



# Sanitary RTDs and Temperature Transmitters



Form No. AIC5001P © 3/99  
Rev. 9/04

- **Modular components provide maximum configuration flexibility**
- **Unique element-to-housing design eliminates exposed threads, lowers profile**
- **All stainless steel construction with O-ring seals for maximum corrosion and moisture protection**
- **NIST traceable with certifications**

Anderson Instrument's electronic temperature sensors combine our industry proven, all stainless steel construction with modular components. Interchangeable RTD elements, wiring heads, transmitter modules and digital displays can be individually selected. Components can be factory or field assembled in the optimum configuration for any application. To further facilitate adaptability, our RTD's are

offered with the widest selection of sanitary clamp, thermowell and flush-mount fittings available. Our temperature transmitters are available in analog, HART "SMART" and Foundation Fieldbus versions. These modules can be factory or field installed in any wiring head or panel mounted remotely from the RTD element allowing for greater flexibility. Ordering information, technical specifications and dimensional drawings are included herein.

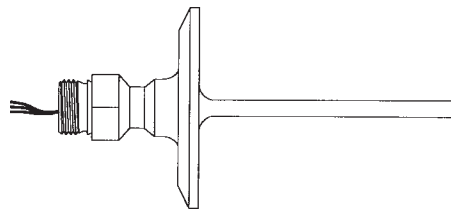


# Sanitary RTD's

Anderson RTD sensors are 100 ohm, 3-wire, DIN standard elements designed for direct immersion in sanitary applications or in any of a wide variety of thermowells. Sensors are available in single or dual element configurations. Single element styles may be specified with factory sealed, shielded cables up to 200 feet in length, or in our unique modular design. The modular elements can be mated with a standard wiring head for analog or "smart" transmitter applications, with or without an integral display. Also available is a mini wiring head for stand-alone RTD applications, optionally available with a new mini (4-20mA) transmitter module. All dual element sensors are supplied in the modular configuration. All sensors feature completely sealed internals for maximum moisture and vibration resistance. They provide the fastest possible response characteristics due to our unique method of internal element attachment which eliminates all air and non-metallic materials between the element and the process material being monitored.

These sensors are constructed entirely of 316L grade stainless steel and all product contact surfaces are electropolished to an Ra max. of 8 micro-inches (0.2 microns). All elements are provided with a permanently engraved stainless steel tag and a certificate of calibration.

- All stainless steel with no exposed threads
- Compact, low in profile
- Field serviceable - replaceable elements



## Specifications

### RTD Elements

General:	100 ohm, 3-wire sensors which conform to DIN standards. Single element standard; dual element optional	Response:	2.5 to 3 seconds for 63% step change
Coefficient:	.00385 ohms/ohm/Deg. C	Span:	400°F (221°C) maximum
Accuracy:	Conforms to ASTM E1137-B and IEC-751B; 0.10% (0.26°C) at ice point 0.18% (0.66°C) at 100°C 0.21% (1.0°C) at 180°C	Low End:	-50°F (-45°C) minimum
Probe Diameters:	1/4" standard for sanitary clamp styles (1"-4") single or dual element. 5/32" standard for direct mount, clamp styles (1/2" - 3/4") clamp and "mini wells" <u>single element only</u> Other diameters available for thermowell installation	High End:	350°F (180°C) maximum
		Material:	316 "L" Stainless Steel wettable parts
		Surface Finish:	8 micro-inch R <sub>a</sub> electropolished 32 micro-inch R <sub>a</sub> (thermowell fittings)
		Fitting Styles:	All standard sanitary clamp styles, including fractional clamps and mini thermowell styles; Refer to ordering matrix for details
		Standards:	Designed and manufactured to sound engineering practices in accordance with Article 3.3 of the PED 97/23/EC.

