Temperature Sensing Product Catalogue

Professional · Quality · Innovation

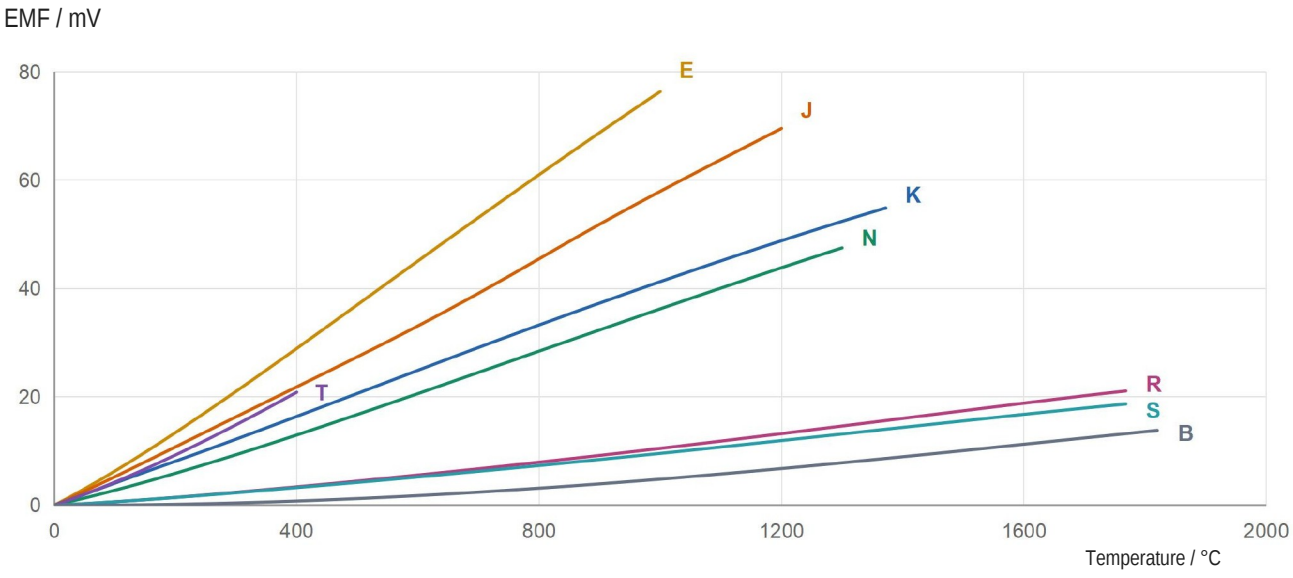
Thermocouple Fundamentals

A thermocouple uses two different conductors to measure temperature through the thermoelectric effect. Thermocouple types have different EMF outputs and operating conditions; reference-junction temperature compensation is required.

Common Thermocouple Types

K NiCr / NiSi	Wide range and good oxidation resistance; widely used in furnaces, heat treatment and process measurement. Protect in reducing atmospheres.
E NiCr / constantan	High EMF output for sensitive measurement. Suitable for oxidizing or inert atmospheres and low temperatures.
J Iron / copper-nickel	General industrial use. The iron leg can rust in damp conditions; protect it in high-temperature oxidizing atmospheres.
T Copper / constantan	Good low-temperature stability for low and cryogenic temperatures. Use suitable protection for prolonged service.
N NiCrSi / NiSiMg	Good high-temperature oxidation resistance and long-term stability. Select for the atmosphere and protective construction.

Thermocouple EMF and Temperature



Reference junction: 0°C. Curves use NIST ITS-90 reference functions and show non-negative temperatures only. Curve endpoints are not product ratings; service limits depend on wire diameter, sheath material, atmosphere and installation.



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We develop and manufacture precision temperature sensing and heating products. Advanced technology, strict quality control and comprehensive service support reliable, stable solutions for metallurgy, chemicals, energy, aerospace, laboratories and automation, helping customers operate efficiently, safely and sustainably.

About Us

Changzhou OSK Special Cable Co., Ltd.

Established in the 1980s as the former Xinhe Special Wire Factory in Lucheng, Changzhou, we have over 40 years of experience in special mineral insulation and precision thermocouples.

Decades of development have built an integrated factory covering MI stock drawing, high-density insulation filling, custom structural design and finished thermocouple production.

We serve demanding supply chains in semiconductor process control, medical devices, aerospace, defense research and advanced chemicals, where temperature, insulation and pressure performance are critical.



Factory aerial view



Factory building

Why OSK

Independent R&D, standardized management, supplier qualifications and technical patents support our role as a qualified supplier to defense organizations, universities and multinational manufacturers.

- Independent R&D and patents
- Qualified defense supplier
- University and multinational supplier
- Certified quality management

Milestones

1986 Company founded
Focus on temperature sensing and specialized measurement products.

2000 Production line built
Our first independently developed MI line enabled in-house, scaled thermocouple production.

2002 Sales channels expanded
Online sales launched, with improved company structure, sales channels and customer service.

2002—2012 Supplier partnerships expanded
Supplied PLA Factory 6456, Xi'an Jiaotong University, AVIC and AECC for research, aerospace, defense and advanced equipment.

2020 Capacity expanded
Factory expansion improved production scale, delivery efficiency and custom manufacturing.

2020—2026 Stable supply across industries
Supplied the Beijing Institute of Satellite Environment Engineering, NUDT and other customers in defense, aerospace, semiconductors, medical devices and new energy.

Company Overview

01

Core capabilities

- In-house design and manufacture of MI wire drawing and precision annealing lines.
- High-density MgO filling for uniform, stable insulation.
- An in-house laboratory with high-voltage insulation tests, X-ray inspection and precision electrical test systems.

02

Products and focus

- Fine-diameter MI materials with heat resistance, fast response and strong interference resistance.
- Multiple drawing specifications, sheath materials and precision fine-diameter MI thermocouples.
- Semiconductor, precision sensing and new-energy equipment applications.

03

Technology and processes

- Fine-wire drawing with mature processes and tight dimensional accuracy.
- Fine thermocouples for fast, accurate measurement.
- Custom thermocouples and parts for special conditions.
- Nickel-clad copper balances conductivity, heat and oxidation resistance for cost-sensitive electrical uses.
- Industrial sensing wire for complex environments.

04

Quality and service

- Standardized production throughout, with products meeting international standards.
- Core products used in aerospace, semiconductors, medical devices and precision manufacturing.
- Technical support and custom solutions.
- Continuous improvements for demanding global markets.

Quality Assurance

Quality as our foundation Innovation as our drive Customer focus

Awards and Qualifications



High-tech enterprise certificate



Specialized and innovative SME



High-tech product certificate

Management System Certification



Quality management



Occupational health and safety



Environmental management

Quality Assurance

Quality as our foundation Innovation as our drive Customer focus

Test Reports



Calibration certificate



Test report



Verification certificate

Selected Customers

Beijing Institute of Satellite Environment Engineering

National University of Defense Technology

PLA Factory 6456

Forcecon Technology Co., Ltd.

Shenzhen S.C New Energy Technology Corporation

Shanghai Meili Weiye Medical Technology Co., Ltd.

Product Applications

Precision temperature measurement and signal transmission for demanding industrial applications requiring heat resistance, accuracy, fast response and interference resistance, supported by an agile supply chain.

Aerospace and Power

For extreme temperature differences and vibration.



New Energy and Photovoltaics

Precision sensing throughout battery and PV production.



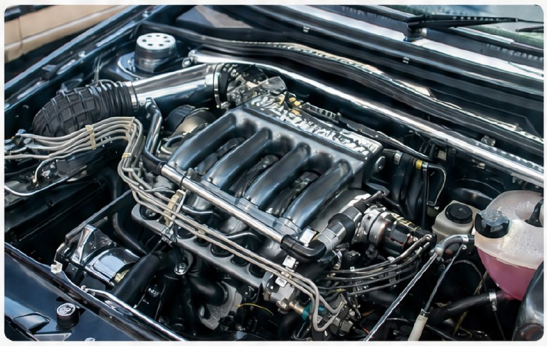
Semiconductors and Precision Manufacturing

Temperature control for chips and precision instruments.



Automotive and Transport

Thermal management for engines and new-energy powertrains.



Medical and Life Sciences

Sensitive sensing for minimally invasive procedures and devices.



Industry and Food Processing

Food-grade probes and industrial temperature sensing.



