

# Sanitary RTDs and Temperature Transmitters

## Introduction

Anderson-Negele'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; and with sealed cable, quick disconnect, or wiring heads options. Our temperature transmitters are available in analog and HART "SMART" versions. These modules can be factory or field installed in any standard (CT) wiring head or panel mounted remotely from the RTD element allowing for greater flexibility.

New Dual Output options provide two signals in virtually any combinations. Ordering information, technical specifications and dimensional drawings are included herein, or for more information please visit our Web Site at [www.anderson-negele.com](http://www.anderson-negele.com), or contact your local Authorized Anderson-Negele Distributor.

## Authorizations



## Features

- 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
- Custom lengths (up to 6") available at no extra charge
- Dual Output Options
- Quick Disconnect Options

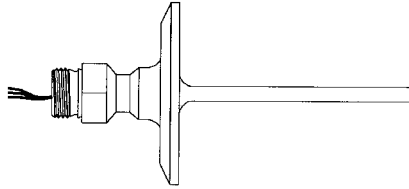


**Introduction - Sanitary RTD's**

Anderson SA-Series 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 or with our new water-tight quick disconnect. The modular elements can be mated with either the "mini" head for stand-alone RTD applications or our transmitter head for analog or "SMART" transmitter applications. All dual element sensors are supplied in the modular configuration, now available with dual output wiring heads as well.

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.

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



**Specifications**

**RTD ELEMENTS**

**General:** 100 ohm, 3-wire\* sensors which conform to DIN standards. Single element standard; dual element optional

**Coefficient:** .00385 ohms/ohm/Deg. C

**Accuracy:** .1% at 0°C (Band 1) Standard

**Probe Diameters:** 1/4" standard for sanitary clamp styles (1"-4") single or dual element. Other diameters available for thermowell installation

**Response:** 2.5 to 3 seconds for 63% step change

**Span:** 400°F (221°C) maximum

**Low End:** -50°F (-45°C) minimum

**High End:** 350°F (176°C) maximum

**Material:** 316 "L" Stainless Steel wettable parts

**Surface Finish:** 25 micro-inch Ra  
32 micro-inch Ra (thermowell fittings)

**Fitting Styles:** All standard sanitary clamp styles, including fractional clamps and mini thermowell styles; Refer to ordering matrix for details

**WRITING 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.

**Material:** 304 Stainless Steel

**Surface Finish:** 32 micro-inch Ra max.

**Dimensions:** Transmitter: 3.15" O.D. X 2.75" L

**Mini RTD:** 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 Connections:** Standard NEMA 4X "Hubbell" style cable "grip", or Optional Quick Disconnect with Field Wireable Connector

**Ratings:** NEMA 4X; IP66

\* RTD's with quick disconnect are configured for 4-wire connection to minimize output errors from connection resistance.

### Introduction - Sanitary RTD's

Any single element RTD can be used with our 4-20 mA transmitters. Our standard 4-20mA transmitter module can be mounted in our transmitter wiring head or in a remote panel. The module not only provides an accurate signal (0.1% of calibrated span) but is also completely sealed in urethane for protection against vibration and moisture. An optional digital display can be mounted in the cap providing local indication of temperature, signal level, or percent output. This option can be factory installed or added in the field. The housing can be oriented vertically or horizontally to simplify wiring and optimize viewing angle. Any of the above may be specified in single (standard) or dual (any combination) outputs. 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

### Specifications

#### ANALOG TRANSMITTER MODULE

Input:	3-wire, 100 ohm, DIN standard curve (385 coefficient)
Output:	2-wire, 4-20 mA analog
Power Supply:	12 to 40 Volts d.c. loop power required
Accuracy:	0.1% of calibrated span, linearized
Minimum Span:	50°F or C
Maximum Span:	300°F, 180°C
Minimum Low End:	0°F or C
Maximum Low End:	100°F or C
Minimum High End:	50°F or C
Maximum High End:	350°F, 180°C
Wiring Connections:	Screw terminals with #3 screws
Isolation:	Non-isolated
Burn-Out:	Upscale (factory standard) downscale (consult factory)
Zero Adjustment:	"Pot" adjustable to $\pm 25^\circ\text{F}$ ( $\pm 15^\circ\text{C}$ ) typical
Span Adjustment:	"Pot" adjustable over a $25^\circ\text{F}$ ( $15^\circ\text{C}$ ) range minimum

