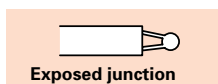


Thermocouple Probe Selection Guide

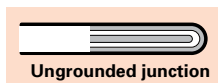
Thermocouple Probe Junction Types

Sheaths with small diameters have faster response times; sheaths with larger diameters have longer life and are better for measuring higher temperatures.

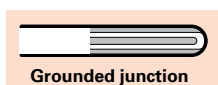
Exposed Junction has the fastest response time—ideal for measuring rapid temperature changes. Clear coating on most models provides a humidity barrier for the thermocouple. Do not use with corrosive fluids or atmospheres.



Ungrounded Junction has a welded junction insulated from the protective sheath and is electrically isolated. Longer response time; use for conductive solutions or where isolation of the measuring circuitry is required.



Grounded Junction has a junction welded to tip of sheath. Wires are completely sealed from contaminants. Good response time.



Probe Sheath/Body Materials

Inconel® 600 Sheath is ideal for severely corrosive environments and elevated temperatures. Resists progressive oxidation. Maximum operating temperature: 1148°C (2100°F) continuous; 1371°C (2500°F) intermittent.

304 SS Sheath is for general-purpose use, is corrosion-resistant, and good for food service and biological applications. Maximum operating temperature: 898°C (1650°F) continuous; 1398°C (2550°F) intermittent.

316 SS Sheath has higher corrosion resistance than 304 SS. Withstands some strong acids. Maximum operating temperature: 898°C (1650°F) continuous; 1371°C (2500°F) intermittent.

SS Sheath with Coating of PTFE or PFA with grounded junction is ideal with corrosive liquids and atmospheres. Longer response time. Temperatures to 260°C (500°F).

Polymer Body Probes are available in a variety of polymers including Kapton® and PTFE. These provide excellent flexibility and often good chemical resistance. Be sure to consult a chemical compatibility table when selecting a probe for your application.

Physical Characteristics of Thermocouples



Type J Thermocouple

Wire insulation color:

- + = White
- = Red

Wire material:

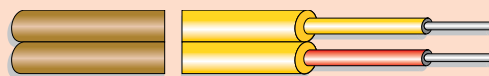
- + = Iron
- = Constantan

Properties:

- + = Strongly magnetic

Atmosphere for exposed junction:

Reducing



Type K Thermocouple

Wire insulation color:

- + = Yellow
- = Red

Wire material:

- + = Chromel
- = Alumel

Properties:

- + = Moderately magnetic

Atmosphere for exposed junction:

Clean oxidizing



Type T Thermocouple

Wire insulation color:

- + = Blue
- = Red

Wire material:

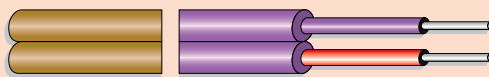
- + = Copper
- = Constantan

Properties:

- + = Copper color

Atmosphere for exposed junction:

Mildly oxidizing and reducing or with moisture



Type E Thermocouple

Wire insulation color:

- + = Purple
- = Red

Wire material:

- + = Chromel
- = Constantan

Properties:

- + = Greater stiffness

Atmosphere for exposed junction:

Vacuum, inert mildly oxidizing or reducing

General Considerations

Extend Your Thermocouples up to 2000 feet without signal loss. Extension wire must be the same type as the thermocouple.

System Error becomes important when you select a probe and meter to make a complete temperature measurement system. For example: a meter has an accuracy of $\pm 0.7^\circ\text{F}$, probe error for the type T probe with metal sheath, straight cable, and stripped ends will have an error limit of $\pm 1.8^\circ\text{F}$ at 400°F . Therefore, the probe-meter system accuracy will be $(\pm 0.7) + (\pm 1.8) = \pm 2.5^\circ\text{F}$ at 400°F .

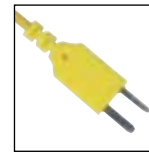
NIST traceability is required for many applications. In order to make an item traceable to NIST standards, the item and the standard are exposed to the same conditions, the readings are noted, and the difference between the readings is recorded on a NIST-traceable calibration report. When taking future readings with the item, the value on the report must be added or subtracted from the measured value.