### Wiring Heads

General:	The wiring heads are designed to accept any type of RTD element, but offers the cleanest package when coupled with Anderson "no exposed thread" RTD's, which provide an O-ring seal against the housing.	Surface Finish:	32 micro-inch R <sub>a</sub> max.
Material:	304 Stainless Steel	Dimensions:	Standard: 3.15" O.D. X 2.75" L Mini head: 2.0" O.D. X 2.3 L
		Penetrations:	(2) at 1/2" - 14 NPT female; (1) centered in bottom plate; (1) in side beneath cap rim.
		Cable "Grip":	Optional NEMA 4X "Hubbel" style connector, supplied when pre-wired cable is specified.
		Ratings:	NEMA 4X; IP-66

# Temperature Transmitters

Temperature transmitters are available in three (3) styles to provide maximum application flexibility. Analog (4-20mA) modules are available in a standard size for mounting in our standard wiring head, or for remote mounting in a control panel. A new "mini" transmitter comes pre-mounted in our "mini" head, providing the world's smallest, all stainless steel transmitter/sensor assembly. Finally, "SMART" HART and Foundation Fieldbus modules are also available for use with our standard wiring head. Any standard head with a transmitter module is also available with a loop-powered display as an option, providing local indication in degrees (F or C), milliamps, or percent output. The FFB transmitter module is available with a digital display. The standard wiring head can be oriented vertically or horizontally to simplify wiring and optimize viewing angle. The result is a competitively priced transmitter which is:

- Modular - field replaceable/upgradeable components.
- All stainless steel with no exposed threads
- Compact, low in profile

All prewired element/transmitter assemblies are factory calibrated and shipped with NIST traceable certifications.

## Specifications

### Analog Transmitter Module (Standard or "Mini")

Input:	3-wire, 100 ohm, DIN standard curve (.00385 ohms/ohm/°C)	Zero Adjustment:	"Pot" adjustable to $\pm 15^{\circ}\text{C}$ ( $\pm 25^{\circ}\text{F}$ ) typical
Output:	2-wire, 4-20 mA analog	Span Adjustment:	"Pot" adjustable over a $15^{\circ}\text{C}$ ( $25^{\circ}\text{F}$ ) range minimum
Power Supply:	12 to 40 Volts d.c. loop power required.	<b>AGENCY APPROVALS</b>	
Power Supply Effect:	Less than 0.0125% of full scale output/volt.	Electromagnetic Compatibility (EMC):	
Accuracy:	0.1% of calibrated span, linearized.	Mini Only:	CE Compliant (Accuracy de-rated up to 0.2% in 226 - 250 MHz and 0.7% in 508 - 533MHz, 3V/M RF Field).
Min/Max. Span:	$50^{\circ}\text{C}$ or F / $180^{\circ}\text{C}$ , $300^{\circ}\text{F}$	Std. Only:	CE Compliant (Accuracy de-rated up to 4% in 200 - 300 MHz 3V/M RF Field).
Min/Max. Low End:	$0^{\circ}\text{C}$ or F / $100^{\circ}\text{C}$ or F	Hazardous Locations:	(Mini Only) Meets UL requirements for Class 1, Div. 1&2; Groups A-D for intrinsically safe apparatus when installed with barrier as required in control drawing provided in manual.
Min/Max. High End:	$50^{\circ}\text{C}$ or F / $180^{\circ}\text{C}$ , $350^{\circ}\text{F}$		
Wiring Connections:	Screw terminals with #3 screws. (removable screw terminal connectors for Mini)		
Isolation:	Non-isolated.		
Burn-Out:	Upscale (factory standard) Downscale (consult factory)		

