

**Product Information TSBA**

**FOOD**

# Temperature Sensor Big

**Application/Specified usage**

- Temperature sensor for food applications
- Aseptic temperature process connection for precise and fast measurement

**Application examples**

- CIP/SIP process monitoring
- Safe temperature measurement in hot steam and pressurized pipes
- Temperature monitoring in vessels or pipes

**Hygienic design/Process connection**

- All wetted materials are FDA-conforming
- CRN: 0H19789.5C
- Versions compliant to 3-A Standard 74- available
- Sensor completely made of stainless steel
- Complete overview of process connections: see order code

**Features/Advantages**

- High accuracy and high ambient temperature resistance
- Customer offset and slope adjustment
- Flex hybrid mode with digital IO-Link and analog 4...20 mA
- Process temperature range -45...176 °C (-50...350 °F)

**Options/Accessories**

- Integrated transmitter
- Programmable transmitters TT.B.H and TT.B.D using IO-Link available
- Programmable with any IO-Link master
- Add-On Instructions are available at [www.anderson-negele.com/aoi](http://www.anderson-negele.com/aoi)

**Communication**

 **IO-Link**  **4...20 mA**

**Certifications**



**Temperature sensor TSBA with Tri-Clamp**



**Temperature sensor TSBA with NPT**



**Configurable design**



| Temperature sensor                    |   |   |
|---------------------------------------|---|---|
| Process connection                    | Tri-Clamp<br>NPT<br>NPT Spring Loaded<br>Thermowell | 1/2", 3/4", 1½", 2" (DIN 32676)                       |
| Dimensions                            | insertion length<br>rod diameter                    | 1½...43½"<br>5/32", 1/4", 3/8", 3/4", 41247 Well      |
| Materials                             | connecting head, spacer<br>wetted parts             | stainless steel AISI 304<br>stainless steel AISI 316L |
| Surface quality                       |   | $R_a \leq 25 \mu\text{in}$                            |
| Operating pressure                    |   | 145 psi (10 bar) max                                  |
| Process temperature                   | standard range                                      | -45...176 °C (-50...350 °F)                           |
| Resistance Temperature Detector (RTD) | accuracy class                                      | Class A: $\pm(0.15 + 0.002 \times  t )$ °C            |
| Electrical connection                 | plug connection<br>cable gland                      | M12 plug AISI 304<br>M16 x 1.5                        |
| Protection class                      |   | IP 69 K (with electrical connection M12 plug)         |

| Transmitter TTB.H, TTB.D |   |  |
|--------------------------|---|--|
| Temperature ranges       | ambient<br>(with display)<br>storage  | -40...85 °C (-40...185 °F)<br>0...70 °C (32...158 °F)<br>-55...90 °C (-67...194 °F)  |
| Measuring ranges         |   | standard °C: -10...40, 0...50 / 100 / 150 / 200 / 250 °C<br>standard °F: 0...100 / 150 / 200 / 250 / 300, 30...230 °F<br>custom ranges programable   |
| Accuracy                 | input<br>repeatability  | $\leq 0.1$ K (at ambient $\leq 85$ °C (185 °F))<br>$\leq 0.05$ K   |
| Temperature drift        | typical<br>maximum  | 5 mK/K (at 25 °C (77 °F))<br>10 mK/K (at 25 °C (77 °F))  |
| Adjustments              | damping<br>offset<br>slope  | 0...120 s<br>$\leq \pm 10$ K<br>$\leq \pm 25$ %  |
| Digital output           | digital resolution<br>master cycle time<br>power supply   | IO-Link<br>0.01 K<br>$\geq 51.2$ ms<br>18...30 V DC according to IO-Link   |
| Analog output            | signal<br>accuracy<br>temperature drift typical<br>temperature drift max<br>effect of supply voltage<br>variations<br>maximum load resistance<br>power supply | 4...20 mA, 2 wire<br>$\leq 0.05$ % of upper range limit<br>0.0005 %/K (at 25 °C (77 °F))<br>0.003 %/K (at 25 °C (77 °F))<br>$< 0.001$ %/V (at 24 V DC)<br>$R \leq (V_{DC} - 12 V) : 0.024$ A (at 25 °C (77 °F)), see diagram<br>12...30 V DC |