#### SMART TRANSMITTER MODULE

Input:	3-wire, 100 ohm, DIN standard (.00385 ohms/ohm/°C)
Output:	4-20 mA, linear with temperature; Digital output signal superimposed on 4-20mA signal; "HART" compliant
Isolation:	Input/Output isolated to 500V rms (707V p-p)
Accuracy:	$\pm 0.1\%$ of upper range limit (URL); includes non-linearity, and hysteresis
Stability:	0.1°C per 6 months
Minimum Span:	10:1 turndown (23°C)
Maximum Span:	230°C
Maximum Range:	-50 to 180°C
Power Required:	14-40 VDC external loop power (unregulated)
Power Supply Effect:	Less than 0.005% of span per Volt
Max. Loop Resistance:	(Supply Voltage - 14) X 40 = Ohms

#### AGENCY APPROVALS

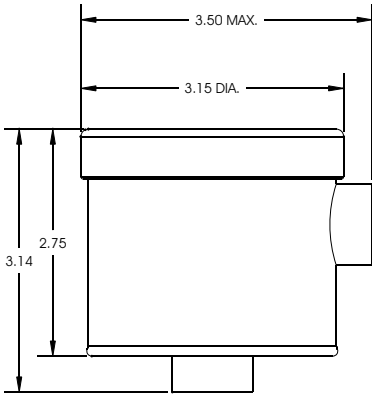
Electromagnetic Compatibility (EMC):	CE Compliant (for optional LCD only, display accuracy de-rated up to 2% in 150 - 180 MHz and 230 - 350MHz, 10V/M RF Field).
Hazardous Locations:	Meets UL requirements for Class 1, Div. 1&2; Groups A-D for intrinsically safe apparatus when installed with barrier as required in control drawing provided
Ambient Limits:	-18 to 50°C
Ambient Effects:	$\pm 0.13^\circ\text{C}$ per $28^\circ\text{C}$ temperature change
Storage Temperature:	-40 to 65°C
Humidity:	0-100% RH
Vibration Effects:	Withstands 2g at 10-60 Hz
Failure Mode:	Field selectable, High or Low
Warranty:	Two Years

#### DISPLAY MODULE

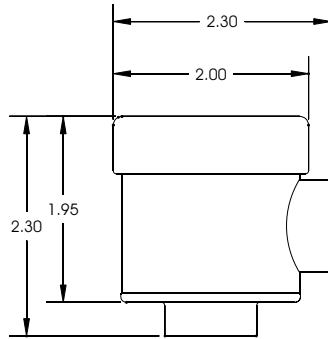
General:	The display module provides a local display of temperature (°F or °C) or output value (milliamps or percent). It mounts in the cap and is powered by the loop power supply. It is designed to be easily added to any unit in the field or can be specified initially with any unit or transmitter.
Digits:	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

