FOOD, DAIRY & PHARMACEUTICAL

CIP Sanitary Fitting Reference Data Sheet

The CIP (clean in place) sanitary connections illustrated on this page are the most commonly used fittings in food, dairy, beverage, pharmaceutical, and chemical processes where contamination and cleanliness is of concern. Fittings other than those illustrated are available upon request. The illustrations are provided for reference purposes to aid in the selection of the correct fitting style for new or replacement sensor assemblies. Most CIP sensor assemblies manufactured by Pyromation are constructed in accordance with the **3-A Sanitary Council Standard 74-** for instrument fittings and connections.

BEVEL SEAT FITTING[1]
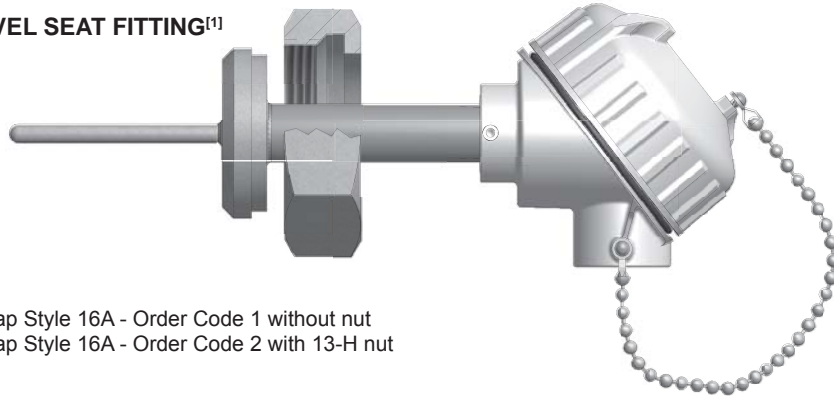
Cap Style 16A - Order Code 1 without nut
Cap Style 16A - Order Code 2 with 13-H nut

TRI-CLAMP® FITTING

Cap Style 16AMP - Order Code 5

### "I" CLAMP FITTING[2]

Cap Style 16AI-14I - Order Code 7

See back section for cap dimension.

[1] Must be manually cleaned.
[2] Not 3-A authorized.

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67-6   Distributed By: M&M Control Service, Inc. www.mmcontrol.com/pyromation.php   800-876-0036 847-356-0566   FD-1

The Water-Tight CIP RTD Assembly houses an optional integral Series 450 Temperature Transmitter (no connection head is required) that is ideal for monitoring temperature in small areas such as tanks and pipes. The water-tight construction meets NEMA 6P requirements. Assemblies are supplied with a surface finish that meets or exceeds 32μin R_a. Surface finishes of 15μin R_a or better are available upon request. Standard units include a M12 process connection housing. The transmitter is a 2-wire unit with an analog output. It has measurement input for Pt100 resistance thermometers (RTD) in 4-wire connections. Transmitters can be ranged from (-51 to 160) °C [-60 to 320] °F with a 10 °C [18 °F] minimum span requirement. **Ambient temperature limits for the M12 connector are (-40 to 85) °C.**
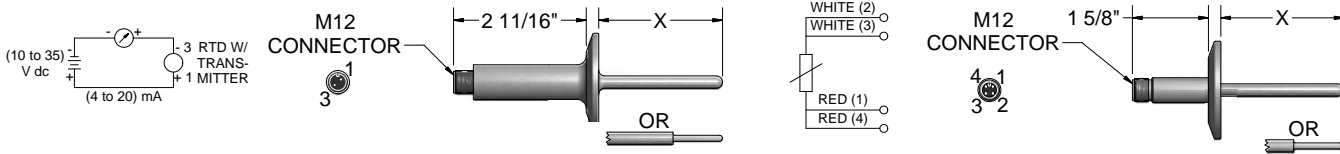
ORDER CODES

Example Order Number:

1	2	3	4	5	6	7	8
R5T185L484	04	CIP	2-5	45, T	450	U	S (0-200) F

1 Standard Tip
Pt100 (α = 0.003 85 °C^{-1}) RTD Assemblies

CODE	TOLERANCE[1]	NOMINAL SHEATH DIAMETER O.D. (inches)
RAF185L484	Class A	1/4
R1T185L484	Grade B	1/4
R5T185L484	(1/5) Class B	1/4

1-1 Reduced Tip
Pt100 (α = 0.003 85 °C^{-1}) RTD Reduced Tip Assemblies

CODE	TOLERANCE[1]	NOMINAL SHEATH DIAMETER O.D. (inches)	TIP OUTER DIA. (inches)
RAF185L88R484	Class A	1/2	1/4
RAF185L68R384	Class A	3/8	3/16
R1T185L88R484	Grade B	1/2	1/4
R1T185L68R384	Grade B	3/8	3/16
R5T185L88R484	(1/5) Class B	1/2	1/4
R5T185L68R384	(1/5) Class B	3/8	3/16

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

2 Immersion Length "X"

Specify "X" length in inches using 2 digits, plus any fractional length
Examples: 04 = 4", 04(1/2) = 4.5"

For field-wireable and molded extensions see RTD Section.

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3 Sanitary Cap Size and Style 316 SS

CODE	DESCRIPTION
1-5	1" & 1 1/2" 16 AMP cap - Tri-Clamp®
2-5	2" 16 AMP cap - Tri-Clamp®
3-5	2 1/2" 16 AMP cap - Tri-Clamp®
4-5	3" 16 AMP cap - Tri-Clamp®
Other cap styles available - consult factory	

4 Termination

CODE	DESCRIPTION
45	M12 Water-tight connector
Optional Transmitter	
T[1]	(4 to 20)mA Temperature Transmitter (requires table 5 selection)

[1] See Transmitter Section for total sensor and transmitter output accuracy.

5 Transmitter

CODE	DESCRIPTION
450-00	Programmable transmitter-unconfigured
450	Programmable transmitter-configured

6 Fault Signal

CODE	DESCRIPTION
U	Upscale burnout
D	Downscale burnout

7 Range

S (lower limit - upper limit)

8 Units

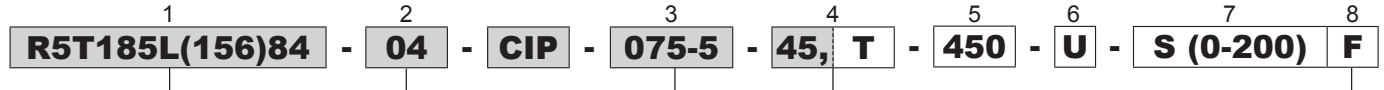| CODE	DESCRIPTION
C	Celsius
F	Fahrenheit

