T/C, Noble, Straight Ceramic

Thermocouple, Noble Metal
Ceramic Tube, Straight

Introduction

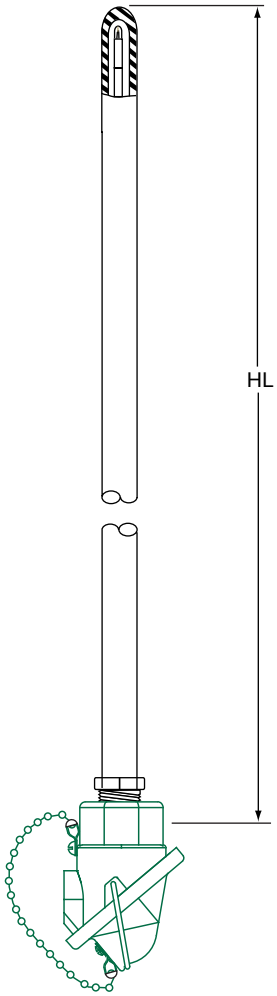
Elements are constructed of high quality material using modern techniques to construct the hot junction. Other high quality components are designed to meet rugged requirements. Mullite protection pipes (Field 5, codes 23, 24, 25) are impervious to gases at high temperature. They have good resistance to thermal shock but poor resistance to mechanical shock; they should be mounted vertically.

Aluminum oxide protection tubes (Field 5, codes 29, 30, 31 and 34) have fair resistance to thermal shock and mechanical shock. They are impervious to gases up to 3200°F.

Applications

Primary metal industry, heat treat furnaces, forging furnaces and bright annealing. Suitable for ceramics and glass industries. Salt baths in general, Barium Chloride salt baths up to 2350°F, and high speed salt baths. Semi-conductor manufacturing and research laboratories.

Ordering Information



Model No. □□□□-□□□□□-0□ 0-□-00

Field No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Schedule: S3

Fields 1, 2, 3. THERMOCOUPLE TYPE; WIRE GAUGE

☞ Determine length by completing Fields 8, 9

	Type	Wire	Gauge	Limits	12" Min.	Ea. Add'l 1"
B24 -	B	Pt, 6% Rh v Pt, 30% Rh	24	standard		
B25 -	B	Pt, 6% Rh v Pt, 30% Rh	25	special		
B26 -	B	Pt, 6% Rh v Pt, 30% Rh	26	standard		
R24 -	R	Pt, 6% Rh v Pt, 30% Rh	24	standard		
R25 -	R	Pt v Pt, 13% Rh	25	special		
R26 -	R	Pt v Pt, 13% Rh	26	standard		
S24 -	S	Pt v Pt, 10% Rh	24	standard		
S25 -	S	Pt v Pt, 10% Rh	25	special		
S26 -	S	Pt v Pt, 10% Rh	26	standard		
C24 -	C	W, 5% Re v W, 26% Re	24	special		
F24 -	F	Platinel II	25	special		

Field 4. NUMBER OF ELEMENTS AND JUNCTION STYLE

I - Single, butt welded, ungrounded

H - Dual, butt welded, ungrounded. Return to Fields 1, 2, 3, double that price.

Fields 5, 6. PROTECTION TUBE

☞ Use length determined for Fields 1, 2, 3. See compatibility table after Field 7.

	Size	Material	12" Min.	Ea. Add'l 6"
23 -	3/8" o.d.	High temperature Mullite		
24 -	11/16"o.d.	High temperature Mullite		
25 -	1" NPT	High temperature Mullite		
29 -	3/8" NPT	Aluminum oxide (not available with Fields 1, 2, 3, code C24)		
30 -	11/16"NPT	Aluminum oxide		
31 -	1" NPT	Aluminum oxide		
34 -	7 mmNPT	Aluminum oxide		

Between 12" and 48" but not multiple of 6", use next longer length,

Ordering Information (continued)

See page 3-24 for protection tube/cold end termination compatibility table.

