

The straight base metal thermocouple elements illustrated on this catalog page are replacement elements for use in Pyromation's complete industrial thermocouple assemblies as found elsewhere in this catalog section. These replacement elements are also compatible for use in other manufacturers' thermocouple assemblies. These thermocouples are available as bare wire or ceramic insulated elements, with options as listed below, and with special construction designs.

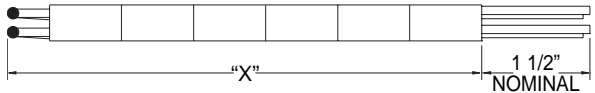
BARE ELEMENT



INSULATED ELEMENT



DUPLEX INSULATED



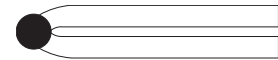
INSULATED JUNCTION



TWIST WELD



TIG WELD



ORDER CODES

Example Order Number:

1 2 3 4
K8 C M - 24 - 1,341

1 Single Straight Element Type

CODE (Type + Wire Gauge)				DESCRIPTION
J8	J11	J14	J20	Iron - Constantan
K8	K11	K14	K20	Chromel - Alumel
N8		N14		Nicrosil - Nisil
DUPLEX STRAIGHT ELEMENTS				
Use thermocouple type code letter twice. Example: JJ14 or KK11. Dual elements with ceramic insulators are supplied as two single elements.				

2 Element Insulation

CODE	DESCRIPTION	WIRE GAUGE	INSULATOR DIMENSIONS (inches)	
			SINGLE	DUPLEX
O	Bare Element		None Used	
C	Oval Ceramic	8 Ga.	0.500 x 0.281	
		11 Ga.	0.375 x 0.218	
		14 Ga.	0.313 x 0.188	
R	Round Ceramic	8 Ga.	0.465 OD	0.500 OD
		11 Ga.	0.465 OD	0.500 OD
		14 Ga.	0.250 OD	0.320 OD
		20 Ga.	0.150 OD	0.188 OD
The above insulated elements are supplied with refractory insulators: 1277 °C [2330 °F] maximum temperature.				
Element Options				
CODE	DESCRIPTION			
M	Special limits wire - types J and K (consult factory for other types)			

4 Element Options

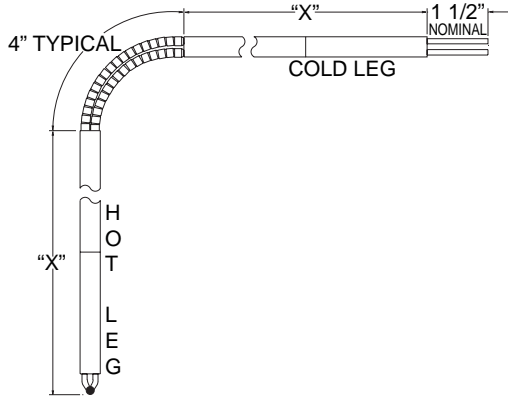
CODE	DESCRIPTION
0	Standard weld as noted below
1	Twist and tig weld (not available with 8 gauge duplex)
2	Tig weld without twist
L	Insulated hot junction
341	Single terminal block on element
342	Duplex terminal block on element

Unless specified by option numbers above, all 8, 11, and 14 gauge elements will be provided with Opt. 2 (tig weld without twist). 20 gauge elements will be provided with Opt. 1 (twist and tig weld). All elements, regardless of gauge, over 96" will be supplied with Option 1 (twist and tig weld).

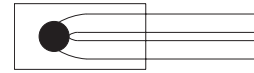
3 Element "X" Length

LENGTH (inches)	LENGTH (inches)
12	30
18	36
24	
Specify other lengths in 1 inch increments.	
Actual cut length will be 1(1/2)" longer than specified length to allow for terminal connections.	

The angle base metal thermocouple elements illustrated on this catalog page are replacement elements for use in Pyromation's complete angle thermocouple assemblies as found elsewhere in this catalog section. These replacement elements are also compatible for use in other manufacturers' angle thermocouple assemblies. These thermocouples are available with the options listed below and with special construction designs. These replacement elements are shipped in a straight configuration and are to be bent at the time of installation.



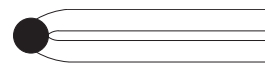
INSULATED JUNCTION



TWIST WELD



TIG WELD



ORDER CODES

Example Order Number:

1 2 3 4 5
K8 A - 12 - 18 - 1, L, 341

1 Single Angle Element Type

CODE (Type + Wire Gauge)			DESCRIPTION
J8	J11	J14	Iron - Constantan
K8	K11	K14	Chromel - Alumel
N8		N14	Nicrosil - Nisil
DUPLEX ANGLE ELEMENTS			
Requires the use of 2 single elements.			

2 Element Insulation

CODE	INSULATOR DESCRIPTION	WIRE GAUGE	INSULATOR DIMENSIONS (inches)
			SINGLE
A	Two hole oval ceramic insulators on hot and cold legs. Ball and socket insulators at bend	8 Ga.	0.500 x 0.281
		11 Ga.	0.500 x 0.286
		14 Ga.	0.375 x 0.218

The above insulated elements are supplied with refractory insulators: 1277 °C [2330 °F] maximum temperature.

Element Options

CODE	DESCRIPTION
M	Special limits wire - types J and K (consult factory for other types)

3 Hot Leg "X" Length

LENGTH (inches)	LENGTH (inches)
12	30
18	36
24	Specify Other Lengths

5 Element Options

CODE	DESCRIPTION
0	Standard weld as noted below
1	Twist and tig weld
2	Tig weld without twist
L	Insulated hot junction
341	Single terminal block on element
342	Duplex terminal block on element

Unless specified by option numbers above, all 8, 11, and 14 gauge elements will be provided with Opt. 2 (tig weld without twist).

