,248	0,254	0,260	0,267	0,273	0,280	0,286	0,292	0,299
50	0,299	0,305	0,312	0,319	0,325	0,332	0,338	0,345	0,352	0,358	0,365
60	0,365	0,372	0,378	0,385	0,392	0,399	0,405	0,412	0,419	0,426	0,433
70	0,433	0,440	0,446	0,453	0,460	0,467	0,474	0,481	0,488	0,495	0,502
80	0,502	0,509	0,516	0,523	0,530	0,538	0,545	0,552	0,559	0,566	0,573
90	0,573	0,580	0,588	0,595	0,602	0,609	0,617	0,624	0,631	0,639	0,646
100	0,646	0,653	0,661	0,668	0,675	0,683	0,690	0,698	0,705	0,713	0,720
110	0,720	0,727	0,735	0,743	0,750	0,758	0,765	0,773	0,780	0,788	0,795
120	0,795	0,803	0,811	0,818	0,826	0,834	0,841	0,849	0,857	0,865	0,872
130	0,872	0,880	0,888	0,896	0,903	0,911	0,919	0,927	0,935	0,942	0,950
140	0,950	0,958	0,966	0,974	0,982	0,990	0,998	1,006	1,013	1,021	1,029
150	1,029	1,037	1,045	1,053	1,061	1,069	1,077	1,085	1,094	1,102	1,110
160	1,110	1,118	1,126	1,134	1,142	1,150	1,158	1,167	1,175	1,183	1,191
170	1,191	1,199	1,207	1,216	1,224	1,232	1,240	1,249	1,257	1,265	1,273
180	1,273	1,282	1,290	1,298	1,307	1,315	1,323	1,332	1,340	1,348	1,357
190	1,357	1,365	1,373	1,382	1,390	1,399	1,407	1,415	1,424	1,432	1,441
200	1,441	1,449	1,458	1,466	1,475	1,483	1,492	1,500	1,509	1,517	1,526
210	1,526	1,534	1,543	1,551	1,560	1,569	1,577	1,586	1,594	1,603	1,612
220	1,612	1,620	1,629	1,638	1,646	1,655	1,663	1,672	1,681	1,690	1,698
230	1,698	1,707	1,716	1,724	1,733	1,742	1,751	1,759	1,768	1,777	1,786
240	1,786	1,794	1,803	1,812	1,821	1,829	1,838	1,847	1,856	1,865	1,874
250	1,874	1,882	1,891	1,900	1,909	1,918	1,927	1,936	1,944	1,953	1,962
260	1,962	1,971	1,980	1,989	1,998	2,007	2,016	2,025	2,034	2,043	2,052
270	2,052	2,061	2,070	2,078	2,087	2,096	2,105	2,114	2,123	2,132	2,141
280	2,141	2,151	2,160	2,169	2,178	2,187	2,196	2,205	2,214	2,223	2,232
290	2,232	2,241	2,250	2,259	2,268	2,277	2,287	2,296	2,305	2,314	2,323
300	2,323	2,332	2,341	2,350	2,360	2,369	2,378	2,387	2,396	2,405	2,415
310	2,415	2,424	2,433	2,442	2,451	2,461	2,470	2,479	2,488	2,497	2,507
320	2,507	2,516	2,525	2,534	2,544	2,553	2,562	2,571	2,581	2,590	2,599
330	2,599	2,609	2,618	2,627	2,636	2,646	2,655	2,664	2,674	2,683	2,692
340	2,692	2,702	2,711	2,720	2,730	2,739	2,748	2,758	2,767	2,776	2,786
350	2,786	2,795	2,805	2,814	2,823	2,833	2,842	2,851	2,861	2,870	2,880
360	2,880	2,889	2,899	2,908	2,917	2,927	2,936	2,946	2,955	2,965	2,974
370	2,974	2,983	2,993	3,002	3,012	3,021	3,031	3,040	3,050	3,059	3,069
380	3,069	3,078	3,088	3,097	3,107	3,116	3,126	3,135	3,145	3,154	3,164
390	3,164	3,173	3,183	3,192	3,202	3,212	3,221	3,231	3,240	3,250	3,259
400	3,259	3,269	3,279	3,288	3,298	3,307	3,317	3,326	3,336	3,346	3,355
410	3,355	3,365	3,374	3,384	3,394	3,403	3,413	3,423	3,432	3,442	3,451
420	3,451	3,461	3,471	3,480	3,490	3,500	3,509	3,519	3,529	3,538	3,548
430	3,548	3,558	3,567	3,577	3,587	3,596	3,606	3,616	3,626	3,635	3,645
440	3,645	3,655	3,664	3,674	3,684	3,694	3,703	3,713	3,723	3,732	3,742
450	3,742	3,752	3,762	3,771	3,781	3,791	3,801	3,810	3,820	3,830	3,840
460	3,840	3,850	3,859	3,869	3,879	3,889	3,898	3,908	3,918	3,928	3,938
470	3,938	3,947	3,957	3,967	3,977	3,987	3,997	4,006	4,016	4,026	4,036
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-50 +1768°C)

CABLE COLOR CODING ANSI

CABLE COLOR CODING ANSI 584-3



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Tel. 011/9085288 - www.latermotecnica.it - info@latermotecnica.it

