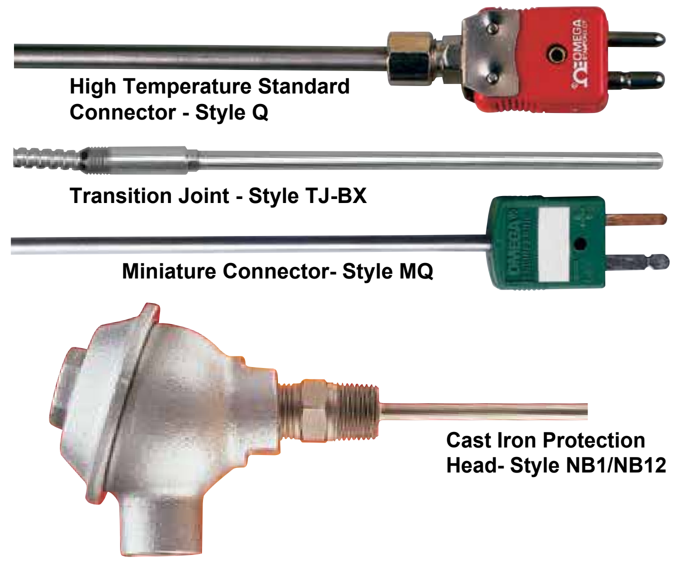
Extreme Temperature Exotic Thermocouple Probes

Omega Exotic Thermocouple Probes are designed to be used in extreme temperatures up to 2315°C (4200°F). These probes utilize either Platinum/Rhodium (Type R, S, or B) or Tungsten/Rhenium (Type C or D) elements and a variety of insulations/sheath material. Depending on the sheath material selected, probes can be used in inert, oxidizing, reducing or vacuum conditions. The maximum temperature of the final assembly is based on the lowest maximum temperature of the element, insulation and sheath material.



Cold end probe terminations are available in: replacement probe (RP), standard or subminiature ceramic connector, standard or subminiature heavy-duty nylon connector, or transition joint with 2 m (72") braided fiberglass lead wire. Other options available on page 3/4, or contact sales. For types R and S, wire accuracy meets special limits of error (SLE); on all other thermocouple types, wire accuracy meets standard limits of error.

Part number Breakdown / Example

XMO	-	W5R26	-	U	-	125	-	30	-	A	-	Q	-	12	-	Dual
1		2		3		4		5		6		7		8		9

1. **Sheath Material: Molybdenum**
2. **Calibration: W5% Re vs. W-26% Re**
3. **Measuring Junction: Ungrounded**
4. **Sheath Diameter: 0.125"**
5. **Thermocouple Wire Gage: 30 AWG**
6. **Insulation: Alumina, Al_2O_3**
7. **Termination: HSTW**
8. **Length: 12"**
9. **Dual Sensing**

- All probes are ungrounded.
- Dual Configurations available. Allows two reads from a single point. Consult page (WITH APPROPRIATE ORDERING CHART) for all options.
- Specify Termination Style: Q, HX, MQ, SX, TJ, TJ-BX, TJ-SB, RP, NB, NB-LK. *Cold End Termination temperature ratings found on page 3.
- Specify Probe Length in Inches (1" = 24.5mm).
- Refractory metals are extremely sensitive to any trace of oxygen above approximately 260°C (500°F). Must be used in vacuum or in very pure inert gases such as Helium or Argon.
- For Type C and D, ANSI color codes are used, as there is no IEC standard.
- Images throughout spec sheet are for reference only.
- Non-Metallic sheaths are available. Please see PTRA and PTRM ceramic thermocouple protection tubes on Omega's website.
- Material/wire calibration certificate available upon request for $50 upcharge. Please add "-CERT" to end of part number.