General-Purpose Probes

Stainless steel sheaths provide good chemical resistance and fast thermal response

These thermocouple probes were designed to measure any general-purpose or liquid immersion application. All thermocouple probes include a 5-ft PVC coiled cord with strain relief that protects from repeated flexing and tugging. Ergonomic, easy-grip 5"L glass-filled nylon handle (unless noted below) provides maximum heat insulation and impact resistance. Fingerstops on handle prevent probe from rolling and fingers from sliding when inserting probe into hard materials.

The 316 stainless steel sheath (shaft casing) provides durability, strength, and maximum abrasion resistance. Rugged thermoset plastic miniconnector is compatible with all Oakton and Acorn® thermocouple thermometers. Connectors and coiled cord are color-coded based on type: type J black, type K yellow, and type T blue.



Miniconnector



Standard nylon handle



General-purpose probe
08516-55

Specifications & Ordering Information

Catalog number	Type	Temperature range	Features	Tip length	Dimensions*
Standard probes					
WD-08517-55	J	-190 to 760°C (-310 to 1400°F)	Junction: grounded Response time: 15 sec (liquids) 316 SS sheath; nylon handle	5"	
WD-08516-55	K	-250 to 899°C (-418 to 1650°F)			
WD-08500-55	T	-250 to 400°C (-418 to 752°F)			
WD-93756-03	J	-190 to 760°C (-310 to 1400°F)		12"	
WD-93756-23	K	-250 to 899°C (-418 to 1650°F)			
WD-93756-63	T	-250 to 400°C (-418 to 752°F)			
WD-93756-04	J	-190 to 760°C (-310 to 1400°F)	24"		
WD-93756-24	K	-250 to 899°C (-418 to 1650°F)			
WD-93756-44	T	-250 to 400°C (-418 to 752°F)			
Low-cost probes					
WD-08439-60	J	-190 to 760°C (-310 to 1400°F)	Junction: grounded Response time: 30 sec (liquids) 304 SS sheath; PVC short handle	4.5"	
WD-08439-62	K	-250 to 899°C (-418 to 1650°F)			
WD-08439-64	T	-250 to 400°C (-418 to 752°F)			
Small-diameter standard probes					
WD-08505-55	J	-190 to 704°C (-310 to 1300°F)	Junction: grounded Response time: 10 sec 316 SS sheath; nylon handle	4"	
WD-08505-56	K	-250 to 816°C (-418 to 1500°F)			
WD-08505-57	T	-250 to 343°C (-418 to 650°F)			
All stainless steel probes					
WD-93600-02	J	-190 to 760°C (-310 to 1400°F)	Junction: grounded Response time: 30 sec 316 SS sheath; 316 SS handle	8"	
WD-93600-22	K	-250 to 899°C (-418 to 1650°F)			
WD-93600-42	T	-250 to 400°C (-418 to 752°F)			

*Overall probe sheath lengths may vary up to ±0.25".



Ensure the accuracy of your thermocouple probe, meter, or system!

Calibration to a NIST-traceable standard helps you meet ISO, FDA, USDA, and EPA guidelines. Our A2LA-accredited metrology laboratory will pretest and calibrate your thermocouple equipment. Service includes NIST-traceable calibration report with before and after test data at four temperature test points. See pages 92–93 for ordering information.

Penetration and Air/Gas Probes

Spear tips make semisolid testing easy; exposed junctions with perforated shields provide fast response to flowing air

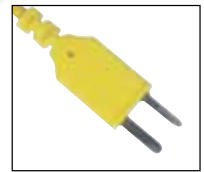
Probes include a 5-ft PVC coiled cord with strain relief that protects from repeated flexing and tugging. Ergonomic, easy-grip 5"L glass-filled nylon handle (unless noted below) provides maximum heat insulation and impact resistance. Fingerstops on handle prevent probe from rolling and fingers from sliding when inserting probe into hard materials.

The 316 stainless steel sheath (shaft casing) provides durability, strength, and maximum abrasion resistance. Rugged thermoset plastic miniconnector is compatible with all Oakton and Acorn® thermocouple thermometers. Connectors and coiled cord are color-coded based on thermocouple type: type J black, type K yellow, and type T blue.