THERMOCOUPLE

S

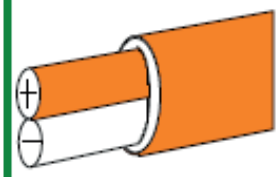
F.E.M. output of a S type thermocouple(Platinum Vs. Platinum/10%Rhodium). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	1	2	3	4	5	6	7	8	9	10
470	3,938	3,947	3,957	3,967	3,977	3,987	3,997	4,006	4,016	4,026	4,036
480	4,036	4,046	4,056	4,065	4,075	4,085	4,095	4,105	4,115	4,125	4,134
490	4,134	4,144	4,154	4,164	4,174	4,184	4,194	4,204	4,213	4,223	4,233
500	4,233	4,243	4,253	4,263	4,273	4,283	4,293	4,303	4,313	4,323	4,332
510	4,332	4,342	4,352	4,362	4,372	4,382	4,392	4,402	4,412	4,422	4,432
520	4,432	4,442	4,452	4,462	4,472	4,482	4,492	4,502	4,512	4,522	4,532
530	4,532	4,542	4,552	4,562	4,572	4,582	4,592	4,602	4,612	4,622	4,632
540	4,632	4,642	4,652	4,662	4,672	4,682	4,692	4,702	4,712	4,722	4,732
550	4,732	4,742	4,752	4,762	4,772	4,782	4,793	4,803	4,813	4,823	4,833
560	4,833	4,843	4,853	4,863	4,873	4,883	4,893	4,904	4,914	4,924	4,934
570	4,934	4,944	4,954	4,964	4,974	4,984	4,995	5,005	5,015	5,025	5,035
580	5,035	5,045	5,055	5,066	5,076	5,086	5,096	5,106	5,116	5,127	5,137
590	5,137	5,147	5,157	5,167	5,178	5,188	5,198	5,208	5,218	5,228	5,239
600	5,239	5,249	5,259	5,269	5,280	5,290	5,300	5,310	5,320	5,331	5,341
610	5,341	5,351	5,361	5,372	5,382	5,392	5,402	5,413	5,423	5,433	5,443
620	5,443	5,454	5,464	5,474	5,485	5,495	5,505	5,515	5,526	5,536	5,546
630	5,546	5,557	5,567	5,577	5,588	5,598	5,608	5,618	5,629	5,639	5,649
640	5,649	5,660	5,670	5,680	5,691	5,701	5,712	5,722	5,732	5,743	5,753
650	5,753	5,763	5,774	5,784	5,794	5,805	5,815	5,826	5,836	5,846	5,857
660	5,857	5,867	5,878	5,888	5,898	5,909	5,919	5,930	5,940	5,950	5,961
670	5,961	5,971	5,982	5,992	6,003	6,013	6,024	6,034	6,044	6,055	6,065
680	6,065	6,076	6,086	6,097	6,107	6,118	6,128	6,139	6,149	6,160	6,170
690	6,170	6,181	6,191	6,202	6,212	6,223	6,233	6,244	6,254	6,265	6,275
700	6,275	6,286	6,296	6,307	6,317	6,328	6,338	6,349	6,360	6,370	6,381
710	6,381	6,391	6,402	6,412	6,423	6,434	6,444	6,455	6,465	6,476	6,486
720	6,486	6,497	6,508	6,518	6,529	6,539	6,550	6,561	6,571	6,582	6,593
730	6,593	6,603	6,614	6,624	6,635	6,646	6,656	6,667	6,678	6,688	6,699
740	6,699	6,710	6,720	6,731	6,742	6,752	6,763	6,774	6,784	6,795	6,806
750	6,806	6,817	6,827	6,838	6,849	6,859	6,870	6,881	6,892	6,902	6,913
760	6,913	6,924	6,934	6,945	6,956	6,967	6,977	6,988	6,999	7,010	7,020
770	7,020	7,031	7,042	7,053	7,064	7,074	7,085	7,096	7,107	7,117	7,128
780	7,128	7,139	7,150	7,161	7,172	7,182	7,193	7,204	7,215	7,226	7,236
790	7,236	7,247	7,258	7,269	7,280	7,291	7,302	7,312	7,323	7,334	7,345
800	7,345	7,356	7,367	7,378	7,388	7,399	7,410	7,421	7,432	7,443	7,454
810	7,454	7,465	7,476	7,487	7,497	7,508	7,519	7,530	7,541	7,552	7,563
820	7,563	7,574	7,585	7,596	7,607	7,618	7,629	7,640	7,651	7,662	7,673
830	7,673	7,684	7,695	7,706	7,717	7,728	7,739	7,750	7,761	7,772	7,783
840	7,783	7,794	7,805	7,816	7,827	7,838	7,849	7,860	7,871	7,882	7,893
850	7,893	7,904	7,915	7,926	7,937	7,948	7,959	7,970	7,981	7,992	8,003
860	8,003	8,014	8,026	8,037	8,048	8,059	8,070	8,081	8,092	8,103	8,114
870	8,114	8,125	8,137	8,148	8,159	8,170	8,181	8,192	8,203	8,214	8,226
880	8,226	8,237	8,248	8,259	8,270	8,281	8,293	8,304	8,315	8,326	8,337
890	8,337	8,348	8,360	8,371	8,382	8,393	8,404	8,416	8,427	8,438	8,449
900	8,449	8,460	8,472	8,483	8,494	8,505	8,517	8,528	8,539	8,550	8,562
910	8,562	8,573	8,584	8,595	8,607	8,618	8,629	8,640	8,652	8,663	8,674
920	8,674	8,685	8,697	8,708	8,719	8,731	8,742	8,753	8,765	8,776	8,787
930	8,787	8,798	8,810	8,821	8,832	8,844	8,855	8,866	8,878	8,889	8,900
940	8,900	8,912	8,923	8,935	8,946	8,957	8,969	8,980	8,991	9,003	9,014
950	9,014	9,025	9,037	9,048	9,060	9,071	9,082	9,094	9,105	9,117	9,128
960	9,128	9,139	9,151	9,162	9,174	9,185	9,197	9,208	9,219	9,231	9,242
970	9,242	9,254	9,265	9,277	9,288	9,300	9,311	9,323	9,334	9,345	9,357
980	9,357	9,368	9,380	9,391	9,403	9,414	9,426	9,437	9,449	9,460	9,472
990	9,472	9,483	9,495	9,506	9,518	9,529	9,541	9,552	9,564	9,576	9,587
1000	9,587	9,599	9,610	9,622	9,633	9,645	9,656	9,668	9,680	9,691	9,703
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-50 +1768°C)