{KŜl-űK ƳI-űŜǊǍI-fă óMΣпΣyú

Code	Material	Max Operating Temp	Work Environment	Approx. Melting Point	Lengths	Available Diameter(s) Single Sensing Point	Available Diameter(s) DUAL Sensing Point	Rigid/ Bendable	Remarks
XTA	Tantalum	2315°C 4200°F	Vacuum	3000°C 5430°F	1"-72"	0.062",0.125", 0.187", 0.250"	0.125",0.187", 0.250"	Rigid	Resists many acids and weak Alkalies. Very sensitive to oxidation above 300°C (570°F).
XMO	Molybdenum	2200°C 4000°F	Inert,Vacuum, Reducing	2610°C 4730°F	1"-72"	0.062",0.125", 0.187", 0.250"	0.125",0.187", 0.250"	Rigid	Sensitive to oxidation above 204C (400F).
XPA	Platinum-Rhodium Alloy	1650°C 3000°F	Oxidizing, Inert	1870°C 3400°F	1"-72"	0.062",0.125"	N/A	Bendable	No attack by SO2 at 1093C (2000F). Silica is detrimental. Halogens attach at high temps.
XIN	Inconel 600	1150°C 2100°F	Oxidizing,Inert, Vacuum	1400°C 2550°F	1"-72"	0.062",0.125", 0.187", 0.250"	0.125",0.187", 0.250"	Rigid	Excellent resistance to oxidation at high temp. Hydrogen tends to embrittle. Very sensitive to Sulfur Corrosion.

XMO/XTA/XIN: MAX LENGTH on 0.062" dia probes is 42"

XMO/XTA/XIN: LENGTH TOLERENCE +/- 1/4"

Calibration (2,5)

Code	Calibration	+ Material	- Material	Wire Gauge (AWG)	Max Temp
P10R	S	Pt - 10% Rh	Pt	ALL GAUGES	1482°C
					2700°F
P13R	R	Pt - 13% Rh	Pt	ALL GAUGES	1482°C
					2700°F
P30R	B	Pt - 30% Rh	Pt - 6% Rh	ALL GAUGES	1704°C
					2700°F
W3R25	D	W - 3% Re	W - 25% Re	40	1871°C
					3400°F
				36	1982°C
					3600°F
				32	2093°C
					3800°F
				30	2315°C
					4200°F
				24	2315°C
					4200°F
W5R26	C	W - 5% Re	W - 26% Re	40	1871°C
					3400°F
				36	1982°C
					3600°F
				32	2093°C
					3800°F
				30	2315°C
					4200°F
				24	2315°C
					4200°F

Insulation (6)

Code	Material	Max Operating Temp **	Approx. Melting Point	Remarks
H	Hafnia (HfO2)	2500°C 4530°F	2830°C 5125°F	Nontoxic substitute for BeO High Thermal Conductivity
M	Magnesia (MgO)	1650°C 3000°F	2790°C 5050°F	Hygroscopic Compacts Well
A	Alumina (Al_2O_3)	1540°C 2800°F	2010°C 3650°F	Requires Considerable Volume Reduction to Compact Satisfactorily

Note: *For temperatures above 1000°C (1800°F), all insulating materials experience a substantial decrease in resistivity with increasing temperatures.*
** including graphite.Molybdenum and Tantalum sheathed probes are not recommended in applications where they will be exposed to carbon,including graphite.*
** Values given are for compacted insulation. For uncompacted hard-fired insulators, useful temperature range can be 50° to100°C (100 to 200°F) higher.*

Termination Options (7)

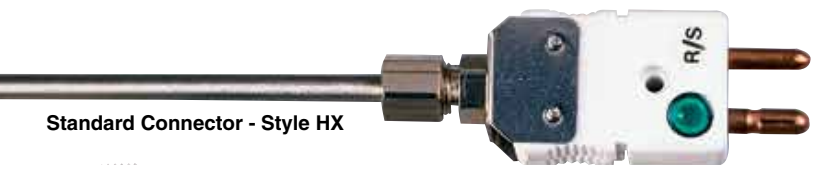
Standard Connector - Style Q

Termination Style Q

Type HSTW Standard Color Coded Male Connector. **Mating Connector and Cable Clamp Sold Separately**

*Only available on 0.062", 0.125", 0.187", 0.250".

