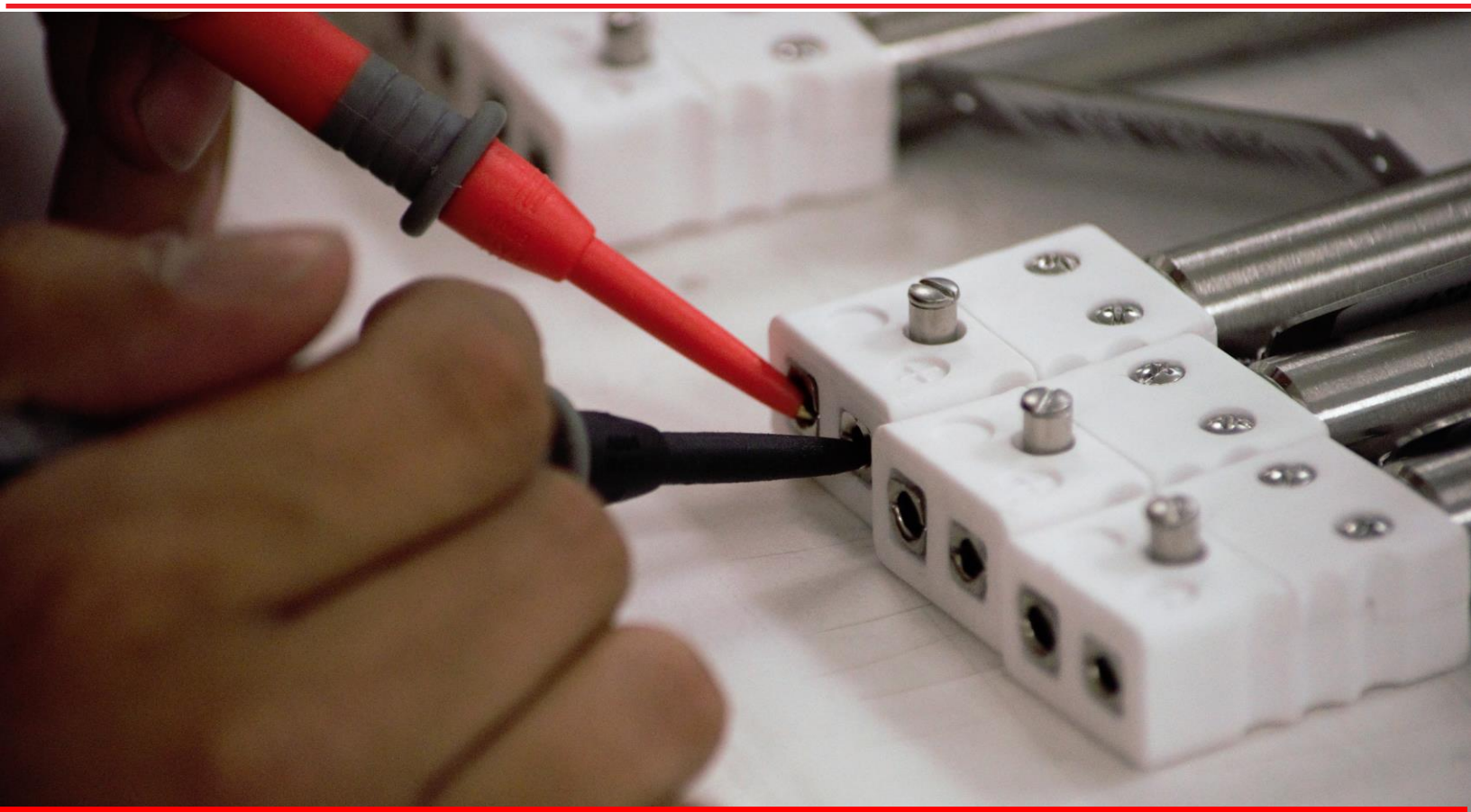
THERMO ELECTRIC

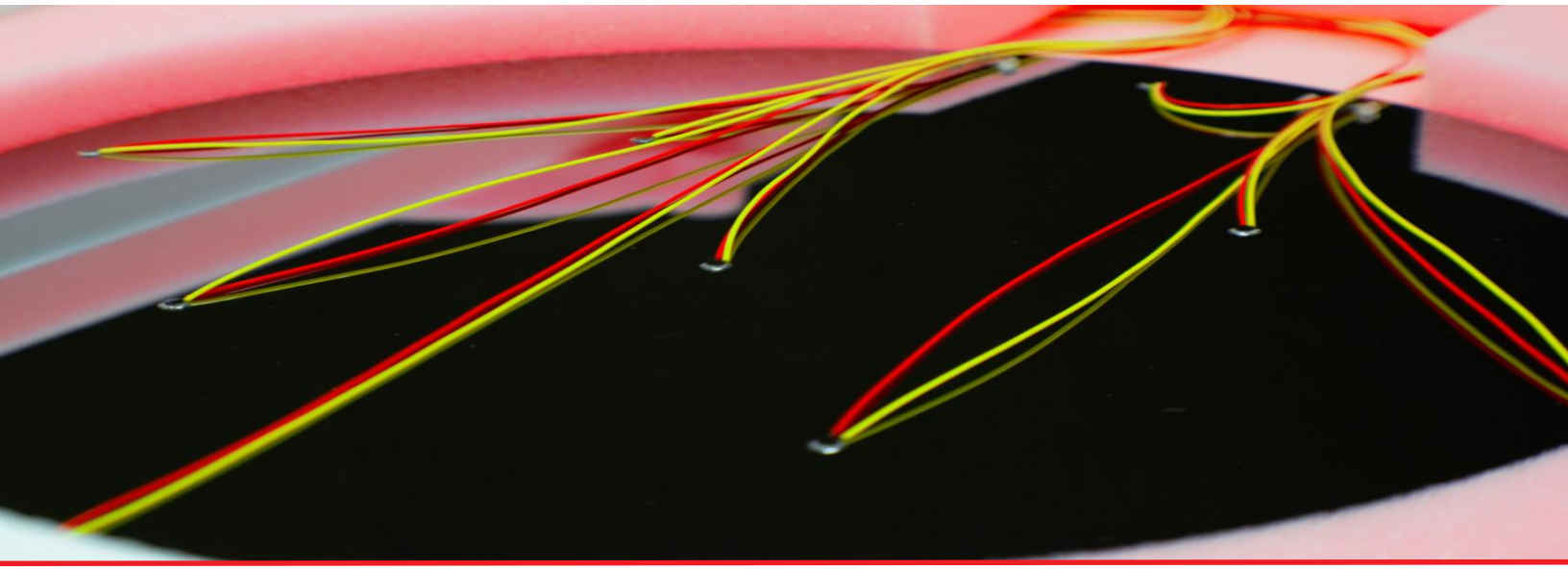
SINCE 1941

Temperature Measurement

Innovative Solutions & Lasting Relationships



PRODUCT GUIDE



Temperature measurement is paramount to optimizing any operations process yield. To trust their applications, operators must trust the quality of their temperature sensors. At Thermo Electric, it's our mission to be our customer's trusted worldwide expert in protecting their assets through superior temperature measurement.

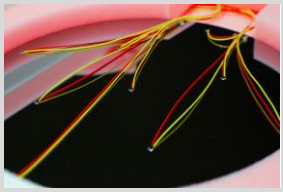
Established in 1941, Thermo Electric is specialized in the design and manufacturing of premium temperature measurement solutions & services. Its products and solutions have been tested, trusted, and used by many major industry leaders. Engineering expertise, manufacturing efficiency, and product quality are the heart of our corporate model. We are committed to building lasting relationships through accurate and timely delivery of top quality products and customized solutions.

THERMO ELECTRIC proudly serves a worldwide customer base with a high level of proximity and top class consistency. All of our locations design and manufacture temperature sensing solutions according to the same techniques that have been proven and developed at our US headquarters for more than 75 years.

MORE THAN JUST A SENSOR

At Thermo Electric, we offer an array of products, including Thermocouples, RTD's, Multipoint Sensors, Tube Skin Sensors, Thermowells, Instrumented Wafers, Specialty Wire, Cable, and Connectors. In addition, we include a wide range of complimentary accessories, customized components, and on-site services.

THERMO ELECTRIC offers more than **50,000** sensor variations and shipped more than **20 MIL** sensors around the world

THERMOCOUPLES RTDs	IMMERSIONS	INDUSTRIALS	TUBESKINS	WAFERS
				
SCOPE	Gas & steam turbines Engines Renewable energy Power industry	Process Power industry Pipe lines Vessels	Petrochemical plants Boilers Super heater tubes	Rapid thermal processing Rapid thermal annealing Post exposure bake
SPECIALS	HIGH PRESSURE SENSORS - MULTIPOINTS - CUSTOM DESIGN			
ACCESSORIES	PROTECTION WELLS – TERMINAL PANELS – CONNECTORS – WIRES & CABLES			
SERVICES	CUSTOMIZATION & INNOVATION - CALIBRATION – TESTING – SITE SERVICES			

QUALITY → ENGINEERING → EXPERTISE → SERVICES

WE ARE DESIGNED ACCURACY

WE ARE TRUSTED EXPERTISE

WE ARE GLOBAL EXPERIENCE

WE ARE ON-TIME EXECUTION

WE ARE PREMIUM QUALITY

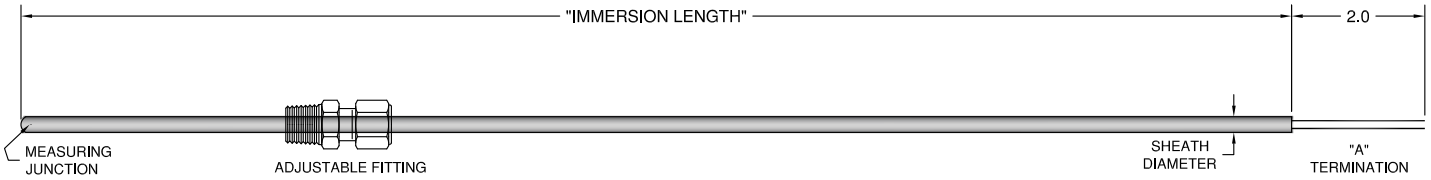
WE ARE ENGINEERING INNOVATION

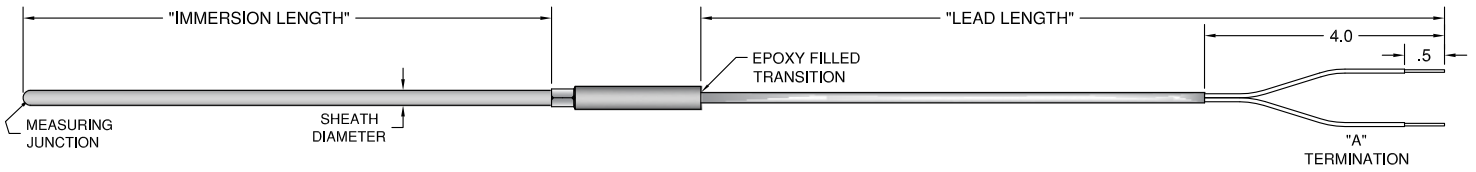
PRODUCT GUIDE

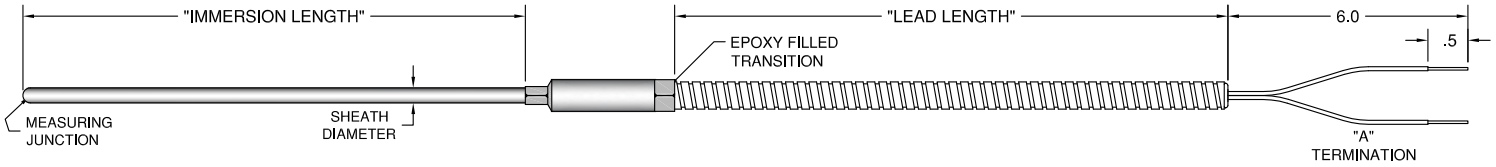
TABLE OF CONTENTS

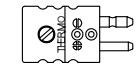
TABLE OF CONTENTS

IMMERSION THERMOCOUPLES – SINGLE & DUPLEX

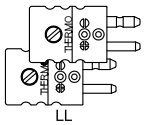







L, Lx, LHD, LxHD


N, Nx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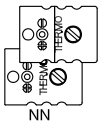
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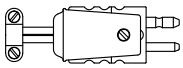
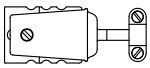
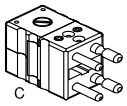

Cx, CxHD


Cx1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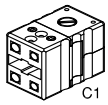
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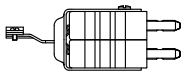
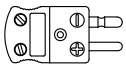
K


H

A


VIEW A


X


X1

CODE	MEASURING JUNCTION (DUPLEX)
DG	DUPLEX GROUNDED
DU	DUPLEX UNGROUNDED
RDG	REDUCED GRD. (NOTE 2)
RDU	REDUCED UNGRD. (NOTE 2)
DE	EXPOSED LOOP

CODE	MEASURING JUNCTION (SINGLE)
G	GROUNDED
U	UNGROUNDED
RG	REDUCED GRD. (NOTE 2)
RU	REDUCED UNGRD. (NOTE 2)
E	EXPOSED LOOP

CODE	SHEATH MATERIAL	
	MATERIAL	STD. CALIBRATIONS (NOTE 3)
304	304 STN. STL.	J, K, T
316	316 STN. STL.	J, K, T, E, N
310	310 STN. STL.	J, K, E
I600	INCONEL 600	K, N

CODE		CALIBRATION
STD.	SPECIAL (NOTE 1)	
J	JJ	IRON(+) vs CONSTANTAN(-)
K	KK	CHROMEL(+) vs ALUMEL(-)
T	TT	COPPER(+) vs CONSTANTAN(-)
E	EE	CHROMEL(+) vs CONSTANTAN(-)
N	NN	NICROSIL(+) vs NISIL(-)

CODE	SHEATH DIAMETER		
	FRACTION	DECIMAL	METRIC
125	1/25"	.040	1.1mm
116	1/16"	.063	1.6mm
3mm		.118	3.0mm
18	1/8"	.125	3.2mm
316	3/16"	.187	4.8mm
6mm		.236	6.0mm
14	1/4"	.250	6.4mm
516	5/16"	.313	8.0mm
38	3/8"	.375	9.5mm

CODE	LEAD WIRE TYPE (NOTE 6)
0	SKINNED ENDS, NO LEAD WIRE
1	FIBERGLASS INSULATION & JACKETED
2	FIBERGLASS with ARMOR OVERALL
3	FIBERGLASS with STN. STEEL BRAID OVERALL
4	PVC INSULATION & JACKETED
5	TEFLON (FEP) INSULATION & JACKETED
8	PVC with ARMOR OVERALL

CALIBRATION	SHEATH DIAMETER	MEASURING JUNCTION		SHEATH MATERIAL	FITTING MAT'L.	FITTING SIZE	IMMERSION LENGTH	LEAD LENGTH	LEAD WIRE TYPE	TERMINATION		MATING CONNECTOR
J	14	G	—	304	— SS	1/4	— 12	— 24	— 3	L	/	N

CODE	FITTING
0	FITTING NOT REQUIRED
BR	ADJUSTABLE BRASS, BRASS INSERT
BRT	READJUSTABLE BRASS, TEFLON INSERT
SS	ADJUSTABLE STN. STL., STN. STL. INSERT
SST	READJUSTABLE STN. STL., TEFLON INSERT
SSL	READJUSTABLE STN. STL., LAVA INSERT

