

## Performance Characteristics

Response time 63% response time per ASTM E644

Construction	Stepped thermowell	Stepped thermowell with thermoconductive paste
High temperature range	20 s	10 s
Low temperature range	25 s	15 s

Maximum measured error

RTD corresponding to IEC 60751

Class	max. Tolerances (°C)
A	$\pm (0.15 + 0.002 \cdot  t ^*)$ , temperature range: -100°C to 450 °C
B	$\pm (0.3 + 0.005 \cdot  t ^*)$ , temperature range: -200°C to 600 °C

\* |t| = absolute value °C. For measurement errors in °F, calculate using equation above in °C, then multiply the outcome by 1.8.

Insulation resistance  $\geq 100 \text{ M}\Omega$  at ambient temperature 77 °F (25 °C)  
Insulation resistance between each terminal and the sheath is tested with a voltage of 100 V DC.

## Supplementary documentation

All important Temperature Operating Instructions, particularly with regard to head and field transmitters are available on CD-ROM, find enclosed or order by order number: **SONDTT-AG**.

[www.addresses.endress.com](http://www.addresses.endress.com)

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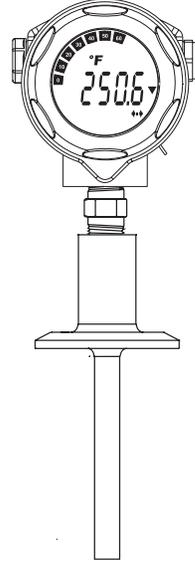
Services

## Compact Instructions Hygienic RTD Assemblies with thermowells and spring loaded insert TH27

### Measuring System

The TH27 temperature sensors are RTD assemblies installed in CIP sanitary connected cap thermowells and designed for use in dairy, food & beverage, pharmaceutical, biochemical and sterile process technology plant.

The single and duplex element RTD's are specifically designed for use in two different process temperature ranges (low range RTD -58 °F to 392 °F; high range RTD -328 °F to 1112 °F). Meets 3-A sanitary standards.



## Important Notice

### CAUTION

Electrical shock could cause death or serious injury. If the sensor is installed in a high voltage environment and a fault or installation error occurs, high voltage may be present on the connection terminals or the probe itself.

### Correct use

The manufacturer cannot be held responsible for damage caused by misuse of the unit. The installation conditions and connection values indicated in the operating instructions must be followed!

### Installation Guidelines and Safety instructions

1. Install the unit according to the relevant NEC Code and local sanitary regulations.
  2. Avoid any spark due to impact, friction and installation. Anti-sparking wrenches should be utilized.
  3. The temperature sensor should be connected to the power supply or other external circuit using the appropriate cable glands and wire entries.
  4. For ambient temperature higher than 158 °F, suitable cables, conduit and conductors must be used. Only use approved wire entries.
  5. When utilized in dust atmospheres, the connection between the housing, fittings and thermowell should provide a minimum degree of ingress protection. Liquid/gas sealants should be used. Local regulations need to be respected.
  6. Installation procedures relating to integrity of sanitary processes should be followed to prevent any contamination.
- CAUTION**  
Do not disconnect equipment unless power has been switched off or the area is not hazardous.

### Installation and operation

The unit is constructed using the most up to date production equipment and complies with the safety requirements of the local guidelines. However, it is installed incorrectly or misused, certain application dangers can occur. Installation, wiring and maintenance of the unit must only be completed by trained, skilled personnel who are authorized to do so by the plant operator. The plant operator must make sure that the measurement system has been correctly wired to the connection schematics. Procedures indicated in these instructions must be followed.

**Returns**  
Please follow the Return Authorization Policy which is attached with this manual.

**Safety pictograms and symbols** 

Notes draw attention to activities or procedures that can have a direct influence on operation or trigger an unforeseen device reaction if they are not carried out properly.

**CAUTION**  
Cautions draw attention to activities or procedures that can lead to persons being injured or to incorrect device operation if they are not carried out properly.