** Temperature Rating to 200°C. B Calibration (P30R) rated to100°C.



Standard Connector - Style HX

Termination Style HX

Type NHX high temperature ceramic male connector with color identification. **Mating Connector and Cable Clamp Sold Separately.**

*Only available on 0.062", 0.125", 0.187", 0.250".

** Temperature Rating to 200°C. B Calibration (P30R) rated to100°C.

Miniature Connector - Style MQ

Crimp bushing

Termination Style MQ

Type HMPW miniature Color Coded Male Connector. **Mating Connector and Cable Clamp Sold Separately.**

*Only available on 0.062", 0.125".

** Temperature Rating to 200°C. B Calibration (P30R) rated to 100°C.

Miniature Connector - Style SX

Termination Style SX

Type SX high temperature ceramic male miniature connector with color identification. **Mating Miniature Connector and Cable Clamp Sold Separately.**

*Only available on 0.062", 0.125".

** Temperature Rating to 200°C. B Calibration (P30R) rated to 100°C.

Termination Options (7) (cont.)

Transition Joint - Style TJ

Termination Style TJ

Heavy-duty transition termination with 2 m (72") braided fiberglass insulated lead wire. Available as an option with PFA lead wire—add suffix "-T".

*Only available on 0.062", 0.125", 0.187", 0.250".

** Temperature Rating to 200°C. B Calibration (P30R) rated to100°C.

Transition Joint - Style TJ-BX

Termination Style TJ-BX

Heavy-duty transition termination with 2 m (72") stainless steel BX armored cable. The armoring adds durability and abrasion protection.

Transition Joint - Style TJ-SB

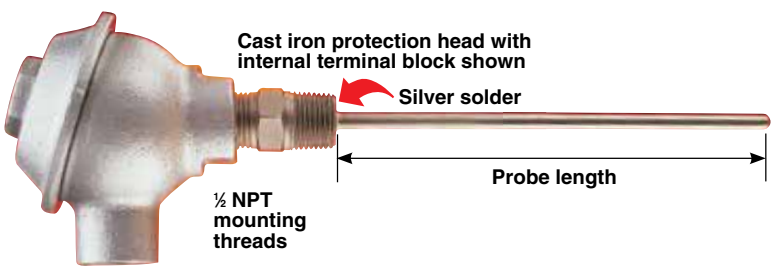
Termination Style TJ-SB

Heavy-duty transition termination with 2 m (72") stainless steel braid cable. The over braiding adds durability and abrasion protection.

RP Style Termination

Termination Style RP

Replacement probe style with 25 mm (1") bare wire leads.



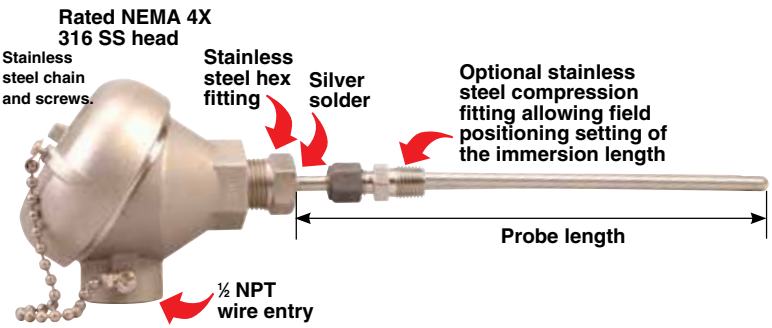
Termination Style NB1/NB12

Termination Style NB1/NB12

Industrial protection heads suitable for demanding environments; such as heavy industrial and process applications.
Different head styles are available to meet application requirements. Visit Omega for complete specifications or consult our technical quotation department. Available in NB1/NB12 style heads.
For NEMA 4X rated head, specify "**NB15**", and for explosion resistant rated head, specify "**NEPB**" or "**NEPA**".