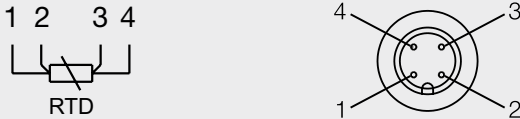
Accuracy classes of temperature sensors | Tolerances for Pt100 acc. to DIN EN 60751

| Pt100            | Class A           |
|------------------|-------------------|
| 0 °C / 100 Ω     | ±0.15 K / ±0.06 Ω |
| 100 °C / 138.5 Ω | ±0.35 K / ±0.13 Ω |

Electrical connection without transmitter

With 1x or 2x M12 plug

same connection for 2nd M12 plug

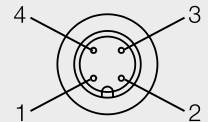


Electrical connection with transmitter

1x or 2x RTD with M12 plug for analog operation

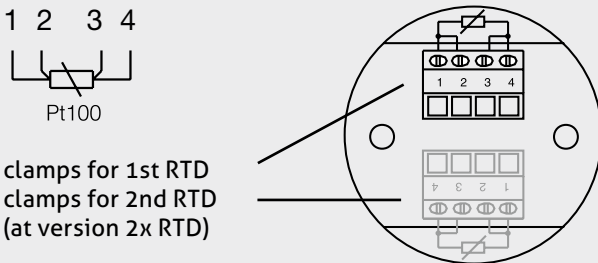
same connection for 2nd M12 plug

- 1: + power supply
- 2: - power supply 4...20 mA
- 3: not connected
- 4: not connected



With 1x or 2x cable gland

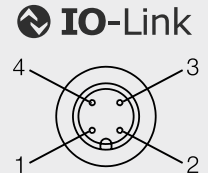
Configuration strip terminal



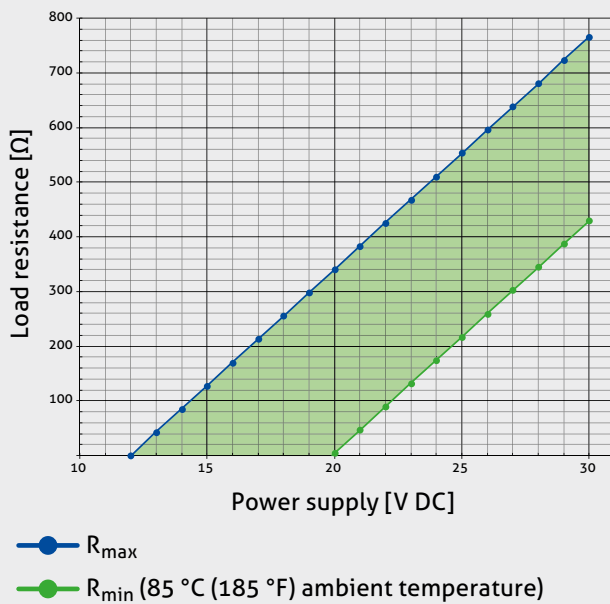
1x or 2x RTD with M12 plug for IO-Link operation

same connection for 2nd M12 plug

- 1: + power supply 24 V DC
- 2: not connected
- 3: - power supply
- 4: IO-Link

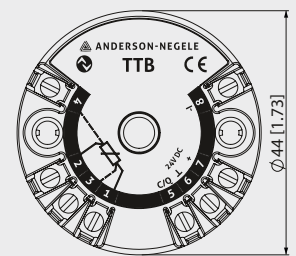


Load resistance diagram at ambient temperature 85 °C



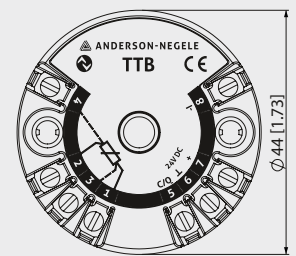
Connection with IO-Link output

- 1: RTD
- 2: RTD
- 3: RTD
- 4: RTD
- 5: IO-Link
- 6: - power supply (4...20 mA)
- 7: + power supply (24 V DC)
- 8: not connected



Connection with 4...20 mA output

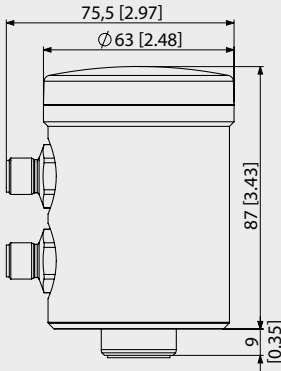
- 1: RTD
- 2: RTD
- 3: RTD
- 4: RTD
- 5: not connected
- 6: not connected
- 7: + power supply (24 V DC)
- 8: - power supply (4...20 mA)