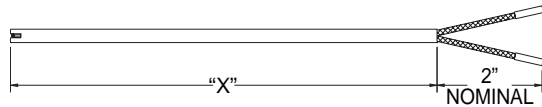
All elements, regardless of gauge, over 96" will be supplied with Option 1 (twist and tig weld).

4 Cold Leg "X" Length

LENGTH (inches)	LENGTH (inches)
12	30
18	36
24	
Specify other lengths in 1 inch increments.	
Actual cut length will be 1(1/2)" longer than specified length to allow for terminal connections.	

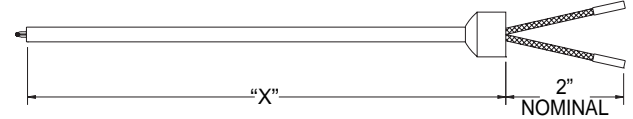
The noble metal platinum thermocouple elements illustrated on this catalog page are replacement elements for use in Pyromation's complete high temperature industrial thermocouple assemblies as found elsewhere in this catalog section. These replacement elements are also compatible for use in other manufacturers' high temperature thermocouple assemblies. All insulated elements are supplied with high temperature alumina insulators and are available with the options as listed below. Element types R, S, and B are supplied with a fusion weld. Custom designed constructions are available.

INSULATED ELEMENT without COLLAR (supplied with recessed junction as standard)



Note: Elements supplied without collars are intended to be used with ceramic tubes that are not supplied with hex fittings.

INSULATED ELEMENT with COLLAR



Note: Elements supplied with collars are intended to be used with ceramic tubes with hex fittings.

ORDER CODES

Example Order Number:

1 2 3 4
R24 - R - 18 - 3

1 Single Straight Element Type

CODE (Type + Wire Gauge)		DESCRIPTION
R24	R26	Platinum - Platinum 13% Rhodium
S24	S26	Platinum - Platinum 10% Rhodium
B24		Platinum - 30% Rhodium - Platinum 6% Rhodium
DUPLEX STRAIGHT ELEMENTS		
Use thermocouple type code letter twice. EXAMPLES: RR24 or SS26		

2 Element Insulation

CODE	INSULATOR DESCRIPTION	WIRE GAUGE	INSULATOR DIMENSIONS (inches)
			<i>SINGLE and DUPLEX</i>
O	Uninsulated Bare Element		None
R	Round, 99.7% Alumina Insulator (4-hole, single and duplex) 1871 °C [3400 °F] maximum temp.	24	0.188 OD w 0.535 OD Collar
		26	0.188 OD w 0.535 OD Collar
Element Options			
CODE	DESCRIPTION		
M	Reference grade (consult factory for other types)		

4 Element Options

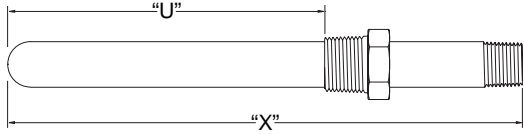
CODE	DESCRIPTION
3	Supplied without ceramic collar
L	Recessed insulated hot junction

3 Element "X" Length

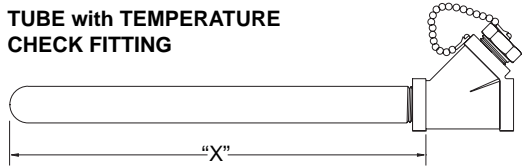
LENGTH (inches)	LENGTH (inches)
12	30
18	36
24	
Specify other lengths in 1 inch increments.	

The thermocouple protection tubes illustrated on this catalog page are replacement tubes for Pyromation's complete thermocouple assemblies as found elsewhere in this catalog section. They are compatible replacements for other manufacturers' protection tubes. The materials of construction are those most commonly used in general purpose industrial process heating applications. These protection tubes are available with the options as listed below, with other pipe schedule sizes, and they can be supplied with custom designed constructions.

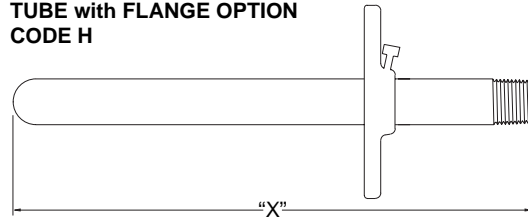
TUBE with OPTIONAL WELDED BUSHING



TUBE with TEMPERATURE CHECK FITTING



TUBE with FLANGE OPTION CODE H



ORDER CODES

Example Order Number:

1 2 3
8-50 - 18 - 8D16

1 Protection Tube NPT Connections

CODE	NPT SIZE (inches)	PIPE SCHED. ^[1]
CARBON STEEL 538 °C [1000 °F] Max.		
6 - 25	1/4	40
6 - 50	1/2	40
6 - 75	3/4	40
6 - 100	1	40
316 SS 927 °C [1700 °F] Max.		
8 - 25	1/4	40
8 - 50	1/2	40
8 - 75	3/4	40
8 - 100	1	40
446 SS 1093 °C [2000 °F] Max.		
5 - 50	1/2	40
5 - 75	3/4	40
INCONEL 600 1149 °C [2100 °F] Max.		
3 - 50	1/2	40
3 - 75	3/4	40
INCONEL 601 1260 °C [2300 °F] Max.		
7 - 50	1/2	40
7 - 75	3/4	40
7 - 100	1	40

[1] Schedule 80 and 160 are available in some alloys as special order items. Consult factory for price and delivery.