A Penetration Probes offer a pointed tip style for penetration into hard and semisolid materials. Sturdy stainless steel tip casing prevents tip from bending when inserting.

B Air/Gas Probes are designed with a perforated shield which allows air and other gases to flow into the sensor for quick readings. Metal shield also absorbs radiated heat and minimizes sensor error. Our sensors are encased in ceramic mineral (MGO) insulation to provide stability, and shock and vibration resistance.

Standard penetration probe
08516-65



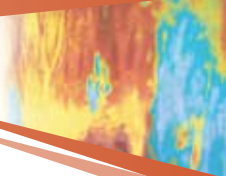
Miniconnector



Standard nylon handle

Specifications & Ordering Information

Catalog number	Type	Temperature range	Features	Tip length	Dimensions
A Penetration probes					
Standard probes					
WD-08517-65	J	-190 to 760°C (-310 to 1400°F)	Junction: grounded	4"	
WD-08516-65	K	-250 to 899°C (-418 to 1650°F)	Response time: 25 sec (liquids)		
WD-08500-65	T	-250 to 400°C (-418 to 752°F)	304 SS sheath; nylon handle		
WD-93601-22	J	-190 to 760°C (-310 to 1400°F)	Junction: grounded	12"	
WD-93601-24	K	-250 to 900°C (-418 to 1652°F)	Response time: 50 sec		
WD-93601-26	T	-250 to 371°C (-418 to 700°F)	316 SS sheath; nylon handle		
WD-93601-42	J	-190 to 760°C (-310 to 1400°F)	Junction: grounded	24"	
WD-93601-44	K	-250 to 900°C (-418 to 1652°F)	Response time: 50 sec		
WD-93601-46	T	-250 to 287°C (-418 to 550°F)	316 SS sheath; nylon handle		
Small-diameter probes with hypodermic tip					
WD-93601-02	J	-190 to 704°C (-310 to 1300°F)	Junction: grounded	4"	
WD-93601-04	K	-250 to 816°C (-418 to 1500°F)	Response time: 15 sec		
WD-93601-06	T	-250 to 343°C (-418 to 650°F)	316 SS sheath; nylon handle		
Low-cost probes					
WD-08439-80	J	-190 to 760°C (-310 to 1400°F)	Junction: grounded	4.5"	
WD-08439-82	K	-250 to 899°C (-418 to 1650°F)	Response time: 25 sec (liquids)		
WD-08439-84	T	-250 to 400°C (-418 to 752°F)	316 SS sheath; PVC short handle		
B Air/gas probes					
Standard probes					
WD-08517-75	J	-190 to 537°C (-310 to 1000°F)	Junction: exposed; isolated	8.5"	
WD-08516-75	K	-250 to 537°C (-418 to 1000°F)	Response time: 225 s at 5 m/s airflow		
WD-08500-75	T	-250 to 537°C (-418 to 1000°F)	316 SS sheath and radiation shield		
Low-cost probes					
WD-08439-90	J	-190 to 300°C (-310 to 572°F)	Junction: exposed; isolated	5"	
WD-08439-92	K	-250 to 300°C (-418 to 572°F)	Response time: 225 s at 5 m/s airflow		
WD-08439-94	T	-250 to 300°C (-418 to 572°F)	304 SS sheath and SS wire coil		



Surface Probes

Surface ground junction ensures junction senses temperature of surface, not surrounding atmosphere

Surface probes offer dual spring tips to provide positive contact with flat or slightly irregular surfaces. Include a 5-ft PVC coiled cord with strain relief that protects from repeated flexing and tugging. Ergonomic, easy-grip 5"L glass-filled nylon handle (unless noted below) provides maximum heat insulation and impact resistance. Fingerstops on handle prevent probe from rolling and fingers from sliding when inserting probe into hard materials.

The 316 stainless steel sheath (shaft casing) provides durability, strength, and maximum abrasion resistance. Rugged thermoset plastic miniconnector is compatible with all Oakton and Acorn® thermocouple thermometers. Connectors and cord are color-coded based on thermocouple type: type J black, type K yellow, and type T blue.