### SMART (HART) Transmitter Module

Input:	3-wire, 100 ohm, DIN standard curve (.00385 ohms/ohm/°C)	<b>AGENCY APPROVALS</b>	
Output:	4-20 mA, linear with temperature; Digital output signal superimposed on 4-20mA signal; "HART" compliant	Electromagnetic Compatibility (EMC):	CE Compliant (for optional LCD only, display accuracy de-rated up to 2% in 150 - 180 MHz and 230 - 350MHz, 10V/M RF Field).
Isolation:	Input/Output isolated to 500V rms (707V p-p)	Hazardous Locations:	Meets UL requirements for Class 1, Div. 1&2; Groups A-D for intrinsically safe apparatus when installed with barrier as required in control drawing provided
Accuracy:	$\pm 0.1\%$ of upper range limit (URL); includes non-linearity, and hysteresis	Ambient Limits:	$-18$ to $50^{\circ}\text{C}$
Stability:	$0.1^{\circ}\text{C}$ per 6 months	Ambient Effects:	$\pm 0.13^{\circ}\text{C}$ per $28^{\circ}\text{C}$ temperature change
Min/Max. Span:	6:1 turndown ( $38^{\circ}\text{C}$ ) / $230^{\circ}\text{C}$	Storage Temperature:	$-40$ to $65^{\circ}\text{C}$
Maximum Range:	$-50$ to $180^{\circ}\text{C}$	Humidity:	0-100% RH
Power Required:	14-40 VDC external loop power (unregulated)	Vibration Effects:	Withstands 2g at 10-60 Hz
Power Supply Effect:	Less than 0.005% of span per Volt	Failure Mode:	Field selectable, High or Low
Max. Loop Resistance:	(Supply Voltage - 14) X 40 = Ohms	Warranty:	Two Years

### Loop Powered Display Module

General: The display module provides a local display of temperature ( $^{\circ}\text{F}$  or  $^{\circ}\text{C}$ ) or output value (milliamps or percent). It mounts in the cap of our standard wiring head and is powered by the loop power supply. It is designed to be easily added to any unit in the field or can be specified initially with any unit or transmitter.

Digits:	3-1/2 digits
Digit Size:	.5" High
Type:	LCD
Mounting:	Integral to cap; field replaceable/upgradeable
Units of Display:	4-20mA; 0-100%; Degrees C; Degrees F (0-199.9°F max) factory set, or 0-300 F.
Accuracy:	$\pm 0.2\%$ of scale
Loop Resistance:	Adds less than 250 ohms.

# Specifications

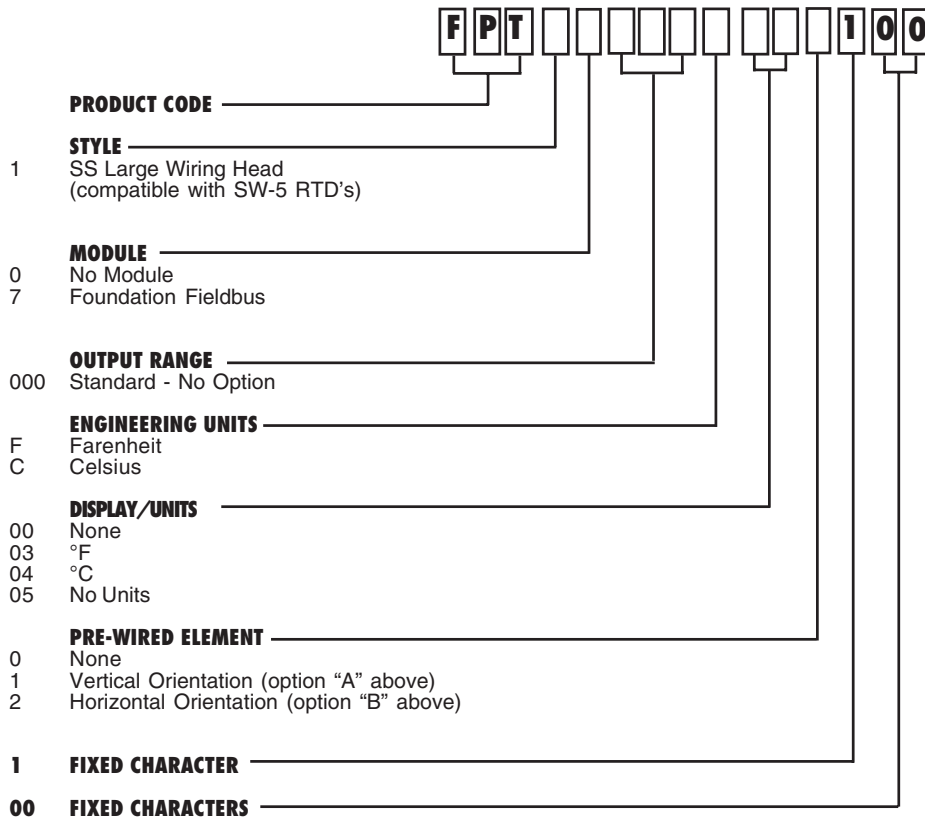
## SMART (Foundation Fieldbus) Transmitter Module