Inventory and Delivery

Stock: dispatch in 24 h

Assessment: reply in 24 h

100% final inspection





Managed Warehouse

Zoned storage · ample stock · first in, first out
Accurate inventory and efficient turnover

01

Fast Stock Dispatch

Standard products held in stock with systematic inventory control. Dispatch within 24 hours after order confirmation helps keep production running.

02

Efficient Custom Orders

Our technical team assesses requirements promptly. Flexible scheduling and supply-chain coordination support on-time custom delivery.

03

Priority for Urgent Orders

Priority handling and dedicated follow-up shorten lead times and respond quickly to urgent requirements.

04

Quality at Every Stage

Strict inspection from raw materials to finished products, including 100% final inspection, supports reliable product quality.

How a Thermocouple Works

A thermocouple uses two dissimilar metal conductors. A temperature difference between the measuring and reference junctions generates an EMF. The instrument calculates temperature from this voltage and the reference-junction temperature using cold-junction compensation.

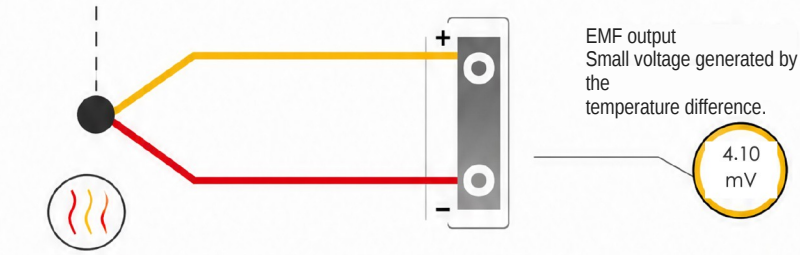
Operating principle

Measuring (hot)

Two different metal wires join at the measuring end.

Reference (cold)

Instrument-terminal temperature must be known or measured.

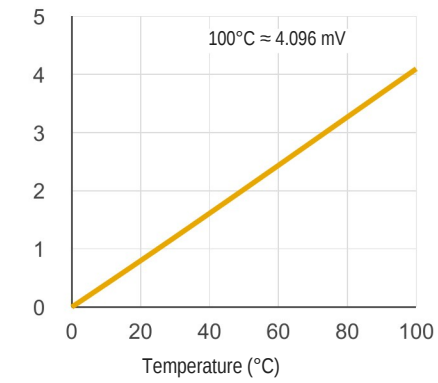


EMF output
Small voltage generated by the temperature difference.

Measured temperature
Hot junction
100°C

Reference temperature (cold junction)
0°C in this example; actual instruments provide cold-junction compensation.

Temperature and Voltage



Type K; reference 0°C; approximately 4.10 mV at 100°C

Test Equipment



High-temperature calibration furnace



Constant-temperature oil bath



Dry-well calibrator



Microfocus X-ray inspection system



Insulation resistance tester



Precision temperature logger

Mineral Insulated Thermocouples



About MI Thermocouples

An MI thermocouple combines thermocouple conductors, insulation and a metal sheath into a robust, drawn assembly.

Compact and durable, MI thermocouples work with transmitters, controllers and displays for process measurement and control. Service temperature depends on type, sheath, probe and conditions. A range of 0-1800°C does not apply universally to all MI thermocouples.



Enlarged MI cross-section

Conductors and Materials

- Thermocouple wire: K, T, J, E, N, R, S, B
- Insulation: alumina or magnesium oxide; MgO is most widely used.
- Sheath: 304, 316L, 310S, Inconel 600, GH3039, GH3030, Hastelloy and others.

Three Common Junction Types

1. Exposed junction
   Fast response for applications such as engine exhaust; lower mechanical strength.



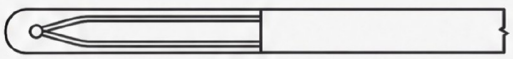
Exposed

2. Grounded junction
   Junction welded to the sheath for fast response. Assess grounding and noise. Nominal pressure reference: 34 MPa; confirm by model and conditions.



Grounded

3. Ungrounded junction
   Electrically isolated from the sheath to reduce ground-loop and noise effects. Usually slower than an equivalent grounded junction.



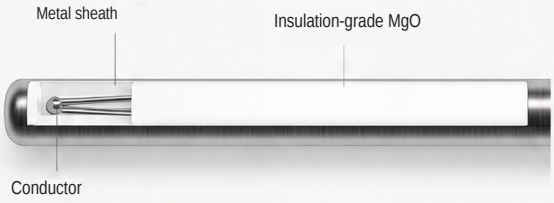
Ungrounded

MI Probes and Mounting Options

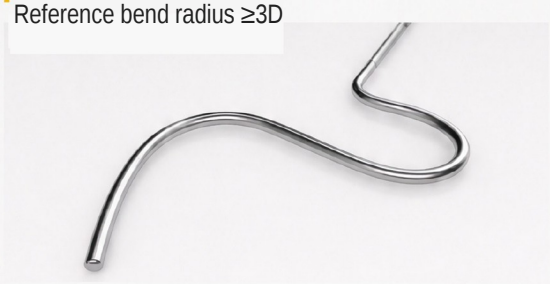
Conductors, insulation and sheath form a drawn assembly. Bending must meet the requirements of the specific probe construction.

MI Probe Construction

Thermocouple conductors, insulation-grade MgO and a metal sheath form one assembly; shape to the specified minimum bend radius.



Probe may be formed as specified
Reference bend radius ≥3D





Default probe: 6 × 40 mm; custom sizes available.



Flexible strain relief protects the lead.

Mounting Options

No fixed fitting, fixed thread, adjustable compression fitting or flange. Select mounting position and sealing for the operating conditions.



No fixed fitting
Convenient for spot measurement.



Fixed thread
Custom thread; fixed position.



Compression fitting
Adjustable insertion depth; custom thread and ferrule.



Flange
Fixed, sealed mounting; custom flange size.

Electrical Terminations

Available MI thermocouple types can use plugs, terminals, pins or bare leads with compatible measuring instruments.



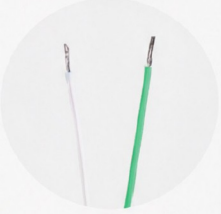
Plug
Portable instruments



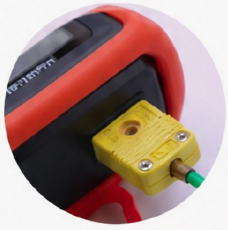
Terminals
Transmitters and controllers



Pins
Recorders and PLCs

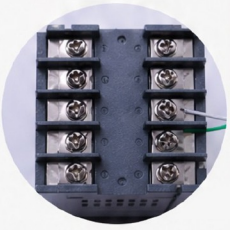


Bare leads
Transmitters and controllers









MI Thermocouple Thermal Response Reference

Thermal Response Time

MI outside diameter mm	Grounded response s	Ungrounded response s	Temperature step °C	Test conditions
0.25	0.007	0.012	Ambient to 100	Boiling water
0.5	0.027	0.031	Ambient to 100	Boiling water
0.5	0.030	0.050	Ambient to 100	Boiling water
1.0	0.077	0.117	Ambient to 100	Boiling water
1.0	0.070	0.120	0 to 100	Boiling water
1.6	0.150	0.200	0 to 100	Boiling water
1.6	0.180	0.260	Ambient to 100	Boiling water
2.3	0.260	0.410	Ambient to 100	Boiling water
3.2	0.400	0.500	0 to 100	Boiling water
3.2	0.460	0.900	Ambient to 100	Boiling water
4.8	0.730	1.200	0 to 100	Boiling water
4.8	1.600	2.400	Ambient to 100	Boiling water
6.4	1.200	2.400	0 to 100	Boiling water
6.4	2.200	3.700	Ambient to 100	Boiling water
8.0	2.100	3.900	0 to 100	Boiling water
8.0	4.000	5.800	Ambient to 100	Boiling water

Notes
1. Boiling-water tests; values are response-time references.
2. Confirm t50 / t63.2 / t90, immersion and flow conditions in the test report.
3. For equivalent structures, smaller diameters and grounded junctions usually respond faster.