Field 7. COLD END TERMINATION **Single** **Dual**

1 - General purpose, cast iron
2 - Weatherproof, cast iron
3 - General purpose, aluminum
7 - Quick disconnect plug
8 - Weatherproof, plastic
9 - Brass, open, no external process mount threads
A - Weatherproof, aluminum
C - Brass, open, with extrnal process mount threads
D - Aluminum, transmitter ready

Compatibility Table
Blank cell = compatible; filled cell = not compatible

Fields 5, 6	Field 7						
	1	2	3	7	8	9	A
23				■	■		
24, 25, 30, 31				■	■	■	
29							
34	■	■	■				■

Fields 8, 9. HOT LENGTH (DIMENSION "HL")

☞ Complete these fields to determine lengths for Fields 1, 2, 3, and Fields 5, 6.
HL - Enter actual inches in 6" increments. Minimum 12", maximum 48".
Over 48" consult factory for availability.

Field 10. RESERVED

Field 11. TUBE SEAL

0 - None – not available with Fields 1, 2, 3, code C24
1 - Sealed and filled with inert gas

Field 12. RESERVED

Field 13. MOUNTING FITTING*

0 - None (Required when Fields 5, 6 is code 01, 09, 41 or 42
1 - 4" Black steel sleeve
3 - 4" Stainless steel sleeve
4 - 4" Stainless steel sleeve and flange
5 - 4" Black steel sleeve and flange
7 - Double ended bushing
P Double ended bushing, 1/2" x 3/4" NPT
(Fields 5, 6, codes 23, 24, 29 and 30 only)
8 - Compression fitting (Fields 5, 6, code 34 only)
9 - Sleeve longer than 4". Specify length on order; **Base 4"** **Ea. Add'l 1"**
specify code on order:
code 1) Black steel sleeve
code 3) Stainless steel sleeve
code 4) Stainless steel sleeve and flange
code 5) Black steel sleeve and flange

*Mounting Fitting NPT Sizes (except as noted for code "P")
Field 5, 6, codes 23, 29, 34 .... 1/2"
Field 5, 6 codes 24, 30 ..... 3/4"
Field 5, 6 codes 25, 31 ..... 1"

Fields 14, 15. RESERVED

Thermocouple, Noble Metal
Dual Tube (Ceramic in Ceramic), Straight

Introduction

This thermocouple is assembled with two tubes to assure element protection in the event one of the tubes cracks or breaks. Also, two tubes provide additional mechanical strength.

Mullite protection tubes (Field 5, codes 23, 24) are impervious to gases at high temperature. They have good resistance to thermal shock but poor resistance to mechanical shock; they should be mounted vertically.

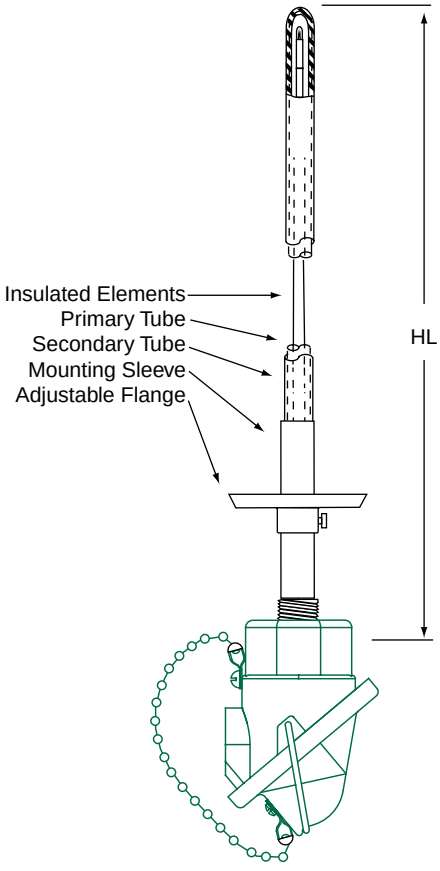
3/8" o.d. primary tube is inside 11/16" o.d. outer tube; 11/16" o.d. primary tube is inside 1" o.d. outer tube.

