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, 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

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## Specifications

<table>
<thead>
<tr>
<th>RTD ELEMENTS</th>
<th>WRITING HEADS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General:</strong></td>
<td>General: The wiring heads are designed to accept any type of RTD element, but offers the cleanest package when coupled with Anderson &quot;no exposed thread&quot; RTD’s, which provide an O-ring seal against the housing.</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Material: 304 Stainless Steel</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Surface Finish: 32 micro-inch Ra max.</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Dimensions: Transmitter: 3.15” O.D. X 2.75” L</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Response: 2.5 to 3 seconds for 63% step change</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Span: 400°F (221°C) maximum</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Low End: -50°F (-45°C) minimum</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>High End: 350°F (176°C) maximum</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Material: 316 &quot;L&quot; Stainless Steel wettable parts</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Surface Finish: 25 micro-inch Ra</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>Fitting Styles: All standard sanitary clamp styles, including fractional clamps and mini thermowell styles; Refer to ordering matrix for details</td>
</tr>
<tr>
<td>Coefficient:</td>
<td>RTD's with quick disconnect are configured for 4-wire connection to minimize output errors from connection resistance.</td>
</tr>
</tbody>
</table>

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* 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

<table>
<thead>
<tr>
<th><strong>ANALOG TRANSMITTER MODULE</strong></th>
<th><strong>SMART TRANSMITTER MODULE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input:</strong> 3-wire, 100 ohm, DIN standard curve (385 coefficient)</td>
<td><strong>Input:</strong> 3-wire, 100 ohm, DIN standard (.00385 ohms/ohm/°C)</td>
</tr>
<tr>
<td><strong>Output:</strong> 2-wire, 4-20 mA analog</td>
<td><strong>Output:</strong> 4-20 mA, linear with temperature; Digital output signal superimposed on 4-20mA signal; &quot;HART&quot; compliant</td>
</tr>
<tr>
<td><strong>Power Supply:</strong> 12 to 40 Volts d.c. loop power required</td>
<td><strong>Isolation:</strong> Input/Output isolated to 500V rms (707V p-p)</td>
</tr>
<tr>
<td><strong>Accuracy:</strong> 0.1% of calibrated span, linearized</td>
<td><strong>Accuracy:</strong> ± 0.1% of upper range limit (URL); includes non-linearity, and hysteresis</td>
</tr>
<tr>
<td><strong>Minimum Span:</strong> 50°F or C</td>
<td><strong>Stability:</strong> ± 0.1°C per 6 months</td>
</tr>
<tr>
<td><strong>Maximum Span:</strong> 300°F, 180°C</td>
<td><strong>Minimum Span:</strong> 10.1 turndown (23°C)</td>
</tr>
<tr>
<td><strong>Minimum Low End:</strong> 0°F or C</td>
<td><strong>Maximum Span:</strong> 230°C</td>
</tr>
<tr>
<td><strong>Maximum Low End:</strong> 100°F or C</td>
<td><strong>Maximum Range:</strong> -50 to 180°C</td>
</tr>
<tr>
<td><strong>Minimum High End:</strong> 350°F, 180°C</td>
<td><strong>Power Required:</strong> 14-40 VDC external loop power (unregulated)</td>
</tr>
<tr>
<td><strong>Wiring Connections:</strong> Screw terminals with #3 screws</td>
<td><strong>Power Supply Effect:</strong> Less than 0.005% of span per Volt</td>
</tr>
<tr>
<td><strong>Burn-Out:</strong> Upscale (factory standard) downscale (consult factory)</td>
<td><strong>Max. Loop Resistance:</strong> Adds less than 250 ohms</td>
</tr>
<tr>
<td><strong>Zero Adjustment:</strong> &quot;Pot&quot; adjustable to ±25°F (±15°C) typical</td>
<td><strong>Span Adjustment:</strong> &quot;Pot&quot; adjustable over a 25°F (15°C) range minimum</td>
</tr>
</tbody>
</table>

### 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:** ±0.13°C per 28°C temperature change |
| **Vibration Effects:** Withstands 2g at 10-60 Hz | **Humidity:** 0-100% RH |
| **Failure Mode:** Field selectable, High or Low | **Storage Temperature:** -40 to 65°C |
| **Warranty:** Two Years | **Units of Display:** 4-20mA; 0-100%; Degrees C; Degrees F (0-199.9°F max) factory set, or 0-300° F. |

### DISPLAY MODULE

| **Digits:** 3-1/2 digits | **Type:** LCD |
| **Digit Size:** .5” High | **Mounting:** Integral to cap; field replaceable/upgradeable |
| **Type:** 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:** ±0.2% of scale | **Loop Resistance:** Adds less than 250 ohms |

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**Food**

**FOOD**
### 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**

<table>
<thead>
<tr>
<th>Description</th>
<th>&quot;A&quot; Dim.</th>
<th>&quot;B&quot; Dim.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/2&quot; Tri-Clamp®</td>
<td>2-3/4&quot;</td>
<td>1/4&quot; DIA.</td>
</tr>
<tr>
<td>2&quot; Tri-Clamp®</td>
<td>3-1/2&quot;</td>
<td>1/4&quot; DIA.</td>
</tr>
<tr>
<td>2-1/2&quot; Tri-Clamp®</td>
<td>3-1/2&quot;</td>
<td>1/4&quot; DIA.</td>
</tr>
<tr>
<td>3&quot; Tri-Clamp®</td>
<td>3-3/4&quot;</td>
<td>1/4&quot; DIA.</td>
</tr>
<tr>
<td>4&quot; Tri-Clamp®</td>
<td>4-1/2&quot;</td>
<td>1/4&quot; DIA.</td>
</tr>
</tbody>
</table>