The Water-Tight Miniature CIP RTD Assembly houses an optional Series 450 Temperature Transmitter (no connection head is required) that is ideal for monitoring temperature in small areas such as tanks and pipes. The water-tight construction meets NEMA 6P requirements. These assemblies include a 316SS clean-in-place connection. Assemblies are supplied with a surface finish that meets or exceeds 15µin R_a. Standard units include a M12 process connection housing. The transmitter is a 2-wire unit with an analog output. It has measurement input for Pt100 resistance thermometers (RTD) in 4 wire connections. Transmitters can be ranged from (-51 to 160) ºC [60 to 320] ºF minimum span requirement. **Ambient temperature limits for the M12 connector is (-40 to 85) °C.**
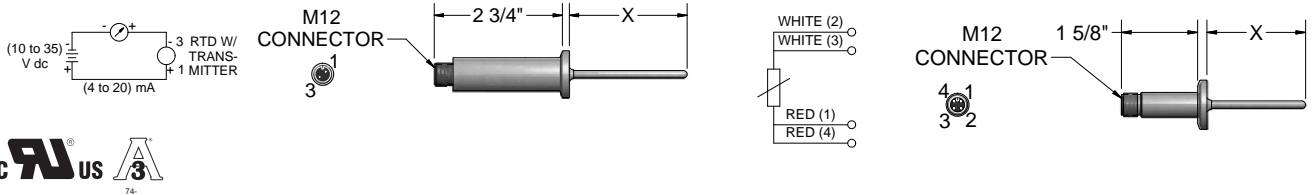
ORDER CODES

Example Order Number:

1	2	3	4	5	6	7	8
R5T185L(156)84	- 04	- CIP -	075-5	- 45, T	- 450	- U	- S (0-200) F

1 Pt100 (α = 0.003 85 °C^{-1}) RTD Assemblies

CODE	TOLERANCE[1]	NOMINAL SHEATH DIAMETER O.D. (inches)
RAF185L(156)84	Class A	5/32
R1T185L(156)84	Grade B	5/32
R3T185L(156)84	Class AA	5/32
R5T185L(156)84	(1/5) Class B	5/32

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

2 Immersion Length "X"

Specify "X" length in inches using 2 digits, plus any fractional length desired
Examples: 04 = 4", 04(1/2) = 4.5"

3 Sanitary Cap Size and Style 316SS

CODE	DESCRIPTION
075-5	1/2" & 3/4" 16 AMP cap - Tri-Clamp®

For field-wireable and molded extensions see RTD Section.

Tri-Clamp® is a registered trademark of Alfa Laval, Inc.

4 Termination

CODE	DESCRIPTION
45	M12 Water-tight connector
Optional Transmitter	
T[1]	(4 to 20)mA Temperature transmitter (requires table 5 selection)

[1] See Transmitter Section for total sensor and transmitter output accuracy.

5 Transmitter

CODE	DESCRIPTION
450-00	Programmable transmitter- unconfigured
450	Programmable transmitter- configured

6 Fault Signal

CODE	DESCRIPTION
U	Upscale burnout
D	Downscale burnout

7 Range

RANGE
S (lower limit - upper limit)

8 Units

CODE	DESCRIPTION
C	Celsius
F	Fahrenheit

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FOOD, DAIRY & PHARMACEUTICAL

General-purpose CIP sanitary-connected RTD temperature sensors are used in food, dairy, beverage, pharmaceutical, and chemical processing applications where sensor corrosion and product contamination are critical factors. The sanitary caps listed are those most commonly used in such processes. Sanitary caps are welded to the sheath and to a heavier support tube, all made of stainless steel, and then ground and polished to a finish that exceeds the No. 4 minimum finish required by the **3-A Sanitary Standard 74 -** . Assemblies are supplied with a surface finish that meets or exceeds 32µin R_a. Surface finishes of 15µin R_a or better are available upon request. The process contact surfaces are free of pits, crevices, and pockets thus preventing corrosion and bacteria growth. The 3-wire constructed sensor assembly consists of a high-accuracy platinum element sealed inside a 316 stainless steel sheath, and is provided with a FDA-compliant white thermoplastic gasketed connecting head. The complete assembly provides excellent washdown protection. It is recommended that once customer connections are made, the connecting terminals be further protected by applying a coating of moisture-proof sealant over the connections.

A3 74-

Ø1/4", 316 SST

Maximum temperature limit: 200 ºC [392 ºF]

ORDER CODES

Example Order Number: R5T185L483 - 04 - CIP - 2 - 5 - 63, T
(1-1) (1-2) (2) (3) (4)

1-1 Pt100 (α = 0.003 85 ºC^{-1}) RTD Assemblies

CODE	TOLERANCE[1]
SINGLE	
RAF185L483	Class A
R1T185L483	Grade B
R3T185L483	Class AA
R5T185L483	(1/5) Class B
DUPLEX	
RAF285L483	Class A
R1T285L483	Grade B
R3T285L483	Class AA
R5T285L483	(1/5) Class B

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

Thermocouple Assemblies

For CIP thermocouple assemblies use T/C types J, K, T, or E and options G for grounded junction or U for ungrounded junction as per example.
EXAMPLE: TP48G-04 - CIP - 2 - 5 - 63

1-2 Immersion Length "X"

Specify "X" length in inches using 2 digits, plus any fractional length desired
Examples: 04 = 4", 05(1/2) = 5.5"

2 Sanitary Cap Size

CODE	TUBE O.D. (inches)	CODE	TUBE O.D. (inches)
1	1(1/2)	4	3
2	2	5	Other (specify)
3	2 (1/2)		

4 Terminations

CODE	DESCRIPTION
91	316L stainless steel screw-cover head
63	White polypropylene screw-cover head
31,W	Aluminum screw-cover head with white epoxy coating
22 (06)	6" individual fluoropolymer leads with terminal pins
02	1/2" O.D., 2 1/4" long extension leadwire transition (requires table 4 & 5 selections from RTD section)
Head Options	
T	Head-mounted transmitter (see Transmitter Section)
I	Stainless steel tags
HS	Wire seal security screws

3 Sanitary Cap Style

CODE	DESCRIPTION
2	16A cap - Bevel Seat with13-H Nut[1] 304SS
5	16 AMP cap - Tri-Clamp® 316SS
7	16AI-14I cap[2] 304SS
8	Other (describe)
[1] Must be manually cleaned	[2] Not 3-A authorized

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General-purpose reduced-tip CIP sanitary-connected RTD temperature sensors are used in food, dairy, beverage, pharmaceutical, and chemical processing applications where sensor corrosion and product contamination are critical factors. The reduced tip construction provides strength along the major sheath length, and faster temperature response times at the reduced tip. The reduced tip sizes listed below are the most common constructions. For other configurations please consult the factory. The sanitary caps listed are those most commonly used in such processes. The sanitary caps are welded to the sheath and to a heavier support tube, all made of stainless steel, and then ground and polished to a finish that exceeds the No. 4 minimum finish required by the **3-A Sanitary Standard 74 -** . Assemblies are supplied with a surface finish that meets or exceeds 32μin R_a. Surface finishes of 15μin R_a or better are available upon request. The process contact surfaces are free of pits, crevices, and pockets thus preventing corrosion and bacteria growth. The 3-wire constructed sensor assembly consists of a high-accuracy platinum element sealed inside a 316 stainless steel sheath, and is provided with a FDA compliant white thermoplastic gasketed connecting head. The complete assembly provides excellent washdown protection. It is recommended that once customer connections are made, the connecting terminals be further protected by applying a coating of moisture-proof sealant over the connections.