Dimensional Drawings

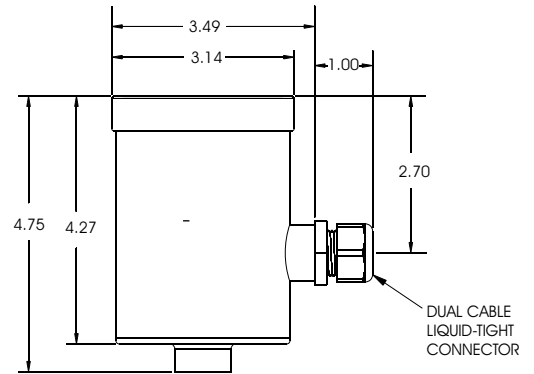
MODULAR WIRING HEADS



TRANSMITTER HEAD



"MINI" RTD HEAD

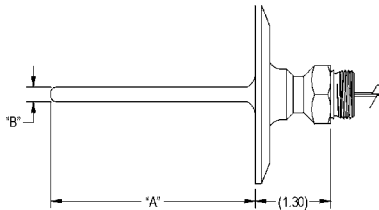


DUAL OUTPUT WIRING HEAD

RTD FITTING STYLES AND SIZES

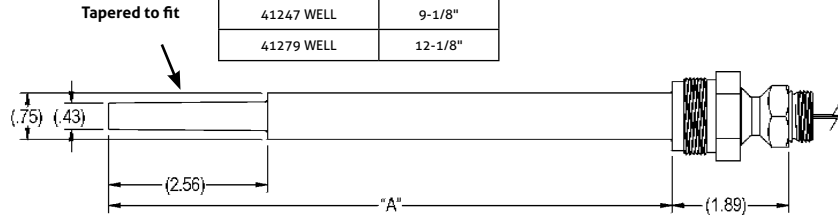
1-1/2" - 4" TRI-CLAMP® STYLE

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

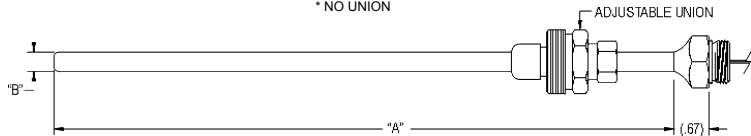
DESCRIPTION	"A" DIM.
41247 WELL	9-1/8"
41279 WELL	12-1/8"



E-1 & E-3 STYLES

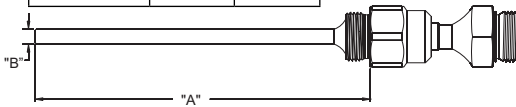
DESCRIPTION	"A" DIM.	"B" DIM.
E-1°	12"	1/4 DIA.
E-1°	18"	3/8 DIA.
E-3	12"	1/4 DIA.
E-3	18"	3/8 DIA.

\* NO UNION



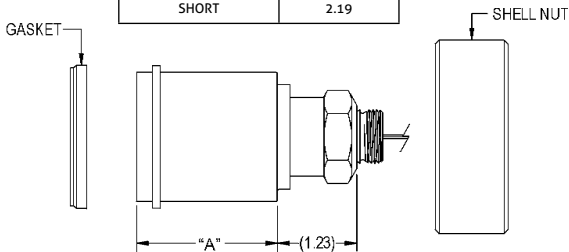
SPRING LOADED STYLES

DESCRIPTION	"A" DIM.	"B" DIM.
1/2" NPT	6"	1/4" DIA.
1/2" NPT	9"	1/4" DIA.

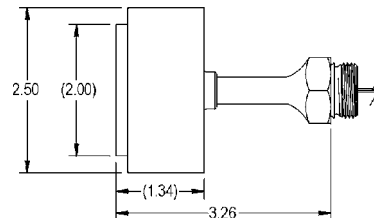


AIC FLUSH MOUNT

DESCRIPTION	"A" DIM.
LONG	6.50
SHORT	2.19

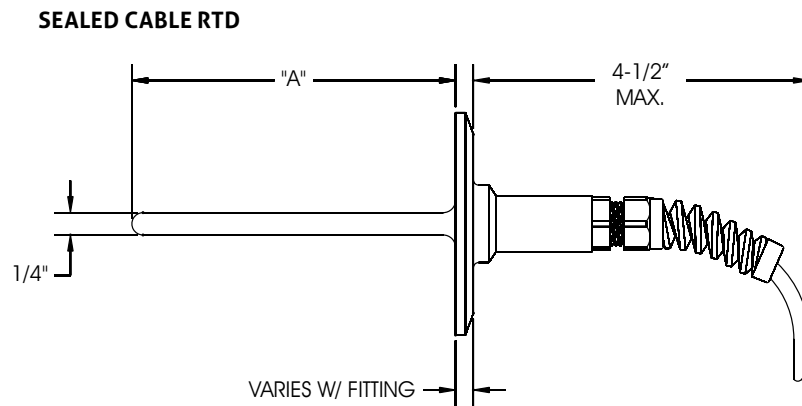
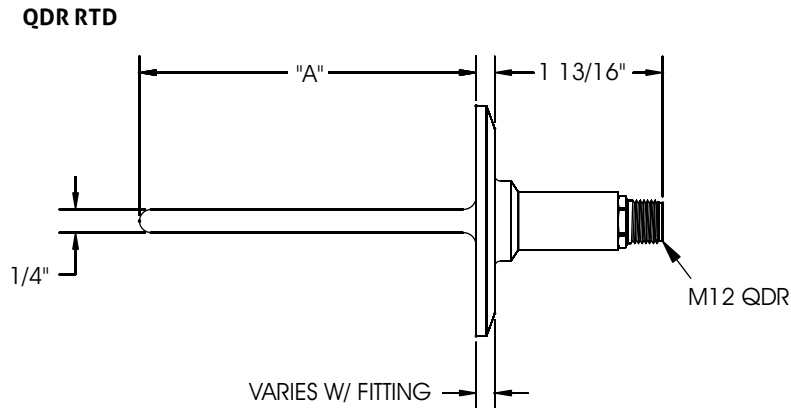