Aluminum oxide protection tubes (Field 5, codes 29, 30) have fair resistance to thermal shock and mechanical shock. They are impervious to gases up to 3200°F.

Applications

Primary metal industry, heat treat furnaces, forging furnaces and bright annealing. Suitable for ceramics and glass industries. Salt baths in general, Barium Chloride salt baths up to 2350°F, and high speed salt baths. Semi-conductor manufacturing and research laboratories.

Ordering Information



Model No. □□□□-□□□□□-1□ 0-□-00

Field No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Schedule: S3

Fields 1, 2, 3. THERMOCOUPLE TYPE; WIRE GAUGE

☞ Determine length by completing Fields 8, 9

	Type	Wire	Gauge	Limits	12" Min.	Ea. Add'l 1"
B24 -	B	Pt, 6% Rh v Pt, 30% Rh	24	standard		
B25 -	B	Pt, 6% Rh v Pt, 30% Rh	25	specia		
R24 -	R	Pt, 6% Rh v Pt, 30% Rh	24	standard		
R25 -	R	Pt v Pt, 13% Rh	25	special .		
R26 -	R	Pt v Pt, 13% Rh	26	standard		
S24 -	S	Pt v Pt, 10% Rh	24	standard		
S25 -	S	Pt v Pt, 10% Rh	25	special		
S26 -	S	Pt v Pt, 10% Rh	26	standard		
C24 -	C	W, 5% Re v W, 26% Re	24	special		
F24 -	F	Platinel II	25	special		

Field 4. NUMBER OF ELEMENTS AND JUNCTION STYLE

I - Single, butt welded, ungrounded

H - Dual, butt welded, ungrounded.

Ordering Information (continued)

Fields 5, 6. PROTECTION TUBES

☞ Use length determined in Fields 8, 9

Primary Tube

	Size	Material	12" Min.	Ea. Add'l 6"
23 -	3/8"	High temperature Mullite*		
24 -	11/16"	High temperature Mullite*		
29 -	3/8"	Aluminum oxide		
30 -	11/16"	Aluminum oxide		

Price includes both primary and secondary tubes. For length between 12" and 48", but not a multiple of 6", use the price of the next longer length, plus $14.00

*Not recommended above 1800°F

Field 7. COLD END TERMINATION

See page 3-24 for protection tube/cold end termination compatibility table.

		Single	Dual
1 -	General purpose, cast iron		
2 -	Weatherproof, cast iron		
3 -	General purpose, aluminum		
9 -	Brass, open, no external process mount threads .		
A -	Weatherproof, aluminum		
C -	Brass, open, with extrnal process mount threads		
D -	Aluminum, transmitter ready		

Fields 8, 9. HOT LENGTH (DIMENSION "HL")

☞ Complete these Fields to determine lengths for Fields 1, 2, 3 and Fields 5, 6

HL- Enter actual inches. Minimum 12", maximum 48"
Over 48" consult factory for availability

Field 10. RESERVED

Field 11. TUBE SEAL

0 - None – not available with Fields 1, 2, 3, code C24
1 - Sealed and filled with inert gas

Field 12. RESERVED

Field 13. MOUNTING FITTING*

0 - None (Required when Fields 5, 6 is code 01, 09, 41 or 42)
1 - 4" Black steel sleeve
3 - 4" Stainless steel sleeve
4 - 4" Stainless steel sleeve and flange
5 - 4" Black steel sleeve and flange
7 - Double ended bushing
P Double ended bushing, 1/2" x 3/4" (Fields 5, 6, codes 23 and 29 only) ..
9 - Sleeve longer than 4". Specify length on order;

specify code on order:	Base 4"	Ea. Add'l 1 "
code 1) Black steel sleeve		
code 3) Stainless steel sleeve		
code 4) Stainless steel sleeve and flange		
code 5) Black steel sleeve and flange		