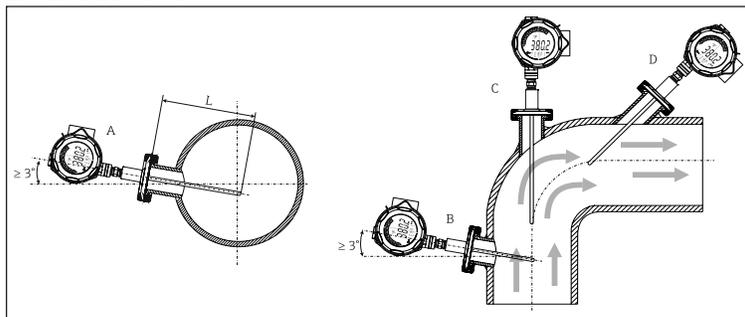
Though the information provided herein is believed to be accurate, be advised that the information contained herein is NOT a guarantee of satisfactory results. Specifically, this information is neither a warranty nor guarantee, expressed or implied, regarding performance, merchantability, fitness, or other matter with respect to the products; and recommendation for the use of the product/process information in conflict with any patent. Please note that Endress+Hauser reserves the right to change and/or improve the product design and specifications without notice.

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## Installation

### Installation locations



A - B: In pipes with a small cross section the sensor tip should reach or extend slightly past the center line of the pipe ( $= L$ ). Installation with minimal 3° inclination because of self draining.

C - D: Tilted installation

Care should be taken by the user in the execution of the welding on the process side (suitable weld material, welding radius  $> 3.2$  mm, absence of pits, folds, crevices, ...). As a general rule, the thermometers should be installed in such a way that does not adversely affect their cleanability (3-A® requirements must be adhered to).

Minimum immersion RTD assembly TH15 without thermowell (as per ASTM E644):

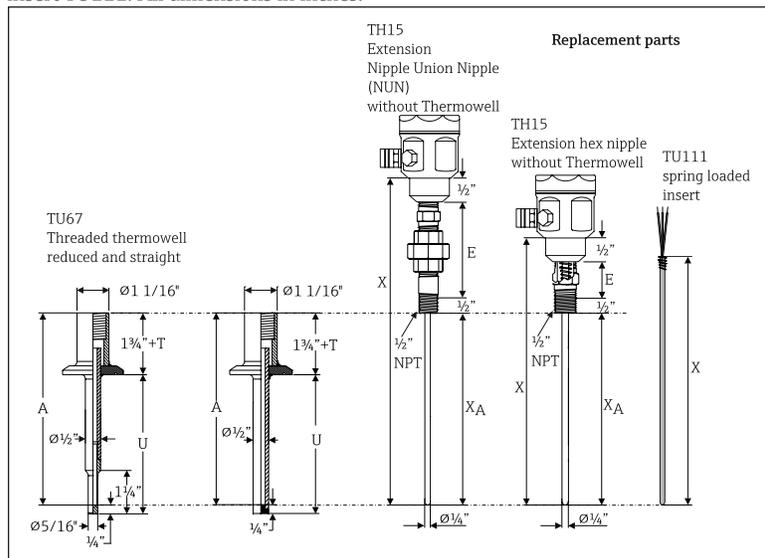
Construction	RTD insert $\varnothing$ 1/4"
High temperature range	1 1/4"
Low temperature range	3/4"

For temperature assembly TH27 with thermowell, the minimum immersion is the depth to which the thermowell is immersed in the medium, measured from the tip. To minimize errors from ambient temperature the following minimum immersion lengths are recommended:

Construction	Minimum immersion
1/2" straight thermowell	4"
1/2" reduced thermowell	2 1/2"

## Dimensions

TH27 assemblies with: TH15 RTD assembly, TU67 thermowell and spring loaded insert TU111. All dimensions in inches.