*Only available on 0.062", 0.125", 0.187", 0.250".

** Temperature Rating to 230°C.



Termination Style NB1-LK/NB12-LK

Termination Style NB1-LK/NB12-LK

Industrial protection heads with optional stainless steel compression fitting for application requiring fast mounting and level adjustment of probe.
For NB1/NB12 style heads, specify "**NB1-LK**".
For NEMA 4X rated head, specify "**NB15-LK**".
For explosion resistant rated head, specify, "**NEPB-LK**" or "**NEPA-LK**".
Select an appropriate size compression fitting from our *Accessories table* below. Available in different mounting threads. Small diameter probes should be handled with greater care than our larger probes.

Accessories table (for Protection Head Units)

Compression Fittings			
Protection Tube OD in	Male Th's NPT	Length mm (inch)	316 Stainless Steel Model No.
1/16	1/16	24.6 (0.97)	**SSLK-116-116**
1/16	1/8	26.2 (1.03)	**SSLK-116-18**
1/8	1/8	30.0 (1.18)	**SSLK-18-18**
1/8	1/4	44.2 (1.74)	**SSLK-18-14**
3/16	1/8	31.0 (1.22)	**SSLK-316-18**
3/16	1/4	46.0 (1.81)	**SSLK-316-14**
1/4	1/8	32.8 (1.29)	**SSLK-14-18**
1/4	1/4	37.6 (1.48)	**SSLK-14-14**

Ordering Table
(The following table shows possible combinations and combination restrictions):

XMO	-	W5R26	-	U	-	125	-	30	-	A	-	Q	-	12	-	Dual
1		2		3		4		5		6		7		8		9

Single Element

(1) Sheath Material	(2) Calibration	(3) Meas. Junction	(4) Sheath Diam. (in.)	(5) Wire Gauge	(6) Insulation	(7) Termination	(8) Length	(9) Dual	RESTRICTIONS
XTA/XMO/ XIN	P10R,P13R,P30R, W3R25,W5R26	U	062 (0.062")	32,36,40	H	See pg. 2	See pg. 1	N/A	
			125 (0.125")	30,36					
			187 (0.187")	24,30					
			250 (0.250")	24,30					
XTA/XMO/ XIN	P10R,P13R,P30R, W3R25,W5R26	U	062 (0.062")	40	A	See pg. 2	See pg. 1	N/A	
			125 (0.125")	30,36					
			187 (0.187")	24,30					
			250 (0.250")	24,30					
XTA/XMO/ XIN	P10R,P13R,P30R, W3R25,W5R26	U	062 (0.062")	n/a	M	See pg. 2	See pg. 1	N/A	
			125 (0.125")	24,30					
			187 (0.187")	24,30					
			250 (0.250")	24,30					250 not available for XMO AND XIN
XPA	P10R,P13R,P30R	U	062 (0.062")	30	M	See pg. 2	See pg. 1	N/A	
			125 (0.125")	24					

DUAL Element

XTA/XMO/ XIN	P10R,P13R,P30R, W3R25,W5R26	U	125 (0.125")	32,36,40	H	See pg. 2	See pg. 1	DUAL	125 not available for XMO
			187 (0.187")	24,30					187 not available for XIN
			250 (0.250")	24,30					
XTA/XMO/ XIN	P10R,P13R,P30R, W3R25,W5R26	U	125 (0.125")	30,36	A	See pg. 2	See pg. 1	DUAL	
			187 (0.187")	24,30					187 not available for XMO AND XIN
			250 (0.250")	24,30					

NOTE:

1. TERMINATIONS; RP,RP(*), Q, HX, MQ, SX, TJ-T, TJ-SB, TJ-BX, NB HEADS (See page. 3/4).