A,B,C Standard Surface Probes feature ceramic tips to ensure excellent thermal contact.

D Flat-leaf Probe facilitates insertion into openings.

E Adhesive Probes make it easy to monitor surface temperatures over time.



Miniconnector

Specifications & Ordering Information

Catalog number	Type	Temperature range	Features	Tip length	Dimensions
A Standard straight probes					
WD-08517-60	J	-190 to 649°C (-310 to 1200°F)	Junction: exposed; isolated	10"	
WD-08516-60	K	-250 to 649°C (-418 to 1200°F)	Response time: 30 sec		
WD-08500-60	T	-250 to 343°C (-418 to 650°F)	Aluminum housing; nylon handle		
B Low-cost probes					
WD-08439-70	J	-190 to 649°C (-310 to 1200°F)	Junction: exposed; isolated	4.5"	
WD-08439-72	K	-250 to 649°C (-418 to 1200°F)	Response time: 30 sec		
WD-08439-74	T	-250 to 371°C (-418 to 700°F)	Aluminum housing; no handle		
C 90°-angle probes: ideal for hard-to-reach areas.					
WD-08517-64	J	-190 to 649°C (-310 to 1200°F)	Junction: exposed; isolated	2"	
WD-08516-64	K	-250 to 649°C (-418 to 1200°F)	Response time: 30 sec		
WD-08500-64	T	-250 to 343°C (-418 to 650°F)	Aluminum housing; nylon handle		
D Flat-leaf probe: flexible for positive contact in hard-to-reach areas; use between metal plates or on other surfaces.					
WD-08518-60	K	-250 to 900°C (-418 to 1650°F)	Response time: 5 sec	4.5"	
E Self-adhesive probes: adhere to most surfaces, Kapton®-insulated wire and industrial adhesives for high temperature and long-term durability.					
WD-08519-50	J	-190 to 404°C (-310 to 760°F)	Junction: grounded	—	
WD-08519-52	K	-250 to 404°C (-418 to 760°F)	Response time: 5 sec		
WD-08519-54	T	-250 to 404°C (-418 to 760°F)	No handle; 5-ft L wire		

Flexible Insulated-Wire Probes

Choose from a variety of coating materials to match your application

Flexible insulated-wire probes include a straight insulated cable without a handle. These probes can be easily bent and mounted on walls or around corners.

Rugged thermoset plastic miniconnector is compatible with all Oakton and Acorn® thermocouple thermometers. Connectors and cord are color-coded based on thermocouple type: type J black, type K yellow, and type T blue.

A PVC-insulated probes provide economical options with good flexibility.

B The PTFE- and FEP-insulated probes are for use with acids and chemicals.

C Kapton®-insulated probes exhibit an excellent balance of physical, chemical, and electrical properties over a wide temperature range, particularly at unusually high temperatures.

D Fiberglass-insulated probes offer excellent electrical insulation properties and can be exposed to extremely high temperatures.