CABLE COLOR CODING ANSI

CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

S

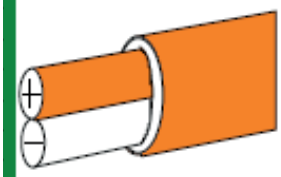
F.E.M. output of a S type thermocouple(Platinum Vs. Platinum/10%Rhodium). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	1	2	3	4	5	6	7	8	9	10
1000	9,587	9,599	9,610	9,622	9,633	9,645	9,656	9,668	9,680	9,691	9,703
1010	9,703	9,714	9,726	9,737	9,749	9,761	9,772	9,784	9,795	9,807	9,819
1020	9,819	9,830	9,842	9,853	9,865	9,877	9,888	9,900	9,911	9,923	9,935
1030	9,935	9,946	9,958	9,970	9,981	9,993	10,005	10,016	10,028	10,040	10,051
1040	10,051	10,063	10,075	10,086	10,098	10,109	10,121	10,133	10,145	10,156	10,168
1050	10,168	10,180	10,191	10,203	10,215	10,227	10,238	10,250	10,262	10,273	10,285
1060	10,285	10,297	10,309	10,320	10,332	10,344	10,356	10,367	10,379	10,391	10,403
1070	10,403	10,414	10,426	10,438	10,450	10,461	10,473	10,485	10,497	10,509	10,520
1080	10,520	10,532	10,544	10,556	10,567	10,579	10,591	10,603	10,615	10,626	10,638
1090	10,638	10,650	10,662	10,674	10,686	10,697	10,709	10,721	10,733	10,745	10,757
1100	10,757	10,768	10,780	10,792	10,804	10,816	10,828	10,839	10,851	10,863	10,875
1110	10,875	10,887	10,899	10,911	10,922	10,934	10,946	10,958	10,970	10,982	10,994
1120	10,994	11,006	11,017	11,029	11,041	11,053	11,065	11,077	11,089	11,101	11,113
1130	11,113	11,125	11,136	11,148	11,160	11,172	11,184	11,196	11,208	11,220	11,232
1140	11,232	11,244	11,256	11,268	11,280	11,291	11,303	11,315	11,327	11,339	11,351
1150	11,351	11,363	11,375	11,387	11,399	11,411	11,423	11,435	11,447	11,459	11,471
1160	11,471	11,483	11,495	11,507	11,519	11,531	11,542	11,554	11,566	11,578	11,590
1170	11,590	11,602	11,614	11,626	11,638	11,650	11,662	11,674	11,686	11,698	11,710
1180	11,710	11,722	11,734	11,746	11,758	11,770	11,782	11,794	11,806	11,818	11,830
1190	11,830	11,842	11,854	11,866	11,878	11,890	11,902	11,914	11,926	11,939	11,951
1200	11,951	11,963	11,975	11,987	11,999	12,011	12,023	12,035	12,047	12,059	12,071
1210	12,071	12,083	12,095	12,107	12,119	12,131	12,143	12,155	12,167	12,179	12,191
1220	12,191	12,203	12,216	12,228	12,240	12,252	12,264	12,276	12,288	12,300	12,312
1230	12,312	12,324	12,336	12,348	12,360	12,372	12,384	12,397	12,409	12,421	12,433
1240	12,433	12,445	12,457	12,469	12,481	12,493	12,505	12,517	12,529	12,542	12,554
1250	12,554	12,566	12,578	12,590	12,602	12,614	12,626	12,638	12,650	12,662	12,675
1260	12,675	12,687	12,699	12,711	12,723	12,735	12,747	12,759	12,771	12,783	12,796
1270	12,796	12,808	12,820	12,832	12,844	12,856	12,868	12,880	12,892	12,905	12,917
1280	12,917	12,929	12,941	12,953	12,965	12,977	12,989	13,001	13,014	13,026	13,038
1290	13,038	13,050	13,062	13,074	13,086	13,098	13,111	13,123	13,135	13,147	13,159
1300	13,159	13,171	13,183	13,195	13,208	13,220	13,232	13,244	13,256	13,268	13,280
1310	13,280	13,292	13,305	13,317	13,329	13,341	13,353	13,365	13,377	13,390	13,402
1320	13,402	13,414	13,426	13,438	13,450	13,462	13,474	13,487	13,499	13,511	13,523
1330	13,523	13,535	13,547	13,559	13,572	13,584	13,596	13,608	13,620	13,632	13,644
1340	13,644	13,657	13,669	13,681	13,693	13,705	13,717	13,729	13,742	13,754	13,766
1350	13,766	13,778	13,790	13,802	13,814	13,826	13,839	13,851	13,863	13,875	13,887
1360	13,887	13,899	13,911	13,924	13,936	13,948	13,960	13,972	13,984	13,996	14,009
1370	14,009	14,021	14,033	14,045	14,057	14,069	14,081	14,094	14,106	14,118	14,130
1380	14,130	14,142	14,154	14,166	14,178	14,191	14,203	14,215	14,227	14,239	14,251
1390	14,251	14,263	14,276	14,288	14,300	14,312	14,324	14,336	14,348	14,360	14,373
1400	14,373	14,385	14,397	14,409	14,421	14,433	14,445	14,457	14,470	14,482	14,494
1410	14,494	14,506	14,518	14,530	14,542	14,554	14,567	14,579	14,591	14,603	14,615
1420	14,615	14,627	14,639	14,651	14,664	14,676	14,688	14,700	14,712	14,724	14,736
1430	14,736	14,748	14,760	14,773	14,785	14,797	14,809	14,821	14,833	14,845	14,857
1440	14,857	14,869	14,881	14,894	14,906	14,918	14,930	14,942	14,954	14,966	14,978
1450	14,978	14,990	15,002	15,015	15,027	15,039	15,051	15,063	15,075	15,087	15,099
1460	15,099	15,111	15,123	15,135	15,148	15,160	15,172	15,184	15,196	15,208	15,220
1470	15,220	15,232	15,244	15,256	15,268	15,280	15,292	15,304	15,317	15,329	15,341
1480	15,341	15,353	15,365	15,377	15,389	15,401	15,413	15,425	15,437	15,449	15,461
1490	15,461	15,473	15,485	15,497	15,509	15,521	15,534	15,546	15,558	15,570	15,582
1500	15,582	15,594	15,606	15,618	15,630	15,642	15,654	15,666	15,678	15,690	15,702
1510	15,702	15,714	15,726	15,738	15,750	15,762	15,774	15,786	15,798	15,810	15,822
1520	15,822	15,834	15,846	15,858	15,870	15,882	15,894	15,906	15,918	15,930	15,942
1530	15,942	15,954	15,966	15,978	15,990	16,002	16,014	16,026	16,038	16,050	16,062
1540	16,062	16,074	16,086	16,098	16,110	16,122	16,134	16,146	16,158	16,170	16,182
1550	16,182	16,194	16,205	16,217	16,229	16,241	16,253	16,265	16,277	16,289	16,301
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-50 +1768°C)