2 Tube "X" Length

LENGTH (inches)
12
18
24
30
36
Specify other lengths in 1 inch increments.

3 Protection Tube Options

CODE	DESCRIPTION
A	Open end tube (closed end standard)
H	Adjustable steel mounting flange
NT	Supplied without threads
6Y	Steel temperature check fitting

Optional Welded Bushings

CODE	DESCRIPTION
STEEL	316 SS
BUSHING SIZE (inches)	
6C(U)	8C(U) 1/2 NPT Bushing (25 tubes only)
6D(U)	8D(U) 3/4 NPT Bushing (25 and 50 tubes only)
6E(U)	8E(U) 1 NPT Bushing (25, 50, and 75 tubes only)
6F(U)	8F(U) 1(1/4) NPT Bushing
6G(U)	8G(U) 1(1/2) NPT Bushing

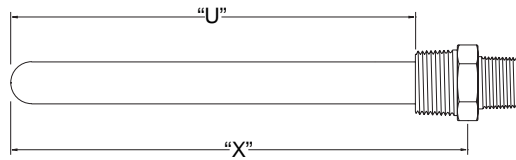
Substitute insertion length, in inches, measured from hot tip to bottom of bushing for (U) above. Insert NW in place of insertion length (U) for bushing supplied loose on tube.

Metal Alloy Tube Dimensions

PIPE SIZE (inches)	OD (inches)	SCH. 40 ID (inches)	SCH. 80 ID (inches)	SCH. 160 ID (inches)
1/4	0.540	0.364	0.302	
1/2	0.840	0.622	0.546	0.046
3/4	1.050	0.824	0.742	0.612
1	1.315	1.049	0.957	0.815

The protection tubes listed below are designed for use in high temperature corrosive service applications. The Series 41 protection tubes are used in waste incineration, cement and lime kilns, utility and recovery boilers, fluidized bed combustion systems, and other harsh process environments when high levels of sulphur, chlorides, ash, and salt deposits are commonly found. The Series 12 protection tubes are also excellent choices for use in waste incineration, immersion into molten copper, brass, basic steels and slag, and for use in open hearth furnaces, soaking pits, and blast furnace applications.

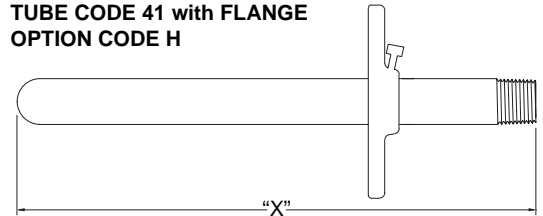
TUBECODE 12 (see note below)



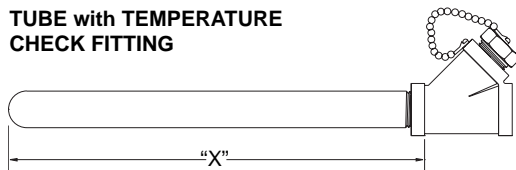
Note: Series 12 tubes "U" dimensions are fixed at approximately 1" less than specified "X" length.

1" x 3/4"
Steel Hex Fitting
Standard.
No optional
welded bushings
are necessary.

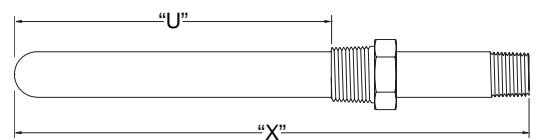
TUBE CODE 41 with FLANGE
OPTION CODE H



TUBE with TEMPERATURE
CHECK FITTING

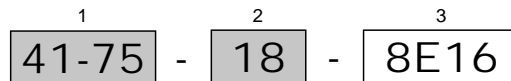


TUBE CODE 41 with OPTIONAL BUSHING



ORDER CODES

Example Order Number:



1 Protection Tube
NPT Connections

CODE	NPT SIZE (inches)	PIPE SCHED.
<i>HR-160 1204 °C [2200 °F] Max.</i>		
41-50	1/2	40
41-51	1/2	80
41-75	3/4	40
41-76	3/4	80
41-100	1	40
<i>LT-1 1371 °C [2500 °F] Max.</i>		
12-75	n/a	0.875" OD 0.625" ID

2 Tube "X"
Length

LENGTH (inches)
12
18
24
30
36
Specify other lengths in 1 inch increments.

3 Protection Tube Options

CODE	DESCRIPTION
A	Open end tube (closed end standard)
H	Adjustable steel mounting flange
NT	Supplied without threads
6Y	Steel temperature check fitting

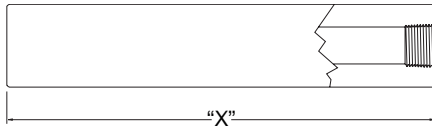
Optional Welded Bushings For Series 41

CODE	DESCRIPTION
<i>STEEL</i>	<i>316 SS</i>
BUSHING SIZE (inches)	
6D(U)	8D(U) 3/4 NPT Bushing (50 tubes only)
6E(U)	8E(U) 1 NPT Bushing (50 and 75 tubes only)
6F(U)	8F(U) 1(1/4) NPT Bushing
6G(U)	8G(U) 1(1/2) NPT Bushing

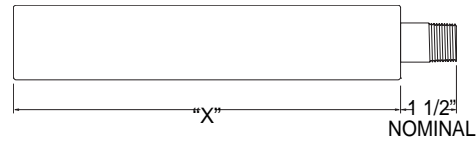
Substitute insertion length, in inches, measured from hot tip to bottom of bushing for (U) above. Insert NW in place of insertion length (U) for bushing supplied loose on tube.