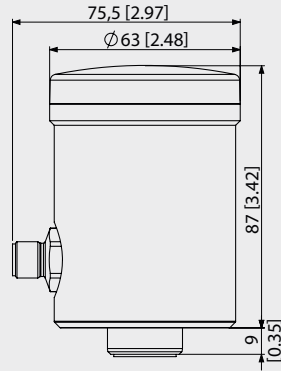
Electrical connection | Head Big



Head unit with 2 Transmitter (Display optional)



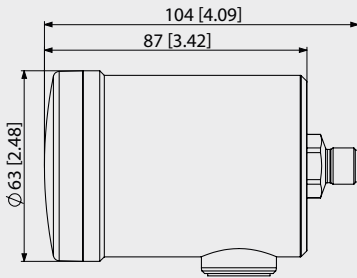
Head-unit with 1 Transmitter and Display and M12-plug



Configurable design



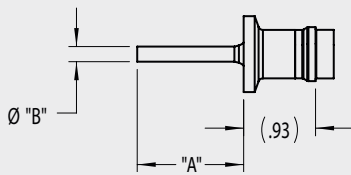
Head-unit horizontal with 1 or 2 Transmitter with Display



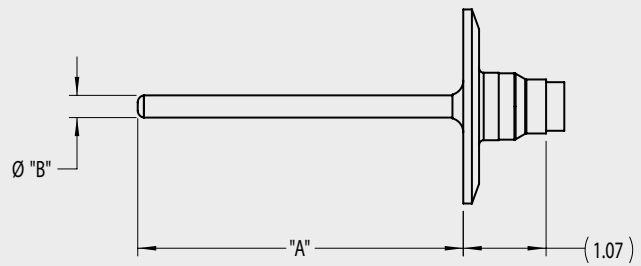
Process Connection and Rod



1/2" and 3/4" Tri-Clamp®



1½" and 2" Tri-Clamp®



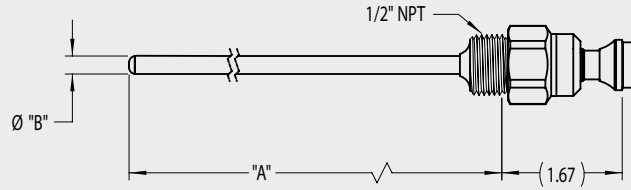
Dimensions table 1/2" and 3/4" Tri-Clamp®

| Code | Description     | Typical Length "A" | Dim. Custom Length "A" | Dim. "B" |
|------|-----------------|--------------------|------------------------|----------|
| 001  | 1/2" Tri-Clamp® | 1½"                | 1½" Min. - 6" Max      | 5/32"    |
| 002  | 3/4" Tri-Clamp® | 1¾" and 2¾"        | 1½" Min. - 6" Max.     | 5/32"    |

Dimensions table 1½" and 2" Tri-Clamp®

| Code | Description    | Typical Length "A" | Dim. Custom Length "A" | Dim. "B" |
|------|----------------|--------------------|------------------------|----------|
| 004  | 1½" Tri-Clamp® | 2¾"                | 1¾" Min. - 4¾" Max.    | 1/4"     |
|      |                | 3¾"                | 2¾" Min. - 4¾" Max.    | 3/4"     |
| 005  | 2" Tri-Clamp®  | 3½"                | 1¾" Min. - 4¾" Max.    | 1/4"     |
|      |                | 3½"                | 2¾" Min. - 4¾" Max.    | 3/4"     |

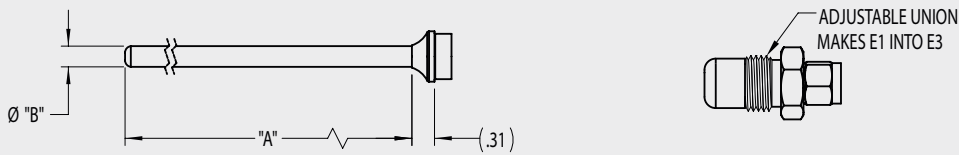
1/2" NPT Spring Loaded



Dimensions table 1/2" NPT Spring Loaded

| Code | Description              | Typical Length "A" | Dim. Custom Length "A"     | Dim. "B" |
|------|--------------------------|--------------------|----------------------------|----------|
| 174  | 1/2" NPT - Spring Loaded | 6" and 9"          | 2 3/4" Min. - 43 1/2" Max. | 1/4"     |