CABLE COLOR CODING ANSI

CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

S

F.E.M. output of a S type thermocouple(Platinum Vs. Platinum/10%Rhodium). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	1	2	3	4	5	6	7	8	9	10
1550	16,182	16,194	16,205	16,217	16,229	16,241	16,253	16,265	16,277	16,289	16,301
1560	16,301	16,313	16,325	16,337	16,349	16,361	16,373	16,385	16,396	16,408	16,420
1570	16,420	16,432	16,444	16,456	16,468	16,480	16,492	16,504	16,516	16,527	16,539
1580	16,539	16,551	16,563	16,575	16,587	16,599	16,611	16,623	16,634	16,646	16,658
1590	16,658	16,670	16,682	16,694	16,706	16,718	16,729	16,741	16,753	16,765	16,777
1600	16,777	16,789	16,801	16,812	16,824	16,836	16,848	16,860	16,872	16,883	16,895
1610	16,895	16,907	16,919	16,931	16,943	16,954	16,966	16,978	16,990	17,002	17,013
1620	17,013	17,025	17,037	17,049	17,061	17,072	17,084	17,096	17,108	17,120	17,131
1630	17,131	17,143	17,155	17,167	17,178	17,190	17,202	17,214	17,225	17,237	17,249
1640	17,249	17,261	17,272	17,284	17,296	17,308	17,319	17,331	17,343	17,355	17,366
1650	17,366	17,378	17,390	17,401	17,413	17,425	17,437	17,448	17,460	17,472	17,483
1660	17,483	17,495	17,507	17,518	17,530	17,542	17,553	17,565	17,577	17,588	17,600
1670	17,600	17,612	17,623	17,635	17,647	17,658	17,670	17,682	17,693	17,705	17,717
1680	17,717	17,728	17,740	17,751	17,763	17,775	17,786	17,798	17,809	17,821	17,832
1690	17,832	17,844	17,855	17,867	17,878	17,890	17,901	17,913	17,924	17,936	17,947
1700	17,947	17,959	17,970	17,982	17,993	18,004	18,016	18,027	18,039	18,050	18,061
1710	18,061	18,073	18,084	18,095	18,107	18,118	18,129	18,140	18,152	18,163	18,174
1720	18,174	18,185	18,196	18,208	18,219	18,230	18,241	18,252	18,263	18,274	18,285
1730	18,285	18,297	18,308	18,319	18,330	18,341	18,352	18,362	18,373	18,384	18,395
1740	18,395	18,406	18,417	18,428	18,439	18,449	18,460	18,471	18,482	18,493	18,503
1750	18,503	18,514	18,525	18,535	18,546	18,557	18,567	18,578	18,588	18,599	18,609
1760	18,609	18,620	18,630	18,641	18,651	18,661	18,672	18,682	18,693		
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-50 +1768°C)

CABLE COLOR CODING ANSI

LA TERMOTECNICA

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THERMOCOUPLE

E

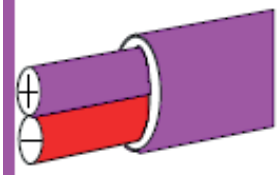
F.E.M. output of a E type thermocouple(Costantan Vs.Copper/Nikel). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-270	-9,835										
-260	-9,797	-9,802	-9,808	-9,813	-9,817	-9,821	-9,825	-9,828	-9,831	-9,833	-9,835
-250	-9,718	-9,728	-9,737	-9,746	-9,754	-9,762	-9,770	-9,777	-9,784	-9,790	-9,797
-240	-9,604	-9,617	-9,630	-9,642	-9,654	-9,666	-9,677	-9,688	-9,698	-9,709	-9,718
-230	-9,455	-9,471	-9,487	-9,503	-9,519	-9,534	-9,548	-9,563	-9,577	-9,591	-9,604
-220	-9,274	-9,293	-9,313	-9,331	-9,350	-9,368	-9,386	-9,404	-9,421	-9,438	-9,455
-210	-9,063	-9,085	-9,107	-9,129	-9,151	-9,172	-9,193	-9,214	-9,234	-9,254	-9,274
-200	-8,825	-8,850	-8,874	-8,899	-8,923	-8,947	-8,971	-8,994	-9,017	-9,040	-9,063
-190	-8,561	-8,588	-8,616	-8,643	-8,669	-8,696	-8,722	-8,748	-8,774	-8,799	-8,825
-180	-8,273	-8,303	-8,333	-8,362	-8,391	-8,420	-8,449	-8,477	-8,505	-8,533	-8,561
-170	-7,963	-7,995	-8,027	-8,059	-8,090	-8,121	-8,152	-8,183	-8,213	-8,243	-8,273
-160	-7,632	-7,666	-7,700	-7,733	-7,767	-7,800	-7,833	-7,866	-7,899	-7,931	-7,963
-150	-7,279	-7,315	-7,351	-7,387	-7,423	-7,458	-7,493	-7,528	-7,563	-7,597	-7,632
-140	-6,907	-6,945	-6,983	-7,021	-7,058	-7,096	-7,133	-7,170	-7,206	-7,243	-7,279
-130	-6,516	-6,556	-6,596	-6,636	-6,675	-6,714	-6,753	-6,792	-6,831	-6,869	-6,907
-120	-6,107	-6,149	-6,191	-6,232	-6,273	-6,314	-6,355	-6,396	-6,436	-6,476	-6,516
-110	-5,681	-5,724	-5,767	-5,810	-5,853	-5,896	-5,939	-5,981	-6,023	-6,065	-6,107
-100	-5,237	-5,282	-5,327	-5,372	-5,417	-5,461	-5,505	-5,549	-5,593	-5,637	-5,681
-90	-4,777	-4,824	-4,871	-4,917	-4,963	-5,009	-5,055	-5,101	-5,147	-5,192	-5,237
-80	-4,302	-4,350	-4,398	-4,446	-4,494	-4,542	-4,589	-4,636	-4,684	-4,731	-4,777
-70	-3,811	-3,861	-3,911	-3,960	-4,009	-4,058	-4,107	-4,156	-4,205	-4,254	-4,302
-60	-3,306	-3,357	-3,408	-3,459	-3,510	-3,561	-3,611	-3,661	-3,711	-3,761	-3,811
-50	-2,787	-2,840	-2,892	-2,944	-2,996	-3,048	-3,100	-3,152	-3,204	-3,255	-3,306
-40	-2,255	-2,309	-2,362	-2,416	-2,469	-2,523	-2,576	-2,629	-2,682	-2,735	-2,787
-30	-1,709	-1,765	-1,820	-1,874	-1,929	-1,984	-2,038	-2,093	-2,147	-2,201	-2,255
-20	-1,152	-1,208	-1,264	-1,320	-1,376	-1,432	-1,488	-1,543	-1,599	-1,654	-1,709
-10	-0,582	-0,639	-0,697	-0,754	-0,811	-0,868	-0,925	-0,982	-1,039	-1,095	-1,152
0	0,000	-0,059	-0,117	-0,176	-0,234	-0,292	-0,350	-0,408	-0,466	-0,524	-0,582
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10