The Series 11, 13, and 14 protection tubes are used to protect thermocouple elements in molten aluminum and zinc applications such as diecasting, melting, smelting, and high temperature holding furnace environments. Series 18 Silicon Carbide protection tube can also be used in the above applications, however the Series 18 is a refractory silicate bonded tube and generally will not provide a service life equal to silicon nitride bonded silicon carbide protection tubes. The Series 18 is satisfactory for use in other molten metals, molten glass, and other high temperature applications. Series 13, 14, and 18 protection tubes should be preheated and slowly immersed into any molten materials.

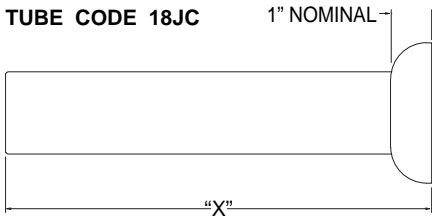
TUBE CODE 11



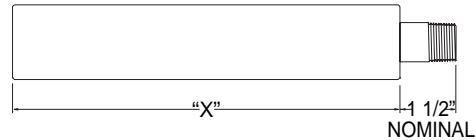
TUBE CODE 13



TUBE CODE 18JC



TUBE CODE 14



ORDER CODES

Example Order Number:

11-75 - **24**

1 Protection Tube NPT Connections

2 Tube "X" Length

CODE	DESCRIPTION	NPT SIZE (inches)	TUBE		MAX. LENGTH (inches)	LENGTH (inches)
			OD (inches)	ID (inches)		
<i>CAST IRON 871 °C [1600 °F] Max.</i>						
11 - 75	Internally threaded	3/4	1.625	0.875	72	12
<i>VESUVIUS 927 °C [1700 °F] Max.</i>						
13 - 75		3/4	2.00	0.824	48	18
<i>SILICON CARBIDE 1649 °C [3000 °F] Max.</i>						
18J	Plain tube w/o collar	None	1.75	1.00	48	24
18JC	3" OD collar	None	1.75	1.00	48	30
<i>CERITE® 815 °C [1300 °F] (36" maximum "X" length)</i>						
14-50 ^[1]	Cerite® II	1/2	2.00	0.622	36	36
[1] For Cerite® protection tubes supplied with 316SS pipe instead of a carbon steel pipe, change model number prefix code 14 to 148. EXAMPLE: 148-50-24						

Recommended Applications

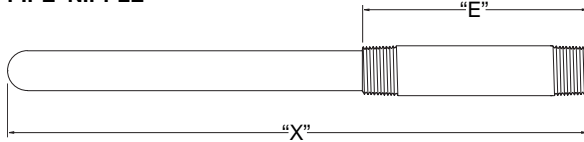
<i>CAST IRON</i>	Aluminum
<i>VESUVIUS</i>	Aluminum
<i>SILICON CARBIDE (Silicate Bonded)</i>	Aluminum (see comments above for Series 18 Tube), molten ferrous and non-ferrous metals, glass processing, kilns, incinerators, and other high temperature processes
<i>CERITE®</i>	Aluminum, Zinc

Pyromation, INC.

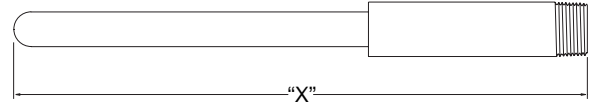
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The thermocouple protection tubes illustrated on this catalog page are replacement tubes for Pyromation's complete ceramic protection tube thermocouple assemblies as found elsewhere in this catalog section, and they are compatible replacements for other manufacturers' protection tubes. The Series 16 mullite tubes are composed of 63% alumina, and have slightly more porosity than the Series 17 alumina tube composed of 99.7% alumina, which is considered to be more gas tight.

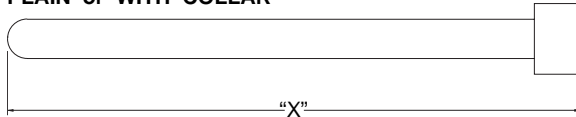
PIPE NIPPLE



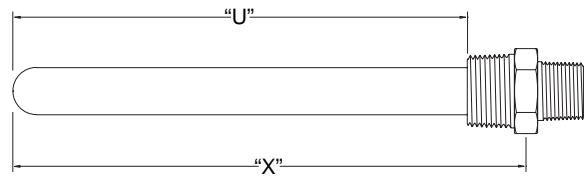
BRASS FERRULE for OPEN STYLE HEAD or NT OPTION



PLAIN or WITH COLLAR

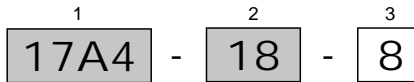


HEX FITTING



ORDER CODES

Example Order Number:



1 Ceramic Protection Tube Materials - Sizes - Fittings

TUBE MATERIAL		TUBE SIZE		COLLAR or FITTING STYLE and DESCRIPTION	FITTING TYPE - SIZE	
CODE		ID (inches)	OD (inches)		PROCESS THREAD (inches)	TERM. THREAD (inches)
MULLITE 1482 °C [2700 °F]	ALUMINA 1871 °C [3400 °F]					
16AH	17AH	1/4	3/8	Steel hex fitting	1/2 NPT	1/2 NPT
16A1	17A1	1/4	3/8	Steel close nipple	1/2 NPT	1/2 NPT
16A(E)	17A(E)	1/4	3/8	Specify "E length" steel nipple	1/2 NPT	1/2 NPT
16AF	17AF	1/4	3/8	7/8" OD x 2" L brass ferrule for open head	None	7/8 x 27 UNS
16A	17A	1/4	3/8	Plain tube	None	None
16AC	N/A	1/4	3/8	Tube with 5/8" OD x 1/2" L collar	None	None
16BH	17BH	7/16	11/16	Steel hex fitting	3/4 NPT	1/2 NPT
16B1	17B1	7/16	11/16	Steel close nipple	3/4 NPT	3/4 NPT
16B(E)	17B(E)	7/16	11/16	Specify "E length" steel nipple	3/4 NPT	3/4 NPT
16BF	17BF	7/16	11/16	7/8" OD x 2" L brass ferrule for open head	None	7/8 x 27 UNS
16B	17B	7/16	11/16	Plain tube	None	None
16BC	N/A	7/16	11/16	Tube with 1" OD x 1/2" L collar	None	None
16CH	17CH	1/2	3/4	Steel hex fitting	3/4 NPT	1/2 NPT
16C1	17C1	1/2	3/4	Steel close nipple	3/4 NPT	3/4 NPT
16C(E)	17C(E)	1/2	3/4	Specify "E length" steel nipple	3/4 NPT	3/4 NPT
16C	17C	1/2	3/4	Plain tube	None	None
16CC	N/A	1/2	3/4	Tube w/1(1/8)" OD x 1/2" L collar	None	None
16WH	17WH	5/8	7/8	Steel hex fitting	1 NPT	3/4 NPT
16W1	17W1	5/8	7/8	Steel close nipple	1 NPT	1 NPT
16W(E)	17W(E)	5/8	7/8	Specify "E length" steel nipple	1 NPT	1 NPT
16W	17W	5/8	7/8	Plain tube	None	None
16EH	17EH	1	1(1/4)	Steel hex fitting	1(1/4) NPT	1 NPT
16E1	17E1	1	1(1/4)	Steel close nipple	1(1/4) NPT	1(1/4) NPT
16E(E)	17E(E)	1	1(1/4)	Specify "E length" steel nipple	1(1/4) NPT	1(1/4) NPT
16E	17E	1	1(1/4)	Plain tube	None	None
16EC	N/A	1	1(1/4)	Tube w/1(3/4)" OD x 1/2" L collar	None	None

3 Options

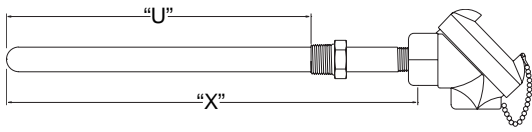
CODE	DESCRIPTION
8	316 SS nipple or hex tube fitting
NT	No process mtg. threads on pipe nipples

2 Tube "X" Length

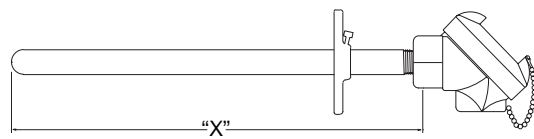
LENGTH (inches)
12
18
24
30
36
Specify other lengths in 1 inch increments.

The straight base metal thermocouple assemblies illustrated on this page are those most commonly used in medium to high temperature low corrosion industrial process heating applications. All listed assemblies are provided with schedule 40 protection tubes, and are available with listed options. Heavier pipe schedule protection tubes and special construction designs are also available.

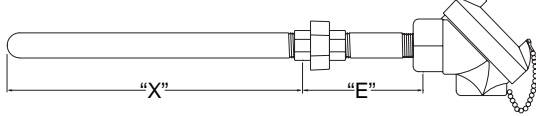
ASSEMBLY with WELDED BUSHING



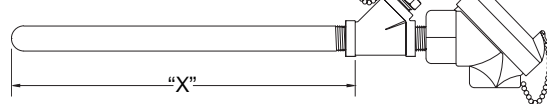
ASSEMBLY with OPTIONAL FLANGE



ASSEMBLY with OPTIONAL UNION NIPPLE



ASSEMBLY with TEMPERATURE CHECK FITTING



ORDER CODES

Example Order Number: 1 K8C - 2 7 - 3 50 - 4 24 - 5 6E20 - 6 34

1 Thermocouple Type + Wire Gauge Size

CODE		
J8C	K8C	N8C
J11C	K11C	
J14C	K14C	N14C

Thermocouples of 8 ga. wire require minimum of 1/2" NPT tube

DUPLIX T/C ASSEMBLIES

For duplex assemblies use the T/C type code letter twice. Example: K8C - 7 - 75 becomes KK8C - 7 - 75

2 Protection Tube Material 3 NPT Thread Size

CODE	MATERIAL	CODE (inches)			
		1/4	1/2	3/4	1
6	CARBON STEEL	25	50	75	100
8	316 SS	25	50	75	100
5	446 SS		50	75	100
3	INCONEL 600		50	75	
7	INCONEL 601		50	75	100

4 Tube "X" Length

LENGTH (inches)	LENGTH (inches)
12	30
18	36
24	

Specify other lengths in 1 inch increments.

Duplex 8, 11, and 14 ga. assemblies require a minimum 1/2" NPT protection tube size (size codes 50 and larger).

8 gauge duplex thermocouple elements supplied in 1/2" NPT protection tubes will be supplied with round insulators.