CODE	THREAD SIZE
1/8	1/8"NPT
1/4	1/4"NPT
1/2	1/2"NPT
1/4BSPP	1/4"BSPP
1/4BSPT	1/4"BSPT
1/2BSPP	1/2"BSPP
1/2BSPT	1/2"BSPT

CODE	IMMERSION LENGTH
	IN INCHES or MILLIMETER FOLLOWED BY mm

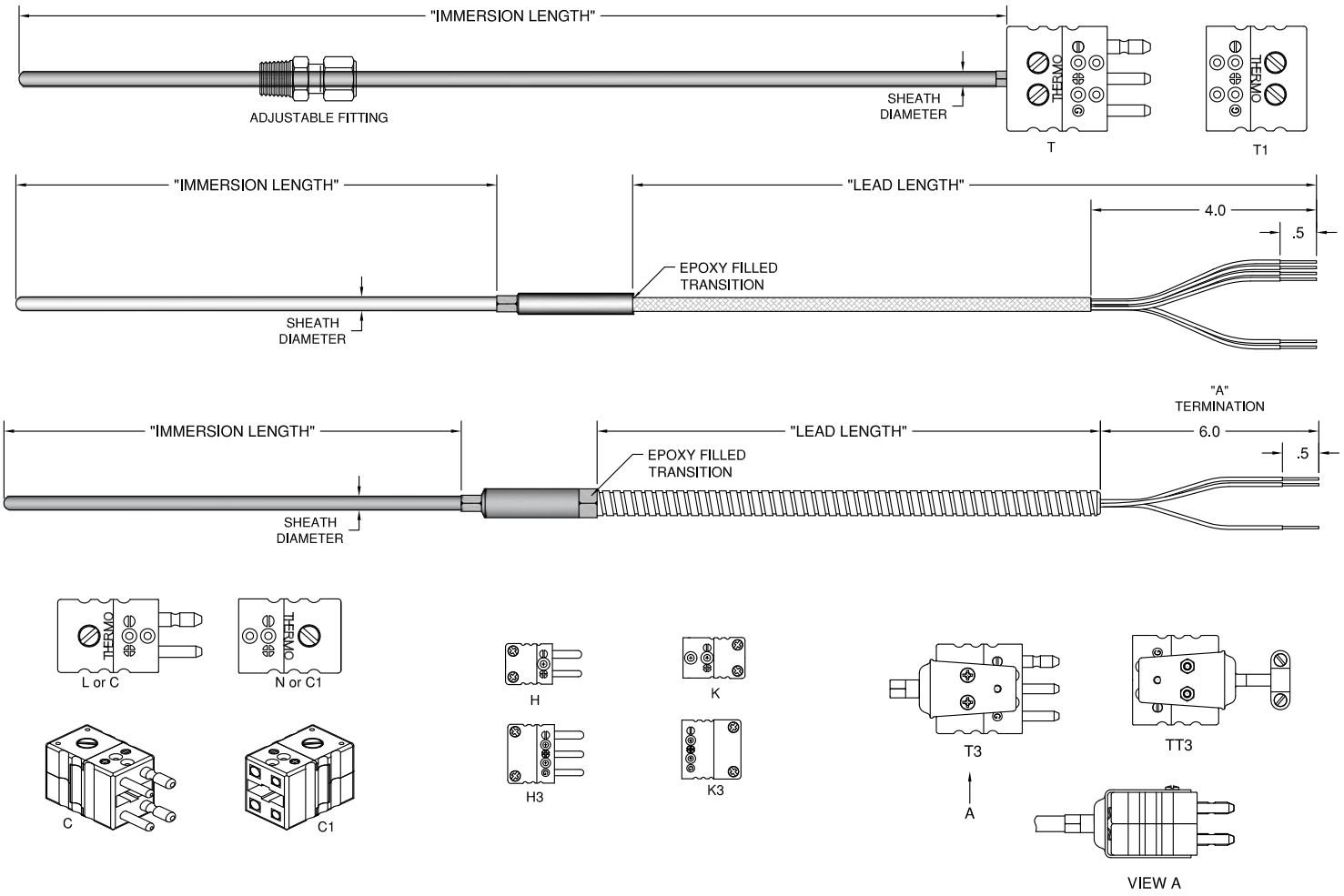
CODE	LEAD LENGTH
	IN INCHES or MILLIMETER FOLLOWED BY mm

CODE	TERMINATION (SINGLE)	MATING CONN. (NOTE 4)	
		CODE	TEMPERATURE LIMIT
A	BARE ENDS		
L	STANDARD SIZE PLUG	N	390°F(200°C)
LHD	STANDARD SIZE SOLID PIN PLUG	N	390°F(200°C)
Lx	EXTENDED LIMITS PLUG	Nx	660°F(320°C)
LxHD	EXTENDED LIMITS SOLID PIN PLUG	Nx	660°F(320°C)
X	ULTRA-TEMP PLUG	X1	1000°F(538°C)
H	MINIATURE PLUG (NOTE 5)	K	390°F(200°C)

CODE	TERMINATION (DUPLEX)	MATING CONN. (NOTE 4)	
		CODE	TEMPERATURE LIMIT
A	BARE ENDS		
C	STANDARD SIZE DUPLEX PLUG	C1	390°F(200°C)
Cx	EXENDED LIMITS DUPLEX PLUG	Cx1	660°F(320°C)
CxHD	EXTENDED LIMITS SOLID PIN DUPLEX PLUG	Cx1	660°F(320°C)

Notes:
(1) Meets or exceeds Special Initial Calibration Tolerances per ANSI MC96.1 and ASTM E230.
(2) Specify length of reduced tip when ordering.
(3) Contact factory for other calibrations and/or sheath materials.
(4) Omit mating connector if not ordered. Mating connector can be attached to the sheath.
(5) Available in 1/25" up to and including 1/8" diameters only.
(6) Standard 20 gauge stranded conductors.
(7) For connectors and lead wire identified with IEC color add -IEC to end of completed code.
(8) For an item that does not fall within the catalog description an (SP) can be added to the ordering code as part of a custom construction.

IMMERSION RTD'S – SINGLE & DUPLEX



CODE	TEMPERATURE RANGE
LT	-50 to +260° C
	-180 to +500° C (LEAVE BLANK)
HT	-180 to +650° C

CODE	IMMERSION LENGTH
	IN INCHES or
	MILLIMETERS FOLLOWED BY mm

CODE	FITTING
	OMIT IF FITTING NOT ORDERED
BR	ADJUSTABLE BRASS, BRASS INSERT
BRT	READJUSTABLE BRASS, TEFLON INSERT
SS	ADJUSTABLE STN. STL., STN. STL. INSERT
SST	READJUSTABLE STN. STL., TEFLON INSERT
SSL	READJUSTABLE STN. STL., LAVA INSERT

CODE	THREAD SIZE
1/8	1/8"NPT
1/4	1/4"NPT
1/2	1/2"NPT
1/4BSPP	1/4"BSPP
1/4BSPT	1/4"BSPT
1/2BSPP	1/2"BSPP
1/2BSPT	1/2"BSPT

– RTD – – – – – – – / – – – – –

CODE	SHEATH DIAMETER
3mm	3.0mm
18	1/8" (3.2mm)
316	3/16" (4.8mm)
6mm	6.0mm
14	1/4" (6.4mm)

CODE	SYSTEM
2W	2 WIRE
	3 WIRE (LEAVE BLANK)
4W	4 WIRE

CODE	ACCURACY (ASTM E1137)
	CLASS B (LEAVE BLANK)
CLA	CLASS A

CODE	SINGLE DUPLEX
	SINGLE
D	DUPLEX

CODE	LEAD WIRE
0	NO LEAD WIRE
1	FIBERGLASS, FIBERGLASS JACKET
2	FIBERGLASS WITH ARMOR OVERALL
5	TEFLON, TEFLON JACKET
8	TEFLON WITH ARMOR OVERALL

CODE	LEAD LENGTH
	OMIT IF NO LEAD WIRES
	IN INCHES or MILLIMETERS FOLLOWED BY mm

CODE	TERMINATION
A	BARE ENDS
T	STANDARD SIZE 3 PIN PLUG
L	STANDARD SIZE 2 PIN PLUG
C	STANDARD SIZE 4 PIN PLUG
H	MINIATURE 2 PIN PLUG
H3	MINIATURE 3 PIN PLUG
T3	STANDARD SIZE 6 PIN PLUG

CODE	MATING CONNECTOR (OMIT IF NOT REQUIRED)
T1	STANDARD SIZE 3 PIN JACK
N	STANDARD SIZE 2 PIN JACK
C1	STANDARD SIZE 4 PIN JACK
K	MINIATURE 2 PIN JACK
K3	MINIATURE 3 PIN JACK
TT3	STANDARD SIZE 6 PIN JACK

Notes:
(1) Type "HT" not available with Class A accuracy.
(2) "H" & "H3" with sheath termination available in 3mm and 1/8" diameter only.
(3) For an item that does not fall within the catalog description an (SP) can be added to the ordering code as part of a custom construction.

CONNECTOR TERMINATION

CODE	TERMINATION	MATING CONN. (NOTE 2) CODE	TEMPERATURE LIMIT
L	STANDARD SIZE PLUG	N	390°F(200°C)
LHD	STANDARD SIZE SOLID PIN PLUG	N	390°F(200°C)
Lx	EXTENDED LIMITS PLUG	Nx	660°F(320°C)
LxHD	EXTENDED LIMITS SOLID PIN PLUG	Nx	660°F(320°C)
C	STANDARD SIZE DUPLEX PLUG	C1	390°F(200°C)
Cx	EXTENDED LIMITS DUPLEX PIN PLUG	Cx1	660°F(320°C)
CxHD	EXTENDED LIMITS SOLID PIN DUPLEX PLUG	CxHD	660°F(320°C)

EXAMPLE: 2J0131L/N, I=1.13-1.75
2J0331C/C1-DUAL, I=4-4.63

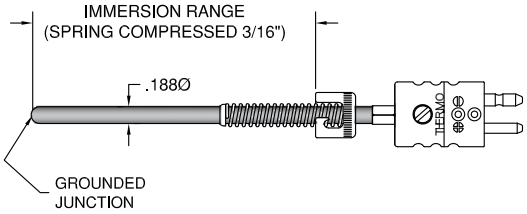
2 [ ] 0 [ ] 3 1 [ ] / [ ] – [ ] I= [ ]

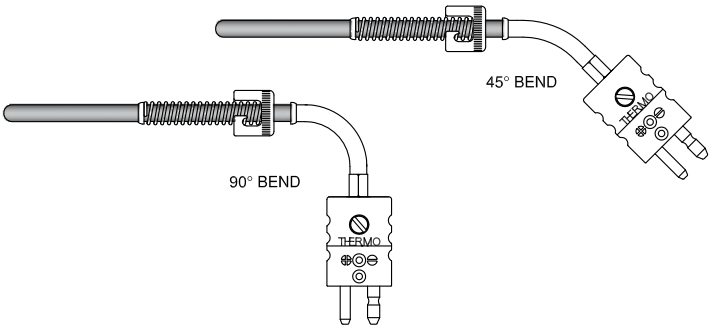
CODE	CONSTRUCTION
DUAL	DUPLEX (ONLY)

CODE	MOUNTING POSITION
1	STRAIGHT
2	45° ANGLE
3	90° ANGLE

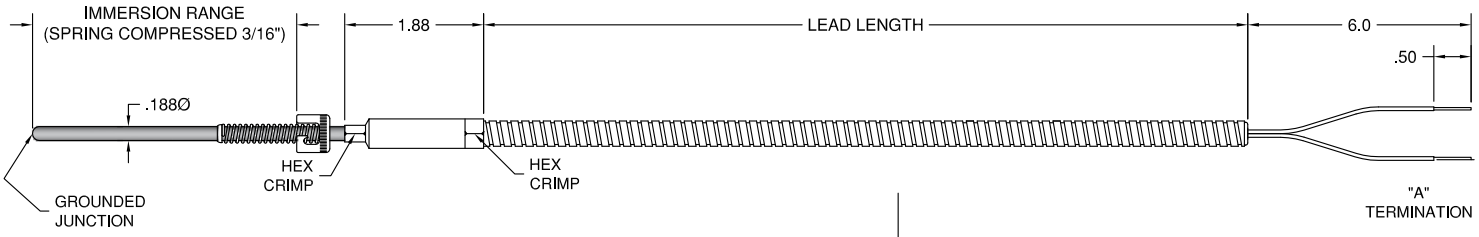
CODE	RANGE
1.13 - 1.75	1-1/8" to 1-3/4"
1.5 - 2.13	1-1/2" to 2-1/8"
2 - 2.63	2" to 2-5/8"
2.5 - 3.13	2-1/2" to 3-1/8"
3 - 3.63	3" to 3-5/8"
3.5 - 4.13	3-1/2" to 4-1/8"
4 - 4.63	4" to 4-5/8"
4.5 - 5.13	4-1/2" to 5-1/8"
5 - 5.63	5" to 5-5/8"
5.5 - 6.13	5-1/2" to 6-1/8"
6 - 6.63	6" to 6-5/8"
6.5 - 7.13	6-1/2" to 7-1/8"
7 - 7.63	7" to 7-5/8"
7.5 - 8.13	7-1/2" to 8-1/8"
8 - 8.63	8" to 8-5/8"

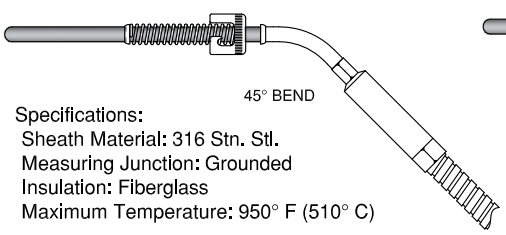
CODE STD.	CODE SPECIAL (NOTE 1)	CALIBRATION
J	JJ	IRON(+) vs CONSTANTAN(-)
K	KK	CHROMEL(+) vs ALUMEL(-)
T	TT	COPPER(+) vs CONSTANTAN(-)

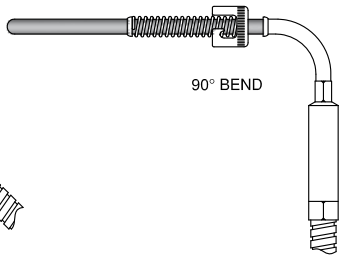


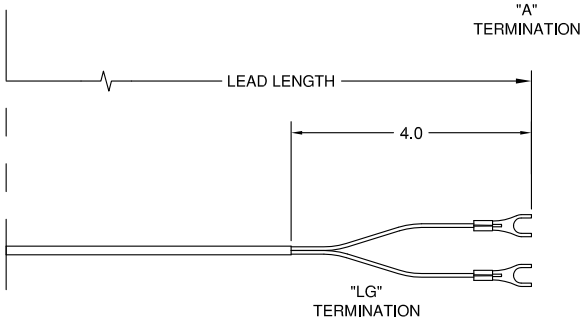


LEAD WIRE









Specifications:
Sheath Material: 316 Stn. Stl.
Measuring Junction: Grounded
Insulation: Fiberglass
Maximum Temperature: 950° F (510° C)

CODE	TERMINATION	MATING CONN. (NOTE 2) CODE	TEMPERATURE LIMIT
A	BARE ENDS		
LG	SPADE LUGS, COPPER		
L	STANDARD SIZE PLUG	N	390°F(200°C)
LHD	STANDARD SIZE SOLID PIN PLUG	N	390°F(200°C)
Lx	EXTENDED LIMITS PLUG	Nx	660°F(320°C)
LxHD	EXTENDED LIMITS SOLID PIN PLUG	Nx	660°F(320°C)
C	STANDARD SIZE DUPLEX PLUG	C1	390°F(200°C)
Cx	EXTENDED LIMITS DUPLEX PIN PLUG	Cx1	660°F(320°C)
CxHD	EXTENDED LIMITS SOLID PIN DUPLEX PLUG	CxHD	660°F(320°C)

EXAMPLE: 2J3131L/N, I=1.13-1.75, L=48"

CODE	LEAD LENGTH (IN INCHES)

2 [ ] [ ] [ ] 3 1 [ ] / [ ] – [ ] I= [ ] L= [ ]

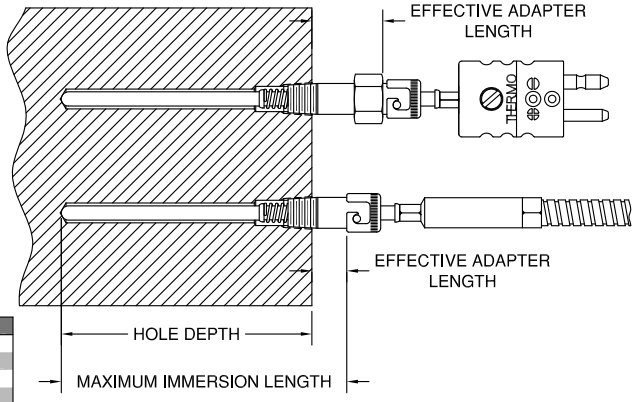
CODE	MOUNTING POSITION
1	STRAIGHT
2	45° ANGLE
3	90° ANGLE

CODE	CONSTRUCTION
DUAL	DUPLEX (ONLY)

CODE	LEAD TYPE
1	FIBERGLASS INSULATION & JACKETED
2	FIBERGLASS INSULATION, ARMOR OVERALL
3	CODE 1 WITH STN. STL. OVERBRAID
4	PVC INSULATION & JACKETED
5	TEFLON(FEP) INSULATION & JACKETED
8	PVC INSULATION, ARMOR OVERALL

CODE	RANGE
1.13 - 1.75	1-1/8" to 1-3/4"
1.5 - 2.13	1-1/2" to 2-1/8"
2 - 2.63	2" to 2-5/8"
2.5 - 3.13	2-1/2" to 3-1/8"
3 - 3.63	3" to 3-5/8"
3.5 - 4.13	3-1/2" to 4-1/8"
4 - 4.63	4" to 4-5/8"
4.5 - 5.13	4-1/2" to 5-1/8"
5 - 5.63	5" to 5-5/8"
5.5 - 6.13	5-1/2" to 6-1/8"
6 - 6.63	6" to 6-5/8"
6.5 - 7.13	6-1/2" to 7-1/8"
7 - 7.63	7" to 7-5/8"
7.5 - 8.13	7-1/2" to 8-1/8"
8 - 8.63	8" to 8-5/8"

CODE STD.	CODE SPECIAL (NOTE 1)	CALIBRATION
J	JJ	IRON(+) vs CONSTANTAN(-)
K	KK	CHROMEL(+) vs ALUMEL(-)
T	TT	COPPER(+) vs CONSTANTAN(-)



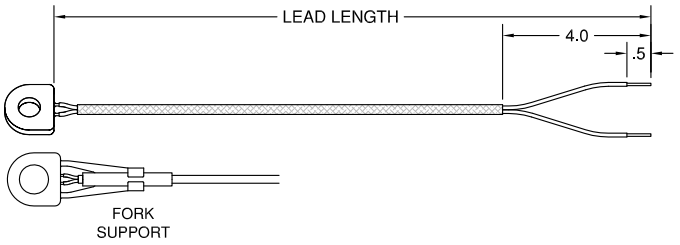
Notes:
(1) Meets or exceeds Special Initial Calibration Tolerances per ANSI MC96.1 and ASTM E230.
(2) Omit mating connector if not ordered. Mating connector can be attached to the sheath.