*Mounting Fitting NPT Sizes (except as noted for code "P")

Tube codes 23, 29, 34 ..... 1/2"
Tube codes 24, 30 ..... 3/4"
Tube codes 25, 31 ..... 1"

Fields 14, 15. RESERVED

Thermocouple, Noble Metal
Dual Tube (Ceramic in Inconel 601), Straight

Introduction

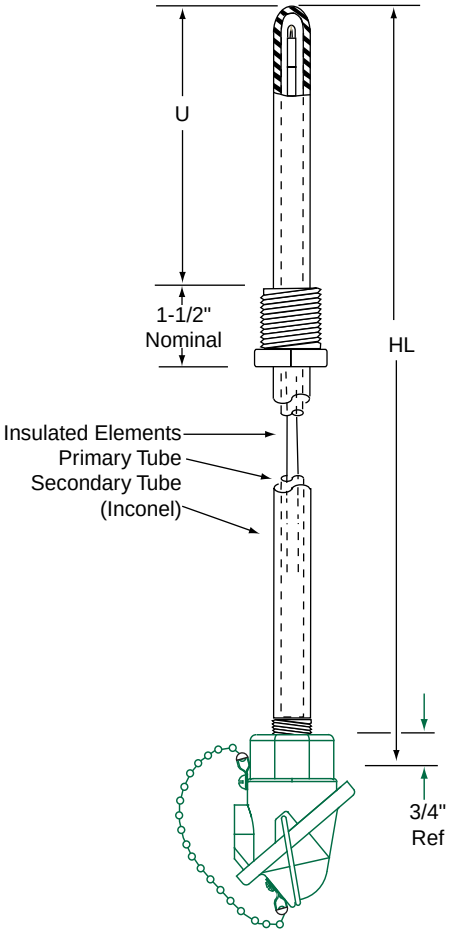
Elements are made of top quality material. Insulators are 99.7% Al_2O_3 (high purity). Primary protection tube is ether high temperature Mullite or aluminum oxide. The secondary protection tube is Inconel 601 which has a high resistance to thermal and mechanical shock up to 2300°F. The Inconel 601 protection tube has excellent resistance to oxidation up to 2300°F and to corrosion at high temperature. Hydrogen makes it brittle.

3/8" o.d. primary tube is inside an 0.8450" o.d. pipe; 11/16" o.d. tube is inside a 1.050" o.d. pipe.

Applications

For use in furnaces, kilns, and other locations where the protection tube is subject to either mechanical or thermal shock. Suitable for high temperature heat treating, carburizing, nitriding, salt baths, blast furnace operation, gas generators, and ceramic kilns.

Ordering Information



Model No. ☐☐☐☐ - ☐☐☐☐☐ - 6☐ **0** - ☐ - ☐☐

Field No.	1	2	3	4		5	6	7	8	9		10	11	12		13		14	15

Schedule: S3

Fields 1, 2, 3. THERMOCOUPLE TYPE; WIRE GAUGE

☞ Determine length by completing Fields 8, 9

	Type	Wire	Gauge	Limits	12" Min.	Ea. Add'l 1"
B24 -	B	Pt, 6% Rh v Pt, 30% Rh	24	standard		
B25 -	B	Pt, 6% Rh v Pt, 30% Rh	25	special		
R24 -	R	Pt, 6% Rh v Pt, 30% Rh	24	standard		
R25 -	R	Pt v Pt, 13% Rh	25	special		
R26 -	R	Pt v Pt, 13% Rh	26	standard		
S24 -	S	Pt v Pt, 10% Rh	24	standard		
S25 -	S	Pt v Pt, 10% Rh	25	special		
S26 -	S	Pt v Pt, 10% Rh	26	standard		
C24 -	C	W, 5% Re v W, 26% Re	24	special		
F24 -	F	Platinel II	25	special		

Field 4. NUMBER OF ELEMENTS AND JUNCTION STYLE

I - Single, butt welded, ungrounded

H - Dual, butt welded, ungrounded. Return to Fields 1, 2, 3, double that price.