74-

X   3"

1 1/4"

Ø3/8" OR Ø1/2",
316 SST

Maximum temperature limit: 200 °C [392 °F]

ORDER CODES

	1-1	1-2	2	3	4
Example Order Number:	R5T185L68R383 -	04 -	CIP - 2 -	5 -	63, I

1-1   Pt100 (α = 0.003 85 °C^{-1}) RTD Assemblies

CODE		TOLERANCE[1]	NORMAL SHEATH DIA. O.D. (inches)	TIP DIAMETER OD (inches)
SINGLE	*DUPLEX*			
RAF185L88R483	RAF285L88R483	Class A	1/2	1/4
RAF185L68R383	RAF285L68R383	Class A	3/8	3/16
R1T185L88R483	R1T285L88R483	Grade B	1/2	1/4
R1T185L68R383	R1T285L68R383	Grade B	3/8	3/16
R3T185L88R483	R3T285L88R483	Class AA	1/2	1/4
R3T185L68R383	R3T285L68R383	Class AA	3/8	3/16
R5T185L88R483	R5T285L88R483	(1/5) Class B	1/2	1/4
R5T185L68R383	R5T285L68R383	(1/5) Class B	3/8	3/16

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

Thermocouple Assemblies

For CIP thermocouple assemblies use T/C types J, K, T, or E and options G for grounded junction or U for ungrounded junction as per example.
EXAMPLE: TP68R38G-04 - CIP - 2 - 5 - 63

1-2   Immersion Length "X"

Specify "X" length in inches using 2 digits, plus any fractional length desired. Examples: 04 = 4", 05(1/2) = 5.5"

2   Sanitary Cap Size

CODE	TUBE O.D. (inches)	CODE	TUBE O.D. (inches)
1	1(1/2)	4	3
2	2	5	Other (specify)
3	2 (1/2)		

4   Terminations

CODE	DESCRIPTION
91	316L stainless steel screw-cover head
63	White polypropylene screw-cover head
31,W	Aluminum screw-cover head with white epoxy coating
22 (06)	6" individual fluoropolymer leads with terminal pins
02	1/2" O.D., 2 1/4" long extension leadwire transition (requires table 5 & 6 selections from RTD section)
Head Options	
T	Head-mounted transmitter (see Transmitter Section)
I	Stainless steel tags
HS	Wire seal security screws

3   Sanitary Cap Style

CODE	DESCRIPTION
2	16A cap - bevel seat with13-H nut[1] 304SS
5	16 AMP cap - Tri-Clamp® 316SS
7	16AI-14I cap[2] 304SS
8	Other (describe)
[1] Must be manually cleaned [2] Not 3-A authorized	

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Configuration Code FD02
Fast Temperature Response RTDs with CIP Fittings

The sensors listed below are sanitary-connected RTD temperature sensor assemblies designed to meet the stringent requirements of HTST pasteurization systems. HTST requirements are described in the Grade "A" Milk Pasteurization Ordinance. The sensors listed on this page have response times below four seconds and come standard in accuracies at 100 ºC [212 ºF] ± 0.5 ºC. The below listed assemblies are available in a variety of sanitary connections. All wetted parts are ground and polished to a finish that exceeds the No. 4 minimum finish required by the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections used on Milk and Milk Product Equipment Standard **74-** . Assemblies are supplied with a surface finish that meets or exceeds 32μin R_a. Surface finishes of 15μin R_a or better are available upon request. The three-wire constructed sensor assembly consists of a high accuracy platinum element sealed inside a 316 stainless steel sheath and a white FDA compliant polypropylene connecting head. The complete assembly provides excellent wash down protection. It is recommended that once customer connections are made, the connecting terminals be further protected by applying a coating of moisture-proof sealant over the connections.

A3 ®
74-

X — 3"

1 1/4"

Ø3/8", 316 SST
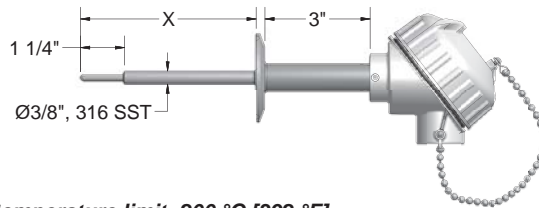
Maximum temperature limit: 200 °C [392 °F]
Pasteurization Test Response Time: 2 to 3 seconds typical

ORDER CODES

Example Order Number: **R5T185L68R383** - **04** - **HTST** - **2** - **5** - **63**

1-1 | 1-2 | | 2 | 3 | 4

1-1 Pt100 (α = 0.003 85 ºC⁻¹) RTD Assemblies

CODE		TOLERANCE[1]
SINGLE	*DUPLEX*	
R3T185L68R383	R3T285L68R383	Class AA
R5T185L68R383	R5T285L68R383	(1/5) Class B
[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.		

1-2 Immersion Length "X"

Specify "X" length in inches using 2 digits, plus any fractional length desired.
Examples: 04 = 4", 05(1/2) = 5.5"

2 Sanitary Cap Size

CODE	TUBE O.D. (inches)	CODE	TUBE O.D. (inches)
1	1(1/2)	4	3
2	2	5	Other (specify)
3	2 (1/2)		

3 Sanitary Cap Style

| CODE	DESCRIPTION
2	16A cap - bevel seat with13-H nut[1] 304SS
5	16 AMP cap - Tri-Clamp® 316SS
7	16AI-14I cap[2] 304SS
8	Other (describe)
[1] Must be manually cleaned [2] Not 3-A authorized	

4 Terminations

CODE	DESCRIPTION
91	316L stainless steel screw-cover head
63	White polypropylene screw-cover head
31,W	Aluminum screw-cover head with white epoxy coating
22 (06)	6" individual fluoropolymer leads with terminal pins
02	1/2" O.D., 2 1/4" long extension leadwire transition (requires table 5 & 6 selections from RTD section)
Head Options	
T	Head-mounted transmitter (see Transmitter Section)
I	Stainless steel tags
HS	Wire seal security screws

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The RTD sensors listed below are constructed with the CIP sanitary-connected cap thermowell, which is then mounted into the process with a clamp and mating sanitary cap. A 3-wire spring-loaded RTD element and sheath is then screwed into the back of the thermowell. This construction method allows for easy removal of both the well and/or the sensor assembly. The well and sanitary cap in contact with the process are all ground and polished to a finish that exceeds the **3-A Sanitary Standard 74-** . Thermowells are supplied with a surface finish that meets or exceeds 32µin R_a. Surface finishes of 15µin R_a or better are available upon request.
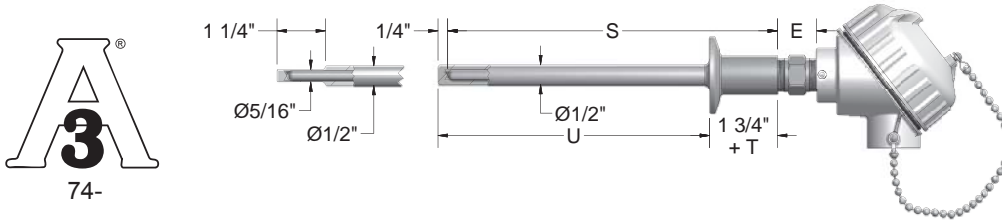
ORDER CODES

	1		2	2-1	2-2	2-3		3		4	5
Example Order Number:	R5T185L483	-	DW4	25	06	08	-	SL	-	8HN	63

1 Pt100 (α = 0.003 85 °C^{-1}) RTD Assemblies

CODE	TOLERANCE[1]
SINGLE	
R1T185L483	Grade B
R3T185L483	Class AA
R5T185L483	(1/5) Class B
RAF185L483	Class A
DUPLEX	
R1T285L483	Grade B
R3T285L483	Class AA
R5T285L483	(1/5) Class B
RAF285L483	Class A

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

2 Well Type

CODE	DESCRIPTION
DW4[1]	0.260" bore straight-stem sanitary well
DR4[2]	0.260" bore reduced-tip sanitary well

[1] Wells with "S" dimensions of 12" or less are supplied with drilled barstock stem. "S" dimensions above 12" will be supplied as tubing and welded tip.
[2] Maximum "S" Dimension is 7 1/2"

2.1 Cap Size and Style

CODE	DESCRIPTION
15	1", 1 1/2" Tri-clamp® 16 AMP
25	2" Tri-clamp® 16 AMP
35	2 1/2" Tri-clamp® 16 AMP
45	3" Tri-clamp® 16 AMP
Other styles - sizes available. Consult factory.	