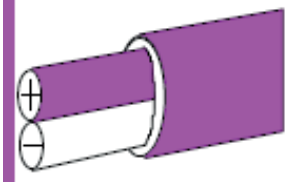
°C	0	1	2	3	4	5	6	7	8	9	10
0	0,000	0,059	0,118	0,176	0,235	0,294	0,354	0,413	0,472	0,532	0,591
10	0,591	0,651	0,711	0,770	0,830	0,890	0,950	1,010	1,071	1,131	1,192
20	1,192	1,252	1,313	1,373	1,434	1,495	1,556	1,617	1,678	1,740	1,801
30	1,801	1,862	1,924	1,986	2,047	2,109	2,171	2,233	2,295	2,357	2,420
40	2,420	2,482	2,545	2,607	2,670	2,733	2,795	2,858	2,921	2,984	3,048
50	3,048	3,111	3,174	3,238	3,301	3,365	3,429	3,492	3,556	3,620	3,685
60	3,685	3,749	3,813	3,877	3,942	4,006	4,071	4,136	4,200	4,265	4,330
70	4,330	4,395	4,460	4,526	4,591	4,656	4,722	4,788	4,853	4,919	4,985
80	4,985	5,051	5,117	5,183	5,249	5,315	5,382	5,448	5,514	5,581	5,648
90	5,648	5,714	5,781	5,848	5,915	5,982	6,049	6,117	6,184	6,251	6,319
100	6,319	6,386	6,454	6,522	6,590	6,658	6,725	6,794	6,862	6,930	6,998
110	6,998	7,066	7,135	7,203	7,272	7,341	7,409	7,478	7,547	7,616	7,685
120	7,685	7,754	7,823	7,892	7,962	8,031	8,101	8,170	8,240	8,309	8,379
130	8,379	8,449	8,519	8,589	8,659	8,729	8,799	8,869	8,940	9,010	9,081
140	9,081	9,151	9,222	9,292	9,363	9,434	9,505	9,576	9,647	9,718	9,789
150	9,789	9,860	9,931	10,003	10,074	10,145	10,217	10,288	10,360	10,432	10,503
160	10,503	10,575	10,647	10,719	10,791	10,863	10,935	11,007	11,080	11,152	11,224
170	11,224	11,297	11,369	11,442	11,514	11,587	11,660	11,733	11,805	11,878	11,951
180	11,951	12,024	12,097	12,170	12,243	12,317	12,390	12,463	12,537	12,610	12,684
190	12,684	12,757	12,831	12,904	12,978	13,052	13,126	13,199	13,273	13,347	13,421
200	13,421	13,495	13,569	13,644	13,718	13,792	13,866	13,941	14,015	14,090	14,164
210	14,164	14,239	14,313	14,388	14,463	14,537	14,612	14,687	14,762	14,837	14,912
220	14,912	14,987	15,062	15,137	15,212	15,287	15,362	15,438	15,513	15,588	15,664
230	15,664	15,739	15,815	15,890	15,966	16,041	16,117	16,193	16,269	16,344	16,420
240	16,420	16,496	16,572	16,648	16,724	16,800	16,876	16,952	17,028	17,104	17,181
250	17,181	17,257	17,333	17,409	17,486	17,562	17,639	17,715	17,792	17,868	17,945
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1000 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

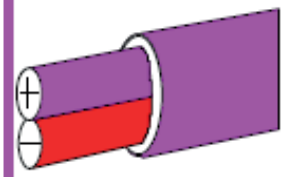
E

F.E.M. output of a E type thermocouple(Costantan Vs.Copper/Nikel). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

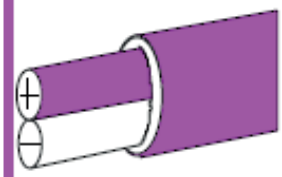
°C	0	1	2	3	4	5	6	7	8	9	10
250	17,181	17,257	17,333	17,409	17,486	17,562	17,639	17,715	17,792	17,868	17,945
260	17,945	18,021	18,098	18,175	18,252	18,328	18,405	18,482	18,559	18,636	18,713
270	18,713	18,790	18,867	18,944	19,021	19,098	19,175	19,252	19,330	19,407	19,484
280	19,484	19,561	19,639	19,716	19,794	19,871	19,948	20,026	20,103	20,181	20,259
290	20,259	20,336	20,414	20,492	20,569	20,647	20,725	20,803	20,880	20,958	21,036
300	21,036	21,114	21,192	21,270	21,348	21,426	21,504	21,582	21,660	21,739	21,817
310	21,817	21,895	21,973	22,051	22,130	22,208	22,286	22,365	22,443	22,522	22,600
320	22,600	22,678	22,757	22,835	22,914	22,993	23,071	23,150	23,228	23,307	23,386
330	23,386	23,464	23,543	23,622	23,701	23,780	23,858	23,937	24,016	24,095	24,174
340	24,174	24,253	24,332	24,411	24,490	24,569	24,648	24,727	24,806	24,885	24,964
350	24,964	25,044	25,123	25,202	25,281	25,360	25,440	25,519	25,598	25,678	25,757
360	25,757	25,836	25,916	25,995	26,075	26,154	26,233	26,313	26,392	26,472	26,552
370	26,552	26,631	26,711	26,790	26,870	26,950	27,029	27,109	27,189	27,268	27,348
380	27,348	27,428	27,507	27,587	27,667	27,747	27,827	27,907	27,986	28,066	28,146
390	28,146	28,226	28,306	28,386	28,466	28,546	28,626	28,706	28,786	28,866	28,946
400	28,946	29,026	29,106	29,186	29,266	29,346	29,427	29,507	29,587	29,667	29,747
410	29,747	29,827	29,908	29,988	30,068	30,148	30,229	30,309	30,389	30,470	30,550
420	30,550	30,630	30,711	30,791	30,871	30,952	31,032	31,112	31,193	31,273	31,354
430	31,354	31,434	31,515	31,595	31,676	31,756	31,837	31,917	31,998	32,078	32,159
440	32,159	32,239	32,320	32,400	32,481	32,562	32,642	32,723	32,803	32,884	32,965
450	32,965	33,045	33,126	33,207	33,287	33,368	33,449	33,529	33,610	33,691	33,772
460	33,772	33,852	33,933	34,014	34,095	34,175	34,256	34,337	34,418	34,498	34,579
470	34,579	34,660	34,741	34,822	34,902	34,983	35,064	35,145	35,226	35,307	35,387
480	35,387	35,468	35,549	35,630	35,711	35,792	35,873	35,954	36,034	36,115	36,196
490	36,196	36,277	36,358	36,439	36,520	36,601	36,682	36,763	36,843	36,924	37,005
500	37,005	37,086	37,167	37,248	37,329	37,410	37,491	37,572	37,653	37,734	37,815
510	37,815	37,896	37,977	38,058	38,139	38,220	38,300	38,381	38,462	38,543	38,624
520	38,624	38,705	38,786	38,867	38,948	39,029	39,110	39,191	39,272	39,353	39,434
530	39,434	39,515	39,596	39,677	39,758	39,839	39,920	40,001	40,082	40,163	40,243
540	40,243	40,324	40,405	40,486	40,567	40,648	40,729	40,810	40,891	40,972	41,053
550	41,053	41,134	41,215	41,296	41,377	41,457	41,538	41,619	41,700	41,781	41,862
560	41,862	41,943	42,024	42,105	42,185	42,266	42,347	42,428	42,509	42,590	42,671
570	42,671	42,751	42,832	42,913	42,994	43,075	43,156	43,236	43,317	43,398	43,479
580	43,479	43,560	43,640	43,721	43,802	43,883	43,963	44,044	44,125	44,206	44,286
590	44,286	44,367	44,448	44,529	44,609	44,690	44,771	44,851	44,932	45,013	45,093
600	45,093	45,174	45,255	45,335	45,416	45,497	45,577	45,658	45,738	45,819	45,900
610	45,900	45,980	46,061	46,141	46,222	46,302	46,383	46,463	46,544	46,624	46,705
620	46,705	46,785	46,866	46,946	47,027	47,107	47,188	47,268	47,349	47,429	47,509
630	47,509	47,590	47,670	47,751	47,831	47,911	47,992	48,072	48,152	48,233	48,313
640	48,313	48,393	48,474	48,554	48,634	48,715	48,795	48,875	48,955	49,035	49,116
650	49,116	49,196	49,276	49,356	49,436	49,517	49,597	49,677	49,757	49,837	49,917
660	49,917	49,997	50,077	50,157	50,238	50,318	50,398	50,478	50,558	50,638	50,718
670	50,718	50,798	50,878	50,958	51,038	51,118	51,197	51,277	51,357	51,437	51,517
680	51,517	51,597	51,677	51,757	51,837	51,916	51,996	52,076	52,156	52,236	52,315
690	52,315	52,395	52,475	52,555	52,634	52,714	52,794	52,873	52,953	53,033	53,112
700	53,112	53,192	53,272	53,351	53,431	53,510	53,590	53,670	53,749	53,829	53,908
710	53,908	53,988	54,067	54,147	54,226	54,306	54,385	54,465	54,544	54,624	54,703
720	54,703	54,782	54,862	54,941	55,021	55,100	55,179	55,259	55,338	55,417	55,497
730	55,497	55,576	55,655	55,734	55,814	55,893	55,972	56,051	56,131	56,210	56,289
740	56,289	56,368	56,447	56,526	56,606	56,685	56,764	56,843	56,922	57,001	57,080
750	57,080	57,159	57,238	57,317	57,396	57,475	57,554	57,633	57,712	57,791	57,870
760	57,870	57,949	58,028	58,107	58,186	58,265	58,343	58,422	58,501	58,580	58,659
770	58,659	58,738	58,816	58,895	58,974	59,053	59,131	59,210	59,289	59,367	59,446
780	59,446	59,525	59,604	59,682	59,761	59,839	59,918	59,997	60,075	60,154	60,232
790	60,232	60,311	60,390	60,468	60,547	60,625	60,704	60,782	60,860	60,939	61,017
800	61,017	61,096	61,174	61,253	61,331	61,409	61,488	61,566	61,644	61,723	61,801
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1000 °C)