5 Optional Welded Bushings

CODE			DESCRIPTION
STEEL	316SS	BUSHING SIZE (inches)	
6C(U)	8C(U)	1/2 NPT Bushing (25 tubes only)	
6D(U)	8D(U)	3/4 NPT Bushing (25 and 50 tubes only)	
6E(U)	8E(U)	1 NPT Bushing (25, 50 and 75 tubes only)	
6F(U)	8F(U)	1(1/4) NPT Bushing	
6G(U)	8G(U)	1(1/2) NPT Bushing	

Substitute insertion length, in inches, measured from hot tip to bottom of bushing for (U) above. Insert NW in place of insertion length (U) for bushing supplied loose on tube.

Optional Union and Nipple Head Connection

STEEL	316 SS	Union-nipple supplied as material specified
6PU(E) ^[1]	8PU(E) ^[1]	

[1] Insert extension length, in inches, for (E) above.

6 Head Terminations

CODE	DESCRIPTION
31	Aluminum screw cover head
34	Cast iron screw cover head
49	Flip top aluminum head
71 ^[1]	Cast iron aluminum explosion proof head
81 ^[1]	316L SS explosion proof head
91 ^[1]	316L SS head

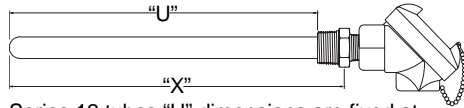
[1] Not available with 1" NPT protection tubes.

6-1 Assembly Options

CODE	DESCRIPTION
GS	Ground screw
H	Adjustable steel mounting flange
I	Stainless tag
6Y	Steel temperature check fitting
L	Insulated hot junction

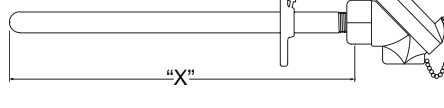
The straight base metal thermocouple assemblies illustrated on this page are typically used in high temperature and highly corrosive applications commonly found in waste incinerators, cement and lime kilns, utility and waste recovery boilers, and other severe process environments. Special construction designs are also available.

SERIES 12 ASSEMBLY with 1" STEEL HEX FITTING STD.

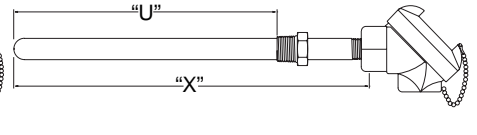


Series 12 tubes "U" dimensions are fixed at approximately 1" less than specified "X" length

SERIES 41 ASSEMBLY with OPTIONAL FLANGE



ASSEMBLY with WELDED BUSHING



ORDER CODES

Example Order Number:

1 2 3 4 5 5-1
K8C - **41-75** - **24** - **6E20** - **34, I**

1 Thermocouple Type + Wire Gauge Size

CODE	
K8C	N8C
DUPLIX T/C ASSEMBLIES	
For duplex assemblies use the T/C type code letter twice. Example: K8C - 41 - 75 becomes KK8C - 41 - 75	
8 gauge duplex thermocouple elements supplied in 41-50 and 12-75 protection tubes will be supplied with round insulators.	

2 Protection Tube Material NPT Connection

CODE	NPT SIZE (inches)	PIPE SCHED.
<i>HR - 160</i>		
41 - 50	1/2	40
41 - 51	1/2	80
41 - 75	3/4	40
41 - 76	3/4	80
41 - 100	1	40
<i>LT - 1</i>		
12 - 75	3/4	0.875" OD 0.625" ID

3 Tube "X" Length

LENGTH (inches)	LENGTH (inches)
12	30
18	36
24	
Specify other lengths in 1 inch increments.	

4 Optional Welded Bushings

CODE		DESCRIPTION
<i>STEEL</i>	<i>316SS</i>	BUSHING SIZE (inches)
6D(U)	8D(U)	3/4 NPT Bushing (25 and 50 tubes only)
6E(U)	8E(U)	1 NPT Bushing (50 and 75 tubes only)
6F(U)	8F(U)	1(1/4) NPT Bushing
6G(U)	8G(U)	1(1/2) NPT Bushing
Substitute insertion length, in inches, measured from hot tip to bottom of bushing for (U) above. Insert NW in place of insertion length (U) for bushing supplied loose on tube.		
Optional Union and Nipple Head Connection		
<i>STEEL</i>	<i>316 SS</i>	Union-nipple supplied as material specified
6PU(E)	8PU(E)	
Insert extension length, in inches, for (E) above.		

5 Head Terminations

CODE	DESCRIPTION
31	Aluminum screw cover head
34	Cast iron screw cover head
49	Flip top aluminum head
71 ^[1]	Cast iron aluminum explosion proof head
81 ^[1]	316L SS explosion proof head
91 ^[1]	316L SS head
[1] Not available with 1" NPT protection tubes.	

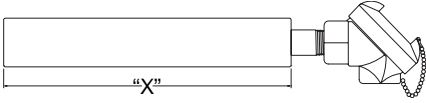
5-1 Assembly Options

CODE	DESCRIPTION
GS	Ground screw
H	Adjustable steel mounting flange
I	Stainless tag
6Y	Steel temperature check fitting
L	Insulated hot junction

The Series 11, 13 and 14 assemblies are used to protect thermocouple elements in molten aluminum and zinc applications such as diecasting, melting, smelting and high temperature holding furnace environments. The Series 18 silicon carbide assembly can also be used in the above mentioned applications, however the Series 18 is a refractory silicate bonded tube and generally will not provide a service life equal to silicon nitride bonded silicon carbide assemblies. The Series 18 is satisfactory for use in other molten metals, molten glass, and other high temperature applications. Series 13, 14, and 18 assemblies should be preheated and slowly immersed into any molten materials.