2.2 "S" Length

CODE	DESCRIPTION
XX	Specify length in inches using two digits.

2.3 Well Material

CODE	DESCRIPTION
08	316SS

3 Element Style

CODE	DESCRIPTION
SL	Spring-loaded element

4 Head Mounting Fittings

CODE	DESCRIPTION
8HN	316SS hex fitting
8PN(E)	316SS pipe nipple specify E length

5 Terminations

| CODE	DESCRIPTION
91	316L stainless steel screw-cover head
63	White polypropylene screw-cover head
31,W	Aluminum screw-cover head with white epoxy coating
Head Options	
T	Head-mounted transmitter (see Transmitter Section)
I	Stainless steel tags (specify tag #)

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Miniature CIP sanitary RTD temperature sensors are provided with 16AMP sanitary caps to fit 1/2" and 3/4" tube size sanitary fittings. They are used in pharmaceutical, chemical, biotech, R & D laboratory, and food process applications. The sanitary caps are welded to the sheath and to a heavier support tube, all made of 316 stainless steel, and then ground and polished to a finish that exceeds the No. 4 minimum finish required by the **3-A Sanitary Standard 74-** . Assemblies are supplied with a surface finish that meets or exceeds 15μin R_a. The process contact surfaces are free of pits, crevices, and pockets thus preventing corrosion and bacteria growth. All leads are fluoropolymer insulated to further provide moisture and chemical resistance. The listed sheath lengths provide assurance that the sensing element is properly placed in the flowing medium when used with typical sanitary tees and tube fittings, and the small sheath diameter provides fast temperature response times.
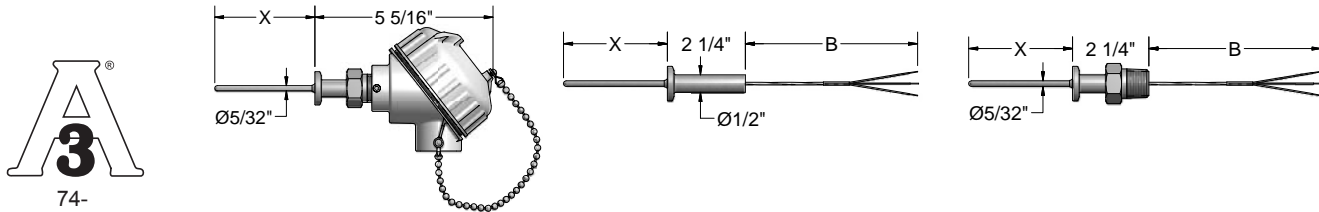
ORDER CODES

Example Order Number: **R1T185L(156)83 - 02 - CIP - 075-5 - 02 - T3T120 - 3**

(1) R1T185L(156)83 (2) 02 (3) CIP (3) 075-5 (4) 02 (5) T3T120 (6) 3

1 Pt100 (α = 0.003 85 °C⁻¹) RTD Assemblies

CODE	TOLERANCE[1]
R1T185L(156)83	Grade B
R3T185L(156)83	Class AA
R5T185L(156)83	(1/5) Class B
RAF185L(156)83	Class A

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

2 Immersion Length "X"

Specify "X" length in inches using 2 digits, plus any fractional length desired
Examples: 02 = 2", 02(1/2) = 2.5"

3 16 AMP Sanitary Cap Size

CODE	DESCRIPTION
075-5	1/2", 3/4" 16AMP cap Tri-Clamp®

4 Terminations

CODE	DESCRIPTION
91	316L stainless steel screw-cover head
63	White polypropylene screw-cover head
31,W	Aluminum screw-cover head with white epoxy coating
02	1/2" O.D., 2 1/4" long extension leadwire transition (requires table 5 and 6 selection)
8HP	1/2" NPT 316 SS hex fitting for conduit box or head mounting (use w/lead options from Tbl. 5 and 6)

6 Lead Terminations

| CODE	DESCRIPTION
0	Leads not stripped
2	2" split leads, 1/4" stripped
3	2" split leads w/spade lugs
4	Standard plug
6	Miniature plug
Options	
CG	1/2" NPT weatherproof nylon cord grip on FEP covered flex. armor
HS	Head supplied with wire seal security screws
I	Stainless steel tags
MC	Mating connector
T	Head-mounted transmitter (see Transmitter Section)

5 Extension Leadwire

CODE	DESCRIPTION	TEMP RATING
T3_ _ _ [1]	Fluoropolymer Insulation - stranded conductor	204 °C [400 °F]
T3T_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - flexible armor - FEP coated	204 °C [400 °F]
M3_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - stainless steel overbraid - FEP Insulation	204 °C [400 °F]

[1] Insert 3 digit "B" dimension in inches.

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Thermometer replacement RTD temperature sensor assemblies are used when converting instrumentation from older direct reading thermometers to electronic instruments requiring RTD inputs. These RTD assemblies replace the filled system capillary actuating bulbs and will fit into the old existing bulb wells as listed below. These 3-wire constructed sensor assemblies consist of a high-accuracy platinum element sealed inside a spring-loaded 316 stainless steel sheath and are supplied with a FDA-compliant white thermoplastic gasketed head. Each sensor is supplied with a free-rotating stainless steel mounting fitting with the appropriate threading for the wells listed below.

1 1/2"
X
Ø1/4"
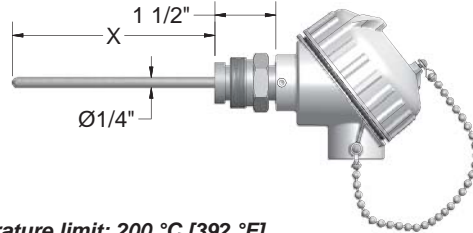
Maximum temperature limit: 200 °C [392 °F]

ORDER CODES

Example Order Number: **R5T185L483** - **09(1/2)** - **TR** - **63, I**

(1)   (2)   (3)

1 Pt100 (α = 0.003 85 ºC^{-1})
RTD Assemblies

CODE		TOLERANCE[1]
SINGLE	*DUPLEX*	
R1T185L483	R1T285L483	Grade B
R3T185L483	R3T285L483	Class AA
R5T185L483	R5T285L483	(1/5) Class B
RAF185L483	RAF285L483	Class A

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

Thermocouple Assemblies

For thermocouple assemblies use T/C types J, K, T, or E and options G for grounded junction or U for ungrounded junction as per example. EX.: TP48G - 09 (1/2) - TR - 63.