Fields 5, 6. PROTECTION TUBES

☞ Use length determined in Fields 8, 9

Primary Tube

	Size	Material	12" Min.	Ea. Add'l 6"
23 -	3/8"	High temperature Mullite		
24 -	11/16"	High temperature Mullite		
29 -	3/8"	Aluminum oxide		
30 -	11/16"	Aluminum oxide		

Note: Prices include both primary and secondary tubes. For length between 12" and 48", but not a multiple of 6", use the price of the next longer length,

Ordering Information (continued)

Field 7. COLD END TERMINATION

See page 3-24 for protection tube/cold end termination compatibility table.

		Single	Dual
1 -	General purpose, cast iron		
2 -	Weatherproof, cast iron		
3 -	General purpose, aluminum		
9 -	Brass, open, no external process mount threads		
A -	Weatherproof, aluminum		
B -	Explosionproof, cast iron		
C -	Brass, open, with extrnal process mount threads		
D -	Aluminum, transmitter ready		
E -	Explosionproof, aluminum (extended lead time)		

Fields 8, 9. HOT LENGTH (DIMENSION "HL")

☞ Complete these Fields to determine lengths for Fields 1, 2, 3 and Fields 5, 6

HL - Enter actual inches. Minimum 12", maximum 48"
Over 48" consult factory
When "U" dimension (Fields 14, 15) is specified, allow for 1-1/2" nominal bushing length

Field 10. RESERVED

Field 11. TUBE SEAL

0 - None
1 - Sealed and filled with inert gas

Field 12. RESERVED

Field 13. MOUNTING FITTING

0 - None
2 - Adjustable mounting flange
F - Welded bushing, 3/4" NPT, SS (Fields 5, 6, codes 23 and 29 only)
G - Welded bushing, 1" NPT, SS (Fields 5, 6, codes 24 and 30 only)

Fields 14, 15. MOUNTING FITTING LOCATION ("U" DIMENSION)

Applicable only if Field 13 is code F or G.

00 - Not applicable
UU - Whole inches
99 - Fractional inches, specify on order

T/C, Noble, Dual or Triple, Straight

Thermocouple, Noble Metal
Dual or Triple Tube (Ceramic in Silicon Carbide), Straight

Introduction

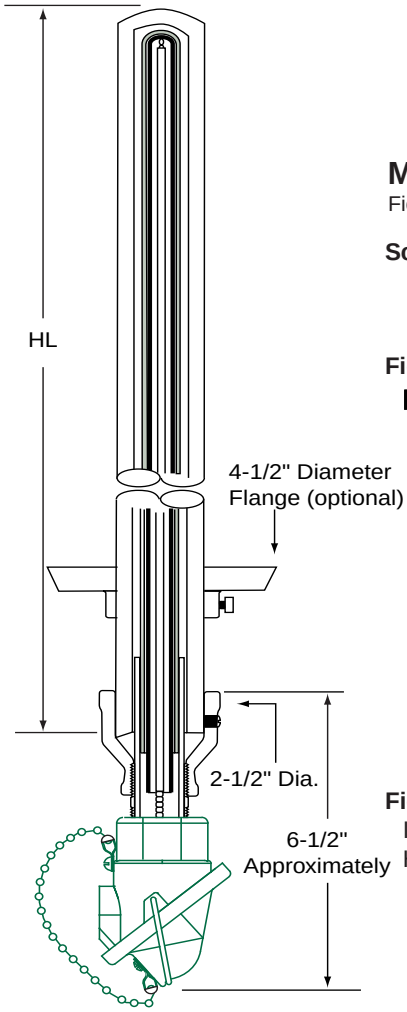
The design of this assembly is for the maximum protection of the noble metal element. The primary protection tube (or tubes) protects the element from outside gases while the outer tube of silicon carbide protects the assembly against the cutting action of flames and hot gases. You can choose either high temperature Mullite or aluminum oxide for the primary tube material. High temperature Mullite is not recommended for temperatures above 1800°F.