MI Probe Diameter and Test Parameters

Outside diameter D mm	Diameter tolerance mm	Withstand test V	Reference bend radius
0.5	±0.025	100	≥3D
1.0	±0.025	100	≥3D
1.5	±0.025	100	≥3D
2.0	±0.025	500	≥3D
3.0	±0.030	500	≥3D
3.2	±0.032	500	≥3D
4.0	±0.040	500	≥3D
4.5	±0.045	500	≥3D
4.8	±0.048	500	≥3D
6.0	±0.060	500	≥3D
6.4	±0.064	500	≥3D
8.0	±0.080	500	≥3D
9.5	±0.095	500	≥3D
10.8	±0.108	500	≥3D

Confirm AC/DC test format, duration and acceptance criteria against the product test specification.

Recommended MI Thermocouple Temperatures

Unit: °C

Type	Ø0.25-0.5 mm	Ø1.0 mm	Ø1.5-3.0 mm	Ø4.5-6.0 mm
T	350	350	350	350
J	500	650	750	750
E	500	700	850	900
K	500	700	900	1,100
N	500	700	1,000	1,200

Notes

1. Recommended values for conventional conditions, for selection reference only.
2. Actual limits depend on sheath, atmosphere, corrosiveness, installation and required life.
3. High-temperature Types S, R and B generally use alumina or ceramic tubes; a direct metal-sheathed MI construction is generally not recommended.

Sheath Material Temperature Reference

Unit: °C

Sheath	Ø0.25-0.5 mm	Ø1.0 mm	Ø1.5-3.0 mm	Ø4.5-6.0 mm
304	500	700	800	900
316L	500	700	800	900
310S	500	800	950	1,100
Inconel 600	500	700	1,050	1,150
GH3039	700	900	1,100	1,200
Hastelloy	500	700	900	1,000

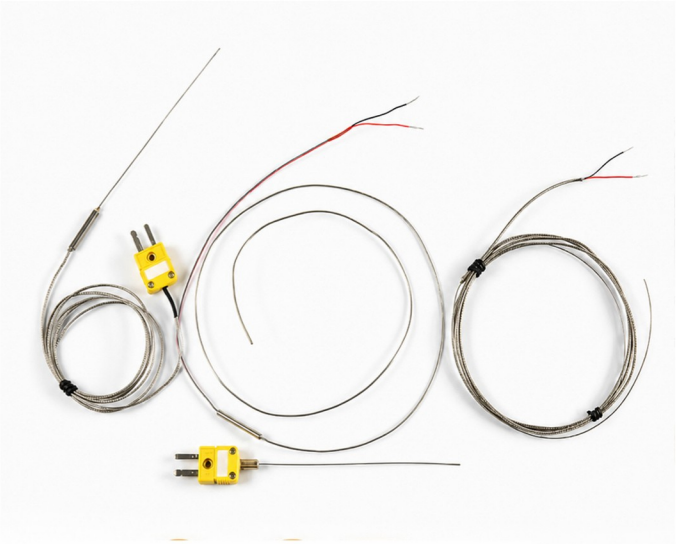
Notes

1. Conventional material reference values, rather than complete-probe ratings.
2. Confirm continuous or short-term temperature and grade; consider atmosphere, corrosion and life.
3. Verify the specific product limits for high temperature, severe corrosion, vibration or special atmospheres.

Fine-Diameter MI Thermocouples

Fine diameters · Custom designs · Dedicated manufacture

We develop and manufacture fine-diameter MI thermocouples for confined spaces, complex structures and special conditions. Our product-development and production experience supports custom dimensions, construction and connections for your application and installation.



Ø0.25 mm

Outside diameter down to

Key Advantages

Fine diameters
For confined spaces, precision equipment and complex installations.

Custom manufacture
Custom diameter, length, type, sheath, junction, shape, mounting and termination.

Manufacturing experience
Long-term expertise in product development, processing and special applications.

Fast response
Small dimensions and low thermal mass for rapid temperature measurement.

Custom Options

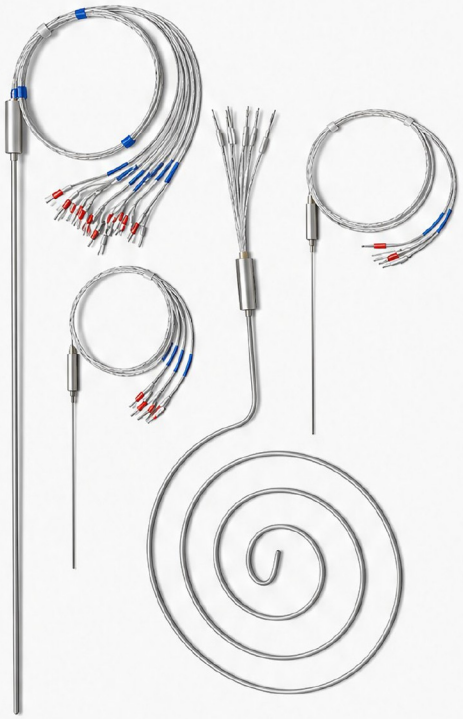
Diameter	Ø0.25 / 0.5 / 0.8 / 1.0 / 1.5 / 2.0 mm ...
Type	K / J / E / T / N / S / R / B
Sheath	SUS304 / SUS316 / 310S / Inconel ...
Junction	Grounded / ungrounded / exposed / special
Construction	Straight / bent / preformed / threaded / compression / special
Termination	High-temperature leads / compensating cable / standard or miniature connectors / custom

Confirm available combinations of diameter, type and sheath for the specific model.

From a Thermocouple to a Complete Custom Solution

Requirements → Application analysis → Design → Sample approval → Production → Final inspection

Multipoint Thermocouples



Multipoint thermocouples measure several positions within one area. Multiple sensing points are integrated into a protection tube or assembly with different lengths and positions, for monitoring temperature distribution, gradients and critical process points.

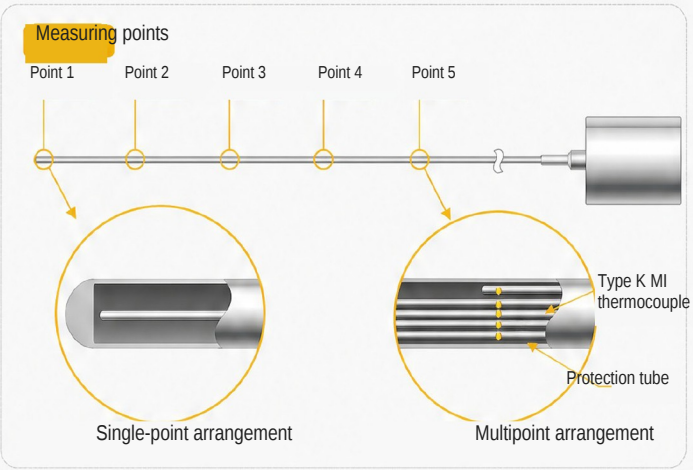
They collect more temperature data in limited space, reduce vessel penetrations and simplify installation for more complete monitoring.

Sensing-point count and spacing, tube material, wiring and mounting can be customized for high temperature, high pressure, corrosion and wear.

Used in reactors, tanks, towers, furnaces, piping, chemical plants and power systems to support operating monitoring, process optimization, safety interlocks and fault diagnosis.

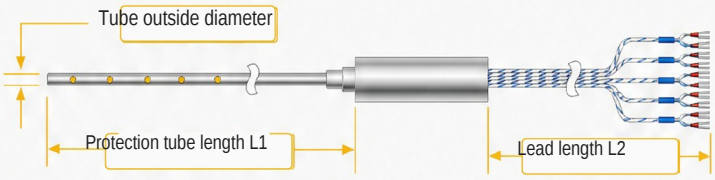
Features

- Multiple points in one sensor to monitor temperature distribution.
- Fewer equipment penetrations and simpler installation and maintenance.
- Custom point count, position and length.
- Types K, J, E, N and T available.
- Tube materials for heat, corrosion and wear.
- Stable output for continuous process measurement.



Applications

- Temperature profiles in chemical reactors.
- Different heights in tanks and silos.
- Furnace and heat-treatment zones.
- Critical points in piping, towers and pressure vessels.
- Power, metallurgy and petrochemical processes.



L1: protection tube length excluding leads.
L2: lead length from the connection to the terminal end.