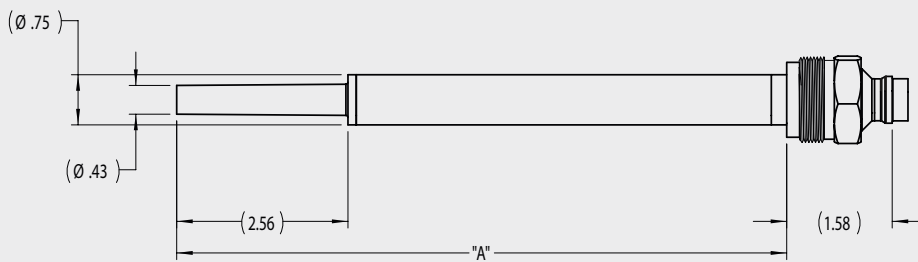
E1 Plain Probe and E3 Plain Probe with Adjustable Union



Dimensions table E1 Plain Probe and E3 Plain Probe with Adjustable Union

| Code | Description                      | Typical Length "A" | Dim. Custom Length "A" | Dim. "B" |
|------|----------------------------------|--------------------|------------------------|----------|
| 074  | E1 - Plain probe                 | 12"                | 4" Min. - 43 1/2" Max. | 1/4"     |
| 075  | E1 - Plain probe                 | 18"                | 4" Min. - 43 1/2" Max. | 3/8"     |
| 079  | E3 - Probe with adjustable union | 12"                | 4" Min. - 43 1/2" Max. | 1/4"     |
| 080  | E3 - Probe with adjustable union | 18"                | 4" Min. - 43 1/2" Max. | 3/8"     |

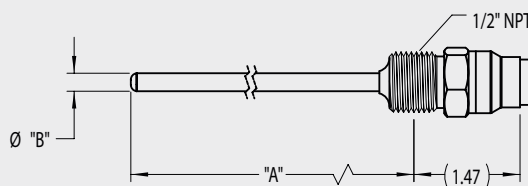
Thermowell 41247



Dimensions table - Thermowell 41247

| Code | Description      | Typical Length "A" | Dim. Custom Length "A" | Dim. "B" |
|------|------------------|--------------------|------------------------|----------|
| 062  | Thermowell 41247 | 9 1/8"             | N/A                    | NA       |

1/2" NPT



Dimensions table 1/2" NPT

| Code | Description | Typical Length "A" | Dim. Custom Length "A" | Dim. "B" |
|------|-------------|--------------------|------------------------|----------|
| 084  | 1/2" NPT    | 6" and 9"          | 2" Min. - 43 1/2" Max. | 1/4"     |

**Transport/Storage**

- Do not store outside
- Store in an area that is dry and dust-free
- Do not expose to corrosive media
- Protect against solar radiation
- Avoid mechanical shock and vibration
- Storage temperature -55...90 °C (-67...194 °F)
- Relative humidity max. 98 %

**Cleaning/Maintenance**

- When using a pressure washer, do not point the nozzle directly at the electrical connections.

**Reshipment**

- Sensors shall be clean and free of media or heat-conductive paste and must not be contaminated with dangerous media!
- Use suitable transport packaging only to avoid damage of the equipment!

**Note on 3-A Sanitary Standard 74-**

Information on installation according to 3-A standard is available on our website:  
[www.anderson-negele.com/3A74.pdf](http://www.anderson-negele.com/3A74.pdf)

Click on the PDF icon to download the document.

**Warning**

Remove power from the unit before installing, removing, or making adjustments

**Caution**

When mounting units, never adjust the orientation by turning the housing. Install the sensor into the process using the appropriate sanitary clamp and gasket, or by threading into a mating thermowell. Orient the conduit connection for ease of connection to field wiring before final tightening.

**Conventional usage**

- Not suitable for applications in explosive areas.
- Not suitable for applications in safety-relevant system parts (SIL).

**Standards and guidelines**

- Compliance with the applicable regulations and directives is mandatory.

**Note on CE**

- Applicable directives:  
Electromagnetic Compatibility Directive 2014/30/EU
- Compliance with the applicable EU directives is identified by the CE label on the product.
- The operating company is responsible for complying with the guidelines applicable to the entire installation.

**Disposal**

- Electrical devices should not be disposed of with household trash. They must be recycled in accordance with national laws and regulations.
- Take the device directly to a specialized recycling company and do not use municipal collection points.

**Note on IO-Link**

Information on parameters and events are available on our website:

[www.anderson-negele.com/iodd](http://www.anderson-negele.com/iodd)

Click on the IO-Link icon to open the website.