Specifications & Ordering Information

Catalog number	Type	Temperature range	Features	Dimensions
A PVC-insulated probes with epoxy-coated tip, 20-gauge (0.032" dia) wire; 10-ft L; short-term immersible.				
WD-08466-02	J	-190 to 105°C (-310 to 221°F)	Junction: ungrounded	<p>0.090" x 0.155" outer dia 0.166" dia</p>
WD-08466-04	K	-250 to 105°C (-418 to 221°F)	Response time: 25 sec	
WD-08466-06	T	-250 to 105°C (-418 to 221°F)		
B Fine-gauge PTFE-insulated probe, 0.025" outer dia; 3-ft L; implant in semisolids. Includes five 18-gauge needles.				
WD-08506-75	T	-250 to 150°C (-418 to 302°F)	Junction: ungrounded Response time: 0.5 sec	<p>0.025" dia</p>
C FEP-insulated probes with epoxy-coated junction, 24-gauge (0.020" dia) wire; 10-ft L; long-term immersible.				
WD-08466-81	J	-190 to 204°C (-310 to 400°F)	Junction: ungrounded	<p>0.091" dia 0.056" x 0.093" outer dia</p>
WD-08466-82	K	-250 to 204°C (-418 to 400°F)	Response time: 15 sec	
WD-08466-83	T	-250 to 204°C (-418 to 400°F)		
C Kapton-insulated probe, 24-gauge (0.020" dia) wire; 10-ft L; ideal for multipoint temperature measurements.				
WD-08517-90	J	-190 to 315°C (-310 to 600°F)	Junction: exposed Response time: 15 sec	<p>0.038" x 0.063" outer dia</p>
C Kapton-insulated probes, 30-gauge (0.010" dia) wire; 5-ft L; ideal for checking food temperatures. Pack of six.				
WD-08505-87	J	-190 to 404°C (-310 to 759°F)	Junction: exposed	<p>0.052" outer dia</p>
WD-08505-86	K	-250 to 404°C (-418 to 759°F)	Response time: 0.5 sec	
WD-08505-85	T	-250 to 404°C (-418 to 759°F)		
D Fiberglass-insulated probes, 24-gauge (0.020" dia) wire; 10-ft L. Use for high-temperature measurements.				
WD-08512-81	J	-190 to 482°C (-310 to 900°F)	Junction: exposed	<p>0.052" x 0.081" outer dia</p>
WD-08512-82	K	-250 to 482°C (-418 to 900°F)	Response time: 15 sec	
WD-08512-83	T	-250 to 400°C (-418 to 750°F)		

Thermocouple Wires

Wires come in 20-, 24-, or 30-gauge for fabricating your own probes or extension cables (meets ANSI and ASTM standards). Choose from wire with PVC, FEP, or fiberglass braid insulation. 100 ft (30 m) bolt.



Catalog number	Type	Gauge	Max temperature	Insulation
WD-08541-16	J	20	105°C (221°F)	PVC
WD-08541-06	J	24	105°C (221°F)	PVC
WD-08541-07	J	24	204°C (400°F)	FEP
WD-08541-08	J	24	482°C (900°F)	Glass braid
WD-08541-00	J	30	204°C (400°F)	FEP
WD-08541-20	K	20	105°C (221°F)	PVC
WD-08541-22	K	20	482°C (900°F)	Glass braid
WD-08541-23	K	20	704°C (1300°F)	High-temp glass braid
WD-08541-09	K	24	105°C (221°F)	PVC
WD-08541-10	K	24	204°C (400°F)	FEP
WD-08541-11	K	24	482°C (900°F)	Glass braid
WD-08541-02	K	30	204°C (400°F)	FEP
WD-08541-25	T	20	105°C (221°F)	PVC
WD-08541-26	T	20	204°C (400°F)	FEP
WD-08541-12	T	24	105°C (221°F)	PVC
WD-08541-13	T	24	204°C (400°F)	FEP
WD-08541-04	T	30	204°C (400°F)	FEP