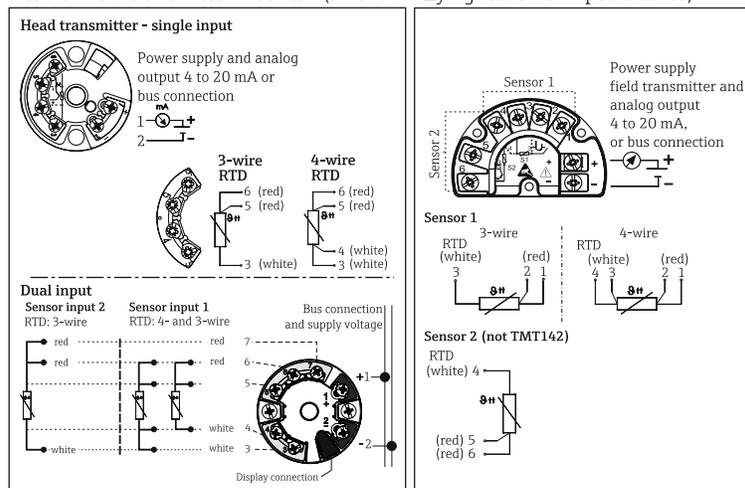


$E$  = Extension  
 $T$  = Lag dimension  
 $U$  = Thermowell immersion length  
 $X_A$  = Immersion length RTD sensor, thermowell drilled length  
 $X$  = Insert overall length

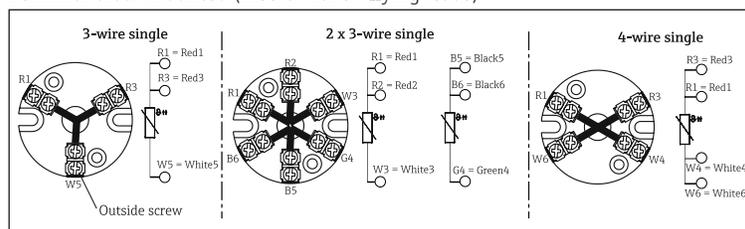
Spare part insert TU111, for replacement please contact Endress+Hauser!

## Electrical connection-wiring diagrams

Head or field transmitter mounted (3" or 5 1/2" flying leads - crimped sleeves)



Terminal block mounted (insert with 3" flying leads)



The blocks and transmitters are shown as they will sit inside the heads in reference to the conduit opening. ALWAYS terminate leads to the outside screw!

Dimensions of TH15 (without thermowell)	
Immersion length RTD sensor $X_A$	E
4", 6", 9", 9 1/2", 12", 14" specified length 4" to 30" in 1/2" increments	Hex nipple = 1" or Nipple Union Nipple (NUN) = 4" or 7"

Dimensions of TH27 (with thermowell TU67)				
U	E	T	Process connection	Shape of thermowell
2 1/2", 3", 4", 4 1/2", 5", 6"; specified length 2" to 18" in 1/2" increments	Hex nipple = 1" or Nipple Union Nipple (NUN) = 3"+1" or 6"+1" Material: 316SS	3" or specified length in 1/4" increments	1"+1 1/2" Tri-clamp	Straight $\varnothing$ 1/2" or stepped ( $\varnothing$ 1/2" reduced to $\varnothing$ 5/16")
			2" Tri-clamp	
			2 1/2" Tri-clamp	
			3" Tri-clamp	
Immersion length RTD sensor = Thermowell drilled length $X_A = A + U + 1 3/4" + T$ Insert overall length $X = A + E$				

## Technical data

Weight: From 1 to 10 lbs  
 Material: Wetted parts 316L SS  
 Shock and vibration resistance: 4g/2 to 150 Hz as per IEC 60 068-2-6

### Ambient temperature limits

Housing without head-mounted transmitter	
Aluminium pressure die-cast housing	-40 to 300 °F (-40 to 150 °C)
Plastic housing	-40 to 185 °F (-40 to 85 °C)
Deep drawn SS housing without display	-40 to 300 °F (-40 to 150 °C)
Housing with head-mounted transmitter	
Deep drawn SS housing with display	-4 to 160 °F (-20 to 70 °C)
Field transmitter	
with display	-40 to 158 °F (-40 to 70 °C)
without display	-40 to 185 °F (-40 to 85 °C)