**WELL STYLES**

- 41247 WELL
- 12-1/8" 9-1/8"
- 41279 WELL
- 12-1/8" 12-1/8"

**Tapered to fit**

**E-1 & E-3 Styles**

<table>
<thead>
<tr>
<th>Description</th>
<th>&quot;A&quot; Dim.</th>
<th>&quot;B&quot; Dim.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1*</td>
<td>12&quot;</td>
<td>1/4&quot; DIA.</td>
</tr>
<tr>
<td>E-1*</td>
<td>18&quot;</td>
<td>3/8&quot; DIA.</td>
</tr>
<tr>
<td>E-3</td>
<td>12&quot;</td>
<td>1/4&quot; DIA.</td>
</tr>
<tr>
<td>E-3</td>
<td>18&quot;</td>
<td>3/8&quot; DIA.</td>
</tr>
</tbody>
</table>

*No Union*

**AIC Flush Mount**

<table>
<thead>
<tr>
<th>Description</th>
<th>&quot;A&quot; Dim.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LONG</td>
<td>6.50</td>
</tr>
<tr>
<td>SHORT</td>
<td>2.19</td>
</tr>
</tbody>
</table>

**Adjustable Union**

**Taylor Flush Mount**

<table>
<thead>
<tr>
<th>Description</th>
<th>&quot;A&quot; Dim.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GASKET</td>
<td>1.29</td>
</tr>
<tr>
<td>SHELL NUT</td>
<td>2.00</td>
</tr>
<tr>
<td>TAYLOR</td>
<td>3.26</td>
</tr>
</tbody>
</table>
Dimensional Drawings

RTD STYLES

QDR RTD

SEALED CABLE RTD

Ordering Examples

1. Sanitary Series RTD, single element, 50' sealed cable with strain relief, 1.5" Tri-Clamp® fitting.
   Model #: SA110040370110

2. Sanitary Series RTD, dual element, with wiring head, 2" Tri-Clamp® fitting.
   Model #’s: SA520050490000 (RTD)
              CT320000001100 (wiring head)

3. 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)

4. 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

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 ¹ (recommended for lengths over 6”)

¹ Heavy Duty Probes with 3/4” Dia. insertion lengths from 3-1/2” to 43-1/2” available for standard fittings, Tri-Clamp®, Cherry “I”, Bevel Seat and Umbrella Consult factory for other fittings.
² Custom lengths (up to 6”) available at no extra charge, but are non-cancellable/non-returnable for credit.
³ Sensors with these fittings are non-cancellable/non-returnable for credit.
⁴ Requires bushing: 29057A0001 1/2” 14NPT 29057A0002 3/4” 14NPT
⁵ Meets 3-A when used with a 3-A compliant well
⁶ 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

PRODUCT CODE

STYLE
1 Standard
2 Standard (with health authority seal provision)
3 Mini (for RTD and analog transmitter)
4 Mini (with health authority seal provision)
7 Standard, Dual Output
8 Standard, Dual Output (with health authority seal provision)

MODULE

Single Output Options
0 No Module
1 Single RTD
2 Dual RTD
3 4-20mA Analog transmitter (head style 1 or 2 only)
4 “SMART” Module with 4-20 mA and HART (head style 1 or 2 only)
5 4-20mA Mini transmitter (head style 3 or 4 only)
6 4-20mA Mini transmitter (head style 3 or 4 only) (for use with probe lengths of 1.25” or less)

Dual Output Options
A Dual 4-20mA Temperature Transmitter
B Dual Smart with 4-20mA with “HART”
C 4-20mA Temperature Transmitter & RTD
D Smart 4-20mA with “HART” & RTD
E 4-20mA Temp. Transmitter & Smart 4-20mA with “HART” Transmitter

OUTPUT RANGE
000 None (RTD only)
069 0-60°C (C only)
071 0-100°F (F or C)
073 0-150°F (F or C)
075 0-200°F (F only)
076 0-250°F (F only)
077 0-300°F (F only)
119 30-230°F (F only)**
132 50-250°F (F only)**
160 100-300°F (F only)
255 0-180°C (C only)
999 Programmable (Module Style 4, B, and D only)

ENGINEERING UNITS
0 None - RTD Only (Module 1 & 2 above)
F Fahrenheit
C Celsius
P Programmable (Module Style 4, B, and D only)

DISPLAY/UNITS
(Not available w/ Mini styles or RTD modules)
00 None
01 4-20mA
02 0-100%
03 °F (same range as output)
04 °C (same range as output)

CONNECTION / CABLE
(Includes water tight cord grip)
00 No cable (Std.)
05 25ft
10 50ft
15 75ft
20 100ft

(Quick Disconnect Options)†
A0 QDR only
A1 QDR & Field Wireable Connector (FWC)
A2 QDR / FWC w/ 25ft
A3 QDR / FWC w/ 50ft
A4 QDR / FWC w/ 75 ft
A5 QDR / FWC w/ 100ft

1 FIXED CHARACTER

PRE-WIRED ELEMENT
(refer to picture below for orientation)
None
Vertical Orientation (option “A”)
Horizontal Orientation (option “B”)

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

** “SMART” Module Part Number: 5610100003

† Not available with Dual Output

Figure 1 - Probe Orientation