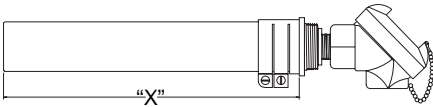
SERIES 13 PROTECTION TUBE ASSEMBLIES

FIG. 1



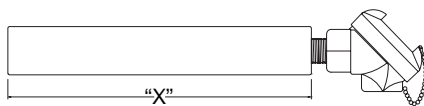
SERIES 18J PROTECTION TUBE ASSEMBLIES

FIG. 2



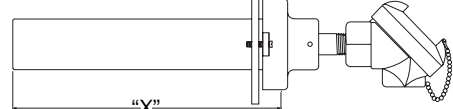
SERIES 11 PROTECTION TUBE ASSEMBLIES

FIG. 3



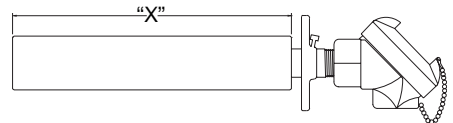
SERIES 18JC PROTECTION TUBE ASSEMBLIES

FIG. 4



CERITE® II 14 PROTECTION TUBE ASSEMBLY

FIG. 5



ORDER CODES

Example Order Number:

K8C - **13-75** - **24** - **31, H**

1 Thermocouple Type + Wire Gauge Size

CODE	
K8C	N8C
DUPLEX T/C ASSEMBLIES	
For duplex assemblies use the T/C type code letter twice. Example: K8C - 13 - 75 becomes KK8C - 13 - 75.	
For additional types and sizes consult factory.	

2 Protection Tube Material

CODE	FIGURE NUMBER
CAST IRON	
11-75	3
VESUVIUS	
13-75	1
SILICON CARBIDE	
18J-75	2
18JC-75	4
CERITE® II	
14-50 ^[1]	5

[1] For protection tubes supplied with a 316SS pipe instead of a carbon steel pipe, change order number 14 to 148.
EXAMPLE: K8C-148-50-24-31

Protection Tube Dimensions

CODE	ID x OD (inches)
11	0.875 x 1.625
13	0.824 x 2.00
18J	1.00 x 1.75
18JC	1.00 x 1.75
14	0.622 x 2.00

4 Head Terminations

CODE	DESCRIPTION
31	Aluminum screw cover head
34	Cast iron screw cover head
49	Flip top aluminum head
91	316L SS head

4-1 Assembly Options

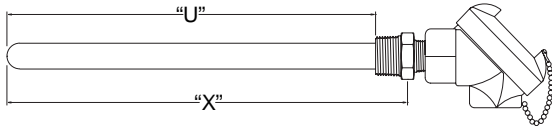
CODE	DESCRIPTION
GS	Ground screw
H	Adjustable steel mounting flange
I	Stainless tag
L	Insulated hot junction

3 Tube "X" Length

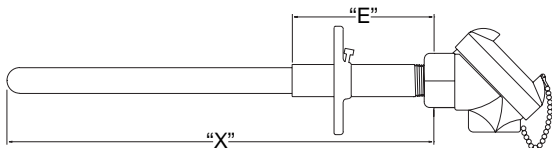
LENGTH (inches)	LENGTH (inches)
12	36
18	42 ^[1]
24	48 ^[1]
30	
Consult factory for other lengths.	
[1] 42 & 48 not available in 14 Series tubes.	

The straight noble and base metal thermocouple assemblies, with Series 16 mullite and Series 17 alumina protection tubes, illustrated on this catalog page are those most commonly used in high temperature process heating applications. These assemblies are available with a variety of process mounting fittings and assembly options as listed below. Special construction designs are also available.

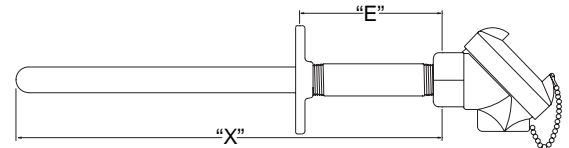
HEX FITTING



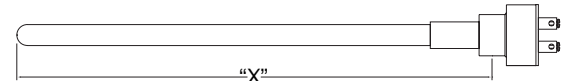
PIPE NIPPLE with NT OPTION and FLANGE



PIPE NIPPLE with HT OPTION



OPEN TERMINAL HEAD (OPT. N)



ORDER CODES

Example Order Number: **R24R** - **17BH** - **18** - **31, 8**

1 Thermocouple Type + Wire Gauge Size

CODE		
B24R R24R R26R S24R S26R	K8R ^[1] N8R ^[1]	K11C ^[2] N14C ^[2]
[1] Use only with 16C or 16W series tubes		[2] Use only with 16B or 16C series tubes
8ga. duplex elements only available in W series tubes. For duplex T/C's, use element type twice. Example: RR24R		

2 Protection Tube

TUBE MATERIAL AND SIZE				PROCESS MOUNTING FITTING
CODE	TUBE OD (inches)	NPT SIZE (inches)		
MULLITE 1482 °C [2700 °F]	ALUMINA 1871 °C [3400 °F]			
16AH ^[1]	17AH ^[1]	3/8	1/2	Steel hex fitting
16A1 ^[1]	17A1 ^[1]	3/8	1/2	Steel close nipple
16A(E) ^[1]	17A(E) ^[1]	3/8	1/2	Specify nipple "E" length
16AF ^[1]	17AF ^[1]	3/8	None	7/8" OD x 2" L open head ftg
16BH	17BH	11/16	3/4	Steel hex fitting
16B1	17B1	11/16	3/4	Steel close nipple
16B(E)	17B(E)	11/16	3/4	Specify nipple "E" length
16BF	17BF	11/16	None	7/8" OD x 2" L open head ftg
16CH		3/4	3/4	Steel hex fitting
16C1		3/4	3/4	Steel close nipple
16C(E)		3/4	3/4	Specify nipple "E" length
16WH		7/8	1	Steel hex fitting

[1] All assemblies with a 3/8" OD tube should be ordered with an aluminum termination head.