Ultrafine Thermocouple Wire

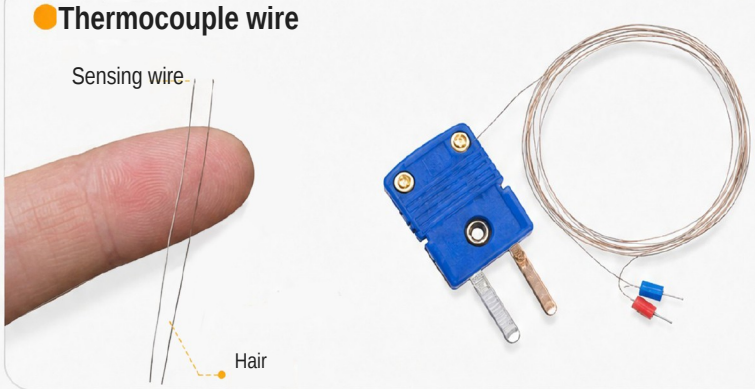


Hair-fine conductors

Surface sensing in small spaces

Minimally invasive procedures, electronic chips and lithium batteries

Thermocouple wire



Connectors



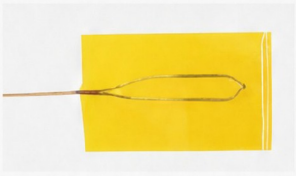
Probe Options

Welded junction, foil, adhesive foil and small-tube probes for different temperature measurements.

Welded junction
Very small spaces



Foil
Surfaces or narrow gaps



Adhesive foil
Surface temperature

Small metal tube
Liquids or internal temperatures

Specifications

Sensing wire

Connectors

Parameter	Type K ultrafine wire	Type T ultrafine wire
Type	K	T
Insulation	Polyesterimide / polyimide / polyester	Polyesterimide / polyimide / polyester
Temperature*	-20 to 200°C / -20 to 260°C	-200 to 200°C / -200 to 260°C
Tolerance	Class 1	Class 1
Conductors	NiCr (+) / NiSi (-)	Copper (+) / constantan (-)
Conductor diameter	0.05-0.2 mm	0.05-0.2 mm
Overall diameter	Custom	Custom
Enamel thickness	Custom	Custom
Enamel color	Custom	Custom
Termination	Custom	Custom

* Confirm the insulation grade and corresponding temperature range for the operating conditions. Under IEC 60584-1, Type T Class 1 tolerance applies from -40 to 260°C; lower-temperature tolerances are specified separately.

Reduced-Tip Thermocouples



1 Applications

Temperature measurement in limited space while maintaining mechanical strength.



2 Manufacturing Principle

Local reduction of the sensing end uses plastic deformation to compress the sheath, MgO insulation and thermocouple conductors together. It forms a continuous, uniform reduced section while keeping the internal structure intact and preventing conductor breakage or insulation failure.

Typical reductions

- Ø3.2 to Ø2.3 mm
- Ø6 to Ø3.2 mm
- Ø4.8 to Ø1.6 mm
- Ø3.0 to Ø1.6 mm

Custom sizes available

3 Design Considerations

1 Reduced-tip dimensions

Select body diameter, reduced diameter and reduced length for response time, installation space and mechanical strength. Balance thermal response with structural strength.

2 Transition design

Use a smooth radiused or tapered transition to avoid abrupt section changes, reduce stress concentration and improve bending and fatigue performance.

3 Manufacturability

Keep reduction within process limits to avoid sheath cracking, conductor damage or reduced insulation performance.

Hot Runner Thermocouples



1 Application

Temperature measurement in injection-mold hot runners: nozzles, manifolds, hot tips and confined spaces inside molds.

2 Features

Fast response **Accurate sensing** **Flexible form** **Heat stability**

Specifications

- Ø0.25 / 0.5 / 0.8 mm
- Ø1.0 / 1.5 / 2.0 mm
- Types K / J / E / T / N
- Straight / bent / preformed

Custom

3 Selection

1 Probe size	2 Tip structure	3 Mounting	4 Connection	5 Materials
Select diameter and length for the hole size and depth.	Select for response speed and installation.	Select for available space and lead routing.	Select for cable distance and environment.	Select for temperature and service conditions.

Product Highlights

- Fine probes for small spaces
- Precision sensing for stable control
- Flexible installation
- Heat stability and durability
- For nozzles, manifolds, hot tips and mold interiors

Miniature MI Heaters



Miniature mineral insulated heaters combine a heating element, insulation and metal sheath through precision processing. Their compact, reliable structure offers efficient heat transfer and fast response for uniform heating in confined installation spaces.

Mechanical strength, high-temperature resistance and long-term stability suit precision heating with demanding size, response and control requirements. Various structures and custom designs support different equipment and operating conditions.

Features

Compact design

Flexible installation in space-limited equipment.

Robust construction

Reliable MI construction resists vibration and shock.

Fast response

Close element-to-sheath contact improves heat transfer for rapid heat-up.

Stable control

For precision temperature control and continuous heating.

Applications

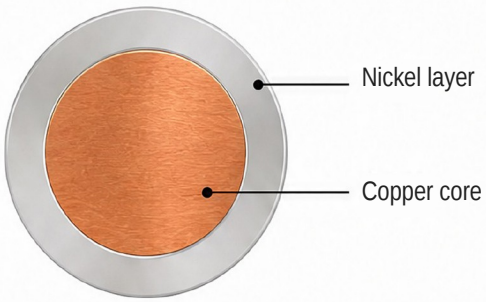
Semiconductor equipment, analytical and test instruments, medical devices, precision molds, hot runners, automation, laboratories and other processes requiring rapid heating and stable control.

Parameter	Options
Sheath outside diameter	Ø0.5 / 1.0 / 1.5 / 2.0 / 3.0 / 4.0 / 5.0 / 6.0 mm; custom
Sheath material	SUS304 / SUS316L / SUS321 / SUS310S / Inconel 600, etc.
Heating wire	Cr20Ni80 (NiCr80/20) / iron-chromium-aluminum (FeCrAl)
Insulation	High-purity magnesium oxide (MgO)
Lead arrangement	Single-ended or double-ended; custom
Rated voltage	12 / 24 / 36 / 48 / 110 / 220 / 380 V or custom
Power	Custom
Heated length	Custom
Overall length	Custom
Cold section length	Custom
Lead length	Custom
Lead types	Nickel-plated copper / nickel / fiberglass / silicone / PTFE
Lead exit	Axial / radial / 90° bend / custom
Mounting	Direct insertion / thread / flange / compression fitting
Seal	Epoxy / silicone / ceramic

Nickel-Clad Copper Wire

High conductivity High temperature resistance High strength

Composite construction



Product appearance



Specifications

Material: nickel-clad copper composite wire
Nickel: (30 ± 3)% (confirm the measurement basis in the specification)
Copper core: balance, approximately 67%-73%
Diameter: 0.15-8.0 mm

Features

Low resistivity
High conductivity
Corrosion resistance
High-temperature oxidation resistance
High tensile strength
Strong nickel-to-copper bond

Material advantages

Copper core
High conductivity
Low resistivity
Good ductility
Nickel layer
High-temperature resistance
Oxidation resistance
Corrosion resistance

Applications

Thermocouples and sensing
Automotive systems
High-temperature cables
Industrial equipment
Heating elements
Special electrical connections

Pure Silver Wire



High purity · High conductivity · Reliable · Custom

1 Application

Electronics, sensors, precision instruments, aerospace, advanced connections and industrial measurement.

2 Features

Conductivity **High purity** **Ductility** **Reliability**

3 Specs

- Diameter: custom.
- Purity: various silver grades to suit requirements.
- Conductor: solid, stranded or special.
- Length and packing: cut lengths, spools or coils.
- Custom designs for temperature, conductivity and other requirements.

4 Applications

Electronics | Sensors | Precision | Aerospace | Connections | Industry

5 Custom Process

Requirements → Material selection → Specifications → Precision processing → Testing → Delivery

Product Highlights

- High-purity silver for excellent conductivity
- Good ductility for complex processing
- Stable and reliable in diverse applications
- Custom manufacture and prompt response

Thermocouple Extension and Compensating Cable

Types K / T / J / N / R / S and others

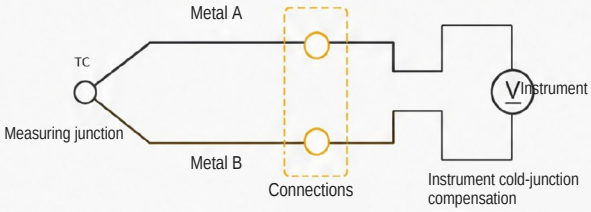


Extension vs. Compensating Cable

Extension cable (e.g. KX) uses the same nominal conductor alloys as its thermocouple. Compensating cable (e.g. KCA/KCB) uses different alloys with matching thermoelectric characteristics within a specified temperature range.