CABLE COLOR CODING ANSI



CABLE COLOR CODING ANSI 584-3



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THERMOCOUPLE

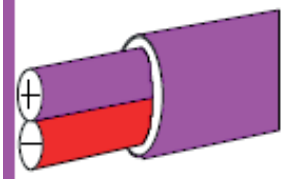
E

F.E.M. output of a E type thermocouple(Costantan Vs.Copper/Nikel). Temperature[°C] vs. F.e.m. [mV] IEC 584-1. - ITS-90. cold junction 0 °C

°C	0	1	2	3	4	5	6	7	8	9	10
800	61,017	61,096	61,174	61,253	61,331	61,409	61,488	61,566	61,644	61,723	61,801
810	61,801	61,879	61,958	62,036	62,114	62,192	62,271	62,349	62,427	62,505	62,583
820	62,583	62,662	62,740	62,818	62,896	62,974	63,052	63,130	63,208	63,286	63,364
830	63,364	63,442	63,520	63,598	63,676	63,754	63,832	63,910	63,988	64,066	64,144
840	64,144	64,222	64,300	64,377	64,455	64,533	64,611	64,689	64,766	64,844	64,922
850	64,922	65,000	65,077	65,155	65,233	65,310	65,388	65,465	65,543	65,621	65,698
860	65,698	65,776	65,853	65,931	66,008	66,086	66,163	66,241	66,318	66,396	66,473
870	66,473	66,550	66,628	66,705	66,782	66,860	66,937	67,014	67,092	67,169	67,246
880	67,246	67,323	67,400	67,478	67,555	67,632	67,709	67,786	67,863	67,940	68,017
890	68,017	68,094	68,171	68,248	68,325	68,402	68,479	68,556	68,633	68,710	68,787
900	68,787	68,863	68,940	69,017	69,094	69,171	69,247	69,324	69,401	69,477	69,554
910	69,554	69,631	69,707	69,784	69,860	69,937	70,013	70,090	70,166	70,243	70,319
920	70,319	70,396	70,472	70,548	70,625	70,701	70,777	70,854	70,930	71,006	71,082
930	71,082	71,159	71,235	71,311	71,387	71,463	71,539	71,615	71,692	71,768	71,844
940	71,844	71,920	71,996	72,072	72,147	72,223	72,299	72,375	72,451	72,527	72,603
950	72,603	72,678	72,754	72,830	72,906	72,981	73,057	73,133	73,208	73,284	73,360
960	73,360	73,435	73,511	73,586	73,662	73,738	73,813	73,889	73,964	74,040	74,115
970	74,115	74,190	74,266	74,341	74,417	74,492	74,567	74,643	74,718	74,793	74,869
980	74,869	74,944	75,019	75,095	75,170	75,245	75,320	75,395	75,471	75,546	75,621
990	75,621	75,696	75,771	75,847	75,922	75,997	76,072	76,147	76,223	76,298	76,373
1000	76,373										
°C	0	1	2	3	4	5	6	7	8	9	10

TEMPERATURE RANGE (-270 +1000 °C)

CABLE COLOR CODING ANSI



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TERMORESISTANCE

PT100

Ohm output of a PT100 probe. Temperature[°C] vs. resistance [Ohm] IEC 751. - ITS-90.