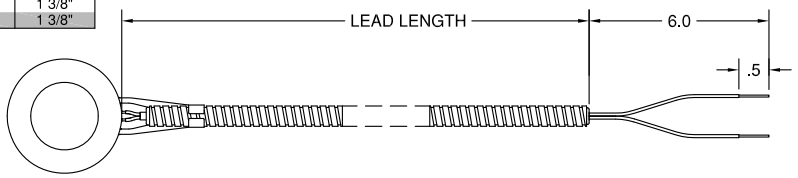
WIRE TYPE

CODE STD.	CODE SPECIAL (NOTE 1)	CALIBRATION
J	JJ	IRON(+) vs CONSTANTAN(-)
K	KK	CHROMEL(+) vs ALUMEL(-)
T	TT	COPPER(+) vs CONSTANTAN(-)
E	EE	CHROMEL(+) vs CONSTANTAN(-)
N	NN	NICROSIL(+) vs NISIL(-)

CODE	LEAD TYPE (20 Ga STANDARD)
1	FIBERGLASS INSULATION & JACKETED
2	FIBERGLASS, ARMOR OVERALL
3	CODE 1 WITH STN. STL. OVERBRAID
4	PVC, INSULATION & JACKETED
5	TEFLON(FEP) INSULATION & JACKETED
8	PVC INSULATION, ARMOR OVERALL

CODE	GASKET SIZE BOLT SIZE	ID	OD
05	#6	.144"	3/8"
06	#8	3/16"	3/8"
07	#10	13/64"	5/8"
08	#12	7/32"	5/8"
10	1/4"	9/32"	5/8"
12	5/16"	11/32"	5/8"
14	3/8"	13/32"	13/16"
16	7/16"	15/32"	13/16"
18	1/2"	17/32"	13/16"
20	9/16"	19/32"	13/16"
22	5/8"	21/32"	1 3/8"
26	3/4"	13/16"	1 3/8"
30	7/8"	15/16"	1 3/8"
04	1"	1 1/16"	1 3/8"





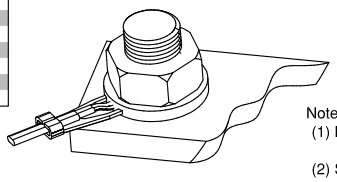
1 [ ][ ][ ][ ][ ] / [ ] L= [ ]

CODE	LEAD LENGTH (IN INCHES)

CODE	TERMINATION	MATING CONN. (NOTE 4) CODE	TEMPERATURE LIMIT
A	BARE ENDS		
L	STANDARD SIZE PLUG	N	390°F(200°C)
LHD	STANDARD SIZE SOLID PIN PLUG	N	390°F(200°C)
Lx	EXTENDED LIMITS PLUG	Nx	660°F(320°C)
LxHD	EXTENDED LIMITS SOLID PIN PLUG	Nx	660°F(320°C)
X	ULTRA-TEMP PLUG	X1	1000°F(538°C)
H	MINIATURE PLUG	K	390°F(200°C)

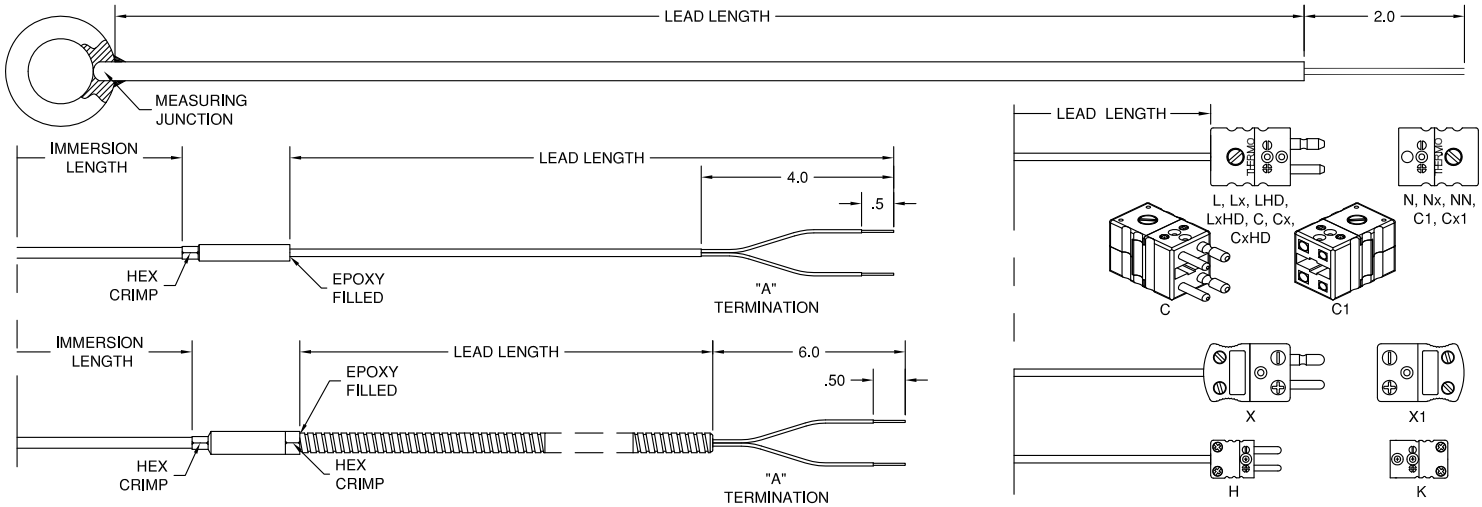
CODE	GASKET TYPE
1	COPPER GASKET, NO SUPPORT
2	COPPER GASKET, STAINLESS STEEL SUPPORT
3	STAINLESS STEEL GASKET, NO SUPPORT
4	STAINLESS STEEL GASKET, STN. STL. SUPPORT

EXAMPLE: 1J3414L/N, L=36



Notes:
(1) Meets or exceeds Special Initial Calibration Tolerances per ANSI MC96.1 and ASTM E230.
(2) Specify length of reduced tip when ordering.
(3) Contact factory for other calibrations and/or sheath materials.
(4) Omit mating connector if not ordered. Mating connector can be attached to the sheath.
(5) For connectors identified with IEC color add -IEC to end of completed code.
(6) For an item that does not fall within the catalog description an (SP) can be added to the ordering code as part of a custom construction.

HIGH TEMPERATURE



CODE STD.	CODE SPECIAL (NOTE 1)	CALIBRATION
J	JJ	IRON(+) vs CONSTANTAN(-)
K	KK	CHROMEL(+) vs ALUMEL(-)
T	TT	COPPER(+) vs CONSTANTAN(-)
E	EE	CHROMEL(+) vs CONSTANTAN(-)
N	NN	NICROSIL(+) vs NISIL(-)

CODE	SHEATH DIAMETER FRACTION	DECIMAL	METRIC
125	1/25"	.040	1.1mm
116	1/16"	.063	1.6mm
18	1/8"	.125	3.2mm
316	3/16"	.187	4.8mm
14	1/4"	.250	6.4mm

CODE	MEASURING JUNCTION
G	GROUNDED
U	UNGROUNDED
DG	DUPLEX GROUNDED
DU	DUPLEX UNGROUNDED

CODE	SHEATH MATERIAL MATERIAL	STD. CALIBRATIONS (NOTE 3)
304	304 STN. STL.	J, K, T
316	316 STN. STL.	J, K, T, E, N
310	310 STN. STL.	J, K, E
I600	INCONEL 600	K, N

EXAMPLE: J14G-316-G-3-10-12-48-1L/N

[ ][ ][ ] – [ ] – G – [ ] – [ ] – [ ] – [ ] – [ ][ ] / [ ]

CODE	GASKET MATERIAL
1	COPPER
3	STAINLESS STEEL

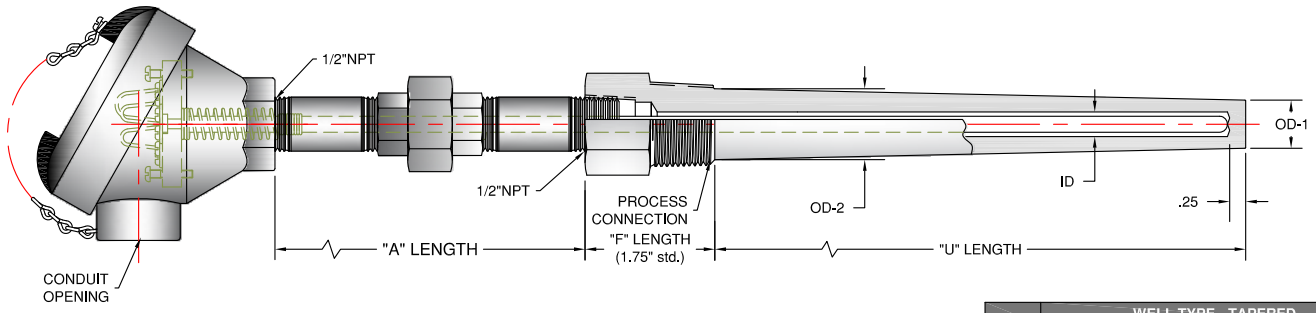
CODE	GASKET SIZE BOLT SIZE	ID	OD
05	#6	.144"	3/8"
06	#8	3/16"	3/8"
07	#10	13/64"	5/8"
08	#12	7/32"	5/8"
10	1/4"	9/32"	5/8"
12	5/16"	11/32"	5/8"
14	3/8"	13/32"	13/16"
16	7/16"	15/32"	13/16"
18	1/2"	17/32"	13/16"
20	9/16"	19/32"	13/16"
22	5/8"	21/32"	1 3/8"
26	3/4"	13/16"	1 3/8"
30	7/8"	15/16"	1 3/8"
04	1"	1 1/16"	1 3/8"

CODE	IMMERSION LENGTH (IN INCHES)

CODE	LEAD LENGTH (IN INCHES) OMIT IF LEAD WIRE 0

CODE	LEAD TYPE (20 Ga STANDARD)
0	NO LEAD WIRE
1	FIBERGLASS INSULATION & JACKETED
2	FIBERGLASS, ARMOR OVERALL
3	CODE 1 WITH STN. STL. OVERBRAID
4	PVC, INSULATION & JACKETED
5	TEFLON(FEP) INSULATION & JACKETED
8	PVC INSULATION, ARMOR OVERALL

CODE	TERMINATION	MATING CONN. (NOTE 4) CODE	TEMPERATURE LIMIT
A	BARE ENDS		
L	STANDARD SIZE PLUG	N	390°F(200°C)
LHD	STANDARD SIZE SOLID PIN PLUG	N	390°F(200°C)
Lx	EXTENDED LIMITS PLUG	Nx	660°F(320°C)
LxHD	EXTENDED LIMITS SOLID PIN PLUG	Nx	660°F(320°C)
X	ULTRA-TEMP PLUG	X1	1000°F(538°C)
H	MINIATURE PLUG	K	390°F(200°C)
C	STANDARD SIZE DUPLEX PLUG	C1	390°F(200°C)
Cx	EXTENDED LIMITS DUPLEX PLUG	Cx1	660°F(320°C)
CxHD	EXT. LIMITS SOLID PIN DUPLEX PLUG	Cx1	660°F(320°C)
LL	TWO STANDARD SIZE 2-PIN PLUGS	NN	390°F(200°C)



THERMOWELL SELECTION

CODE	HEAD EXTENSION
2	NIPPLE ONLY
4	NIPPLE/UNION/NIPPLE

CODE	CONNECTION HEAD
AN	ALUMINUM
SN	STAINLESS STEEL
A	CAST IRON

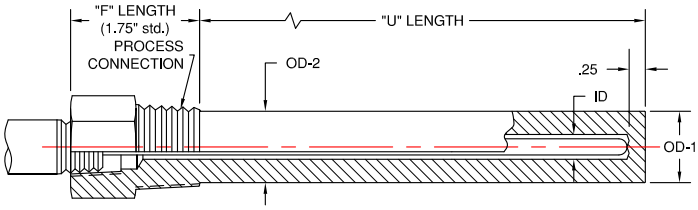
CODE	CONDUIT OPENING
1/2	1/2" NPT
3/4	3/4" NPT
M20	M20 x 1.5

CODE	"A" LENGTH
	IN INCHES

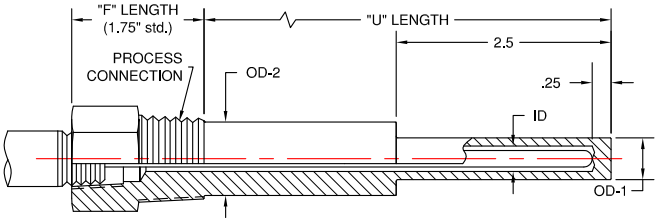
CODE	"F" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

CODE	"U" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

CODE	WELL MATERIAL
P	304 STAINLESS STEEL
B	BRASS
R	316 STAINLESS STEEL
RL	316 STN. STL., LOW CARBON
N	CARBON STEEL

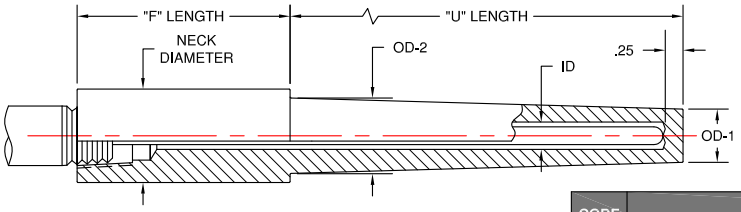


CODE	WELL TYPE - TAPERED				
	PROCESS NPT	OD-1	OD-2	ID	HEX
05	1/2"	.500	.625	.260	1.13
11	3/4"	.563	.844	.203	1.13
12	3/4"	.750	.844	.385	1.13
14	1"	.750	1.11	.385	1.38
121	3/4"	.750	.844	.260	1.13
141	1"	.750	1.11	.260	1.38

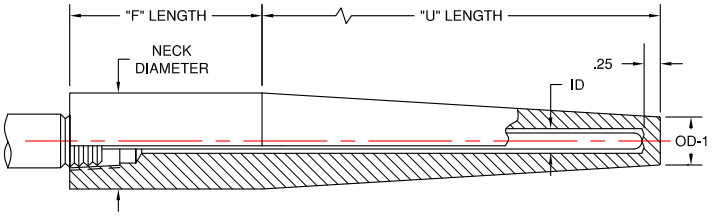


CODE	WELL TYPE - STRAIGHT				
	PROCESS NPT	OD-1	OD-2	ID	HEX
16	3/4"	.750	.750	.385	1.13
18	1"	.750	.750	.385	1.38
161	3/4"	.750	.750	.260	1.13
181	1"	.750	.750	.260	1.38

CODE	WELL TYPE - STEP DOWN				
	PROCESS NPT	OD-1	OD-2	ID	HEX
122	3/4"	.500	.750	.260	1.13
142	1"	.500	.875	.260	1.38



CODE	WELL TYPE - SOCKET WELD				
	PROCESS NPS	OD-1	OD-2	ID	PIPE SIZE (ACTUAL)
01	3/4"	.750	.844	.385	3/4" (1.05")
011	3/4"	.750	.844	.260	3/4" (1.05")
02	1"	.750	1.063	.385	1" (1.315")
021	1"	.750	1.063	.260	1" (1.315")



CODE	WELL TYPE - WELD IN		
	NECK DIAMETER	OD-1	ID
03	1.50"	.750	.385
031	1.50"	.750	.260
04	1.315"	.750	.385
041	1.315"	.750	.260

THERMOCOUPLE SELECTION

CODE		ELEMENT CONSTRUCTION			
SINGLE	DUPLEX	SHEATH DIAMETER	WIRE SIZE (AWG)	INSULATION	SPRING LOADED
ASL6mm	ADSL6mm	6mm (.236")	19	MgO-SHEATH	YES
ASL14	ADSL14	.25" (6.6mm")	18	MgO-SHEATH	YES

CODE		CALIBRATION
STANDARD	SPECIAL	
J	JJ	IRON (+) vs CONSTANTAN (-)
K	KK	CHROMEL (+) vs ALUMEL (-)
T	TT	COPPER (+) vs CONSTANTAN (-)
E	EE	CHROMEL (+) vs CONSTANTAN (-)
N	NN	NICROSIL (+) vs NISIL (-)

CODE	MEASURING JUNCTION
G	SINGLE GROUNDED
U	SINGLE UNGROUNDED
DG	DUPLEX GROUNDED
DU	DUPLEX UNGROUNDED

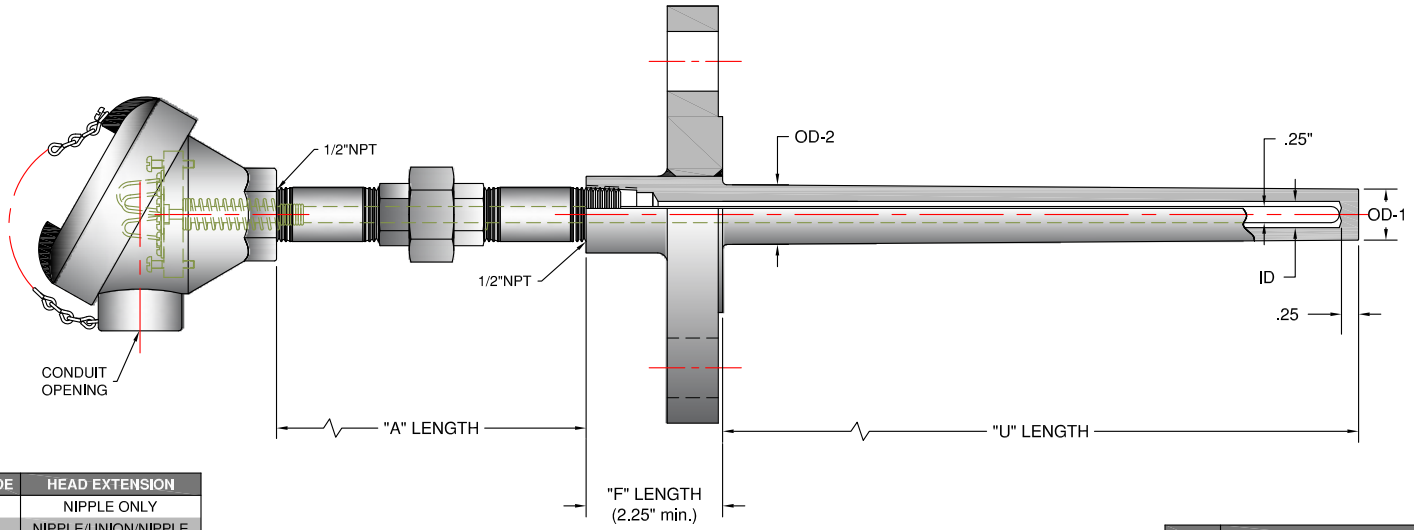
CODE	SHEATH MATERIAL
P	304 STN. STL.
R	316 STN. STL.
Q	310 STN. STL.
J	INCONEL 600