Silicon carbide protection tubes have low lag time and long life; high resistance to thermal shock, high conductivity, and impermeability. They are especially resistant to many corrosive atmospheres and are highly resistant to attack by many molten nonferrous metals.

Applications

For use with molten nonferrous metals, brick kilns, ceramic kilns and where the thermocouple is exposed to either flames or hot gases.

Ordering Information



Model No. ☐☐☐☐ - ☐☐☐☐☐ - ☐☐ **0** - ☐ - **0 0**

Field No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Schedule: S3

Fields 1, 2, 3. THERMOCOUPLE TYPE; WIRE GAUGE

☞ Determine length by completing Fields 8, 9

	Type	Wire	Gauge	Limits	12" Min.	Ea. Add'l 1"
B24 -	B	Pt, 6% Rh v Pt, 30% Rh	24	standard		
B25 -	B	Pt, 6% Rh v Pt, 30% Rh	25	special		
B26 -	B	Pt, 6% Rh v Pt, 30% Rh	26	standard		
R24 -	R	Pt, 6% Rh v Pt, 30% Rh	24	standard		
R25 -	R	Pt v Pt, 13% Rh	25	special		
R26 -	R	Pt v Pt, 13% Rh	26	standard		
S24 -	S	Pt v Pt, 10% Rh	24	standard		
S25 -	S	Pt v Pt, 10% Rh	25	special		
S26 -	S	Pt v Pt, 10% Rh	26	standard		
C24 -	C	W, 5% Re v W, 26% Re	24	special		
F24 -	F	Platinel II	25	special		

Field 4. NUMBER OF ELEMENTS AND JUNCTION STYLE

I - Single, butt welded, ungrounded

H - Dual, butt welded, ungrounded. Return to Fields 1, 2, 3, double that price.

Ordering Information (continued)

Fields 5, 6. PROTECTION TUBES

☞ Use length determined in Fields 8, 9

Size	Material	12" Min.	Ea. Add'l 6"
Dual Tube Assemblies (Primary tube is 11/16")			
24 - 11/16"	High temperature Mullite		
30 - 11/16"	Aluminum oxide		
Triple Tube Assemblies (Primary tube is 3/8"; middle tube is 11/16")			
23 - 3/8"	High temperature Mullite		
29 - 3/8"	Aluminum oxide		

Note: Price includes all tubes.

Field 7. COLD END TERMINATION

See page 3-24 for protection tube/cold end termination compatibility table.

	Single	Dual
1 - General purpose, cast iron		
2 - Weatherproof, cast iron		
3 - General purpose, aluminum		
9 - Brass, open, no external process mount threads		
A - Weatherproof, aluminum		
C - Brass, open, with extrnal process mount threads		
D - Aluminum, transmitter ready		

Fields 8, 9. HOT LENGTH (DIMENSION "HL")

☞ Complete these Fields to determine lengths for Fields 1, 2, 3 and Fields 5, 6

HL - Enter actual inches in 6" increments. Minimum 12", maximum 48"
Over 48" consult factory for availability.

Field 10. OUTER TUBE

Priced in Fields 5, 6

2 - Dual tube assembly, silicone carbide outer tube
3 - Triple tube assembly, silicone carbide outer tube

Field 11. TUBE SEAL

0 - None
1 - Sealed and filled with inert gas

Field 12. RESERVED

Field 13. MOUNTING FITTING

0 - None
2 - Adjustable mounting flange

Fields 14, 15. RESERVED