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-200	18,493										
-190	22,803	22,374	21,944	21,514	21,083	20,653	20,221	19,790	19,358	18,926	18,493
-180	27,078	26,652	26,226	25,799	25,372	24,945	24,517	24,089	23,661	23,232	22,803
-170	31,320	30,897	30,474	30,051	29,627	29,203	28,779	28,354	27,929	27,504	27,078
-160	35,531	35,111	34,691	34,271	33,850	33,429	33,008	32,587	32,165	31,742	31,320
-150	39,714	39,297	38,879	38,462	38,044	37,626	37,208	36,789	36,370	35,951	35,531
-140	43,869	43,455	43,040	42,625	42,210	41,795	41,379	40,963	40,547	40,130	39,714
-130	47,999	47,587	47,175	46,763	46,350	45,937	45,524	45,111	44,697	44,283	43,869
-120	52,106	51,696	51,286	50,876	50,466	50,055	49,645	49,234	48,822	48,411	47,999
-110	56,190	55,783	55,375	54,967	54,559	54,151	53,742	53,333	52,924	52,515	52,106
-100	60,254	59,849	59,443	59,037	58,631	58,225	57,818	57,412	57,005	56,598	56,190
-90	64,299	63,895	63,491	63,087	62,683	62,279	61,874	61,469	61,065	60,659	60,254
-80	68,325	67,923	67,521	67,119	66,717	66,314	65,911	65,508	65,105	64,702	64,299
-70	72,335	71,934	71,534	71,134	70,733	70,332	69,931	69,530	69,128	68,727	68,325
-60	76,328	75,930	75,531	75,132	74,733	74,333	73,934	73,534	73,135	72,735	72,335
-50	80,307	79,910	79,512	79,115	78,717	78,319	77,921	77,523	77,125	76,727	76,328
-40	84,271	83,875	83,479	83,083	82,687	82,291	81,894	81,498	81,101	80,704	80,307
-30	88,222	87,828	87,433	87,038	86,643	86,248	85,853	85,458	85,063	84,667	84,271
-20	92,160	91,767	91,374	90,980	90,587	90,193	89,799	89,405	89,011	88,617	88,222
-10	96,086	95,694	95,302	94,910	94,517	94,125	93,732	93,339	92,946	92,553	92,160
0	100,000	99,609	99,218	98,827	98,436	98,045	97,653	97,262	96,870	96,478	96,086
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10

°C	0	1	2	3	4	5	6	7	8	9	10
0	100,000	100,391	100,781	101,172	101,562	101,953	102,343	102,733	103,123	103,513	103,902
10	103,902	104,292	104,681	105,071	105,460	105,849	106,238	106,627	107,016	107,404	107,793
20	107,793	108,181	108,570	108,958	109,346	109,734	110,122	110,509	110,897	111,284	111,672
30	111,672	112,059	112,446	112,833	113,220	113,607	113,994	114,380	114,767	115,153	115,539
40	115,539	115,925	116,311	116,697	117,083	117,469	117,854	118,240	118,625	119,010	119,395
50	119,395	119,780	120,165	120,550	120,934	121,319	121,703	122,087	122,471	122,855	123,239
60	123,239	123,623	124,007	124,390	124,774	125,157	125,540	125,923	126,306	126,689	127,072
70	127,072	127,454	127,837	128,219	128,602	128,984	129,366	129,748	130,130	130,511	130,893
80	130,893	131,274	131,656	132,037	132,418	132,799	133,180	133,561	133,941	134,322	134,702
90	134,702	135,083	135,463	135,843	136,223	136,603	136,982	137,362	137,741	138,121	138,500
100	138,500	138,879	139,258	139,637	140,016	140,395	140,773	141,152	141,530	141,908	142,286
110	142,286	142,664	143,042	143,420	143,797	144,175	144,552	144,930	145,307	145,684	146,061
120	146,061	146,438	146,814	147,191	147,567	147,944	148,320	148,696	149,072	149,448	149,824
130	149,824	150,199	150,575	150,950	151,326	151,701	152,076	152,451	152,826	153,200	153,575
140	153,575	153,950	154,324	154,698	155,072	155,446	155,820	156,194	156,568	156,941	157,315
150	157,315	157,688	158,061	158,435	158,808	159,180	159,553	159,926	160,298	160,671	161,043
160	161,043	161,415	161,787	162,159	162,531	162,903	163,274	163,646	164,017	164,388	164,760
170	164,760	165,131	165,501	165,872	166,243	166,613	166,984	167,354	167,724	168,095	168,465
180	168,465	168,834	169,204	169,574	169,943	170,313	170,682	171,051	171,420	171,789	172,158
190	172,158	172,527	172,895	173,264	173,632	174,000	174,368	174,736	175,104	175,472	175,840
200	175,840	176,207	176,575	176,942	177,309	177,676	178,043	178,410	178,777	179,143	179,510
210	179,510	179,876	180,242	180,609	180,975	181,340	181,706	182,072	182,437	182,803	183,168
220	183,168	183,533	183,899	184,264	184,628	184,993	185,358	185,722	186,087	186,451	186,815
230	186,815	187,179	187,543	187,907	188,271	188,634	188,998	189,361	189,724	190,088	190,451
240	190,451	190,813	191,176	191,539	191,901	192,264	192,626	192,988	193,350	193,712	194,074
250	194,074	194,436	194,798	195,159	195,520	195,882	196,243	196,604	196,965	197,326	197,686
260	197,686	198,047	198,407	198,768	199,128	199,488	199,848	200,208	200,568	200,927	201,287
270	201,287	201,646	202,006	202,365	202,724	203,083	203,442	203,800	204,159	204,517	204,876
280	204,876	205,234	205,592	205,950	206,308	206,666	207,024	207,381	207,739	208,096	208,453
290	208,453	208,810	209,167	209,524	209,881	210,237	210,594	210,950	211,307	211,663	212,019
300	212,019	212,375	212,731	213,086	213,442	213,797	214,153	214,508	214,863	215,218	215,573

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TERMORESISTANCE

PT100

Ohm output of a PT100 probe. Temperature[°C] vs. resistance [Ohm] IEC 751. - ITS-90.

310	215,573	215,928	216,282	216,637	216,991	217,346	217,700	218,054	218,408	218,762	219,115
320	219,115	219,469	219,822	220,176	220,529	220,882	221,235	221,588	221,941	222,294	222,646
°C	0	1	2	3	4	5	6	7	8	9	10