RTD SELECTION

CODE		ELEMENT CONSTRUCTION	
SINGLE	DUPLEX	SHEATH DIAMETER	SPRING LOADED
RTD6mm	DRTD6mm	6mm (.236")	YES
RTD14	DRTD14	.25" (6.6mm")	YES

CODE	TEMPERATURE RANGE
LT	-50 to +260° C
(LEAVE BLANK)	-180 to +500° C
HT	-180 to +650° C

RTD CONSTRUCTION
CONSTRUCTION: 3-WIRE (6 FOR DUPLEX)
ELEMENT TYPE: PLATINUM
TCR: .00385 OHMS/OHM/°C
RESISTANCE @ °C: 100 OHMS
SHEATH MATERIAL: 316 SS



CODE	HEAD EXTENSION
2	NIPPLE ONLY
4	NIPPLE/UNION/NIPPLE

CODE	CONNECTION HEAD
AN	ALUMINUM
SN	STAINLESS STEEL
A	CAST IRON

CODE	CONDUIT OPENING
1/2	1/2" NPT
3/4	3/4" NPT
M20	M20 x 1.5

CODE	"A" LENGTH
	IN INCHES

THERMOWELL SELECTION

CODE	"F" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

CODE	"U" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

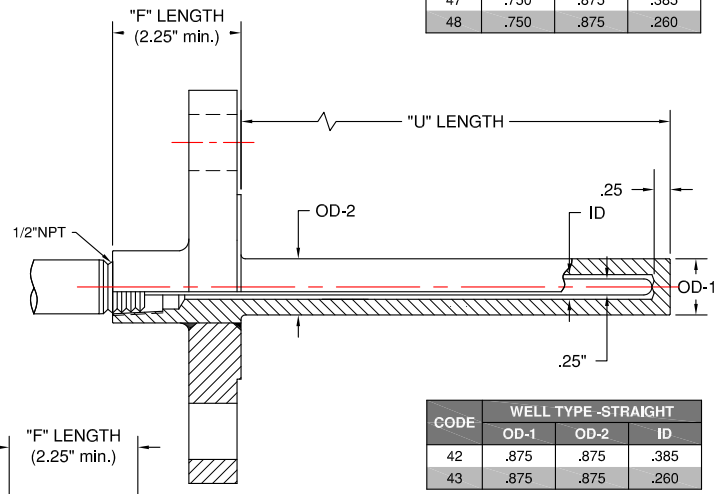
CODE	WELL MATERIAL
P	304 STAINLESS STEEL
R	316 STAINLESS STEEL
RL	316 STN. STL., LOW CARBON
Q	310 STAINLESS STEEL
N	CARBON STEEL

CODE	FLANGE TYPE
FF	FLAT FACE
RF	RAISED FACE
RJ	RING TYPE JOINT

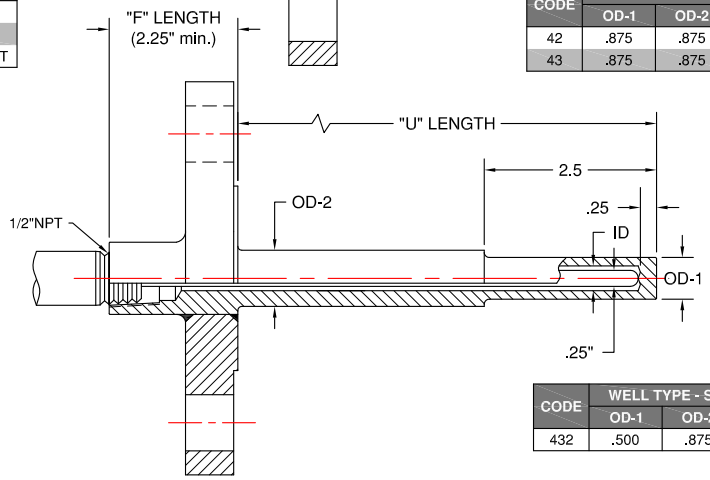
CODE	FLANGE RATING
150	150 #
300	300 #
600	600 #
900	900 #

CODE	FLANGE SIZE
1	1.0"
1.5	1.5"
2	2.0"
3	3.0"

CODE	WELL TYPE -TAPERED		
	OD-1	OD-2	ID
47	.750	.875	.385
48	.750	.875	.260



CODE	WELL TYPE -STRAIGHT		
	OD-1	OD-2	ID
42	.875	.875	.385
43	.875	.875	.260



CODE	WELL TYPE - STEP DOWN		
	OD-1	OD-2	ID
432	.500	.875	.260

THERMOCOUPLE SELECTION

CODE		ELEMENT CONSTRUCTION			
SINGLE	DUPLEX	SHEATH DIAMETER	WIRE SIZE (AWG)	INSULATION	SPRING LOADED
ASL6mm	ADSL6mm	6mm (.236")	19	MgO-SHEATH	YES
ASL14	ADSL14	.25" (6.6mm")	18	MgO-SHEATH	YES

CODE		CODE
STANDARD	SPECIAL	CALIBRATION
J	JJ	IRON (+) vs CONSTANTAN (-)
K	KK	CHROMEL (+) vs ALUMEL (-)
T	TT	COPPER (+) vs CONSTANTAN (-)
E	EE	CHROMEL (+) vs CONSTANTAN (-)
N	NN	NICROSIL (+) vs NISIL (-)

CODE	MEASURING JUNCTION
G	SINGLE GROUNDED
U	SINGLE UNGROUNDED
DG	DUPLEX GROUNDED
DU	DUPLEX UNGROUNDED

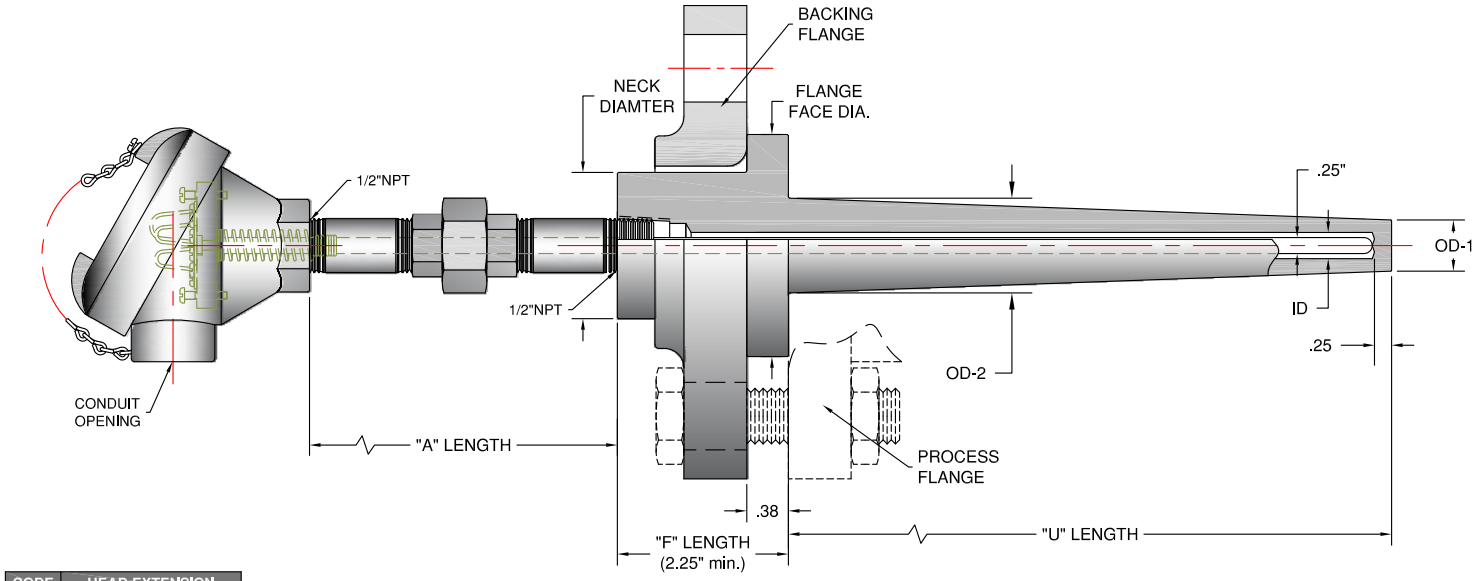
CODE	SHEATH MATERIAL
P	304 STN. STL.
R	316 STN. STL.
Q	310 STN. STL.
J	INCONEL 600

RTD SELECTION

CODE		ELEMENT CONSTRUCTION	
SINGLE	DUPLEX	SHEATH DIAMETER	SPRING LOADED
RTD6mm	DRTD6mm	6mm (.236")	YES
RTD14	DRTD14	.25" (6.6mm")	YES

CODE	TEMPERATURE RANGE
LT	-50 to +260° C
(LEAVE BLANK)	-180 to +500° C
HT	-180 to +650° C

RTD CONSTRUCTION
CONSTRUCTION: 3-WIRE (6 FOR DUPLEX)
ELEMENT TYPE: PLATINUM
TCR: .00385 OHMS/OHM/°C
RESISTANCE @ °C: 100 OHMS
SHEATH MATERIAL: 316 SS



CODE	HEAD EXTENSION
2	NIPPLE ONLY
4	NIPPLE/UNION/NIPPLE

CODE	CONDUIT OPENING
1/2	1/2" NPT
3/4	3/4" NPT
M20	M20 x 1.5

CODE	CONNECTION HEAD
AN	ALUMINUM
SN	STAINLESS STEEL
A	CAST IRON

CODE	"A" LENGTH
	IN INCHES

THERMOWELL SELECTION

CODE	WELL TYPE - TAPERED				
	OD-1	OD-2	ID	FLANGE FACE DIA.	NECK DIAMETER
41	.750	.875	.385	2.0 (1" FLANGE SIZE)	1.315
44	.750	.875	.385	2.88 (1.5"FLANGE SIZE)	1.90
411	.750	.875	.260	2.0 (1" FLANGE SIZE)	1.315
441	.750	.875	.260	2.88 (1.5"FLANGE SIZE)	1.90

BACKING FLANGE, OMIT IF NOT SUPPLIED

$\square\square\square - \frac{1}{2} - \square - \square\square\square - \square\square\square\square$ W/ $\square\square$ – $\square\square$ LJ – $\square$

BACKING FLANGE MATERIAL

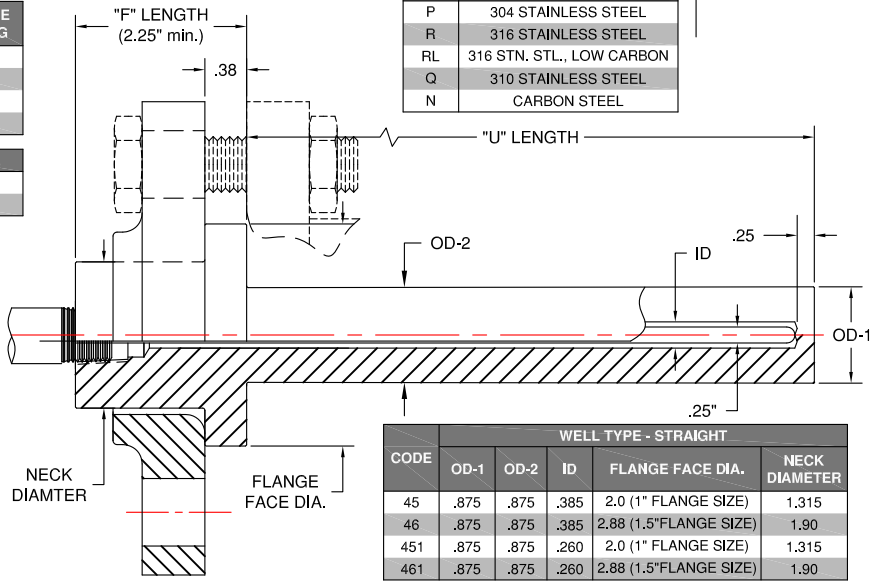
CODE	FLANGE MATERIAL
P	304 STAINLESS STEEL
R	316 STAINLESS STEEL
RL	316 STN. STL., LOW CARBON
Q	310 STAINLESS STEEL
N	CARBON STEEL

CODE	"F" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

CODE	"U" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

CODE	FLANGE RATING
150	150 #
300	300 #
600	600 #
900	900 #

CODE	FLANGE SIZE
1	1.0"
1.5	1.5"



CODE	WELL TYPE - STRAIGHT				
	OD-1	OD-2	ID	FLANGE FACE DIA.	NECK DIAMETER
45	.875	.875	.385	2.0 (1" FLANGE SIZE)	1.315
46	.875	.875	.385	2.88 (1.5"FLANGE SIZE)	1.90
451	.875	.875	.260	2.0 (1" FLANGE SIZE)	1.315
461	.875	.875	.260	2.88 (1.5"FLANGE SIZE)	1.90

CODE	WELL MATERIAL
P	304 STAINLESS STEEL
B	BRASS
R	316 STAINLESS STEEL
RL	316 STN. STL., LOW CARBON
N	CARBON STEEL

THERMOCOUPLE SELECTION

CODE		ELEMENT CONSTRUCTION			
SINGLE	DUPLEX	SHEATH DIAMETER	WIRE SIZE (AWG)	INSULATION	SPRING LOADED
ASL6mm	ADSL6mm	6mm (.236")	19	MgO-SHEATH	YES
ASL14	ADSL14	.25" (6.6mm")	18	MgO-SHEATH	YES

CODE		CALIBRATION
STANDARD	SPECIAL	
J	JJ	IRON (+) vs CONSTANTAN (-)
K	KK	CHROMEL (+) vs ALUMEL (-)
T	TT	COPPER (+) vs CONSTANTAN (-)
E	EE	CHROMEL (+) vs CONSTANTAN (-)
N	NN	NICROSIL (+) vs NISIL (-)

CODE	MEASURING JUNCTION
G	SINGLE GROUNDED
U	SINGLE UNGROUNDED
DG	DUPLEX GROUNDED
DU	DUPLEX UNGROUNDED

CODE	SHEATH MATERIAL
P	304 STN. STL.
R	316 STN. STL.
Q	310 STN. STL.
J	INCONEL 600

RTD SELECTION

CODE		ELEMENT CONSTRUCTION	
SINGLE	DUPLEX	SHEATH DIAMETER	SPRING LOADED
RTD6mm	DRTD6mm	6mm (.236")	YES
RTD14	DRTD14	.25" (6.6mm")	YES

CODE	TEMPERATURE RANGE
LT	-50 to +260° C
(LEAVE BLANK)	-180 to +500° C
HT	-180 to +650° C

RTD CONSTRUCTION
CONSTRUCTION: 3-WIRE (6 FOR DUPLEX)
ELEMENT TYPE: PLATINUM
TCR: .00385 OHMS/OHM/°C
RESISTANCE @ °C: 100 OHMS
SHEATH MATERIAL: 316 SS

CODE	HEAD EXTENSION
1	(NO EXTENSION, 0 "A" LENGTH)
3	NIPPLE UNION

CODE	CONNECTION HEAD
AN	ALUMINUM
SN	STAINLESS STEEL
A	CAST IRON

CODE	CONDUIT OPENING
1/2	1/2" NPT
3/4	3/4" NPT
M20	M20 x 1.5

CODE	TUBE OPENING
1/2	1/2" NPT(with 1/4" & 1/2" TUBES)
3/4	3/4" NPT(with 3/4" & 1" TUBES)

CODE	"A" LENGTH
	IN INCHES

CODE	TUBE SCHEDULE (INSIDE DIAMETER)			
	1/4"NPT	1/2"NPT	3/4"NPT	1"NPT
40	0.364	0.622	0.824	1.049
80	0.302	0.546	0.742	0.957
160	N/A	0.464	0.612	0.815
XXS	N/A	N/A	0.434	0.599

CODE	"F" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

CODE	"U" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

CODE	TUBE MATERIAL
P	304 STAINLESS STEEL
Q	310 STAINLESS STEEL
R	316 STAINLESS STEEL
RL	316 S. S. (LOW CARBON)
N	CARBON STEEL
J	INCONEL 600
H	HASTELLOY C276