Both carry the thermocouple signal to the instrument. Match type, polarity and temperature range correctly. Cold-junction compensation is performed by the instrument, rather than automatically by the cable.

Construction: conductors, insulation, jacket and optional shield.



Cable Selection and Connection

01 Match the cable to the thermocouple type for matching EMF characteristics within the specified range.

02 Connect the correct polarity. Keep both connection pairs at the same temperature.

03 Keep the cable and thermocouple connection within the specified cable temperature range.

04 Select conductor diameter for the instrument requirements.

Features

Quality alloys
Stable electrical properties and precise EMF matching.

Reliable insulation
Heat and abrasion resistance with good electrical insulation.

Optional shielding
Select for the electromagnetic environment to reduce noise.

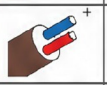
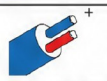
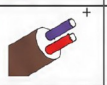
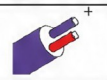
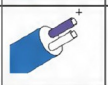
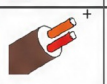
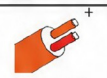
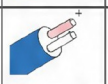
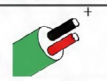
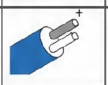
Examples







Thermocouple, Cable and Connector Color Codes
KPS · ANSI · IEC

Connectors			Connectors						
ANSI Code	ANSI / ASTM E-230 Color code · TC grade	Ext. grade	IEC Code	IEC 584-3 Color code · TC grade	Ext. grade	Alloy pair + leg	Alloy pair - leg	Notes Bare-wire atmosphere	Maximum TC-grade range
K			K			NiCr	NiAl (magnetic)	Clean oxidizing or inert atmospheres; limited vacuum or reducing use. Wide range; most common type.	-200 to 1372°C
T			T			Cu	CuNi constantan	Mildly oxidizing, reducing, vacuum or inert. Good in damp conditions and for low-temperature or refrigeration use.	-270 to 400°C
J			J			Fe (magnetic)	CuNi constantan	Reducing, vacuum or inert atmospheres; limited high-temperature reducing use. Not recommended for low temperatures.	-210 to 1200°C
E			E			NiCr	CuNi constantan	Oxidizing or inert; limited vacuum or reducing use. Highest EMF change per degree.	-270 to 1000°C
N			N			NiCrSi	NiSiMg	Alternative to Type K; suited to higher temperatures.	-270 to 1300°C
R	Undefined		R	Undefined		Pt-13Rh	Pt	Oxidizing or inert. Avoid metal tubes and contamination. High-temperature use.	0 to 1600°C
S	Undefined		S	Undefined		Pt-10Rh	Pt	Oxidizing or inert. Avoid metal tubes and contamination. High-temperature use.	0 to 1600°C
B	Undefined		B	Undefined		Pt-30Rh	Pt-6Rh	Oxidizing or inert. Avoid metal tubes and contamination. High-temperature and glass applications.	0 to 1800°C
C* (W5)	Undefined		C (W5)	No IEC standard; use ANSI colors		W-5Re	W-26Re	Vacuum, inert or hydrogen. Protect from oxidation. Impractical below 399°C (750°F); unsuitable for oxidizing atmospheres.	0 to 2320°C

Insulation and Jacket Temperature References

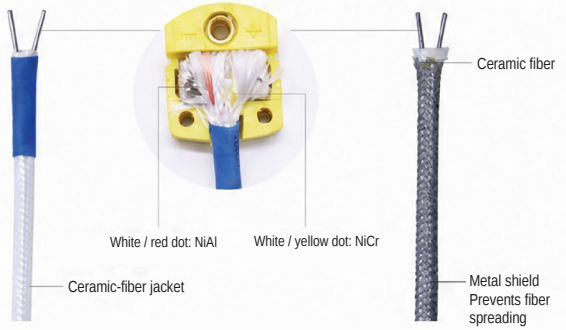
Material	Range °C	Features	Applications
PVC	70-105	Low cost; flexible	Ambient instruments; cabinet wiring
Silicone	180-200	Flexible; bend and thermal-shock resistance	Heaters; molds; moving connections
PTFE	200-260	Heat, chemical and insulation performance	Chemical; semiconductor; precision equipment
PFA	200-260	Chemical resistance; smooth and clean	Semiconductor; medical; clean equipment
Fiberglass	350-500	Heat and aging resistance	Ovens; furnaces; heat treatment
Fiberglass + shield	350-400	EMI, abrasion and heat resistance	Industrial furnaces; strong EMI
Ceramic fiber	600-1000	High heat resistance; lower flexibility	Furnaces; kilns; hot zones
Quartz fiber	500-800	Heat and thermal-shock resistance	High-temperature and heat-treatment furnaces

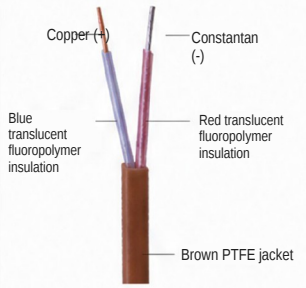
Customization Options

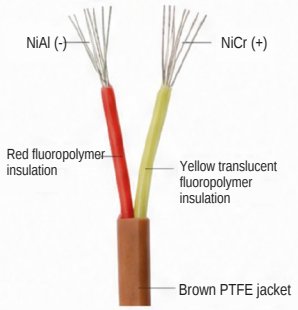
Parameter	Available options
Conductor	Solid / stranded
Core count	2 / 4 / 6 / 8 / custom multicore
Diameter	Ø0.2 / 0.3 / 0.5 / 0.8 / 1.0 / 1.2 mm, etc.
Cross-section	0.2 / 0.3 / 0.5 / 0.75 / 1.0 / 1.5 mm², etc.
Insulation	Single / double layer / insulation plus jacket
Shield	None / tinned copper / stainless braid / foil / overall / individual
Jacket	PVC / silicone / PTFE / PFA / fiberglass / metal braid / ceramic fiber
Color standard	IEC / ANSI / GB / customer specified
Tolerance	Class 1 / Class 2 / special
Packing	Coils / spools / cut lengths / prepared ends

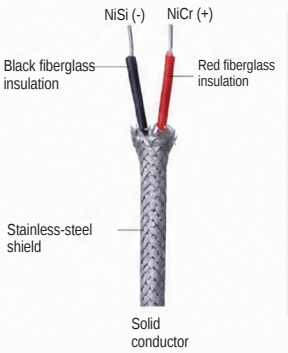
Thermocouple Type and Application Reference

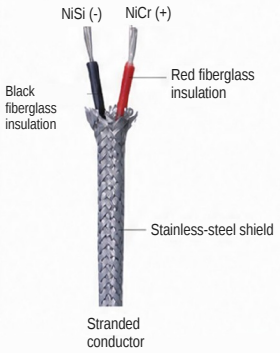
Type	Conductors	Typical cable	Sensor range °C	Main characteristics	Typical applications
K	NiCr / NiSi	K; KX extension; KCA/KCB compensating	-200 to 1260	Versatile; widely used	Heaters; molds; furnaces; piping; machinery
J	Iron / CuNi	J wire; JX extension	-40 to 750	Common at low/medium temperatures; low cost	Plastics; packaging; ovens; older controllers
T	Copper / CuNi	T wire; TX extension	-200 to 350	Good low-temperature stability	Cold chain; laboratories; food; low temperatures
E	NiCr / CuNi	E wire; EX extension	-200 to 900	High EMF and sensitivity	Laboratories; precision sensing; low-signal uses
N	NiCrSi / NiSiMg	N wire; NX/NC cable	-200 to 1300	Heat stability; oxidation resistance	Furnaces; heat treatment; aerospace; advanced equipment
S	Pt-10Rh / Pt	S wire; SC compensating	0 to 1600	High accuracy and stability; higher cost	Lab and calibration furnaces; glass; ceramics; metallurgy
R	Pt-13Rh / Pt	R wire; RC compensating	0 to 1600	High-temperature accuracy and stability	Industrial furnaces; laboratories; noble-metal thermometry
B	Pt-30Rh / Pt-6Rh	B wire; BC compensating	600 to 1700	Very high temperatures; low sensitivity at low temperatures	Metallurgy; glass and ceramic kilns; furnaces