2 Immersion Length "X"

Specify "X" length in inches using 2 digits, plus any fractional length desired. Examples: 04 = 4", 05(1/2) = 5.5

3 Terminations

CODE	DESCRIPTION
91	316L stainless steel screw-cover head
63	White polypropylene screw-cover head
31,W	Aluminum screw-cover head with white epoxy coating
Head Options	
T	Head-mounted transmitter (see Transmitter Section)
I	Stainless steel tags
HS	Head supplied w/wire seal security screw

Immersion Length "X"

"X" IMMERSION LENGTH[1] (inches)	LENGTH AND MOUNTING FITTING TO FIT BELOW LISTED WELL PART NUMBER		MOUNTING FITTING THREAD
	TAYLOR	**ANDERSON**	
9 (1/2)	26P397	41247	1 (1/4)"-18 UNEF
12 (1/2)	26P398	41279	1 (1/4)"-18 UNEF
11 (1/2)	SK10274	41280	1 (1/4)"-18 UNEF

[1] "X" dimension indicates length with spring in its fully expanded position. Spring will retract 1/2" minimum to 3/4" maximum.

The Weld-In RTD temperature sensor assemblies listed below are commonly used in the food, dairy, beverage, pharmaceutical, and chemical processing industries. The complete assemblies are provided with a 3-wire platinum RTD element sealed inside a 1/4" O.D., spring-loaded, stainless steel sheath, and with a heavy wall sanitary protection well. Thermowells are supplied with a surface finish that meets or exceeds 32μin R_a. Surface finishes of 15μin R_a or better are available upon request. The well is to be welded into a tank or vat with a full crevice-free fillet-weld to prevent corrosion, bacteria growth, and product contamination. Assemblies are provided with a FDA-compliant white thermoplastic-gasketed connection head. The complete assembly provides excellent washdown protection.
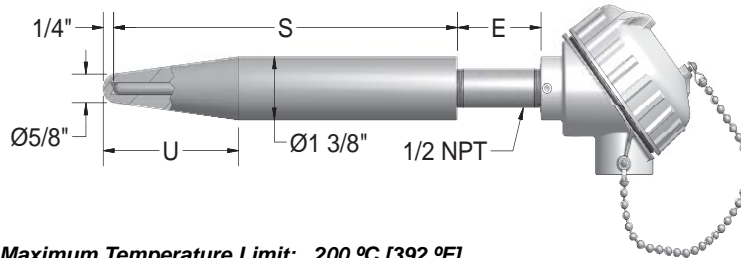
Maximum Temperature Limit: 200 ºC [392 ºF]

ORDER CODES

Example Order Number: R1T185L483 - W81-18 - SL - 8PN4 - 63

(1) (2) (3) (4) (5)

1 Pt100 (α = 0.003 85 °C^{-1}) RTD Assemblies

CODE	TOLERANCE[1]	NORMAL SHEATH DIAMETER O.D. (inches)
SINGLE		
R1T185L483	Grade B	1/4
R3T185L483	Class AA	1/4
R5T185L483	(1/5) Class B	1/4
RAF185L483	Class A	1/4
DUPLEX		
R1T285L483	Grade B	1/4
R3T285L483	Class AA	1/4
R5T285L483	(1/5) Class B	1/4
RAF285L483	Class A	1/4

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

2 Weld - In Wells

CODE	WELL DIMENSIONS (inches)	
316SS	**S**	**U**
W81-18	8 (1/4)	3 (1/4)
W81-28	9 (7/8)	3 (1/4)
W81-38	11 (5/8)	5
W81-48	12 (7/8)	3 (3/4)

3 Element Style

CODE	DESCRIPTION
SL	Spring-loaded element

4 Head Extensions

CODE	DESCRIPTION
8HN	316SS 1/2" NPT hex fitting
8PN(E)	316SS pipe nipple (specify length in inches)

5 Terminations

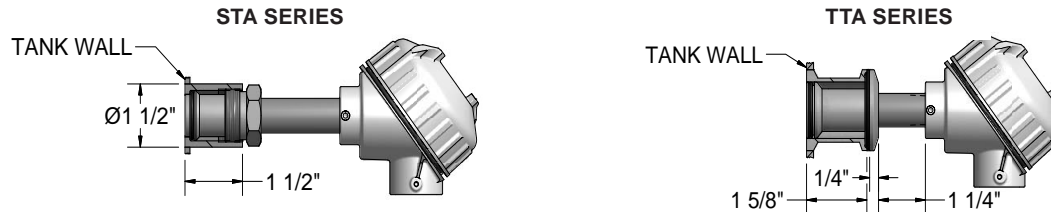| CODE	DESCRIPTION
91	316L stainless steel screw-cover head
63	White polypropylene screw-cover head
31,W	Aluminum screw-cover head with white epoxy coating
Head Options	
T	Head-mounted transmitter (see Transmitter Section)
I	Stainless steel tag

Example Order Number: W81-18

PART NUMBER	S LENGTH (inches)	U LENGTH (inches)
W81-18	8 (1/4)	3 (1/4)
W81-28	9 (7/8)	3 (1/4)
W81-38	11 (5/8)	5
W81-48	12 (7/8)	3 (3/4)
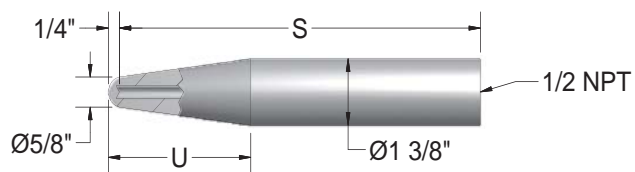
The non-intrusive tank sensors listed on this page are designed to mount flush with the interior tank wall for maximum product contact. This allows the wiping or mixing blades to properly mix the product within the tank without damaging the temperature sensor. The temperature sensors are manufactured of highly polished stainless steel and use various mounting methods for simple installation. These sensors are supplied standard with a 100 Ω, Platinum RTD sensing element. These RTD assemblies are constructed of 316 stainless steel and all wetted parts are supplied with a surface finish that meets or exceeds 32µin R_a. Surface finishes of 15µin R_a or better are available upon request. These RTD assemblies have an operation temperature of (-50 to 200) °C [-58 to 400] °F. See back of section for complete dimensions and installation instructions.

STA SERIES

TANK WALL

Ø1 1/2"

1 1/2"

TTA SERIES

TANK WALL

1/4"

1 5/8"   1 1/4"

ORDER CODES

Example Order Number: **RAF185L | 3** - **DTA** - **63**

1-0   1-1   1-2   1-3

1-0   100 Ω Platinum RTD Elements

CODE		TOLERANCE	TEMPERATURE COEFICIENT
Single	Duplex		
RBF185L	RBF285L	Class B	α = 0.003 85 °C^{-1}
RAF185L	RAF285L	Class A	α = 0.003 85 °C^{-1}

1-1   Element Connection

CODE	DESCRIPTION
3	3-Wire Element
4 [1]	4-Wire Element
[1] Not Available in Duplex	