FLANGE MATERIAL IF DIFFERENT THEN TUBE MATERIAL

FLANGE SELECTION

CODE	FLANGE TYPE
FF	FLAT FACE
RF	RAISED FACE
RJ	RING TYPE JOINT

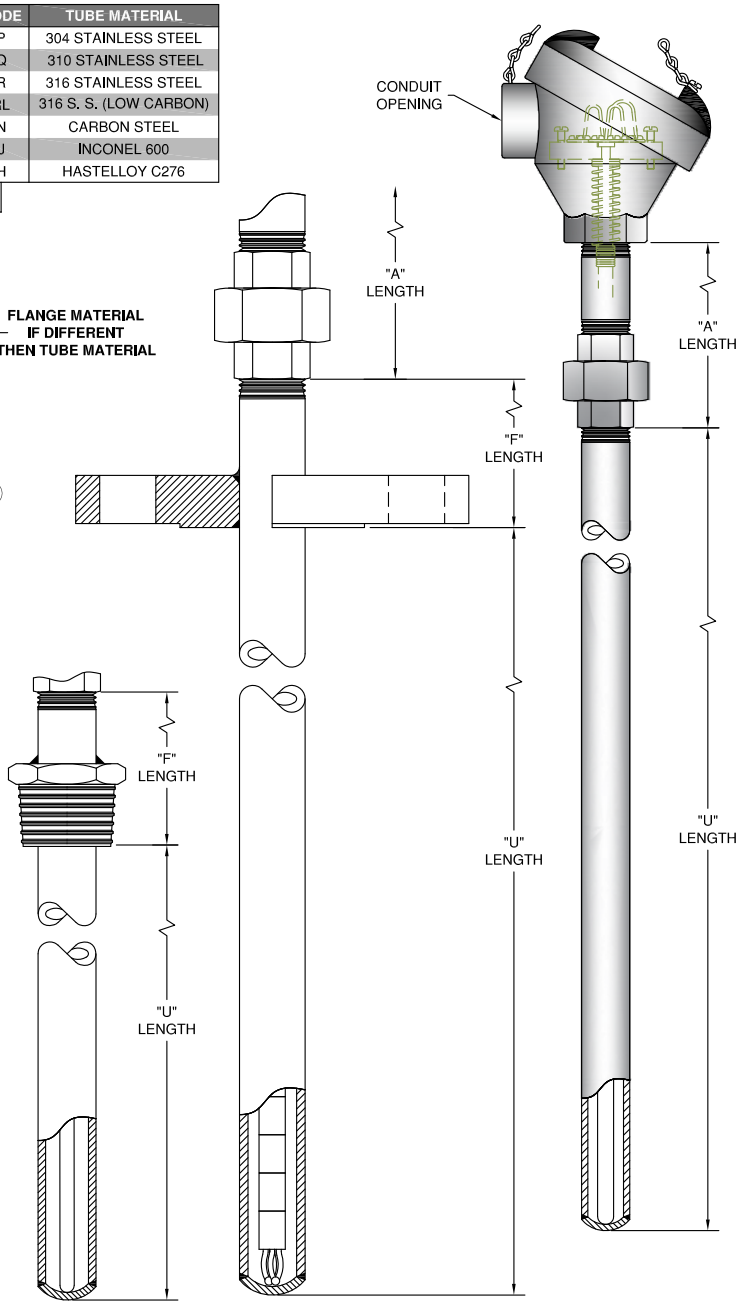
CODE	FLANGE RATING
150	150 #
300	300 #
600	600 #
900	900 #

CODE	FLANGE SIZE
1	1.0"
1.5	1.5"
2	2.0"
3	3.0"

CODE	FLANGED TUBE	
	TUBE SIZE	OD
81	1/4" NPS	0.540
82	1/2" NPS	0.840
83	3/4" NPS	1.050
84	1" NPS	1.315

CODE	PLAIN TUBE	
	TUBE SIZE	OD
51	1/4" NPS	0.540
52	1/2" NPS	0.840
53	3/4" NPS	1.050
54	1" NPS	1.315

CODE	THREADED TUBE		
	TUBE SIZE	PROCESS NPT	OD
601	1/4" NPS	1/2" NPT	0.540
602		3/4" NPT	
603		1" NPT	
606	1/2" NPS	3/4" NPT	0.840
607		1" NPT	
608		1 1/4" NPT	
610	3/4" NPS	1" NPT	1.050
611		1 1/4" NPT	
612		1 1/2" NPT	
613	1" NPS	1 1/4" NPT	1.315
614		1 1/2" NPT	



THERMOCOUPLE SELECTION

CODE		ELEMENT CONSTRUCTION			
SINGLE	DUPLEX	SHEATH DIAMETER	WIRE SIZE (AWG)	INSULATION	SPRING LOADED
ASL6mm	ADSL6mm	6mm (.236")	19	MgO-SHEATH	YES
ASL14	ADSL14	.25" (6.6mm")	18	MgO-SHEATH	YES
ASL516	ADSL516	.313" (8mm")	16	MgO-SHEATH	YES
ASL38	ADSL38	.38" (9.5mm")	15	MgO-SHEATH	YES
B08	BD08	.5"/.69"	8	CERAMIC BEAD	NO

CODE		
STANDARD	SPECIAL (NOTE 5)	CALIBRATION
J	JJ	IRON (+) vs CONSTANTAN (-)
K	KK	CHROMEL (+) vs ALUMEL (-)
T	TT	COPPER (+) vs CONSTANTAN (-)
E	EE	CHROMEL (+) vs CONSTANTAN (-)
N	NN	NICROSIL (+) vs NISIL (-)

CODE	MEASURING JUNCTION
G	SINGLE GROUNDED
U	SINGLE UNGROUNDED
DG	DUPLEX GROUNDED
DU	DUPLEX UNGROUNDED

DROP SHEATH MATERIALCODE WHEN USING CERAMIC BEADED ELEMENTS

CODE	SHEATH MATERIAL
P	304 STN. STL.
R	316 STN. STL.
Q	310 STN. STL.
J	INCONEL 600

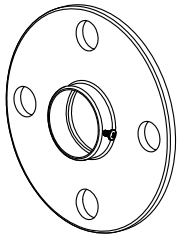
RTD SELECTION

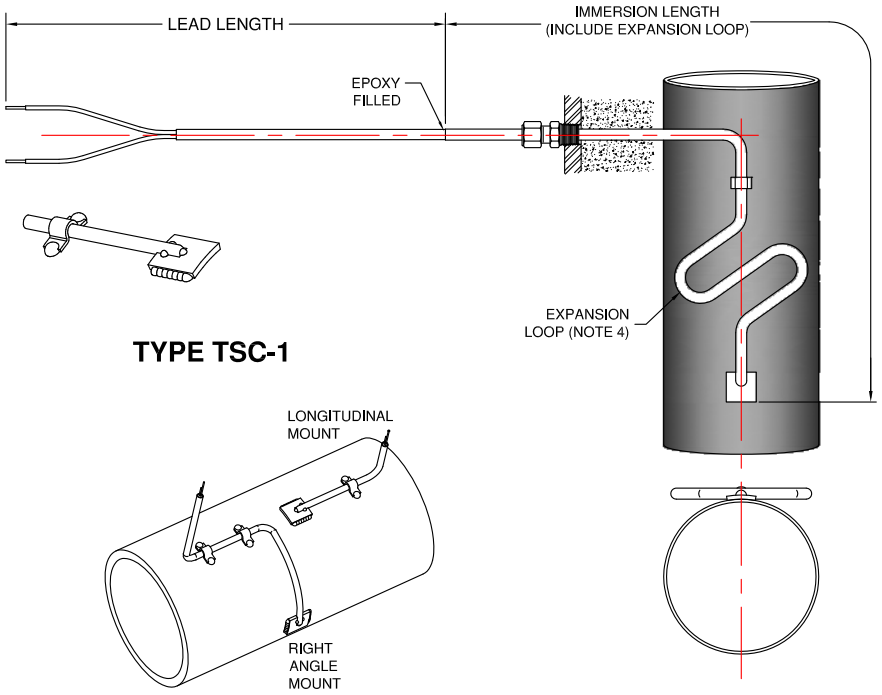
CODE	TYPE	TEMPERATURE RANGE
RTD14LT	SINGLE RTD, 3-WIRE	-50 to +260° C
RTD14	SINGLE RTD, 3-WIRE	-180 to +500° C
RTD14HT	SINGLE RTD, 3-WIRE	-180 to +650° C
DRTD14LT	DUPLEX RTD, 3-WIRE (6 TOTAL)	-50 to +260° C
DRTD14	DUPLEX RTD, 3-WIRE (6 TOTAL)	-180 to +500° C
DRTD14HT	DUPLEX RTD, 3-WIRE (6 TOTAL)	-180 to +650° C

RTD CONSTRUCTION
CONSTRUCTION: 3-WIRE (6 FOR DUPLEX)
ELEMENT TYPE: PLATINUM
TCR: .00385 OHMS/OHM/°C
RESISTANCE @ °C: 100 OHMS
SHEATH MATERIAL: 316 SS

ADJUSTABLE MOUNTING FLANGE
CAST IRON, USED TO MOUNT SERIES 50 PROTECTION TUBES (ORDER SEPARATELY)

CODE	TUBE TYPE	FLANGE DIA.
SS004-561	51	2.19"
SS000-282	52	3.5"
SF006-937	53	3.5"
SR002-526	54	4.0"





TYPE TSC-1

CODE		CALIBRATION
STANDARD	SPECIAL (NOTE 1)	
J	JJ	IRON (+) vs CONSTANTAN (-)
K	KK	CHROMEL (+) vs ALUMEL (-)
E	EE	CHROMEL (+) vs CONSTANTAN (-)
N	NN	NICROSIL (+) vs NISIL (-)

CODE	SHEATH DIAMETER		
	FRACTION	DECIMAL	METRIC
316	3/16"	.187	4.8mm
14	1/4"	.250	6.4mm
38	3/8"	.375	9.5mm

CODE	MEASURING JUNCTION
G	SINGLE GROUNDED, GROUNDED TO SHEATH
U	SINGLE UNGROUNDED, ISOLATED FROM SHEATH
DG	DUPLEX GROUNDED, GROUNDED TO SHEATH
DU	DUPLEX UNGROUNDED, ISOLATED FROM SHEATH

CODE	ELEMENT SHEATH MATERIAL (NOTE 2)
P	304 STN. STL. (STD. CALIBR. J, K, T)
R	316 STN. STL. (STD, CALIBR. J, K, T, E, N)
Q	310 STN. STL. (STD. CALIBR. J, K, E)
J	INCONEL 600 (STD. CALIBR. K,N)

CODE	IMMERSION LENGTH
	(IN INCHES)

CODE	BEND RADIUS
R	RIGHT ANGLE
L	LONGITUDINAL
FLAT	FLAT SURFACE

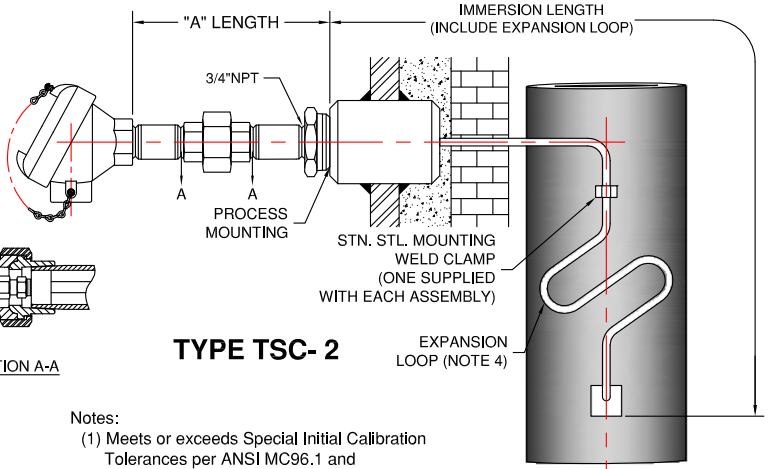
TSC-1 — □ — □□ — □ — □ — □□ — □□ — □□ — □□

K — 14 — G — R — 60 — L 12 — 36 — GGS

CODE	PIPE DIAMETER
	(IN INCHES)

CODE	LEAD LENGTH
	(IN INCHES)

CODE	LEAD TYPE
GG	FIBERGLASS INSULATION & JACKETED
GGS	FIBERGLASS INSULATION & JACKETED WITH STN. STL. BRAID OVERALL



TYPE TSC- 2

TSC-2 — □ — □□ — □ — □ — □□ — □□ — □ — □□ — □□

K — 14 — G — R — 60 — L 12 — 6 — AN — 1NPT

CODE	PIPE DIAMETER
	(IN INCHES)

CODE	"A" LENGTH
	(IN INCHES)

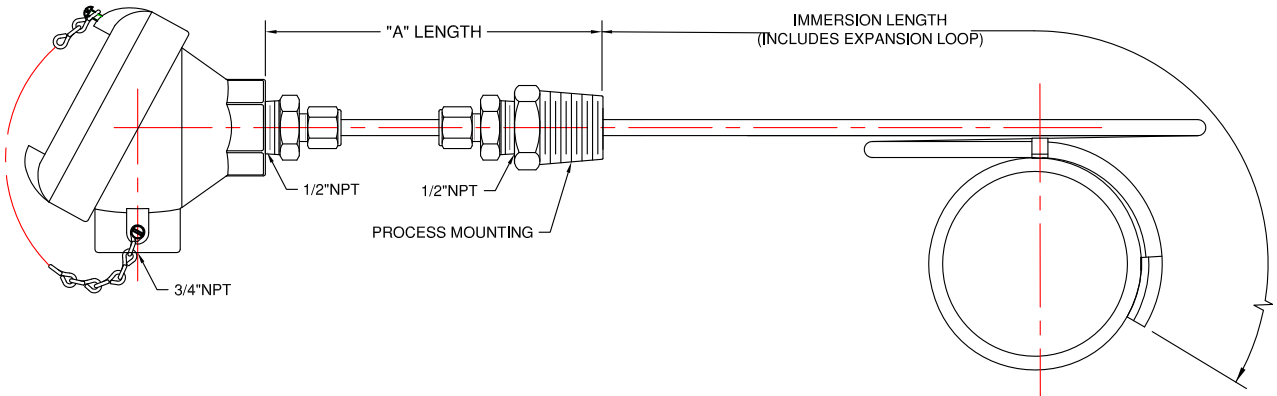
CODE	PROCESS MOUNTING
3/4NPT	3/4"NPT (NO REDUCER)
1NPT	1"NPT
1 1/2NPT	1 1/2"NPT
2NPT	2"NPT

CODE	CONNECTION HEAD
AN	ALUMINUM
SN	STAINLESS STEEL
A	CAST IRON

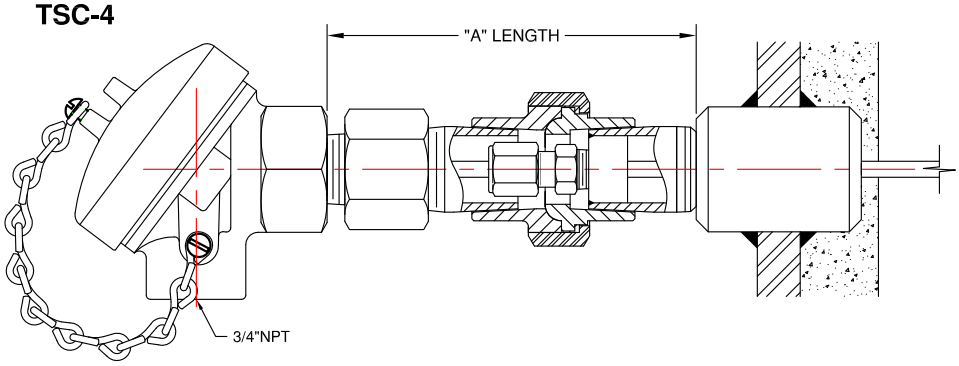
Notes:
(1) Meets or exceeds Special Initial Calibration Tolerances per ANSI MC96.1 and ASTM E230.
(2) Contact factory for other calibration and sheath combinations.
(3) For an item that does not fall within the catalog description an (SP) can be added to the ordering code as part of a custom construction.
(4) Tube skins are normally shipped straight or coiled. Expansion loops or coils are available formed at factory to specification.

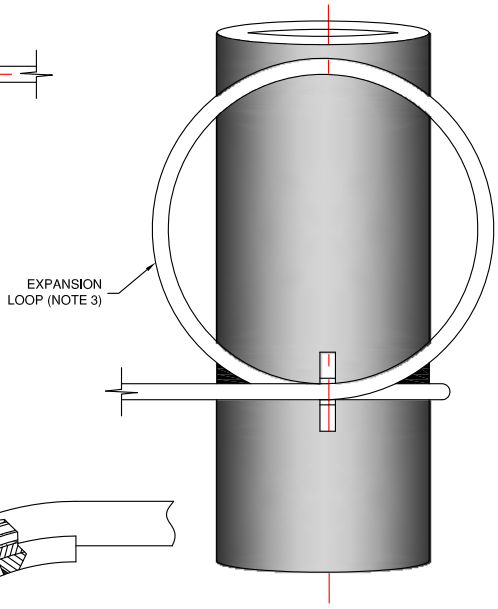
Specifications
(1) Lead Wire Standard 20 gauge stranded conductors.
(2) Weld pad of same material as sheath unless specified otherwise.
(3) Pad size, 1" by 1" by .13" thk.