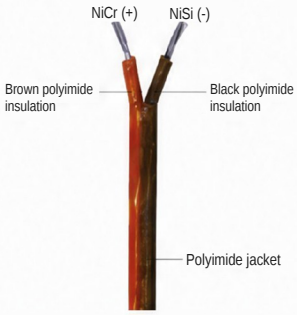

Ceramic fiber
White / red dot: NiAl
White / yellow dot: NiCr
Ceramic-fiber jacket
Metal shield
Prevents fiber
spreading

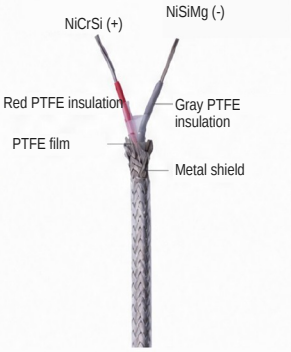

Copper (+)
Constantan
(-)
Blue
translucent
fluoropolymer
insulation
Red translucent
fluoropolymer
insulation
Brown PTFE jacket

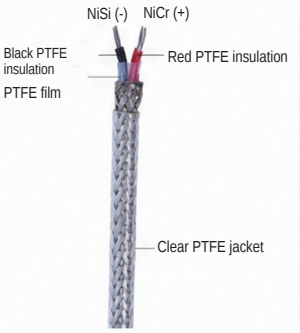

NiAl (-)
NiCr (+)
Red fluoropolymer
insulation
Yellow translucent
fluoropolymer
insulation
Brown PTFE jacket

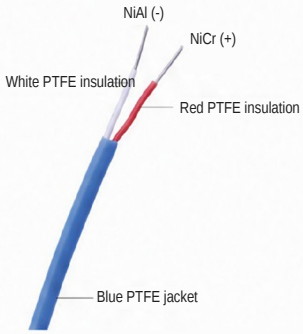

NiSi (-)
NiCr (+)
Black fiberglass
insulation
Red fiberglass
insulation
Stainless-steel
shield
Solid
conductor

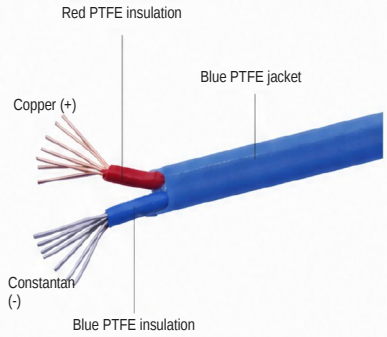

NiSi (-)
NiCr (+)
Black
fiberglass
insulation
Red fiberglass
insulation
Stainless-steel shield
Stranded
conductor


NiCr (+)
NiSi (-)
Brown polyimide
insulation
Black polyimide
insulation
Polyimide jacket

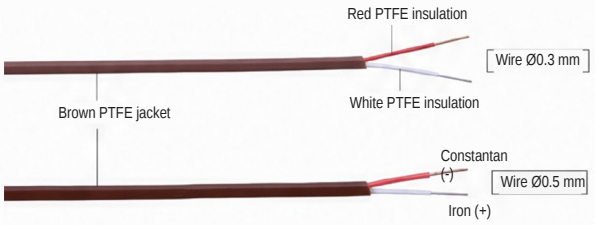

NiCrSi (+)
NiSiMg (-)
Red PTFE insulation
Gray PTFE
insulation
PTFE film
Metal shield

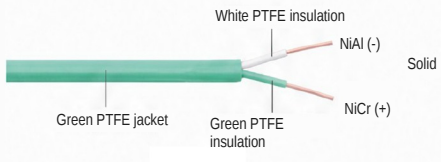

NiSi (-)
NiCr (+)
Black PTFE
insulation
Red PTFE insulation
PTFE film
Clear PTFE jacket

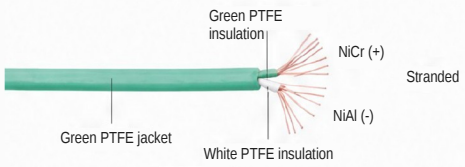

NiAl (-)
NiCr (+)
White PTFE insulation
Red PTFE insulation
Blue PTFE jacket

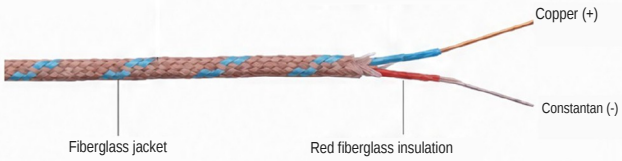

Red PTFE insulation
Blue PTFE jacket
Copper (+)
Constantan
(-)
Blue PTFE insulation

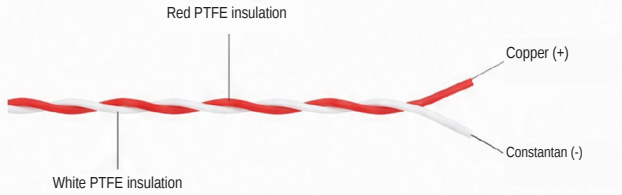

White PTFE insulation
NiAl (-)
NiCr (+)
Blue PTFE jacket
Red PTFE insulation

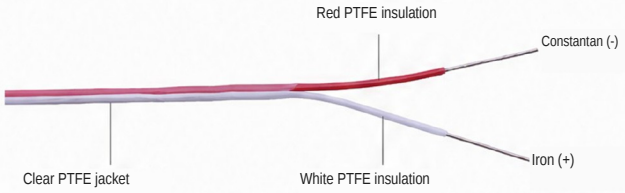

Red PTFE insulation
Wire Ø0.3 mm
Brown PTFE jacket
White PTFE insulation
Constantan
(-)
Wire Ø0.5 mm
Iron (+)

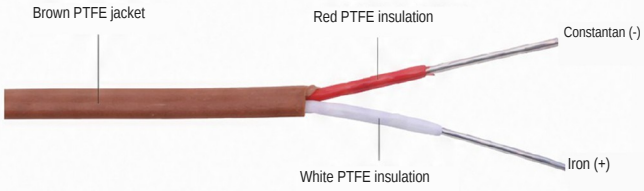

White PTFE insulation
NiAl (-)
Solid
NiCr (+)
Green PTFE jacket
Green PTFE
insulation

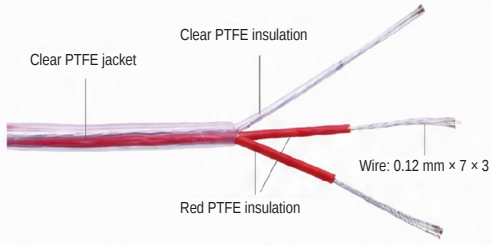

Green PTFE
insulation
NiCr (+)
Stranded
NiAl (-)
Green PTFE jacket
White PTFE insulation

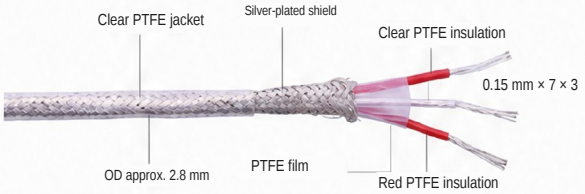

Copper (+)
Constantan (-)
Fiberglass jacket
Red fiberglass insulation

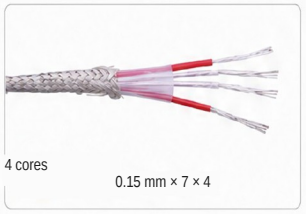

Red PTFE insulation
Copper (+)
Constantan (-)
White PTFE insulation

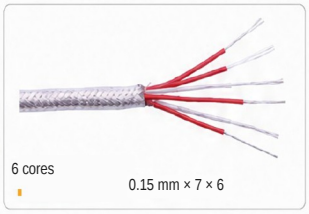

Red PTFE insulation
Constantan (-)
Iron (+)
Clear PTFE jacket
White PTFE insulation

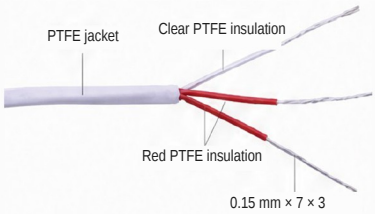

Brown PTFE jacket
Red PTFE insulation
Constantan (-)
Iron (+)
White PTFE insulation