Input:	3-wire, 100 ohm, DIN standard curve (.00385 ohms/ohm/°C)
Communication:	Foundation Fieldbus H1 (31.25kb/s) Bus-powered, 2 terminals
RTD Interconnections:	3 screw terminals with #3 screws
Accuracy:	± 0.1% of URL (module only) ± 0.2% of URL (module and RTD)
Stability:	0.1°C per 6 months
Maximum Range:	-50 to 180°C
Power Requirements:	9-32 VDC (19 mA typical.)
Power Supply Effect:	Less than 0.005% of span per Volt
Fieldbus Display:	Optional 4-digit display

### AGENCY APPROVALS

Electromagnetic Compatibility (EMC):	Transmitter has been tested and complies with IEC 61326 Industrial Location
Hazardous Locations:	Meets UL requirements for Class 1, Div. 1&2; Groups A-D for intrinsically safe apparatus when installed with barrier as required in control drawing provided
Conformance/ Interoperability Tests:	ITK Conformance Test (Passed) Foundation Fieldbus Interoperability (Passed) DeltaV Interoperability (Passed) Rockwell Automation Linking Device Interoperability (Passed)
Ambient Limits:	-18 to 50°C
Ambient Effects:	±0.13°C per 28°C temperature change
Storage Temperature:	-40 to 65°C
Humidity:	0-100% RH
Warranty:	Two Years