1-2   Assembly Types and Options

SINGLE-WALL RTD SENSOR	
CODE	DESCRIPTION
STA	Complete assembly, includes sensor, mounting adaptor, and O-ring
STS	Replacement sensor, includes sensor, and O-ring
DUAL-WALL RTD SENSOR	
CODE	DESCRIPTION
DTA	Complete assembly, includes sensor, mounting adaptor and O-ring
DTS	Replacement sensor, includes sensor and O-ring
TRI-CLAMP® RTD SENSOR	
CODE	DESCRIPTION
TTA	Complete assembly, includes sensor, mounting adaptor, clamp, gasket and O-ring
TTS	Replacement sensor, includes sensor and O-ring
CAN STYLE RTD SENSOR	
CODE	DESCRIPTION
FCA	Complete assembly, includes sensor, backing nut, mounting adaptor and FEP gasket
FCS	Replacement sensor, includes sensor and FEP gasket

1-3   Head Terminations and Options

CODE	DESCRIPTION
63	White polypropylene screw-cover head
31,W	Aluminum screw-cover head with white epoxy coating
91	316 Stainless steel screw-cover head

Optional Temperature Transmitters and Head Options

CODE	DESCRIPTION
T-440	(4 to 20) mA head-mounted RTD transmitter
T-441	(4 to 20) mA isolated head-mounted transmitter
T-442	(4 to 20) mA isolated Hart® head-mounted transmitter
I	Stainless steel identification tag
SB	1/2" NPT conduit reducer bushing
NB	1/2" NPT nylon conduit reducer bushing

Replacement Parts

CODE	DESCRIPTION
13445	Single-wall tank mounting adaptor (STA assembly)
13446	Dual-wall tank mounting adaptor (DTA assembly)
13538	Silicon/FEP O-ring for STA and DTA assemblies
13470	Tank mounting adaptor for Tri-Clamp® assembly
13542	Silicon/FEP O-ring for TTA Tri-Clamp® assembly
13439	1 1/2" clamp for TTA Tri-Clamp® assembly
13440	EDPM gasket for TTA Tri-Clamp® assembly
13447	Tank mounting adaptor for FCA Can style assembly
13449	Backing nut for FCA Can style assembly
13448	FEP gasket for FCA Can style assembly

Tri-Clamp® is a registered trademark of Alfa Laval, Inc.

Pyromation inc.

FOOD, DAIRY & PHARMACEUTICAL

Pyromation insertion probes with formed pistol grip handles, are used to measure internal temperature of meat, fish, poultry, and other food products, both fresh and slightly frozen varieties. Other uses include penetration of soft process materials such as rubber and plastic compounds. The materials of construction are all FDA compliant for use in sanitary applications. The sheath tips are made of full hard-drawn 304SS hypodermic tubing with a sharp needle-point insertion tip. Handles are constructed of formed stainless steel tubing and are available in three size and strength configurations to match the process duty requirements. All leads are epoxy sealed.

FIGURE 1
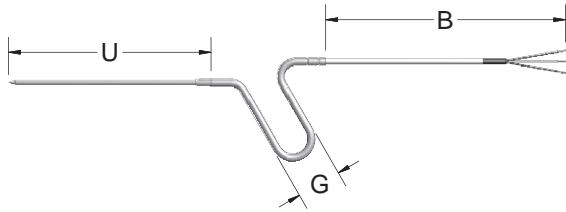
FIGURE 2
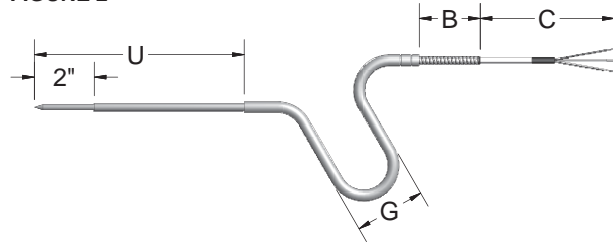
ORDER CODES

	1	2	3	4
Example Thermocouple Order Number:	JPGM2G	06	M3036	4
Example RTD Order Number:	RBF185PGM3	06	M3120	2

1 Penetration Thermocouple

CODE	TIP DIA. (inches)	GRIP "G" DIM. (inches)	GRIP DIA. (inches)
LIGHT-DUTY HANDLE - FIGURE 1			
JPGL2G	0.134	1 1/4	1/4
MEDIUM-DUTY HANDLE - FIGURE 2			
JPGM2G	0.134	2 3/8	5/16
JPGM3G	0.180	2 3/8	5/16
HEAVY-DUTY HANDLE - FIGURE 2			
JPGH3G	0.180	2 3/8	3/8
DUPLEX - FIGURE 2			
JJPGH3G	0.180	2 3/8	3/8

To specify other calibrations, change first digit to K or T.
To specify ungrounded junction, change last digit from G to U.

1 Penetration Style 3-Wire RTDs Pt100 (α = 0.003 85 °C⁻¹)

CODE	TOLERANCE[1]	TIP DIA. (inches)	GRIP 'G' DIM (inches)	GRIP DIA. (inches)
LIGHT-DUTY HANDLE - FIGURE 1				
RBF185PGL2	Class B	0.134	1 1/4	1/4
MEDIUM-DUTY HANDLE - FIGURE 2				
RBF185PGM2	Class B	0.134	2 3/8	5/16
RBF185PGM3	Class B	0.180	2 3/8	5/16
HEAVY-DUTY HANDLE - FIGURE 2				
RBF185PGH3	Class B	0.180	2 3/8	3/8
DUPLEX - FIGURE 2				
RBF285PGH3	Class B	0.180	2 3/8	3/8

Consult factory for other accuracies and types.

[1] Refer to RTD tolerance information in the General Information section for calculations to determine specific tolerance at temperature.

2 Immersion "U" Length

DESCRIPTION

Specify "U" dimension in inches using 2 digits, plus any fractional lengths. Examples: 02 = 2", 02(1/2) = 2.5". 12" maximum insertion length.

4 Terminations

CODE	DESCRIPTION
2	2" split leads 1/4" stripped
3	2" split leads with spade lugs
4	Standard plug
6	Miniature plug
Options	
RB	Rubber boot (2 pin plugs only)
MC	Mating connector
CG	Cord grip (1/2" NPT PVC)

3 Extension Leadwire

CODE	DESCRIPTION	TEMP RATING
T3_ _ _[1]	Fluoropolymer Insulation - Stranded Conductor	204 °C [400 °F]
T3T_ _ _[1]	Fluoropolymer Insulation - Stranded Conductor - Flexible Armor	204 °C [400 °F]
T3T_ _ _[1]	Fluoropolymer Insulation - Stranded Conductor - Flexible Armor - FEP coated	204 °C [400 °F]
T3P_ _ _[1]	Fluoropolymer Insulation - Stranded Conductor - Flexible Armor - PVC-Coated	105 °C [221 °F]
M3_ _ _[1][2]	Fluoropolymer Insulation - Stranded Conductor - Stainless Steel Overbraid - FEP Insulation	204 °C [400 °F]
S3_ _ _[1][3]	Fluoropolymer Insulation - Stranded Conductor - Silicon Rubber Jacket	204 °C [400 °F]

[1] Insert 3 digit "B" dimension in inches.
[2] Not available with Type K.
[3] Only available in single 3-wire RTD.