TAYLOR FLUSH MOUNT



## Dimensional Drawings

### RTD STYLES



### Ordering Examples

- Sanitary Series RTD, single element, 50' sealed cable with strain relief, 1.5" Tri-Clamp® fitting.  
Model #: SA110040370110
- Sanitary Series RTD, dual element, with wiring head, 2" Tri-Clamp® fitting.  
Model #'s: SA520050490000 (RTD)  
CT320000001100 (wiring head)
- Analog (4-20mA) temperature transmitter, 0-150°C range, 0-100% display, with pre-wired RTD, with thermowell fitting for 6" insertion, 1/4" diameter, 1/2" NPT. Horizontal mount wiring head.  
Model #'s: SA510840890000 (RTD)  
CT13073C022100 (wiring head with transmitter)
- Smart (4-20mA with HART) temperature transmitter, field programmable range, no display, with pre-wired RTD, with 1.5" Tri-Clamp® fitting. Vertical mount wiring head with 25' pre-wired cable.  
Model #'s: SA510040370000 (RTD)  
CT14999P001105 (wiring head with transmitter)

Ordering Information

RTD'S



- WIRING STYLE**
- 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)
  - 7 Quick Disconnect (see Quick Disconnect Connection/Cable)

- ELEMENT TYPE**
- 1 100 ohm Single (DIN std.)
  - 2 100 ohm Dual (DIN std.)  
(available w/wiring style #5 only)

- | <b>FITTING</b>   | <b>INSERTION LENGTH <sup>2</sup></b> |
|--|--------------------------------------|
| 004-037 1-1/2" Tri-Clamp <sup>®</sup>                                  | 2-3/4"                               |
| 005-049 2" Tri-Clamp <sup>®</sup>                                      | 3-1/2"                               |
| 006-049 2-1/2" Tri-Clamp <sup>®</sup>                                  | 3-1/2"                               |
| 007-053 3" Tri-Clamp <sup>®</sup>                                      | 3-3/4"                               |
| 008-065 4" Tri-Clamp <sup>®</sup>                                      | 4-1/2"                               |
| 010-031 1-1/2" APC "K" <sup>3</sup>                                    | 2-3/8"                               |
| 011-730 2" APC "K" <sup>3</sup>  | 2-25/32"                             |
| 016-031 1-1/2" Cherry-Burrell "I"                                      | 2-3/8"                               |
| 017-730 2" Cherry-Burrell "I"  | 2-25/32"                             |
| 027-044 1-1/2" G&H "H" Line (male)                                     | 3-3/16"                              |
| 028-056 2" G&H "H" Line (male)   | 3-15/16"                             |
| 032-033 1-1/2" Cherry "Q"  | 2-1/2"                               |
| 033-049 2" Cherry "Q"  | 3-1/2"                               |
| 034-028 1-1/2" #14 APC-PV (w/nut) <sup>3</sup>                         | 2-3/16"                              |
| 035-729 2" #14 APC-PV (w/ nut) <sup>3</sup>                            | 2-17/32"                             |
| 038-028 1-1/2" #14 APC-PV (w/o nut) <sup>3</sup>                       | 2-3/16"                              |
| 039-729 2" #14 APC-PV (w/o nut) <sup>3</sup>                           | 2-17/32"                             |
| 044-731 1-1/2" #14 Bevel seat (w/nut) <sup>3</sup>                     | 2-15/64"                             |
| 045-035 2" #14 Bevel Seat (w/nut) <sup>3</sup>                         | 2-5/8"                               |
| 046-731 1-1/2" #14 Bevel St. (w/o nut) <sup>3</sup>                    | 2-15/64"                             |
| 047-035 2" #14 Bevel Seat (w/o nut) <sup>3</sup>                       | 2-5/8"                               |
| 051-029 1-1/2" APC K15WXF (female) <sup>3</sup><br>self aligning       | 2-1/4"                               |
| 052-036 2" APC K15WXF (female) <sup>3</sup><br>self aligning           | 2-11/16"                             |
| 060-221 Umbrella   | 14-1/4"                              |
| 060-360 Umbrella   | 22-15/16"                            |
| 060-435 Umbrella   | 27-5/8"                              |
| 060-532 Umbrella   | 33-11/16"                            |
| 060-680 Umbrella   | 42-15/16"                            |
| 061-077 Split Ferrule (button)   | 5-1/4"                               |
| 062-139 Projectile Well (41247) <sup>5</sup>                           | 9-1/8"                               |
| 063-161 Projectile Well (41280) <sup>3,5</sup>                         | 10-1/2"                              |
| 064-187 Projectile Well (41279) <sup>3,5</sup>                         | 12-1/8"                              |
| 074-185 E1 Style - 1/4" Dia. (plain) <sup>5</sup>                      | 12"                                  |
| 075-185 E1 Style - 3/8" Dia. (plain) <sup>5</sup>                      | 12"                                  |
| 079-185 E3 Style - 1/4" Dia.<br>(with adjustable union) <sup>4,5</sup> | 12"                                  |
| 080-185 E3 Style - 3/8" Dia.<br>(w/adjustable union) <sup>4,5</sup>    | 12"                                  |
| 083-137 Bi-Metal Well - 1/4" NPT <sup>5</sup>                          | 9"                                   |
| 084-089 Bi-Metal Well - 1/2" NPT <sup>5</sup>                          | 6"                                   |
| 084-137 Bi-Metal Well - 1/2" NPT <sup>5</sup>                          | 9"                                   |
| 088-000 Anderson Flush Mt. (short) <sup>3</sup>                        |                                      |
| 089-000 Anderson Flush Mt. (long) <sup>3</sup>                         |                                      |
| 098-000 Taylor Flush Mount <sup>3,6</sup>                              |                                      |
| 100-049 Industrial well(41070) <sup>6</sup>                            | 3-1/2"                               |
| 101-091 Industrial well(41074) <sup>6</sup>                            | 6-1/8"                               |
| 174-089 Spring Loaded 1/4" Dia. - 1/2" NPT <sup>5</sup>                | 6"                                   |
| 174-137 Spring Loaded 1/4" Dia. - 1/2" NPT <sup>5</sup>                | 9"                                   |