# Ordering Information



# Ordering Information

## Pharmaceutical RTD's

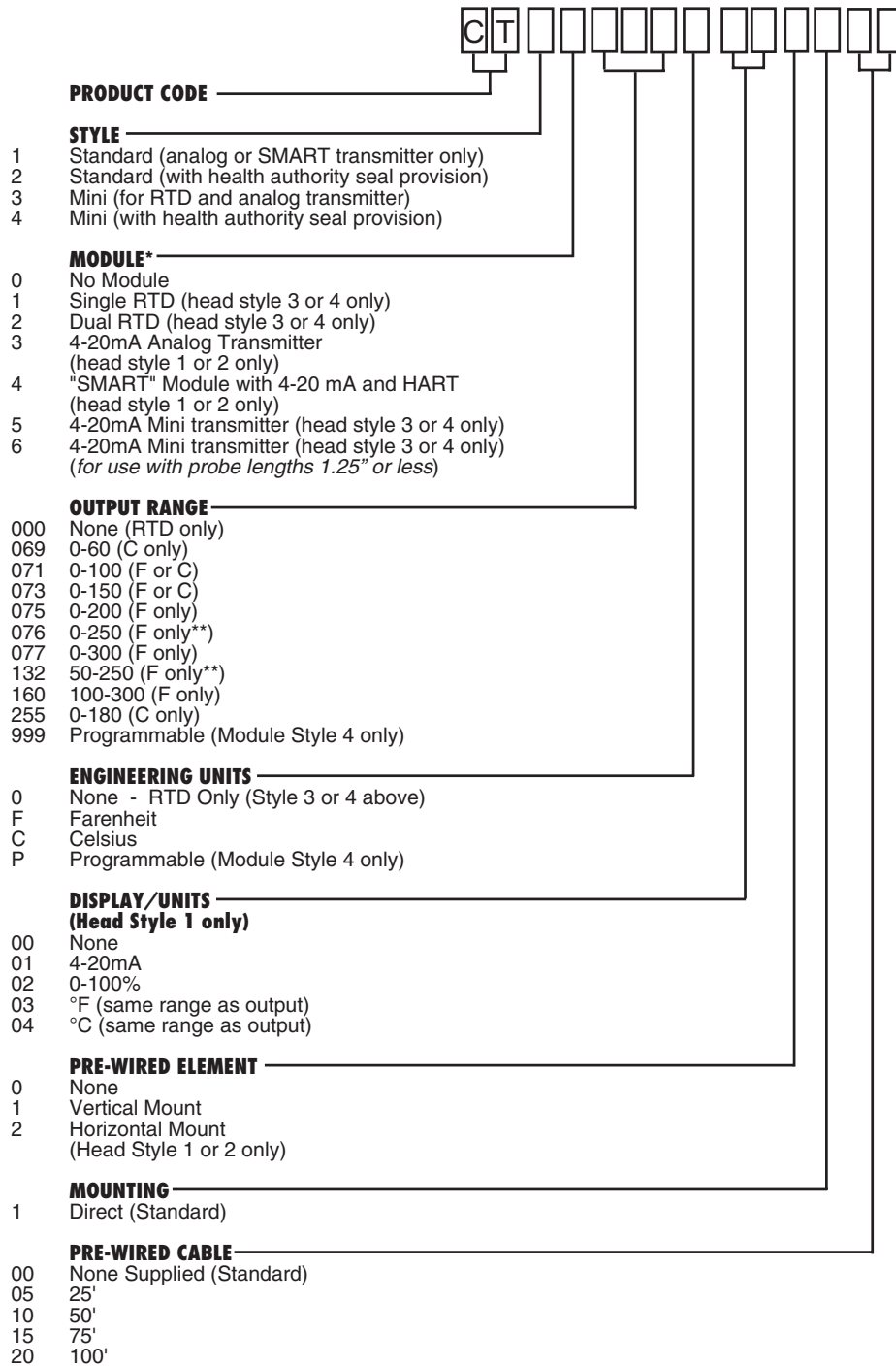


<b>WIRING STYLE</b>	
1	Sealed Cable w/Strain Relief
2	Sealed Cable w/male 1/2" NPT & Strain Relief
5	6" leads for use with wiring head (see CT matrix)
<b>ELEMENT TYPE</b>	
1	100 ohm Single (DIN std.)
2	100 ohm Dual (DIN std.) (available w/wiring style #5 only)
<b>FITTING</b>	
001-011	1/2" Tri-Clamp*
002-013	3/4" Tri-Clamp
002-037	3/4" Tri-Clamp
004-037	1-1/2" Tri-Clamp
005-049	2" Tri-Clamp
006-049	2-1/2" Tri-Clamp
007-053	3" Tri-Clamp
008-065	4" Tri-Clamp
010-031	1-1/2" APC "K"
011-730	2" APC "K"
012-044	2-1/2" APC "K"
013-049	3" APC "K"
016-031	1-1/2" Cherry-Burrell "I"
017-730	2" Cherry-Burrell "I"
018-044	2-1/2" Cherry-Burrell "I"
019-049	3" Cherry-Burrell "I"
027-044	1-1/2" G&H "H" Line (male)
028-056	2" G&H "H" Line (male)
029-056	2-1/2" G&H "H" Line (male)
030-060	3" G&H "H" Line (male)
032-033	1-1/2" Cherry "Q"
033-049	2" Cherry "Q"
062-139	Projectile Well (41247)
064-187	Projectile Well (41279)
083-137	Bi-Metal Well - 1/4" NPT
084-089	Bi-metal Well - 1/2" NPT
088-000	Anderson Flush Mount (short)
089-000	Anderson Flush Mount (long)
098-000	Taylor Flush Mount
<b>PROBE LENGTH/(STANDARD DIAMETER)</b>	
	1-1/8" (.156"; Single Element Only)
	1-1/4" (.156" Single; .250" Dual)
	2-3/4" (.156" Single; .250" Dual)
	2-3/4" (.250" Single or Dual)
	3-1/2" (.250" Single or Dual)
	3-1/2" (.250" Single or Dual)
	3-3/4" (.250" Single or Dual)
	4-1/2" (.250" Single or Dual)
	2-3/8" (.250" Single or Dual)
	2-25/32" (.250" Single or Dual)
	3-3/16" (.250" Single or Dual)
	3-1/2" (.250" Single or Dual)
	2-3/8" (.250" Single or Dual)
	2-25/32" (.250" Single or Dual)
	3-3/16" (.250" Single or Dual)
	3-1/2" (.250" Single or Dual)
	3-3/16" (.250" Single or Dual)
	3-15/16" (.250" Single or Dual)
	3-15/16" (.250" Single or Dual)
	3-15/16" (.250" Single or Dual)
	4-3/16" (.250" Single or Dual)
	2-1/2" (.250" Single or Dual)
	3-1/2" (.250" Single or Dual)
	9-1/8" (Tapered to Fit Well)
	12-1/8" (Tapered to Fit Well)
	9" (.250" Single or Dual)
	6" (.250" Single or Dual)
<b>FIXED CHARACTER</b>	
<b>CABLE TYPE</b>	
0	No Cable Required (Wiring style #5)
1	4 conductor PVC w/Strain Relief (Standard with wiring style #1 or #2)
3	3 conductor (red, red, white), White Teflon® Jacket (FEP) (available with wiring style #1 or #2 only)
<b>CABLE LENGTH</b>	
00	No Cable (wiring style #5 above)
01	5' (Standard with wiring style #2)
05	25' (Standard with wiring style #1)
10	50'
15	75'
20	100'
21	125'
22	150'
23	175'
24	200'