4 Head Terminations

CODE	DESCRIPTION
31	Aluminum screw cover head
34	Cast iron screw cover head
49	Flip top aluminum head
91	316L SS head
N	Open terminal head - R, S, B only (require AF or BF protection tubes)

4-1 Assembly Options

CODE	DESCRIPTION
GS	Ground screw
NT	No process threads on pipe nipple
HT	Threaded flange on nipple
I	Stainless tag
8	316SS nipple or hex tube fitting
H	Adjustable steel mtg. flange

3 Tube "X" Length

LENGTH (inches)	LENGTH (inches)
12	30
18	36
24	
Specify other lengths in 1 inch increments.	

The straight noble metal thermocouple assemblies illustrated on this catalog page are provided with double protection tubes. Outer protection tube choices of ceramic materials, metal alloys, or composite materials offer thermocouple protection from a variety of high temperature process heating environments. All assemblies are provided with a ceramic inner tube. These assemblies are available with a variety of process mounting fittings and assembly options as listed below. Special construction designs are also available.

FLANGED ASSEMBLY

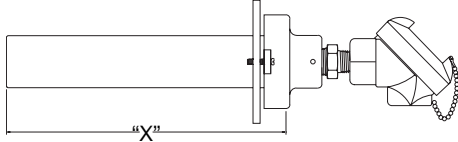


FIG. 1

HEX FITTING

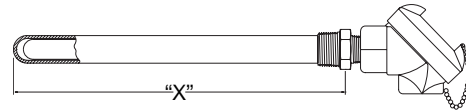


FIG. 2

CLAMP ASSEMBLY

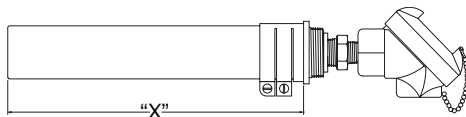


FIG. 3

WELDED BUSHING

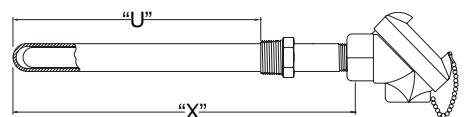


FIG. 4

ORDER CODES

Example Order Number: S24R - 16BH-18J - 36 - 31, H

1 Thermocouple Type + Wire Gauge Size

CODE	
B24R	R26R
R24R	S26R
S24R	
For duplex T/C's, use element type twice. Example: RR24R	

2 Protection Tubes (Inner and Outer)

CODE	MATERIAL TYPE		SIZE O.D. (inches)	PROCESS MOUNTING FITTING	
	INNER	OUTER		NPT. THREAD (inches)	FITTING TYPE
17A-17BH	Alumina	Alumina	11/16	3/4	Figure 2
17A-17B1	Alumina	Alumina	11/16	3/4	1" steel nipple
17A-17B(E)	Alumina	Alumina	11/16	3/4	Nipple (specify length)
17A-12-75	Alumina	LT-1	7/8	1	Figure 2
17BH-18J	Alumina	Silicon Carbide	1(3/4)	None	Figure 3
17BH-18JC	Alumina	Silicon Carbide	1(3/4)	None	Figure 1
16A-16BH	Mullite	Mullite	11/16	3/4	Figure 2
16A-16B1	Mullite	Mullite	11/16	3/4	1" steel nipple
16A-16B(E)	Mullite	Mullite	11/16	3/4	Nipple (specify length)
16A-12-75	Mullite	LT-1	7/8	1	Figure 2
16BH-18J	Mullite	Silicon Carbide	1(3/4)	None	Figure 3
16BH-18JC	Mullite	Silicon Carbide	1(3/4)	None	Figure 1
16B-41-75	Mullite	HR-160	1.050	None	Figure 4
16B-7-75	Mullite	Inc.601	1.050	None	Figure 4

The inner protection tubes are cemented to the outer tube and are not replaceable as separate items, except for Silicon Carbide assemblies.

Optional Welded Bushings
(only on HR-160 and Inconel Tubes)

CODE		DESCRIPTION
STEEL	316 SS	BUSHING SIZE (inches)
6E(U)	8E(U)	1 NPT Bushing
6F(U)	8F(U)	1 (1/4) NPT Bushing
6G(U)	8G(U)	1 (1/2) NPT Bushing

Substitute insertion length, in inches, measured from hot tip to bottom of bushing for (U) above.
Insert NW in place of insertion length (U) for bushing supplied loose on tube.

5 Head Terminations

CODE	DESCRIPTION
31	Aluminum screw cover head
34	Cast iron screw cover head
49	Flip top aluminum head
91	316L SS head
N	Open terminal head - R, S, B only (request AF or BF)

5-1 Assembly Options

CODE	DESCRIPTION
GS	Ground screw
NT	No mounting threads on pipe nipple
HT	Threaded flange on nipple
I	Stainless Tag
8	316SS nipple or hex tube fitting
H	Adjustable steel mtg. flange

3 Tube "X" Length

LENGTH (inches)	LENGTH (inches)
12	30
18	36
24	
Specify other lengths in 1 inch increments.	