TSC-3



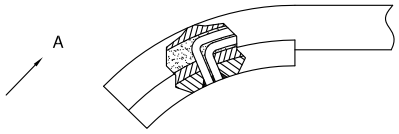
TSC-4

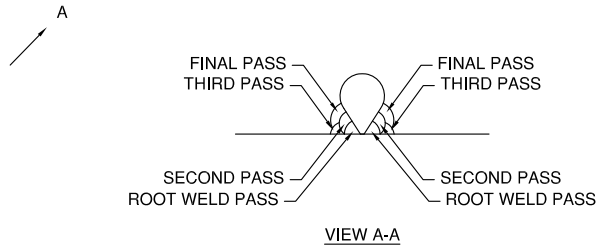




CODE	HEAD EXTENSION
3	DIRECT SHEATH EXTENSION
4	NIPPLE/UNION/SEALING FITTING/NIPPLE

CODE		CALIBRATION
STANDARD	SPECIAL (NOTE 1)	
J	JJ	IRON (+) vs CONSTANTAN (-)
K	KK	CHROMEL (+) vs ALUMEL (-)
E	EE	CHROMEL (+) vs CONSTANTAN (-)
N	NN	NICROSIL (+) vs NISIL (-)





VIEW A-A

CODE	SHEATH DIAMETER & WALL THICKNESS	
	FRACTION	WALL THICKNESS
12	1/2"	STANDARD WALL THICKNESS - .064"
12H	1/2"	HEAVY WALL - .120"

CODE	ELEMENT SHEATH MATERIAL
Q	310 STAINLESS STEEL
J	INCONEL 600
Y	446 STAINLESS STEEL

CODE	IMMERSION LENGTH
	(IN INCHES)

CODE	BEND RADIUS
R	RIGHT ANGLE
L	LONGITUDINAL

TSC-□—□—□—G—□—□—□□—□—□—□

3—K—12 Q—60—L12—6—AN—1NPT

CODE	PIPE DIAMETER
	(IN INCHES)

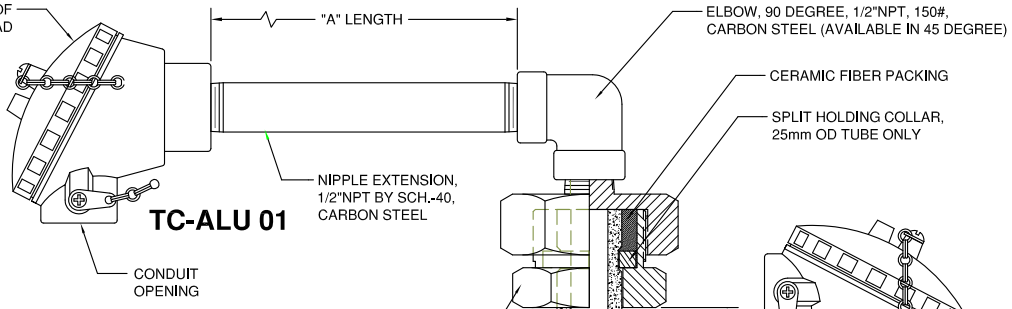
CODE	"A" LENGTH
	(IN INCHES)

CODE	PROCESS MOUNTING
3/4NPT	3/4"NPT
1NPT	1"NPT
1 1/2NPT	1 1/2"NPT
2NPT	2"NPT

CODE	CONNECTION HEAD
AN	ALUMINUM
SN	STAINLESS STEEL
A	CAST IRON

Notes:
(1) Meets or exceeds Special Initial Calibration Tolerances per ANSI MC96.1 and ASTM E230.
(2) For an item that does not fall within the catalog description an (SP) can be added to the ordering code as part of a custom construction.
(3) Knife edge thermocouples are normally shipped straight or coiled. Expansion loops or coils are available formed at factory to specification.

Specifications
Fitting Material: Stainless Steel.
TCS-4: Union Material - Standard Black Malleable Iron.
Nipple Material - Standard Carbon Steel.



TC-ALU 01

CODE	HEAD EXTENSION
01	RIGHT ANGLE
02	STRAIGHT

CODE	CONNECTION HEAD
AN	ALUMINUM
SN	STAINLESS STEEL
A	CAST IRON

CODE	CONDUIT OPENING
1/2	1/2" NPT
3/4	3/4" NPT
M20	M20 x 1.5

CODE	"A" LENGTH (0 IF STRAIGHT)
	IN INCHES or MILLIMETERS FOLLOWED BY mm

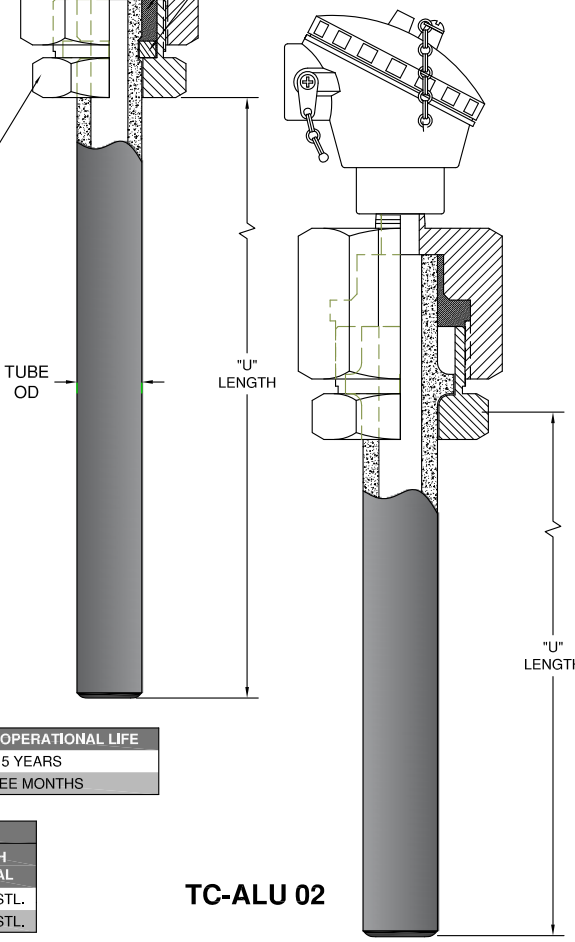
CODE	TUBE SIZE
25	25mm OD/12mm ID
28	28mm OD/16mm ID

CODE	"U" LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

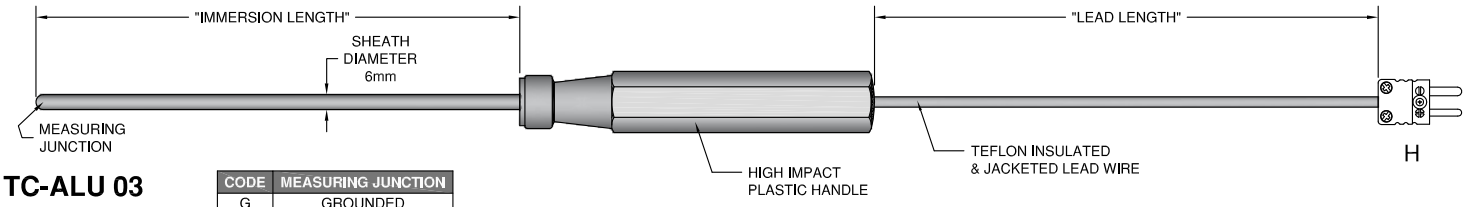
TC-ALU ☐☐☐–☐–☐–☐–☐

CODE	TUBE MATERIAL	ESTIMATED OPERATIONAL LIFE
SiN	SILICON NITRIDE	1.5 YEARS
NBSiC	NITRIDE BONDED SILICON CARBIDE	THREE MONTHS

CODE		ELEMENT CONSTRUCTION				
SINGLE	DUPLEX	CALIBRATION	SHEATH DIAMETER	WIRE SIZE (AWG)	INSULATION	SHEATH MATERIAL
A6mmKGR	AD6mmKGR	TYPE K	6mm (.236")	19	MgO-SHEATH	316 STN. STL.
A8mmKGR	AD8mmKGR	TYPE K	8mm (.313")	16	MgO-SHEATH	316 STN. STL.



TC-ALU 02



TC-ALU 03

CODE	MEASURING JUNCTION
G	GROUNDED
U	UNGROUNDED

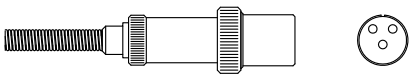
CODE	SHEATH MATERIAL
316	316 STN. STL.
I600	ALLOY 600

CODE	IMMERSION LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm

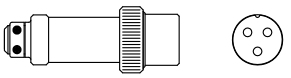
CODE	LEAD LENGTH
	IN INCHES or MILLIMETERS FOLLOWED BY mm or METERS FOLLOWED BY M

CODE	LEAD LENGTH
H	MINIATURE PLUG
3PA	3-PIN AMPHENOL (AACF-3)
3PE	3-PIN ECCENTRIC CONN.

TC-ALU 03-K6mm ☐☐–0–☐☐–5☐

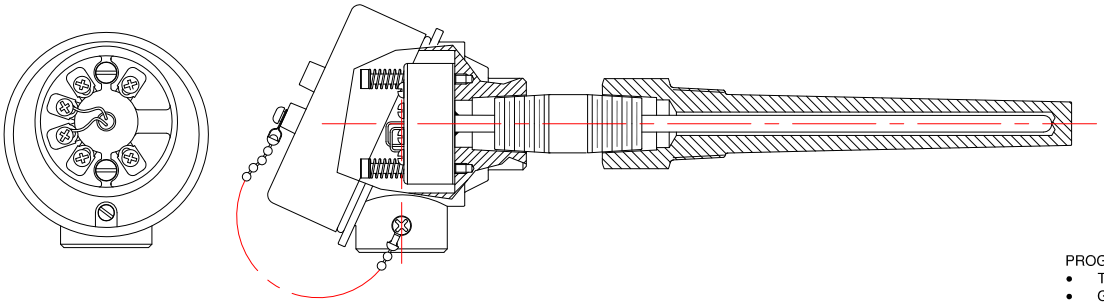


3PE



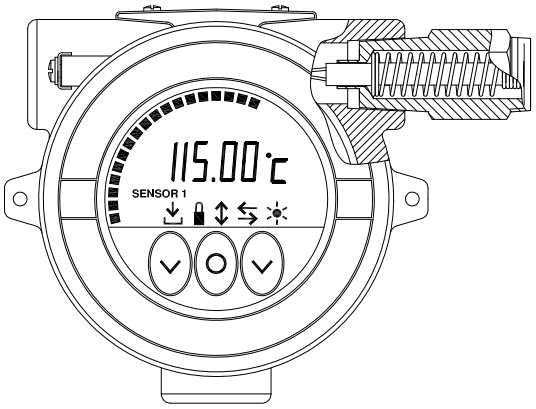
3PA

TRANSMITTER ASSEMBLIES



PROGRAMMABLE
- THERMOCOUPLE INPUT
- GALVANIC ISOLATION
- SUPPLY VOLTAGE: 7.2 to 35 VDC
- SIGNAL RANGE: 4 to 20 mA

PROGRAMMABLE
- 3-WIRE RTD INPUT
- GALVANIC ISOLATION
- SUPPLY VOLTAGE: 8 to 35 VDC
- SIGNAL RANGE: 4 to 20mA



HART 5 PROTOCOL
- THERMOCOUPLE or 3-WIRE RTD INPUT
- SUPPLY VOLTAGE: 8 to 35 VDC
- SIGNAL RANGE: 4 to 20 mA

HART 5 and 7 PROTOCOL
- THERMOCOUPLE or 3-WIRE RTD INPUT
- HARDWARE ASSESSED FOR USE IN SIL
- SUPPLY VOLTAGE: 8 to 35 VDC
- SIGNAL RANGE: 4 to 20 mA

PROFIBUS, FOUNDATION FIELDBUS
- THERMOCOUPLE or 3-WIRE RTD INPUT
- SUPPLY VOLTAGE: 9 to 32 VDC
- AUTOMATIC SWITCHING BETWEEN PROTOCOLS
- BASIC or LAS CAPABILITY with FOUNDATION FIELDBUS

CODE	TRANSMITTER TYPE
PRO	PROGRAMMABLE
HART5	HART 5 PROTOCOL
HART7	HART 7 PROTOCOL
BUS	FIELDBUS
IND	INDICATING

CODE	HEAD EXTENSION
2	NIPPLE ONLY
4	NIPPLE/UNION/NIPPLE

CODE	CONNECTION HEAD
ANT	ALUMINUM
SNT	STAINLESS STEEL

CODE	CONDUIT OPENING
1/2	1/2" NPT
3/4	3/4" NPT
M20	M20 x 1.5

CODE	"A" LENGTH
	IN INCHES

TRM— [ ] — [ ][ ][ ] — 1/2 — [ ] — [ ]

COMPLETE CODE WITH THERMOWELL FROM:
PAGE 8, THREADED, SOCKET, WELD IN
PAGE 9, FLANGED
PAGE 10, VAN STONE

INDICATING
- THERMOCOUPLE or 3-WIRE RTD INPUT
- SUPPLY VOLTAGE: 10 to 30 VDC
- SIGNAL RANGE: 4 to 20 Ma
- HART 5 or 7 PROTOCOL
- HIGH DEFINITION LOCAL OPERATOR INTERFACE with 3 OPTICAL BUTTONS
- SELECTABLE RED or WHITE BACK LIGHT
- 0, 90, 180, 270 DEGREE DISPLAY ADJUSTMENT
- 3 PORT OPENINGS

TYPE	MIN. TEMPERATURE	MAX. TEMPERATURE
J	-148° F (-100° C)	2192° F (1200° C)
K	-292° F (-180° C)	2502° F (1372° C)
T	-328° F (-200° C)	752° F (400° C)
E	-148° F (-100° C)	1832° F (1000° C)
N	-292° F (-180° C)	2372° F (1300° C)
PT100	-328° F (-200° C)	1562° F (850° C)

THERMOCOUPLE SELECTION

CODE		ELEMENT CONSTRUCTION			
SINGLE	DUPLEX	SHEATH DIAMETER	WIRE SIZE (AWG)	INSULATION	SPRING LOADED
ASL6mm	ADSL6mm	6mm (.236")	19	MgO-SHEATH	YES
ASL14	ADSL14	.25" (6.6mm")	18	MgO-SHEATH	YES

CODE		CALIBRATION
STANDARD	SPECIAL	
J	JJ	IRON (+) vs CONSTANTAN (-)
K	KK	CHROMEL (+) vs ALUMEL (-)
T	TT	COPPER (+) vs CONSTANTAN (-)
E	EE	CHROMEL (+) vs CONSTANTAN (-)
N	NN	NICROSIL (+) vs NISIL (-)

CODE	MEASURING JUNCTION
G	SINGLE GROUNDED
U	SINGLE UNGROUNDED
DG	DUPLEX GROUNDED
DU	DUPLEX UNGROUNDED

SECOND LEG OF DUPLEX SENSOR WILL BE TIED OFF AS A SPARE

CODE	SHEATH MATERIAL
P	304 STN. STL.
R	316 STN. STL.
Q	310 STN. STL.
J	INCONEL 600

RTD SELECTION

CODE		ELEMENT CONSTRUCTION	
SINGLE	DUPLEX	SHEATH DIAMETER	SPRING LOADED
RTD6mm	DRTD6mm	6mm (.236")	YES
RTD14	DRTD14	.25" (6.6mm")	YES

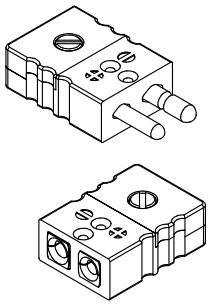
CODE	TEMPERATURE RANGE
LT	-50 to +260° C
(LEAVE BLANK)	-180 to +500° C
HT	-180 to +650° C

RTD CONSTRUCTION
CONSTRUCTION: 3-WIRE (6 FOR DUPLEX)
ELEMENT TYPE: PLATINUM
TCR: .00385 OHMS/OHM/°C
RESISTANCE @ °C: 100 OHMS
SHEATH MATERIAL: 316 SS

STANDARD 2-PIN

ORDERING CODE			CALIBRATION
PLUG	PLUG(SOLID PINS)	JACK	
CO-45101	CO-45101HD	CO-45201	ISA TYPE J
CO-45102	CO-45102HD	CO-45202	ISA TYPE K
CO-45103	CO-45103HD	CO-45203	ISA TYPE T
CO-45104	CO-45104HD	CO-45204	ISA TYPE R/S*
CO-45105	CO-45105HD	CO-45205	ISA TYPE E
CO-45106	CO-45106HD	CO-45206	COPPER**
(USE HD)	CO-45107HD	CO-45207	ISA TYPE N

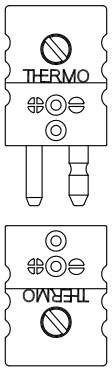
ADD"-IEC" TO END OF PART NUMBER FOR CONNECTORS WITH IEC COLOR INDENTIFICATION



EXTENDED TEMPERATURE LIMITS 2-PIN

ORDERING CODE			CALIBRATION
PLUG	PLUG(SOLID PINS)		
CO-40301	CO-40301HD	CO-40401	ISA TYPE J
CO-40302	CO-40302HD	CO-40402	ISA TYPE K
CO-40303	CO-40303HD	CO-40403	ISA TYPE T
CO-40304	CO-40304HD	CO-40404	ISA TYPE R/S*
CO-40305	CO-40305HD	CO-40405	ISA TYPE E
CO-40306	CO-40306HD	CO-40406	COPPER**
(USE HD)	CO-40307HD	CO-40407	ISA TYPE N