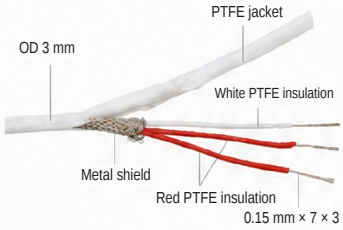

Clear PTFE insulation
Clear PTFE jacket
Wire: 0.12 mm × 7 × 3
Red PTFE insulation

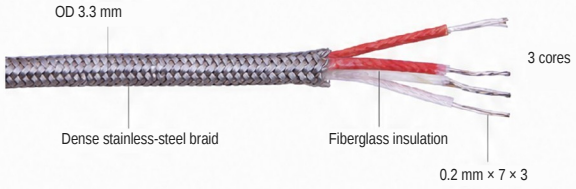

Clear PTFE jacket
Silver-plated shield
Clear PTFE insulation
0.15 mm × 7 × 3
OD approx. 2.8 mm
PTFE film
Red PTFE insulation

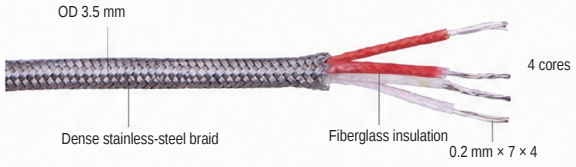

4 cores
0.15 mm × 7 × 4

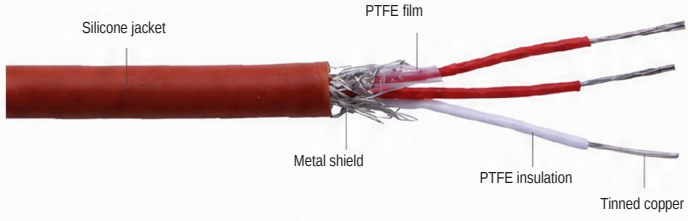

6 cores
0.15 mm × 7 × 6

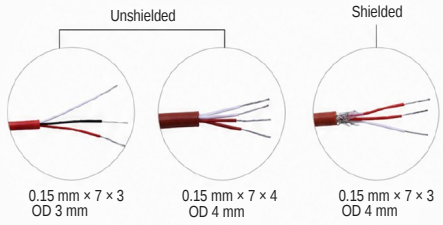

PTFE jacket
Clear PTFE insulation
Red PTFE insulation
0.15 mm × 7 × 3


PTFE jacket
OD 3 mm
White PTFE insulation
Metal shield
Red PTFE insulation
0.15 mm × 7 × 3


OD 3.3 mm
3 cores
Dense stainless-steel braid
Fiberglass insulation
0.2 mm × 7 × 3


OD 3.5 mm
4 cores
Dense stainless-steel braid
Fiberglass insulation
0.2 mm × 7 × 4


PTFE film
Silicone jacket
Metal shield
PTFE insulation
Tinned copper


Unshielded
Shielded
0.15 mm × 7 × 3
OD 3 mm
0.15 mm × 7 × 4
OD 4 mm
0.15 mm × 7 × 3
OD 4 mm

Platinum RTDs



What is an RTD?

A resistance temperature detector (RTD) measures temperature through changes in electrical resistance. Platinum RTDs offer high accuracy and good long-term stability for industrial processes and calibration. The actual temperature range and tolerance depend on the element and probe construction.

Three RTD Lead Configurations

2-wire: one lead connects to each end of the platinum element. The reading includes lead resistance, with error affected by lead length, material and ambient temperature. Suitable for short leads or measurements that can accept the resulting error.

3-wire: one end has one lead and the other has two. An appropriate measurement circuit and matched lead resistances reduce the influence of lead resistance. Common in industrial process measurement.

4-wire: two leads connect to each end. Two provide excitation current and two measure the voltage across the element (Kelvin connection), substantially reducing lead-resistance error for high-accuracy measurement.

Platinum RTD Elements

Fast response



Element tolerance options
A, B, 2 × B, 1/3B, 1/10B. Confirm fractional tolerances and applicable temperature ranges for the specific element.

Pt100 versus Pt1000

1 Resistance sensitivity
For the same temperature coefficient, the change per °C of Pt1000 is 10 times that of Pt100. For α = 0.00385/°C, averages over 0-100°C are:
Pt1000: 3.85 Ω/°C
Pt100: 0.385 Ω/°C
Resistance sensitivity is not thermal response speed.

2 Operating temperature
Determined by element construction, probe design and service conditions, rather than nominal resistance alone.

Pt100 Tolerance Reference

Permissible deviation (±°C)

Temperature °C	Class A	1/3DIN	1/10DIN
-100	0.35		
-50	0.25	0.18	
0	0.15	0.10	0.03
100	0.35	0.27	0.08
200	0.55	0.43	
250	0.65	0.52	
300	0.75		
350	0.85		
400	0.95		
450	1.05		

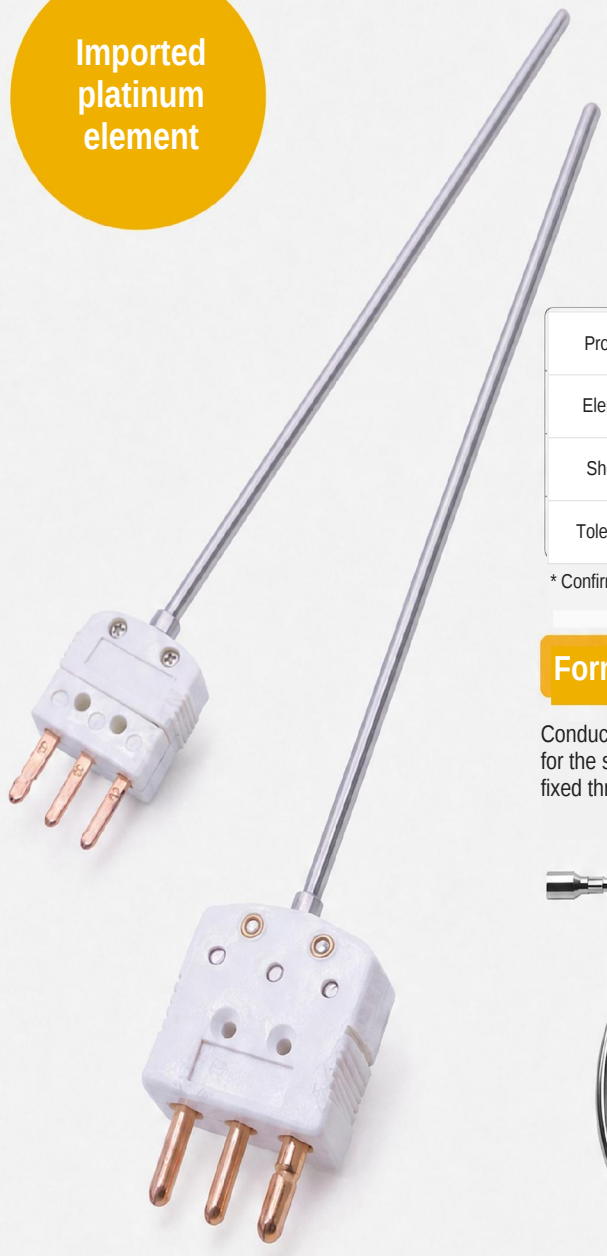
1/3DIN and 1/10DIN are fractional tolerances. Values are references; confirm the applicable temperature range and test conditions for the specific element.