pyromation inc

Insertion RTD probes are used to monitor internal temperatures of meat, fish, poultry, dough, and other food products, both fresh and slightly frozen varieties. Other uses include penetration of soft process materials such as rubber and plastic compounds. The materials of construction are all FDA compliant for use in sanitary applications. The sheaths are made of full hard-drawn 304SS, hypodermic tubing with a sharp needle-point insertion tip. Several varieties of handles, leadwire, and termination configurations are available. All assemblies are 3-wire construction and use a 100 ohm platinum element with a Temperature Coefficient of 0.003 85 ºC^{-1} (Class B) and are rated to 200 ºC [392 ºF] maximum temperature limit.
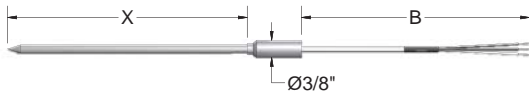
FIGURE 1

FIGURE 2
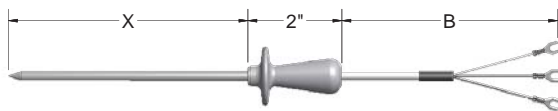
FIGURE 3
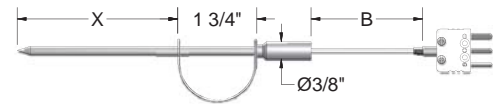
FIGURE 4
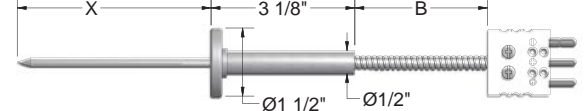
ORDER CODES

	1		2		3		4

Example Order Number: **RBF185MH2** - **06** - **T3120** - **4**

1 Pt100 (α = 0.003 85 ºC^{-1})
3-Wire RTD Assemblies

CODE		NOM. SHEATH DIAMETER (inches)
SINGLE	*DUPLEX*	
FIGURE 1 LESS HANDLE		
RBF185LH2		0.134
RBF185LH3	RBF285LH3	0.180
FIGURE 2 MOLDED PBT HANDLE 135 ºC [275 ºF]		
RBF185MH2		0.134
RBF185MH3	RBF285MH3	0.180
FIGURE 3 SABRE HANDLE		
RBF185SH2		0.134
RBF185SH3	RBF285SH3	0.180
FIGURE 4 HEAVY DUTY HANDLE		
RBF185HD2		0.134
RBF185HD3	RBF285HD3	0.180

2 Sheath 'X' Dimension

Specify "X" length in inches using 2 digits plus any fractional length. Examples: 02 = 2", 02(1/2)" = 2.5"
12" max. standard construction length.

4 Terminations

CODE	DESCRIPTION
2	2" split leads, 1/4" stripped
3	2" split leads with spade lugs
4	Standard plug
6	Miniature plug
Options	
RB	Rubber boot (2 pin plugs only)
MC	Mating connector
CG	Cord grip (1/2" NPT PVC)

3 Extension Leadwire

CODE	DESCRIPTION	TEMP RATING
T3_ _ _ [1]	Fluoropolymer Insulation - stranded conductor	200 °C [392 °F]
T3A_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - flexible armor	200 °C [392 °F]
T3T_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - flexible armor - FEP coated	200 °C [392 °F]
T3P_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - flexible armor - PVC-coated	105 °C [221 °F]
M3_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - stainless steel overbraid - FEP Insulation	200 °C [392 °F]
S3_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - silicon rubber jacket	200 °C [392 °F]
[1] Insert 3 digit "B" dimension in inches.		

pyromation inc.

FOOD, DAIRY & PHARMACEUTICAL

Insertion thermocouple probes are used to monitor internal temperatures of meat, fish, poultry, dough, and other food products, both fresh and slightly frozen varieties. Other uses include penetration of soft process materials such as rubber and plastic compounds. The materials of construction are all FDA compliant for use in sanitary applications. The sheaths are made of full hard-drawn 304SS hypodermic tubing with a sharp needle-point insertion tip. Several varieties of handles, leadwire, and termination configurations are available. Probes are supplied with grounded hot junctions unless otherwise specified and are rated to 200 ºC [392 ºF] maximum temperature limit.

FIGURE 1

X | B | Ø3/8"

FIGURE 3

X | 1 3/4" | B | Ø3/8"

FIGURE 2

X | 2" | B

FIGURE 4

X | 3 1/8" | B | Ø1 1/2" | Ø1/2"
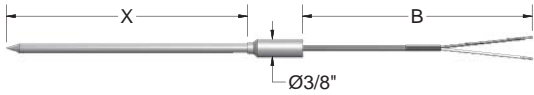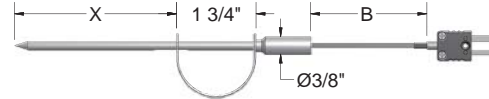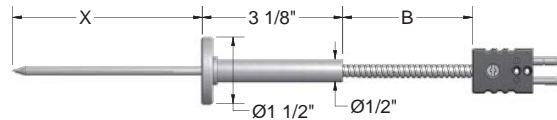
ORDER CODES

Example Order Number:

1	2	3	4
JMH2G	- 06	- T3120	- 4

1   Thermocouple Type

CODE		NOM. SHEATH DIAMETER (inches)	
SINGLE	*DUPLEX*		
FIGURE 1 LESS HANDLE			
JLH2G		J	0.134
JLH3G	JJLH3G	J	0.180
FIGURE 2 MOLDED PBT HANDLE 135 ºC [275 ºF]			
JMH2G		J	0.134
JMH3G	JJMH3G	J	0.180
FIGURE 3 SABRE HANDLE			
JSH2G		J	0.134
JSH3G	JJSH3G	J	0.180
FIGURE 4 HEAVY-DUTY HANDLE			
JHD2G		J	0.134
JHD3G	JJHD3G	J	0.180

To specify other calibrations, change first digit to K or T.
To specify ungrounded junctions, change last digit from G to U.

4   Terminations

CODE	DESCRIPTION
2	2" split leads, 1/4" stripped
3	2" split leads with spade lugs
4	Standard plug
6	Miniature plug
Options	
RB	Rubber boot (2 pin plugs only)
MC	Mating connector
CG	Cord grip (1/2" NPT PVC)

3   Extension Leadwire

CODE	DESCRIPTION	TEMP RATING
T3_ _ _ [1]	Fluoropolymer Insulation - stranded conductor	200 °C [392 °F]
T3A_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - flexible armor	200 °C [392 °F]
T3T_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - flexible armor - FEP coated	200 °C [392 °F]
T3P_ _ _ [1]	Fluoropolymer Insulation - stranded conductor - flexible armor - PVC-coated	105 °C [221 °F]
M3_ _ _ [1][2]	Fluoropolymer Insulation - stranded conductor - stainless steel overbraid - FEP Insulation	200 °C [392 °F]

[1] Insert 3 digit "B" dimension in inches.
[2] Not available with Type K.

2   Sheath "X" Dimension

Specify "X" length in inches using 2 digits.
12" max. standard construction length.