- CONNECTION/CABLE**
- 00 No Cable (wiring style #5)
  - 01 5' (Standard w/wiring style #2)
  - 05 25' (Standard w/wiring style #1)
  - 10 50'
  - 15 75'
  - 20 100'
  - 21 125'
  - 22 150'
  - 23 175'
  - 24 200'
- QUICK DISCONNECT OPTIONS**
- A0 Quick Disconnect Receptacle(QDR)  
w/no cable
  - A1 QDR & Field Wireable  
Connector(FWC) w/ no cable
  - A2 QDR w/25 ft 5-Conductor Molded Cordset
  - A3 QDR w/50 ft 5-Conductor Molded Cordset
  - A5 QDR w/100 ft 5-Conductor Molded Cordset
- CABLE TYPE**
- 0 No Cable Required (Std. w/wiring style #5, available for wiring style #7)
  - 1 Multiple conductor PVC (Std. w/wiring style #1 or #2, available for wiring style #7)
- PROBE**
- 0 Standard probe  
(choose for well fittings)
  - 1 Heavy duty probe<sup>1</sup>  
(recommended for lengths over 6")

<sup>1</sup> Heavy Duty Probes with 3/4" Dia., insertion lengths from 3-1/2" to 43-1/2" available for standard fittings, Tri-Clamp<sup>®</sup>, Cherry "I", Bevel Seat and Umbrella Consult factory for other fittings.

<sup>2</sup> Custom lengths (up to 6") available at no extra charge, but are non-cancellable/non-returnable for credit.

<sup>3</sup> Sensors with these fittings are non-cancellable/non-returnable for credit.