°C	0	1	2	3	4	5	6	7	8	9	10
330	222,646	222,999	223,351	223,703	224,055	224,407	224,759	225,111	225,463	225,814	226,166
340	226,166	226,517	226,868	227,219	227,570	227,921	228,272	228,622	228,973	229,323	229,673
350	229,673	230,023	230,373	230,723	231,073	231,423	231,772	232,122	232,471	232,820	233,169
360	233,169	233,518	233,867	234,216	234,565	234,913	235,261	235,610	235,958	236,306	236,654
370	236,654	237,002	237,349	237,697	238,044	238,392	238,739	239,086	239,433	239,780	240,127
380	240,127	240,473	240,820	241,166	241,513	241,859	242,205	242,551	242,897	243,242	243,588
390	243,588	243,933	244,279	244,624	244,969	245,314	245,659	246,004	246,349	246,693	247,038
400	247,038	247,382	247,726	248,070	248,414	248,758	249,102	249,445	249,789	250,132	250,476
410	250,476	250,819	251,162	251,505	251,848	252,190	252,533	252,875	253,218	253,560	253,902
410	250,476	250,819	251,162	251,505	251,848	252,190	252,533	252,875	253,218	253,560	253,902
420	253,902	254,244	254,586	254,928	255,269	255,611	255,952	256,294	256,635	256,976	257,317
430	257,317	257,658	257,999	258,339	258,680	259,020	259,360	259,700	260,040	260,380	260,720
440	260,720	261,060	261,399	261,739	262,078	262,417	262,757	263,096	263,434	263,773	264,112
450	264,112	264,450	264,789	265,127	265,465	265,803	266,141	266,479	266,817	267,154	267,492
460	267,492	267,829	268,167	268,504	268,841	269,178	269,514	269,851	270,188	270,524	270,860
470	270,860	271,197	271,533	271,869	272,204	272,540	272,876	273,211	273,547	273,882	274,217
480	274,217	274,552	274,887	275,222	275,557	275,891	276,226	276,560	276,894	277,228	277,562
490	277,562	277,896	278,230	278,564	278,897	279,231	279,564	279,897	280,230	280,563	280,896
500	280,896	281,229	281,561	281,894	282,226	282,558	282,891	283,223	283,555	283,886	284,218
510	284,218	284,550	284,881	285,212	285,544	285,875	286,206	286,537	286,867	287,198	287,528
520	287,528	287,859	288,189	288,519	288,849	289,179	289,509	289,839	290,168	290,498	290,827
530	290,827	291,156	291,486	291,815	292,144	292,472	292,801	293,130	293,458	293,786	294,114
540	294,114	294,443	294,770	295,098	295,426	295,754	296,081	296,409	296,736	297,063	297,390
550	297,390	297,717	298,044	298,370	298,697	299,023	299,350	299,676	300,002	300,328	300,654
560	300,654	300,980	301,305	301,631	301,956	302,282	302,607	302,932	303,257	303,582	303,906
570	303,906	304,231	304,556	304,880	305,204	305,528	305,852	306,176	306,500	306,824	307,147
580	307,147	307,471	307,794	308,117	308,440	308,763	309,086	309,409	309,732	310,054	310,376
590	310,376	310,699	311,021	311,343	311,665	311,987	312,308	312,630	312,951	313,273	313,594
600	313,594	313,915	314,236	314,557	314,878	315,198	315,519	315,839	316,160	316,480	316,800
610	316,800	317,120	317,440	317,760	318,079	318,399	318,718	319,037	319,356	319,675	319,994
620	319,994	320,313	320,632	320,950	321,269	321,587	321,905	322,224	322,541	322,859	323,177
630	323,177	323,495	323,812	324,130	324,447	324,764	325,081	325,398	325,715	326,032	326,348
640	326,348	326,665	326,981	327,297	327,614	327,930	328,245	328,561	328,877	329,192	329,508
650	329,508	329,823	330,138	330,453	330,768	331,083	331,398	331,713	332,027	332,342	332,656
660	332,656	332,970	333,284	333,598	333,912	334,225	334,539	334,852	335,166	335,479	335,792
670	335,792	336,105	336,418	336,731	337,043	337,356	337,668	337,981	338,293	338,605	338,917
680	338,917	339,229	339,540	339,852	340,164	340,475	340,786	341,097	341,408	341,719	342,030
690	342,030	342,341	342,651	342,962	343,272	343,582	343,892	344,202	344,512	344,822	345,132
700	345,132	345,441	345,751	346,060	346,369	346,678	346,987	347,296	347,604	347,913	348,222
710	348,222	348,530	348,838	349,146	349,454	349,762	350,070	350,378	350,685	350,993	351,300
720	351,300	351,607	351,914	352,221	352,528	352,835	353,141	353,448	353,754	354,060	354,367
730	354,367	354,673	354,979	355,284	355,590	355,896	356,201	356,506	356,812	357,117	357,422
740	357,422	357,727	358,031	358,336	358,641	358,945	359,249	359,553	359,857	360,161	360,465
750	360,465	360,769	361,073	361,376	361,679	361,983	362,286	362,589	362,892	363,194	363,497
760	363,497	363,800	364,102	364,404	364,707	365,009	365,311	365,613	365,914	366,216	366,517
770	366,517	366,819	367,120	367,421	367,722	368,023	368,324	368,625	368,925	369,226	369,526
780	369,526	369,826	370,127	370,427	370,726	371,026	371,326	371,625	371,925	372,224	372,523
790	372,523	372,822	373,121	373,420	373,719	374,017	374,316	374,614	374,913	375,211	375,509
800	375,509	375,807	376,105	376,402	376,700	376,997	377,295	377,592	377,889	378,186	378,483

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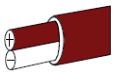
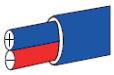
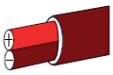
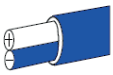
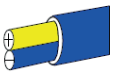
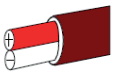
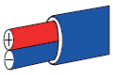
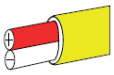
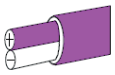
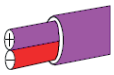
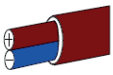
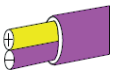
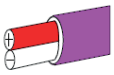
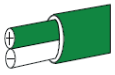
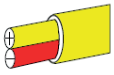
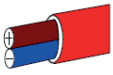
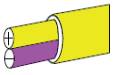
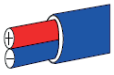
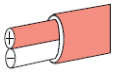
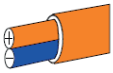
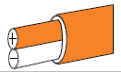
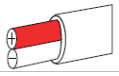
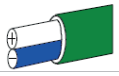
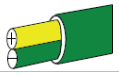
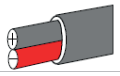
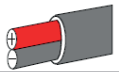
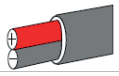
ITERNATIONAL THERMOCOUPLE CABLES COLOR CODING

	TEMPERATURE RANGE (°C)	IEC 584-3 (Europe)	ANSI (USA,Canada)	DIN43710 (German Hollan)	BS1843 (U.K-Czechoslovakia)	NFE 18001 (France)	JIS 1610-1981 (Japan)
T Copper + Copper-Nikel -	-270/+400						
J Iron + Copper-Nikel -	-200/+760						
E Nikel - Cromo + Nikel - Aluminium	-270/+1000						
K Nikel - Cromo + Nikel - Aluminium	-270 /+1372						
N Nikel - Cromo - Silicon+ Nikel - Silicon- Manganesia	-270 /+1300						
S & R Platinum - Rho + Platinum -	-50/+1768						
B Platinum 30% - Rho + Platinum -	0/+1820						

LA TERMOTECNICA