*pyromation*inc

16A Bevel Seat[1]
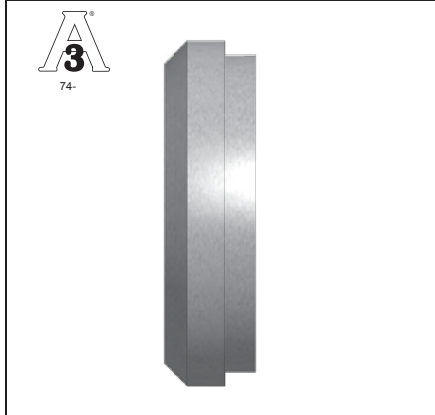
TUBE SIZE (inches)	O.D. (inches)	THICKNESS (inches)
1	1.31	0.46
1 1/2	1.84	0.56
2	2.37	0.62
2 1/2	2.90	0.66
3	3.43	0.71
4	4.50	0.81

[1] Must be manually cleaned

16AH H-Line

TUBE SIZE (inches)	O.D. (inches)	THICKNESS (inches)
1 1/2	2.00	0.250
2	2.50	0.250
2 1/2	3.03	0.250
3	3.56	0.250
4	4.68	0.250

16AI - 14I

TUBE SIZE (inches)	O.D. (inches)	THICKNESS (inches)
1 or 1 1/2	2.00	0.50
2	2.65	0.56
2 1/2	3.12	0.56
3	3.87	0.75
4	4.87	0.75

16AMP
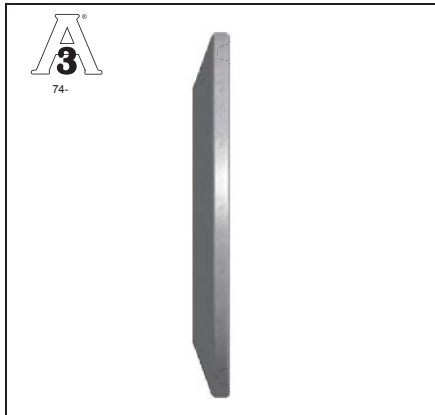
TUBE SIZE (inches)	O.D. (inches)	THICKNESS (inches)
1/2 or 3/4	1.00	0.25
1 or 1 1/2	1.98	0.25
2	2.51	0.25
2 1/2	3.03	0.25
3	3.57	0.25
4	4.68	0.31

16APV
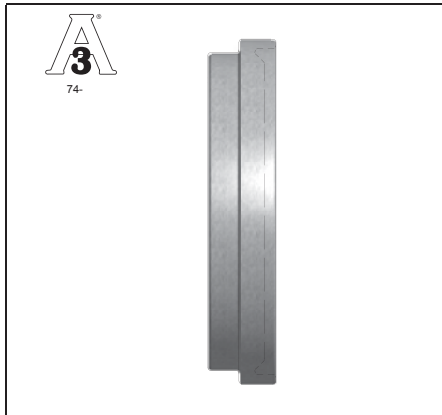
TUBE SIZE (inches)	O.D. (inches)	THICKNESS (inches)
1	1.38	0.29
1 1/2	1.88	0.42
2	2.38	0.46
2 1/2	2.88	0.47
3	3.38	0.50
4	4.38	0.53

16AQ - 14Q
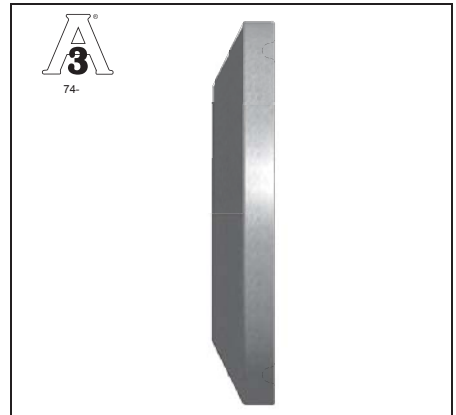
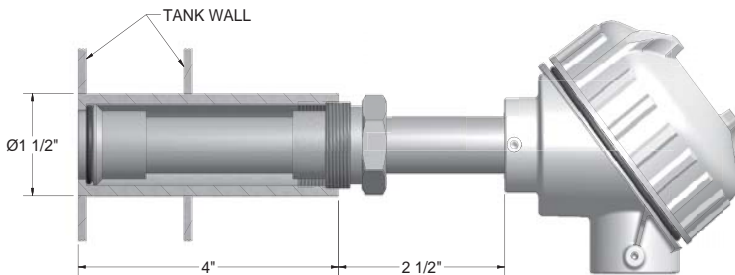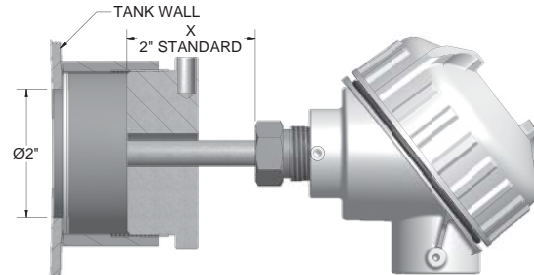| TUBE SIZE (inches)	O.D. (inches)	THICKNESS (inches)
1 or 1 1/2	1.98	0.31
2	2.64	0.43
2 1/2	3.30	9.50
3	3.87	0.50
4	4.87	0.62

STA
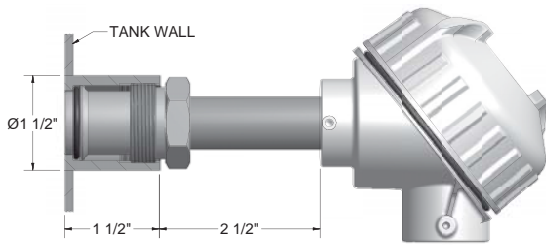
TTA
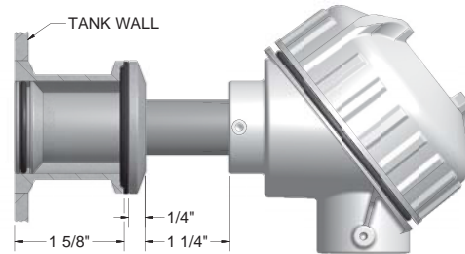
DTA

FCA

STA and DTA Series Tank Sensors
1. Drill a 1.50" Dia. (1 1/2") hole through the tank wall for tank adaptor.
2. Bevel tank wall(s) and/or tank adaptor as needed.
3. Tack weld (GTAW preferred) tank adaptor 3 to 4 places inside of tank wall to ensure flush/ square fit.
4. Seal weld (GTAW preferred) tank adaptor to inside tank wall, grind weld as needed, provide sanitary finish to 180 grit minimum.
5. Weld (GTAW preferred) tank adaptor to outside of tank wall, grind weld as needed.
6. Slide O-ring onto sensor housing assembly.
7. Insert assembly into tank adaptor and tighten backing nut.

TTA Series Tank Sensors
1. Drill a 2.00" hole through the tank wall for tank adaptor.
2. Bevel tank wall(s) and/or tank adapter as needed.
3. Tack weld (GTAW preferred) tank spud 3 to 4 places inside of tank wall to ensure flush/square fit.
4. Seal weld (GTAW preferred) tank spud to inside tank wall, grind weld as needed, provide sanitary finish to 180 grit minimum.
5. Weld (GTAW preferred) tank spud to outside of tank wall, grind weld as needed.
6. Slide O-ring onto sensor housing assembly.
7. Insert assembly into tank adaptor and tighten clamp.

FCA Tank Sensors
1. Drill a 2.00" hole through the tank wall(s) for the tank adaptor.
2. Deburr tank wall(s) as needed.
3. Use the sensor housing to align the tank adaptor to the tank wall.
4. Tack weld (GTAW preferred) the tank adaptor to the outside of the tank wall, grind weld as needed.
5. Slide the FEP Gasket onto the end of the sensor housing.
6. Insert assembly into the tank mounting adaptor and tighten backing nut.