Specialty Probes

Designed for food, science, electronics, and HVAC applications

Catalog number	Type	Temperature range	Features	Dimensions*
Food probes —easy clean-up designs. For more food probes, see the stainless steel probes on page 73				
All stainless steel probes, 8" L ; for added durability—ideal for food processing applications. Include 4.5" L stainless steel handle and 4-ft SS-armored cable.				
WD-93600-02 WD-93600-22 WD-93600-42	J K T	-190 to 760°C (-310 to 1400°F) -250 to 899°C (-418 to 1650°F) -250 to 400°C (-418 to 752°F)	Junction: grounded Response time: 30 sec 316 SS sheath; miniconnector; SS handle	8" 0.125" dia
Small-diameter probes with miniature stainless steel handles, 8" L . Ideal for checking food temperatures. Include 5-ft coiled cable.				
WD-08505-61 WD-08505-62 WD-08505-63	J K T	-190 to 704°C (-310 to 1300°F) -250 to 816°C (-418 to 1500°F) -250 to 343°C (-418 to 650°F)	Junction: grounded Response time: 10 sec 316 SS sheath; miniconnector; SS handle	8" 0.063" dia 2.25" 0.375" dia
Food-service probes with hypodermic tip, 4" L . Include 4-ft straight armored cable.				
WD-93607-20 WD-93607-22 WD-93607-24	J K T	-190 to 371°C (-310 to 700°F) -250 to 371°C (-418 to 700°F) -250 to 371°C (-418 to 700°F)	Junction: grounded Response time: 10 sec 316 SS sheath and handle; miniconnector	4" 0.063" dia 1.5" 0.25" dia
Science needle tip probes				
Small-diameter probes with hypodermic tip, 4" L . Include 5-ft coiled cable.				
WD-93601-02 WD-93601-04 WD-93601-06	J K T	-190 to 704°C (-310 to 1300°F) -250 to 816°C (-418 to 1500°F) -250 to 343°C (-418 to 650°F)	Junction: grounded Response time: 15 sec 316 SS sheath; miniconnector; glass-filled polypropylene handle	4" 0.063" dia 5.5"
Hypodermic probes, 4" L . Include 4-ft straight PVC cable and bendable sheath.				
WD-08116-65 WD-08117-65 WD-08113-65	J K T	-190 to 371°C (-310 to 700°F) -250 to 371°C (-418 to 700°F) -250 to 371°C (-418 to 700°F)	Junction: grounded Response time: 10 sec 316 SS sheath and handle; miniconnector	4" 0.063" dia 1.5" 0.25" dia
Electronics small surface probes —fast response and minimal damages to components.				
Small-diameter probes, 8" L . Small diameter is ideal for confined areas. Exposed junction is isolated from 316 SS shaft and aluminum housing with ceramic support. Include 5-ft coiled cable.				
WD-08517-62 WD-08516-62 WD-08500-62	J K T	-190 to 649°C (-310 to 1200°F) -250 to 649°C (-418 to 1200°F) -250 to 343°C (-418 to 650°F)	Junction: exposed; isolated Response time: 15 sec 316 SS shaft and aluminum housing; miniconnector; nylon handle	1.5" 0.188" tip dia 0.25" dia 6.5" 0.125" dia
HVAC probes				
Dropping/magnetic probes, 1.5" L . Attach magnetic probe to any flat ferrous surface. Include 10-ft straight SS braid over fiberglass-insulated wire.				
WD-08519-86 WD-08514-86 WD-08525-86	J K T	-190 to 649°C (-310 to 1200°F) -250 to 649°C (-418 to 1200°F) -250 to 399°C (-418 to 750°F)	Junction: exposed Response time: 30 sec Aluminum housing; miniconnector	1" dia 1.5"
General-purpose air/gas probes, 8.5" L ; for general-purpose air temperature measurement. Includes 5-ft coiled cable.				
WD-08517-75 WD-08516-75 WD-08500-75	J K T	-310 to 1000°F (-190 to 537°C) -418 to 1000°F (-250 to 537°C) -418 to 1000°F (-250 to 537°C)	Junction: exposed; isolated Response time: 225 s at 5 m/s airflow 316 SS sheath and radiation shield; miniconnector; nylon handle	1.25" 0.25" dia 8.5" 0.156" dia
Standard straight probes, 10" L . Use to monitor such surfaces as hot plates, furnaces, and molds. Exposed junction is isolated from 316 SS shaft and aluminum housing with ceramic support. Includes a 5-ft coiled cable.				
WD-08517-60 WD-08516-60 WD-08500-60	J K T	-190 to 649°C (-310 to 1200°F) -250 to 649°C (-418 to 1200°F) -250 to 343°C (-418 to 650°F)	Junction: exposed; isolated Response time: 30 sec 316 SS shaft; aluminum housing; miniconnector; nylon handle	2.0" 0.5" dia 0.63" dia 10" 0.188" dia
Hook-and-loop strap-on probes, 8" L . Temporarily or permanently strap onto tubing or pipes—probes are easy to install and remove. Strap is 8" long and fits diameters from 0.75 to 2.75" OD. Include 10-ft straight PVC cable.				
WD-08469-80 WD-08469-82 WD-08469-84	J K T	-190 to 100°C (-310 to 212°F) -250 to 100°C (-418 to 212°F) -250 to 100°C (-418 to 212°F)	Junction: ungrounded Response time: 300 sec Miniconnector	1" wide Fits diameters ranging from 0.75 to 2.75" OD

*Overall probe sheath lengths may vary up to ± 0.25 ".