\* Recommended for "short outlet T" applications. (BPE dimensions)

# Ordering Information

## Modular Wiring Heads for RTD's and Transmitters



\* To order only the output module, consult our Customer Service Department.

"SMART" Module Part Number: 5610100003

\*\* This range available with display options 00, 01, 02 only.

# Dimensional Drawings

## RTD Fitting Styles and Sizes

1/2" & 3/4" TRI-CLAMP STYLE

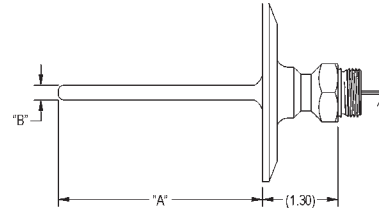
DESCRIPTION	"A" DIM.	"B" DIM.
1/2" TRI-CLAMP	1-1/8"	5/32" DIA.
3/4" TRI-CLAMP	2-3/4"	5/32" DIA.
3/4" TRI-CLAMP	2-3/4"	1/4" DIA.*
3/4" TRI-CLAMP	1-1/4"	5/32" DIA.
3/4" TRI-CLAMP	1-1/4"	1/4" DIA.*

\*Dual element



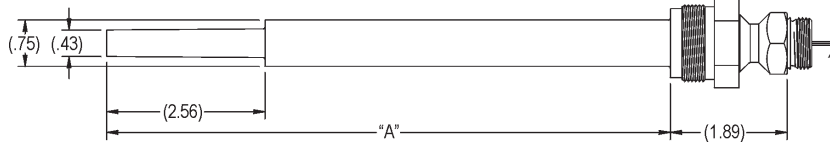
1-1/2" - 4" TRI-CLAMP STYLES

DESCRIPTION	"A" DIM.	"B" DIM.
1-1/2" TRI-CLAMP	2-3/4"	1/4" DIA.
2" TRI-CLAMP	3-1/2"	1/4" DIA.
2-1/2" TRI-CLAMP	3-1/2"	1/4" DIA.
3" TRI-CLAMP	3-3/4"	1/4" DIA.
4" TRI-CLAMP	4-1/2"	1/4" DIA.



WELL STYLES

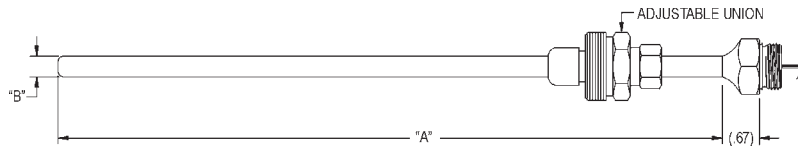
DESCRIPTION	"A" DIM.
41247 WELL	9-1/8"
41279 WELL	12-1/8"



E-1 & E-3 STYLES

DESCRIPTION	"A" DIM.	"B" DIM.
E-1 *	12"	1/4" DIA.
E-1 *	18"	3/8" DIA.
E-3	12"	1/4" DIA.
E-3	18"	3/8" DIA.