<sup>4</sup> Requires bushing: 29057A0001 1/2" 14NPT  
29057A0002 3/4" 14NPT

<sup>5</sup> Meets 3-A when used with a 3-A compliant well

<sup>6</sup> Not 3-A compliant

**ACCESSORIES**

- Anderson Weld-In Shells for Flush Mount Fittings
- 71060A0003 Insulated Vessel (089 fitting)  
Standard Flange - 316L
  - 71060A0004 Uninsulated Vessel (088 fitting)  
Standard Flange - 316L

Ordering Information

MODULAR WIRING HEADS FOR RTD'S AND TRANSMITTERS

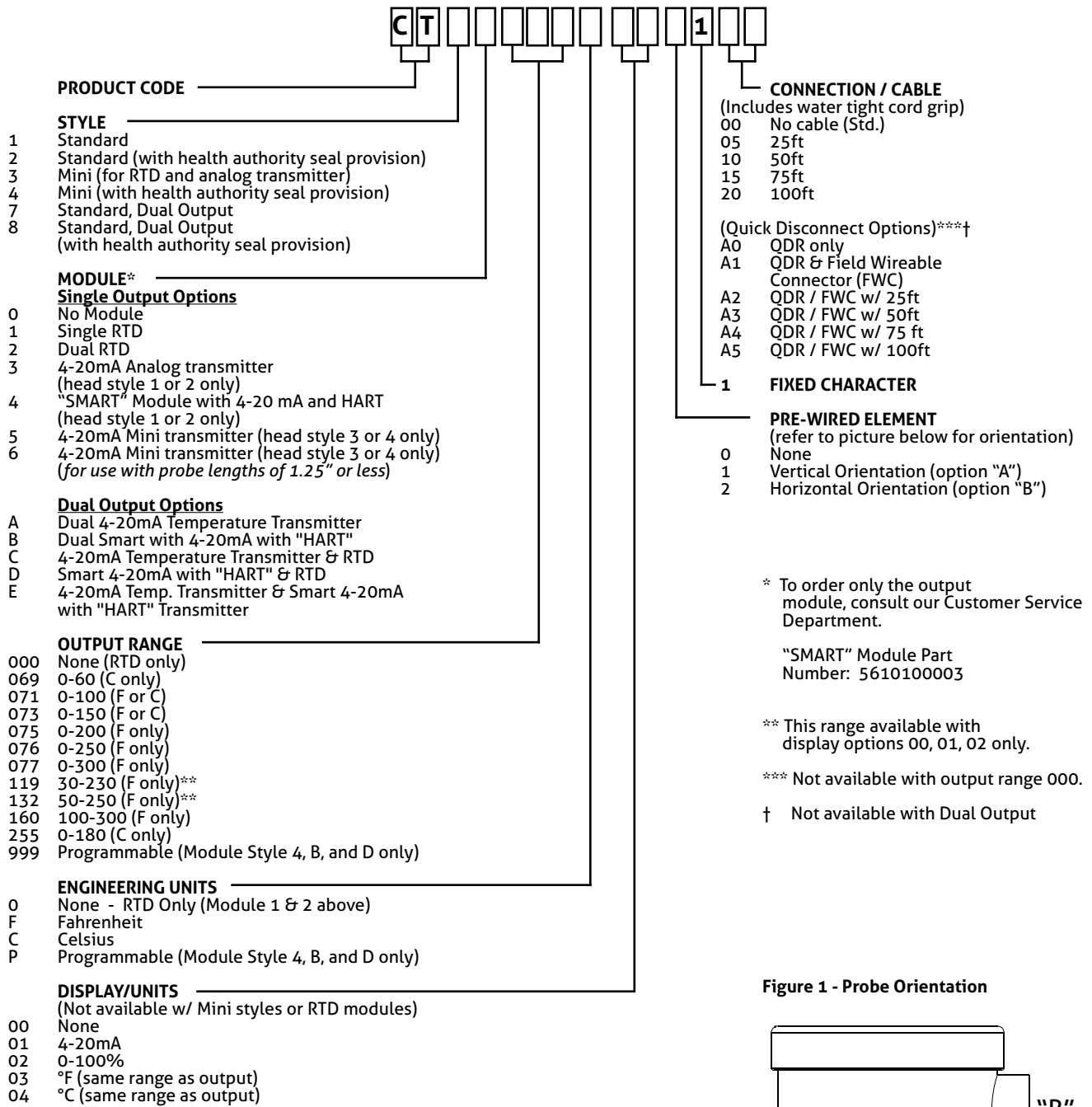


Figure 1 - Probe Orientation