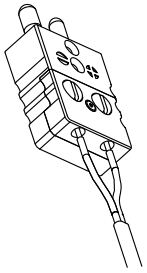
ADD"-IEC" TO END OF PART NUMBER FOR CONNECTORS WITH IEC COLOR INDENTIFICATION



QUICK WIRE 2-PIN

ORDERING CODE			CALIBRATION
PLUG	PLUG(SOLID PINS)	JACK	
CO-45111	CO-45111HD	CO-45211	ISA TYPE J
CO-45112	CO-45112HD	CO-45212	ISA TYPE K
CO-45113	CO-45113HD	CO-45213	ISA TYPE T
CO-45114	CO-45114HD	CO-45214	ISA TYPE R/S*
CO-45115	CO-45115HD	CO-45215	ISA TYPE E
CO-45116	CO-45116HD	CO-45216	COPPER**
(USE HD)	CO-45117HD	CO-45217	ISA TYPE N

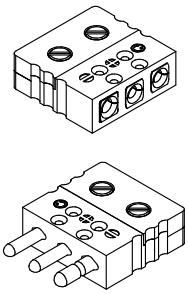
ADD"-IEC" TO END OF PART NUMBER FOR CONNECTORS WITH IEC COLOR INDENTIFICATION



STANDARD SIZE 3-PIN

ORDERING CODE			CALIBRATION
PLUG	PLUG(SOLID PINS)	JACK	
CO-46101	CO-46101HD	CO-46201	ISA TYPE J
CO-46102	CO-46102HD	CO-46202	ISA TYPE K
CO-46103	CO-46103HD	CO-46203	ISA TYPE T
CO-46104	CO-46104HD	CO-46204	ISA TYPE R/S*
CO-46105	CO-46105HD	CO-46205	ISA TYPE E
CO-46106	CO-46106HD	CO-46206	COPPER**
(USE HD)	CO-46107HD	CO-46207	ISA TYPE N

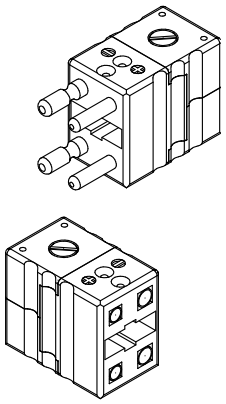
ADD"-IEC" TO END OF PART NUMBER FOR CONNECTORS WITH IEC COLOR INDENTIFICATION



DUPLEX 2-PIN (4 TOTAL)

ORDERING CODE		CALIBRATION
PLUG	JACK	
CO-40801	CO-40901	ISA TYPE J
CO-40802	CO-40902	ISA TYPE K
CO-40803	CO-40903	ISA TYPE T
CO-40804	CO-40904	ISA TYPE R/S*
CO-40805	CO-40905	ISA TYPE E
CO-40806	CO-40906	COPPER**
CO-40807	CO-40907HD	ISA TYPE N

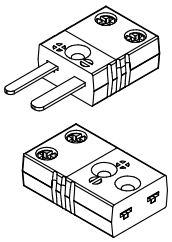
ADD"-IEC" TO END OF PART NUMBER FOR CONNECTORS WITH IEC COLOR INDENTIFICATION



MINIATURE 2-PIN

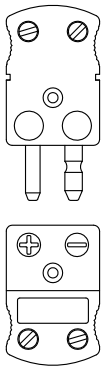
ORDERING CODE		CALIBRATION
PLUG	JACK	
CO-41101	CO-41201	ISA TYPE J
CO-41102	CO-41202	ISA TYPE K
CO-41103	CO-41203	ISA TYPE T
CO-41104	CO-41204	ISA TYPE R/S*
CO-41105	CO-41205	ISA TYPE E
CO-41106	CO-41206	COPPER**
CO-41107	CO-41207	ISA TYPE N

ADD"-IEC" TO END OF PART NUMBER FOR CONNECTORS WITH IEC COLOR INDENTIFICATION



ULTRA TEMP 2-PIN

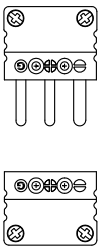
ORDERING CODE		CALIBRATION
PLUG	JACK	
CO-43101	CO-43201	ISA TYPE J
CO-43102	CO-43202	ISA TYPE K
CO-43103	CO-43203	ISA TYPE T
CO-43104	CO-43204	ISA TYPE R/S*
CO-43105	CO-43205	ISA TYPE E
CO-43106	CO-43206	COPPER**
CO-43107	CO-43207	ISA TYPE N



MINIATURE 3-PIN

ORDERING CODE		CALIBRATION
PLUG	JACK	
CO-41111	CO-41211	ISA TYPE J
CO-41112	CO-41212	ISA TYPE K
CO-41113	CO-41213	ISA TYPE T
CO-41114	CO-41214	ISA TYPE R/S*
CO-41115	CO-41215	ISA TYPE E
CO-41116	CO-41216	COPPER**
CO-41117	CO-41217	ISA TYPE N

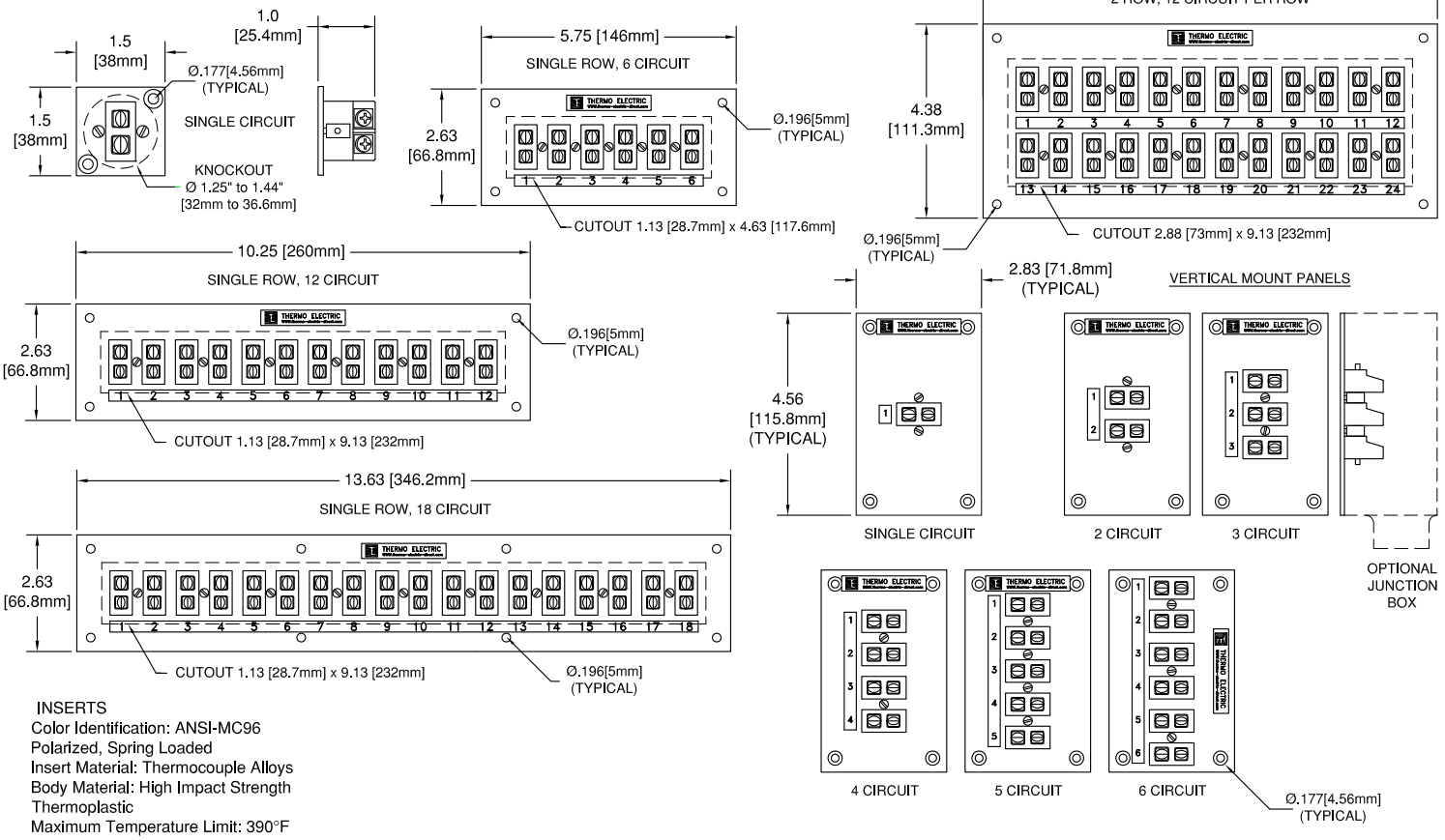
ADD"-IEC" TO END OF PART NUMBER FOR CONNECTORS WITH IEC COLOR INDENTIFICATION



* Compensating Extension Alloys used for both R and S thermocouples

** Copper used for B thermocouples or RTD's

STANDARD SIZE 2-PIN JACK PANELS



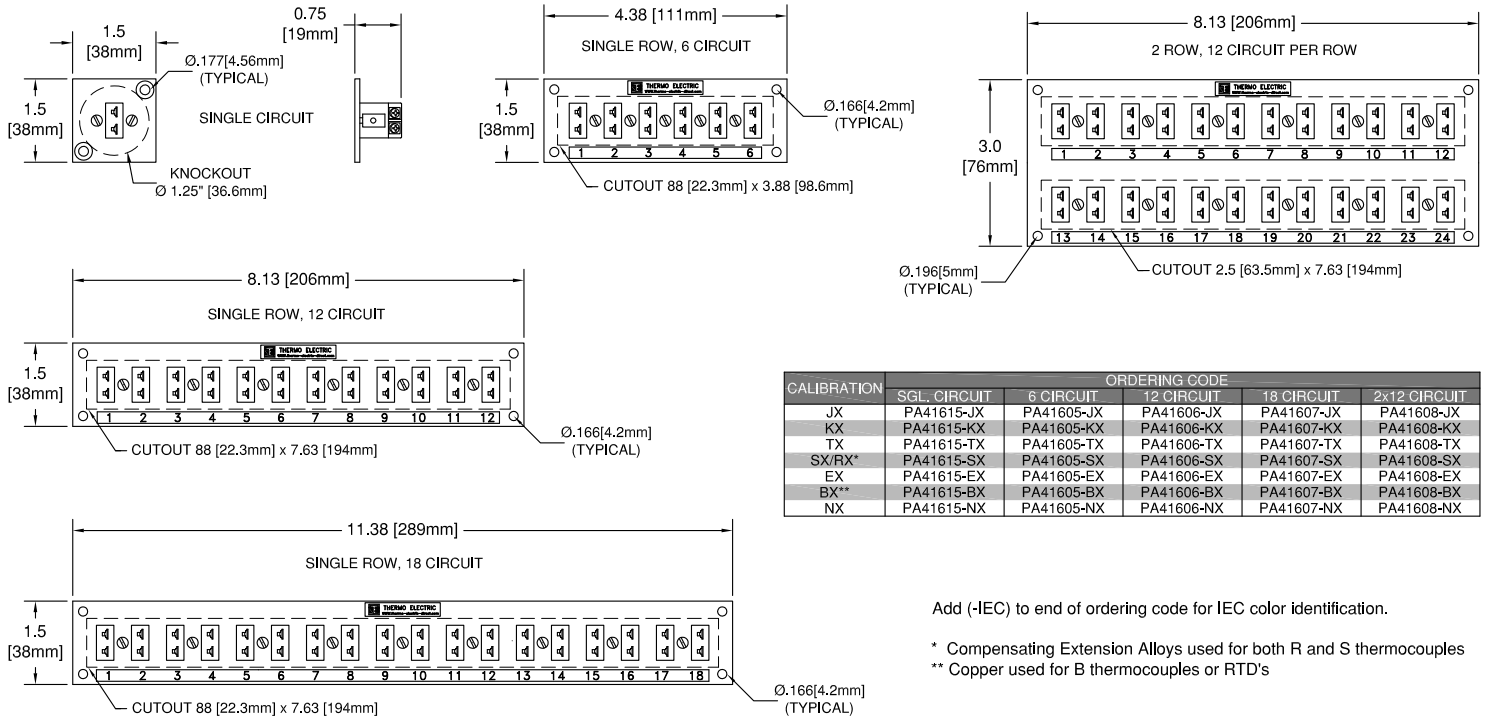
INSERTS
Color Identification: ANSI-MC96
Polarized, Spring Loaded
Insert Material: Thermocouple Alloys
Body Material: High Impact Strength Thermoplastic
Maximum Temperature Limit: 390°F (200°C)

Maximum Wire Diameter:
Standard Size .079" (14Ga)
Miniature .024" (24Ga)

FACE PANEL
Material: Anodized Aluminum

CALIBRATION	ORDERING CODE, VERTICAL MOUNT PANELS						JUNCTION BOX	
	SGL. CIRCUIT	2 CIRCUIT	3 CIRCUIT	4 CIRCUIT	5 CIRCUIT	6 CIRCUIT	1/2"NPT	3/4"NPT
JX	PA41801-JX	PA41802-JX	PA41803-JX	PA41804-JX	PA41805-JX	PA41805-JX		
KX	PA41801-KX	PA41802-KX	PA41803-KX	PA41804-KX	PA41805-KX	PA41805-KX		
TX	PA41801-TX	PA41802-TX	PA41803-TX	PA41804-TX	PA41805-TX	PA41805-TX		
SX/RX*	PA41801-SX	PA41802-SX	PA41803-SX	PA41804-SX	PA41805-SX	PA41805-SX	EN1527-1	EN1527-2
EX	PA41801-EX	PA41802-EX	PA41803-EX	PA41804-EX	PA41805-EX	PA41805-EX		
BX**	PA41801-BX	PA41802-BX	PA41803-BX	PA41804-BX	PA41805-BX	PA41805-BX		
NX	PA41801-NX	PA41802-NX	PA41803-NX	PA41804-NX	PA41805-NX	PA41805-NX		

MINIATURE 2-PIN JACK PANELS



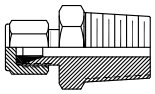
CALIBRATION	ORDERING CODE				
	SGL. CIRCUIT	6 CIRCUIT	12 CIRCUIT	18 CIRCUIT	2x12 CIRCUIT
JX	PA41615-JX	PA41605-JX	PA41606-JX	PA41607-JX	PA41608-JX
KX	PA41615-KX	PA41605-KX	PA41606-KX	PA41607-KX	PA41608-KX
TX	PA41615-TX	PA41605-TX	PA41606-TX	PA41607-TX	PA41608-TX
SX/RX*	PA41615-SX	PA41605-SX	PA41606-SX	PA41607-SX	PA41608-SX
EX	PA41615-EX	PA41605-EX	PA41606-EX	PA41607-EX	PA41608-EX
BX**	PA41615-BX	PA41605-BX	PA41606-BX	PA41607-BX	PA41608-BX
NX	PA41615-NX	PA41605-NX	PA41606-NX	PA41607-NX	PA41608-NX

Add (-IEC) to end of ordering code for IEC color identification.

* Compensating Extension Alloys used for both R and S thermocouples
** Copper used for B thermocouples or RTD's

BORE THRU THERMOCOUPLE & RTD COMPRESSION FITTINGS STAINLESS STEEL with STN. STL. INSERTS

ORDERING CODE	PROCESS THREAD SIZE	SHEATH (TUBE) DIAMETER	FITTING LENGTH	HEX SIZE
AF2485-4-S	1/8"NPT	1/16" (.063)	1.03	7/16
AF2485-3-S	1/8"NPT	1/8" (.125)	1.20	7/16
AF2485-2-S	1/8"NPT	3/16" (.188)	1.23	7/16
AF2485-1-S	1/8"NPT	1/4" (.250)	1.29	1/2
AF2502-6-S	1/4"NPT	1/16" (.063)	1.23	9/16
AF2502-5-S	1/4"NPT	1/8" (.125)	1.40	9/16
AF2502-4-S	1/4"NPT	3/16" (.188)	1.43	9/16
AF2502-1-S	1/4"NPT	1/4" (.250)	1.49	9/16
AF2817-6-S	1/2"NPT	1/8" (.125)	1.87	7/8
AF2817-5-S	1/2"NPT	3/16" (.188)	1.87	7/8
AF2817-2-S	1/2"NPT	1/4" (.250)	1.87	7/8



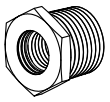
REUSEABLE INSERTS

ORDERING CODE	SHEATH(TUBE) DIAMETER	INSERT MATERIAL
FRC6443-1	1/16" (.063)	TEFLON®
FRC6443-2	1/8" (.125)	TEFLON®
FRC6443-3	3/16" (.188)	TEFLON®
FRC6443-4	1/4" (.250)	TEFLON®
FR5712-3	1/16" (.063)	LAVA
FR5712-1	1/8" (.125)	LAVA
FR5712-4	3/16" (.188)	LAVA
FR5712-2	1/4" (.250)	LAVA