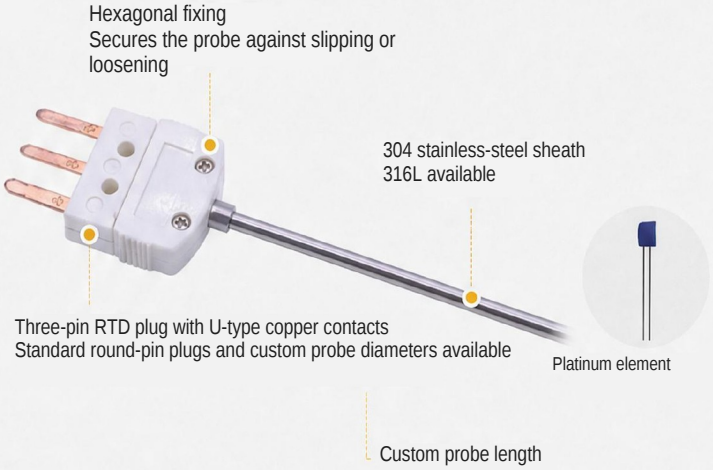
Direct-Insertion MI RTDs

Details

Range: -200 to 500°C*

Imported platinum element





Product	Direct-insertion MI RTD	Brand	OSK
Element	Pt100 default / Pt1000 custom	Temperature	-200 to 500°C*
Sheath	304 stainless steel; 316L optional	Dimensions	Custom diameter and length
Tolerance	A / B / 1/3B / 1/10B	Application	Furnace and oven sensing

* Confirm temperature range and tolerance for the actual element and probe configuration.

Formable MI Probes

Conductors, insulation and sheath form a drawn MI assembly. Follow the bend radius for the specific construction and avoid repeated bending. No fixed fitting is standard; fixed threads or adjustable compression fittings are optional.





Fixed threaded fitting



Adjustable compression fitting

Cold and heat resistant

Corrosion and wear resistant

Water and oil resistant

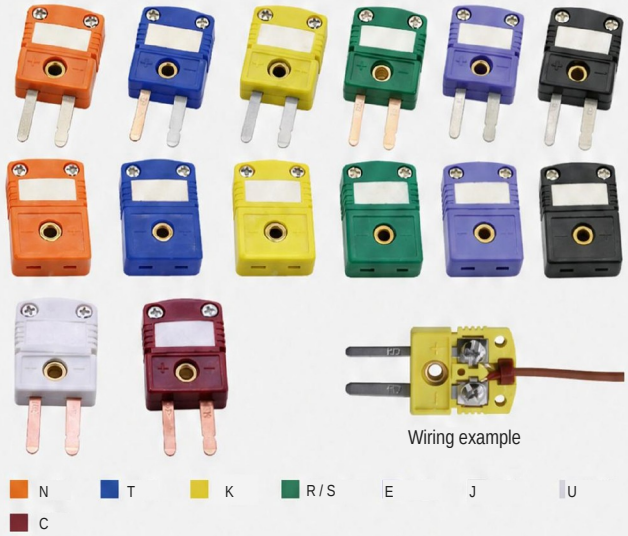
Fast response

Thermocouple Plugs and Sockets

SMPW Miniature Connectors

Types: N / T / K / R / S / E / J / U / C; M = male, F = female

Temperature: -29 to 180°C (-20 to 356°F)



Wiring example

N T K R / S E J U C

Features

- Rugged, heat-resistant construction for -29 to 180°C.
- Solid or stranded wire up to 20 AWG.
- Fast connection and reliable contact.
- Wire divider; Phillips/slotted screws.

Structure



OSTW Standard Connectors

Types: K / T / J / E / N / R / S / U / C; M = male, F = female

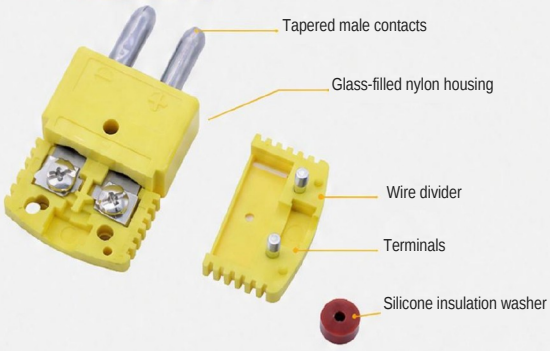
Temperature: -29 to 180°C (-20 to 356°F)



Features

- Versatile universal design.
- Compact, for wire up to 14 AWG.
- Fast connection and reliable contact.
- Wire divider; Phillips/slotted screws.

Structure

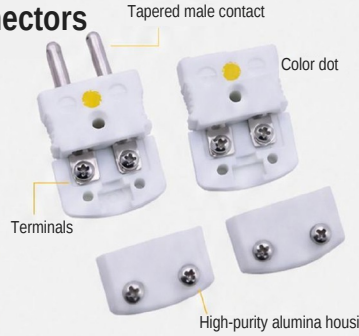


High-Temperature Ceramic Connectors

Miniature and standard ceramic connectors

Temperature: -29 to 650°C (-20 to 1200°F)





Features

- Ceramic construction: -29 to 650°C reference range.
- Strong, durable ceramic housing.
- Screw terminals for easy wiring.
- Solid or stranded wire up to 20 AWG.
- Phillips/slotted screws.
- Suitable for vacuum furnaces.

Images for reference. Confirm available types, ordering codes and 180°C / 650°C rating conditions for the specific product.

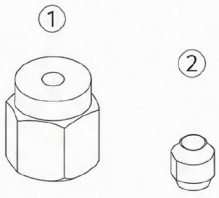
Stainless-Steel Compression Fittings

Threads: M / G / ZG / NPT and others



Adjustable TC Fittings





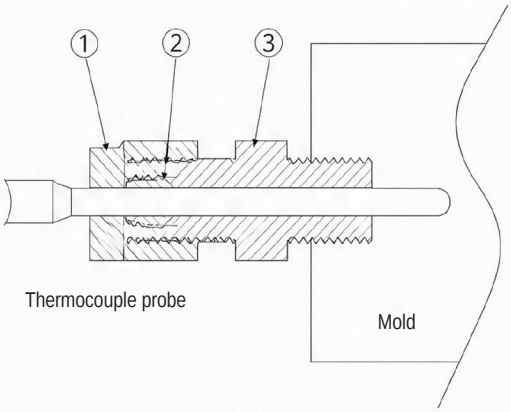
1 Nut

2 Copper ferrule

Parameter	Specification	Parameter	Specification
Product	Stainless-steel fitting	Brand	OSK
Pressure	15 MPa*	Temperature	≤450°C*
Material	304 default; 316 optional		
Media	Water / oil / gas. Check material for corrosive media.		
Threads	M / ZG / G / NPT; custom		
Probe OD	0.5 / 1 / 1.5 / 1.6 / 2 / 2.5 / 3 / 3.2 / 4 / 5 / 6 mm ...		
Parts	Body / ferrule / nut; custom weld-on base		

* Confirm pressure and temperature for the specification and medium; the upper limits do not necessarily apply simultaneously.

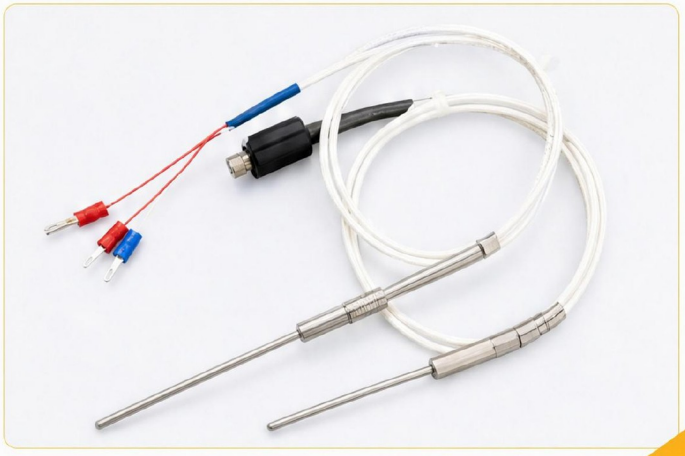
Installation Diagram



Applications

For MI thermocouples, probe RTDs and platinum-rhodium thermocouples.





Precision Temperature Instruments

Thermocouple Thermometers

Platinum RTD Thermometers



Thermocouple Thermometers

Types K / T / J supported

Single / dual / four channels



YET-610/610L/610X

610: 1 channel
610L: 1 channel with logging



YET-620/620L/620X

620: 2 channels
620L: 2 channels with logging



YET-640/640L/640X

640: 4 channels
640L: 4 channels with logging



Applications



Manufacturing



Research



HVAC



Maintenance



High precision
Multiple sensor types, accurate measurement and fast response.



Channel options
Single, dual or four channels for different applications.



Data logging
Record and review data for traceability and analysis.



Rugged design
A slip-resistant, durable housing for industrial environments.

Let’s Talk About Your Temperature Measurement Needs

From operating conditions to product specifications, we will work with you to confirm each requirement.

Send an application description, drawing or sample to discuss product selection and customization.

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