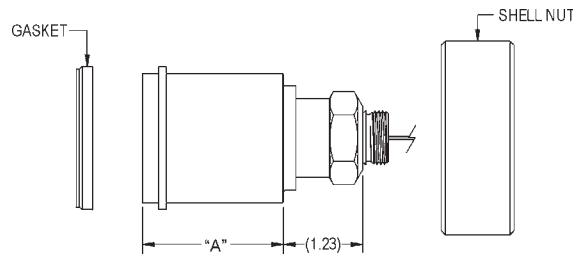
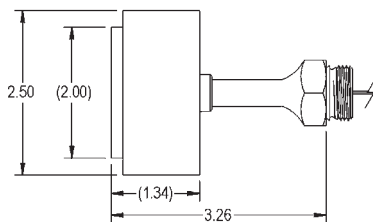
\*NO UNION



AIC FLUSH MOUNT

DESCRIPTION	"A" DIM.
LONG	6.50
SHORT	2.19

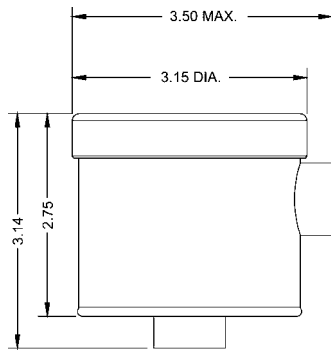
TAYLOR FLUSH MOUNT



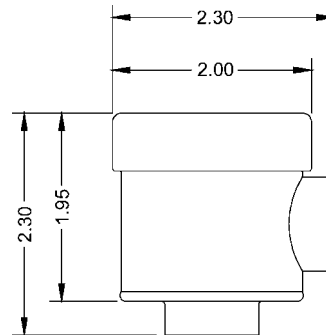
Special "A" dimension available upon request.

# Dimensional Drawings

## Modular Wiring Heads

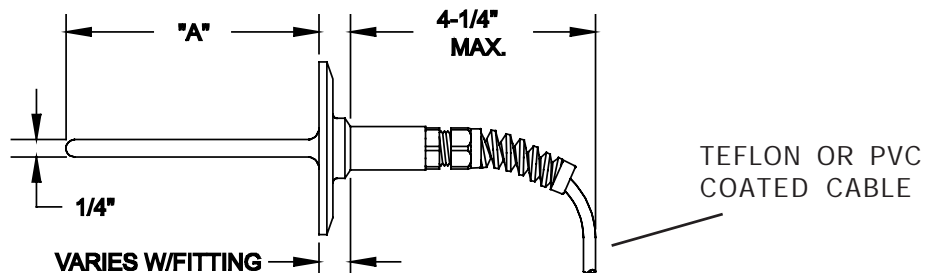


STANDARD WIRING HEAD



"MINI" WIRING HEAD

## Sealed Cable RTD



## Ordering Examples

1. Pharmaceutical Series RTD, single element, 50' sealed cable with strain relief, 1.5" tri-clamp fitting.  
Model #: SW110040370110
2. Pharmaceutical Series RTD, dual element, with wiring head, 2" tri-clamp fitting.  
Model #'s: SW520050490000 (RTD)  
CT320000001100 (wiring head)
3. Analog (4-20mA) temperature transmitter, 0-150°C range, 0-100% display, with pre-wired RTD, Pharmaceutical Series with thermowell fitting for 6" insertion, 1/4" diameter, 1/2" NPT. Horizontal mount wiring head.  
Model #'s: SW510840890000 (RTD)  
CT13073C022100 (wiring head with transmitter)
4. Smart (4-20mA with HART) temperature transmitter, field programmable range, no display, with pre-wired RTD, Pharmaceutical Series with 1.5" tri-clamp fitting. Vertical mount wiring head with 25' pre-wired cable.  
Model #'s: SW510040370000 (RTD)  
CT14999P001105 (wiring head with transmitter)