REDUCING BUSHING STAINLESS STEEL

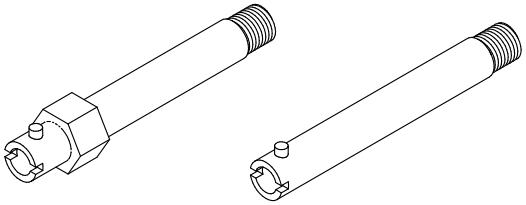
ORDERING CODE
RE1086-4

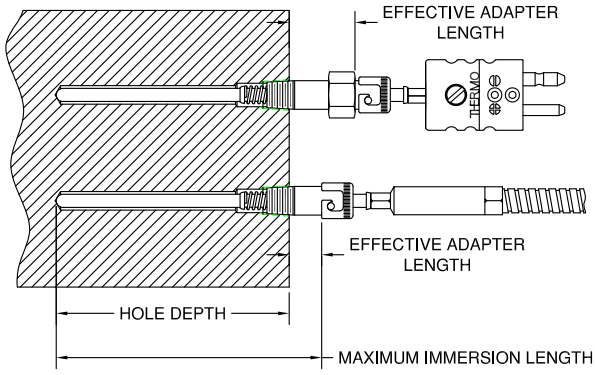
Size: 1/4"NPT Female by 1/2"NPT Male



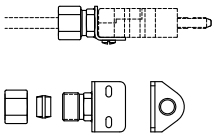
BAYONET MOUNTING ADAPTERS

THREAD SIZE	ADAPTER TYPE	EFFECTIVE LENGTH	ACTUAL LENGTH	ORDERING CODE
1/8"NPT	SCREW DRIVER SLOT	5/32	7/8	AD1500-1
		17/32	1 1/4	AD4011-1
		1 1/32	1 3/4	AD4011-2
		1 17/32	2 1/4	AD4011-3
		2 1/32	2 3/4	AD4011-4
		2 17/32	3 1/4	AD4011-5
		3 1/32	3 3/4	AD4011-6
	HEX NUT	17/32	1 1/4	AD1855-1
		1 1/32	1 3/4	AD1855-2
		1 17/32	2 1/4	AD1855-3
		2 1/32	2 3/4	AD1855-4
		2 17/32	3 1/4	AD1855-5
		3 1/32	3 3/4	AD1855-6
3/8 - 24	SCREW DRIVER SLOT	0	7/8	AD1500-2
		3/8	1 1/4	AD2375-1
		7/8	1 3/4	AD2375-2
		1 3/8	2 1/4	AD2375-3
		1 7/8	2 3/4	AD2375-4
		2 3/8	3 1/4	AD2375-5
		2 7/8	3 3/4	AD2375-6
	HEX NUT	3/8	1 1/4	AD4010-1
		7/8	1 3/4	AD4010-2
		1 3/8	2 1/4	AD4010-3
		1 7/8	2 3/4	AD4010-4
		2 3/8	3 1/4	AD4010-5
		2 7/8	3 3/4	AD4010-6

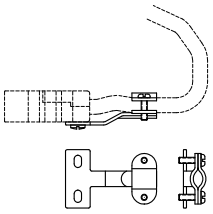




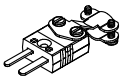
CONNECTOR ACCESSORIES



COMPRESSION BRACKET	
CODE	SHEATH DIAMETER
BK/FT21670-1	1/16" (.063)
BK/FT21670-2	1/8" (.125)
BK/FT21670-3	3/16" (.187)
BK/FT21670-4	1/4" (.25)

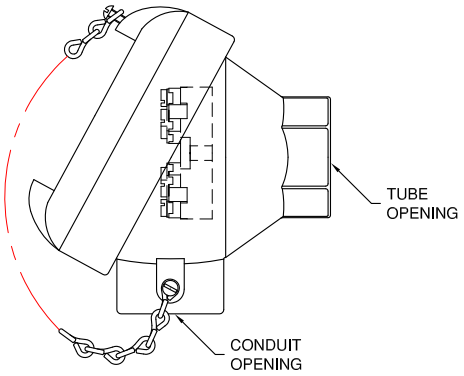


WIRE CLAMP BRACKET
CODE
BK/CL26000-2

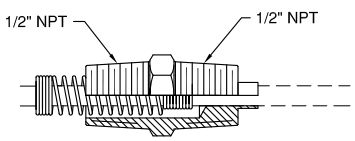


WIRE CLAMP BRACKET
CODE
BK/CL28519

CONNECTION HEADS
SCREW COVER, CAPTIVE CHAIN
NEMA-4, 4X, IP66
6-POINT TERMINAL BLOCK (STANDARD)



HEX NIPPLE EXTENSION for SPRING LOADING or POTTING
SELF-GRIPPING SPRING (SEATS UNDER TERMINAL BLOCKS)
MATERIAL: STAINLESS STEEL



SHEATH DIAMETER	HEX NIPPLE CODE	SPRING CODE
1/8" (.125)	SS000-309	SR002-566
3/16" (.187)	SS000-310	SR002-565
1/4" (.25)	SS001-475	SR002-563

CONNECTION HEADS			
TUBE OPENING	CONDUIT OPENING	CODE ALUMINUM	CODE 316 STN. STL.
1/2"NPT	1/2"NPT	SS014-898	SS014-904
1/2"NPT	3/4"NPT	SS014-899	SS014-905
3/4"NPT	1/2"NPT	SS014-900	SS014-906
3/4"NPT	3/4"NPT	SS014-901	SS014-907
1/2"NPT	M20 x 1.5	SS014-902	SS014-908
3/4"NPT	M20 x 1.5	SS014-903	SS014-909

CALIBRATION	ORDERING CODE	
	STANDARD	SPECIAL
TYPE JX	W-P/P-20F-JX	W-P/P-20F-JJX
TYPE KX	W-P/P-20F-KX	W-P/P-20F-KKX
TYPE TX	W-P/P-20F-TX	W-P/P-20F-TTX
TYPE EX	W-P/P-20F-EX	W-P/P-20F-EEX
TYPE NX	W-P/P-20F-NX	W-P/P-20F-NNX

* Add (-IEC) to the end of the ordering code for IEC color coded insulation and jacketed wire.
Example: W-P/P-20F-JX-IEC

EXTENSION GRADE THERMOCOUPLE WIRE, PVC INSULATION

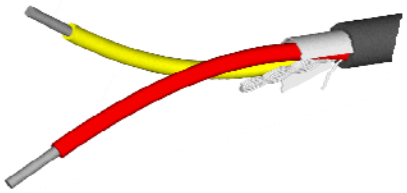
20 gage stranded conductors are insulated with a flexible polyvinyl chloride. Conductors are laid parallel and covered with an overall polyvinyl chloride jacket. Nominal insulation thickness, 15 mils.
Temperature Limit: 220° F (105°C)

CALIBRATION	ORDERING CODE	
	STANDARD	SPECIAL
TYPE JX	W-P/ALPTW-20-JX	W-P/ALPTW-20-JJX
TYPE KX	W-P/ALPTW-20-KX	W-P/ALPTW-20-KKX
TYPE TX	W-P/ALPTW-20-TX	W-P/ALPTW-20-TTX
TYPE EX	W-PAL/PTW-20-EX	W-P/ALPTW-20-EEX
TYPE NX	W-P/ALPTW-20-NX	W-P/ALPTW-20-NNX

* Add (-IEC) to the end of the ordering code for IEC color coded insulation and jacketed wire.
Example: W-P/ALPTW-20-JX-IEC

EXTENSION GRADE THERMOCOUPLE WIRE, PVC INSULATION - SHIELDED

20 gage solid conductors are insulated with a flexible polyvinyl chloride. Conductors are twisted with a polyester backed aluminum tape shield applied with a bare stranded copper drain wire A polyvinyl chloride jacket is extruded over the shielded pair.
Temperature Limit: 220° F (105°C)



CALIBRATION	COLOR CODE (ANSI)			COLOR CODE (IEC)		
	POSITIVE	NEGATIVE	OVERALL	POSITIVE	NEGATIVE	OVERALL
TYPE JX	WHITE	RED	BLACK	BLACK	WHITE	BLACK
TYPE KX	YELLOW	RED	YELLOW	GREEN	WHITE	GREEN
TYPE TX	BLUE	RED	BLUE	BROWN	WHITE	BROWN
TYPE EX	PURPLE	RED	PURPLE	PURPLE	WHITE	PURPLE
TYPE NX	ORANGE	RED	ORANGE	PINK	WHITE	PINK

INITIAL CALIBRATION TOLERANCES Per ANSI MC96.1 and ASTM E230 (°F)				
TEMPERATURE RANGE	STANDARD		SPECIAL	
	CALIBRATION	TOLERANCE	CALIBRATION	TOLERANCE
32 to 400°F	TYPE JX	±4.0°F	TYPE JJX	±2.0°F
32 to 400°F	TYPE KX	±4.0°F	TYPE KKX	±2.0°F
32 to 212°F	TYPE TX	±1.8°F	TYPE TTX	±0.9°F
32 to 400°F	TYPE EX	±3.0°F	TYPE EEX	±1.8°F
32 to 400°F	TYPE NX	±4.0°F	TYPE NNX	±2.0°F

CALIBRATION	ORDERING CODE	
	STANDARD	SPECIAL
TYPE JX	W-TEX/TEX-20F-J	W-TEX/TEX-20F-JJ
TYPE KX	W-TEX/TEX-20F-K	W-TEX/TEX-20F-KK
TYPE TX	W-TEX/TEX-20F-T	W-TEX/TEX-20F-TT
TYPE EX	W-TEX/TEX-20F-E	W-TEX/TEX-20F-EE
TYPE NX	W-TEX/TEX-20F-N	W-TEX/TEX-20F-NN

* Add (-IEC) to the end of the ordering code for IEC color coded insulation and jacketed wire.
Example: W-TEX/TEX-20F-J-IEC

THERMOCOUPLE GRADE WIRE TEFLON® INSULATION

20 gage stranded conductors, TEFLON® (FEP) or Equivalent INSULATION Individual conductors are insulated with extruded FEP Teflon or equivalent Conductors are laid parallel and insulated with extruded FEP Teflon or equivalent jacket.
Temperature Limit: 400° F (205°C)

CALIBRATION	ORDERING CODE	
	STANDARD	SPECIAL
TYPE JX	W-G/G-20F-J	W-G/G-20F-JJ
TYPE KX	W-G/G-20F-K	W-G/G-20F-KK
TYPE TX	W-G/G-20F-T	W-G/G-20F-TT
TYPE EX	W-G/G-20F-E	W-G/G-20F-EE
TYPE NX	W-G/G-20F-N	W-G/G-20F-NN

* Add (-IEC) to the end of the ordering code for IEC color coded insulation and jackete wire.
Example: W-G/G-20F-JX-IEC

THERMOCOUPLE GRADE FIBERGLASS INSULATION

Individual conductors are insulated with a fiberglass braid which is saturated with a resin to improve abrasion resistance and reduce fraying. Conductors are laid parallel and covered with an overall fiberglass jacket and a final impregnation of resin.
Temperature Limit: 950° F (510°C)

CALIBRATION	ORDERING CODE	
	STANDARD	SPECIAL
TYPE JX	W-G/GS-20F-J	W-G/GS-20F-JJ
TYPE KX	W-G/GS-20F-K	W-G/GS-20F-KK
TYPE TX	W-G/GS-20F-T	W-G/GS-20F-TT
TYPE EX	W-G/GS-20F-E	W-G/GS-20F-EE
TYPE NX	W-G/GS-20F-N	W-G/GS-20F-NN

* Add (-IEC) to the end of the ordering code for IEC color coded insulation and jacketed wire.
Example: W-G/GS-20F-J-IEC

THERMOCOUPLE GRADE FIBERGLASS INSULATION with STAINLESS STEEL BRAID OVERALL

Individual conductors are insulated with a fiberglass braid which is saturated with a resin. Conductors are laid parallel and covered with an inner fiberglass jacket. Stainless steel braided outer jacket for additional abrasion resistance.
Temperature Limit: 950° F (510°C)

CALIBRATION	COLOR CODE (ANSI)			COLOR CODE (IEC)		
	POSITIVE	NEGATIVE	OVERALL	POSITIVE	NEGATIVE	OVERALL
TYPE J	WHITE	RED	BROWN	BLACK	WHITE	BLACK
TYPE K	YELLOW	RED	BROWN	GREEN	WHITE	GREEN
TYPE T	BLUE	RED	BROWN	BROWN	WHITE	BROWN
TYPE E	PURPLE	RED	BROWN	PURPLE	WHITE	PURPLE
TYPE N	ORANGE	RED	BROWN	PINK	WHITE	PINK

INITIAL CALIBRATION TOLERANCES Per ANSI MC96.1 and ASTM E230 (°F)				
TEMPERATURE RANGE	STANDARD		SPECIAL	
	CALIBRATION	TOLERANCE	CALIBRATION	TOLERANCE
32 to 1400°F	TYPE J	±4.0°F or ±.75%*	TYPE JJ	±2.0°F or ±.4%*
32 to 2300°F	TYPE K	±4.0°F or ±.75%*	TYPE KK	±2.0°F or ±.4%*
-320 to 32°F 32 to 700°F	TYPE T	±1.8°F or ±1.5%** ±1.8°F or ±.75%*	TYPE TT	±0.9°F or ±.8%** ±0.9°F or ±.4%*
32 to 1600°F	TYPE E	±3.0°F or ±.50%*	TYPE EE	±1.8°F or ±.5%*
32 to 2300°F	TYPE N	±4.0°F or ±.75%*	TYPE NN	±2.0°F or ±.4%*

*Whichever is greater
**Values refer to specially selected cryogenic material. Special limits tolerance is based on limited data, and should only be used as a guide in establishing appropriate working Tolerances.

TYPE (Letter)	Conductor Material	POLARITY	U.S.A.	FRANCE	U.K.	GERMANY	JAPAN	IEC
J	Iron	+	Jacket: Black (+): White (-): Red	Jacket: Black (+): Yellow (-): Black	Jacket: Black (+): Yellow (-): Blue	Jacket: Blue (+): Red (-): Blue	Jacket: Yellow (+): Red (-): White	Jacket: Black (+): Black (-): White
	Constantan	−						
K	Chromel	+	Jacket: Yellow (+): Yellow (-): Red	Jacket: Yellow (+): Yellow (-): Purple	Jacket: Red (+): Brown (-): Blue	Jacket: Green (+): Red (-): Green	Jacket: Blue (+): Red (-): White	Jacket: Green (+): Green (-): White
	Alumel	−						
T	Copper	+	Jacket: Blue (+): Blue (-): Red	Jacket: Blue (+): Yellow (-): Blue	Jacket: Blue (+): White (-): Blue	Jacket: Brown (+): Red (-): Brown	Jacket: Brown (+): Red (-): White	Jacket: Brown (+): Brown (-): White
	Constantan	−						
E	Chromel	+	Jacket: Purple (+): Purple (-): Red	Jacket: Red (+): Yellow (-): Brown	Jacket: Brown (+): Brown (-): Blue	Jacket: Black (+): Red (-): Black	Jacket: Purple (+): Red (-): White	Jacket: Purple (+): Purple (-): White
	Constantan	−						
N	Nicrosil	+	Jacket: Orange (+): Orange (-): Red	Not Established	Jacket: Orange (+): Orange (-): Blue	Not Established	Not Established	Jacket: Pink (+): Pink (-): White
	NISIL	−						
R	Platinum 13% Rhodium	+	Jacket: Green (+): Black (-): Red	Jacket: Green (+): Yellow (-): Green	Jacket: Green (+): White (-): Blue	Jacket: White (+): Red (-): White	Jacket: Black (+): Red (-): White	Jacket: Orange (+): Orange (-): White
	Platinum	−						
S	Platinum 10% Rhodium	+	Jacket: Green (+): Black (-): Red	Jacket: Green (+): Yellow (-): Green	Jacket: Green (+): White (-): Blue	Jacket: White (+): Red (-): White	Jacket: Black (+): Red (-): White	Jacket: Orange (+): Orange (-): White
	Platinum	−						
B	Platinum 30% Rhodium	+	Jacket: Grey (+): Grey (-): Red	Not Established	Not Established	Jacket: Grey (+): Red (-): Grey	Jacket: Grey (+): Red (-): Grey	Not Established
	Platinum 6% Rhodium	−						

THERMOCOUPLE CONNECTOR COLOR CODE

TYPE	ANSI	IEC	DIN
K	Yellow	Green	Green
J	Black	Black	N/A
L	N/A	N/A	Blue
T	Blue	Brown	Brown

THERMOCOUPLE CONNECTOR COLOR CODE

TYPE	ANSI	IEC	DIN
R	Green	Orange	White
E	Purple	Purple	N/A
N	Orange	Pink	N/A
S	Green	Orange	White
B	Grey	Grey	Grey

(1) ISA color codes shown is for thermocouple extension grade wire. Thermocouple grade wire has a brown jacket in all calibrations.
(2) Compensating extension wire and connector pins (copper/alloy II) used with both R and S thermocouples.
(3) Compensating extension wire and connector pins (copper/copper) used with B thermocouples. Connector body is usually supplied white.

ENGINEERING

- INSTALLATION & OPERATION MANUALS
- TECHNICAL DATA SHEETS
- APPROVAL / RECORD DRAWINGS

CALIBRATION

- CALIBRATION TEST CERTIFICATES
- SYSTEM CALIBRATION WITH TRANSMITTER

INSPECTION

- CERTIFIED MATERIAL TEST REPORTS
- POSITIVE MATERIAL IDENTIFICATION (PMI)
- WPS / PQR - WELD RECORDS & CERTIFIED WELDING
- RADIOGRAPHIC (X-RAY) INSPECTION
- THERMOWELL WAKE FREQUENCY CALCULATIONS
- HYDROSTATIC PRESSURE TESTING SERVICES
- DYE PENETRANT INSPECTION (DPI)
- PHASED ARRAY ULTRASONIC TESTING
- NACE CERTIFICATE
- OXYGEN CLEANING

SITE / INSTALLATION SERVICES

- CONSULTING
- DIAGNOSTICS
- INSTALLATION

THERMO ELECTRIC HAS ALL THE CERTIFICATIONS REQUIRED TO MEET THE MOST CRITICAL APPLICATIONS.

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