## Order code

## TSBA Temperature Sensor Big

**Process connection** (Ⓐ: 3-A compliant, \*: 3-A compliant when used with 3-A compliant well.)

|            |                     |            |                                      |
|------------|---------------------|------------|--------------------------------------|
| <b>001</b> | Tri-Clamp 1/2" *    | <b>074</b> | E1 Style - 1/4" Dia. *               |
| <b>002</b> | Tri-Clamp 3/4" Ⓐ    | <b>075</b> | E1 Style - 3/8" Dia. *               |
| <b>004</b> | Tri-Clamp 1½" Ⓐ     | <b>079</b> | E3 Style - 1/4" Dia. (w/ adj. union) |
| <b>005</b> | Tri-Clamp 2" Ⓐ      | <b>080</b> | E3 Style - 3/8" Dia. (w/ adj. union) |
| <b>062</b> | Thermo Well 41247 * | <b>084</b> | 1/2" NPT *                           |
|            |                     | <b>174</b> | 1/2" NPT Spring Loaded *             |

**X Fixed character****RTD type**

|          |                    |
|----------|--------------------|
| <b>0</b> | 1x Pt100 A, 3-wire |
| <b>2</b> | 2x Pt100 A, 3-wire |

**Insertion length [inches]**

**01...43** in steps of 1 inch

**Insertion length [sixteenth]**

|           |       |           |        |
|-----------|-------|-----------|--------|
| <b>00</b> | 0"    | <b>08</b> | 1/2"   |
| <b>01</b> | 1/16" | <b>09</b> | 9/16"  |
| <b>02</b> | 1/8"  | <b>10</b> | 5/8"   |
| <b>03</b> | 3/16" | <b>11</b> | 11/16" |
| <b>04</b> | 1/4"  | <b>12</b> | 3/4"   |
| <b>05</b> | 5/16" | <b>13</b> | 13/16" |
| <b>06</b> | 3/8"  | <b>14</b> | 7/8"   |
| <b>07</b> | 7/16" | <b>15</b> | 15/16" |

**Rod diameter (process connection specific)**

|           |                                     |
|-----------|-------------------------------------|
| <b>20</b> | 5/32" (001, 002)                    |
| <b>21</b> | 1/4" (004, 005, 074, 079, 084, 174) |
| <b>22</b> | 3/8" (075, 080)                     |
| <b>23</b> | 3/4" (004, 005)                     |
| <b>24</b> | 41247 Well (062)                    |

**XX Fixed character****Surface finish**

|          |                         |
|----------|-------------------------|
| <b>1</b> | R <sub>a</sub> ≤ 25 µin |
|----------|-------------------------|

**Transmitter**

|          |  |
|----------|--|
| <b>0</b> | without transmitter  |
| <b>H</b> | TTB.H (Hybrid: analog and IO Link)                                 |
| <b>D</b> | TTB.D (Hybrid: analog and IO-Link with optional display connector) |
| <b>Z</b> | TTB.Z: 1st transmitter TTB.D, 2nd transmitter TTB.H                |
| <b>Y</b> | TTB.Y: 1st transmitter TTB.H, 2nd transmitter TTB.H                |

**Measurement range (\*-full range value)**

|            |                          |            |             |
|------------|--------------------------|------------|-------------|
| <b>000</b> | without transmitter      | <b>04C</b> | -10...40 °C |
| <b>00C</b> | Unit °C *                | <b>05C</b> | 0...50 °C   |
| <b>00F</b> | Unit °F *                | <b>10C</b> | 0...100 °C  |
| <b>00K</b> | Unit K *                 | <b>15C</b> | 0...150 °C  |
| <b>M00</b> | TTB custom configuration | <b>20C</b> | 0...200 °C  |
|            |                          | <b>25C</b> | 0...250 °C  |
|            |                          | <b>10F</b> | 0...100 °F  |
|            |                          | <b>15F</b> | 0...150 °F  |
|            |                          | <b>20F</b> | 0...200 °F  |
|            |                          | <b>23F</b> | 30...230 °F |
|            |                          | <b>25F</b> | 0...250 °F  |
|            |                          | <b>30F</b> | 0...300 °F  |

## Order code

## Electrical connection with transmitter

- 1 1x cable gland
- 2 2x cable gland
- 4 1x M12 plug (4 pin)
- 5 2x M12 plug (4 pin)

## Enclosure

- X opaque plastic cap
- P clear plastic cap
- M stainless steel cap without control window
- W stainless steel cap with control window

## Head orientation

without display

- 0 vertical

with display

- 1 vertical
- 2 horizontal

TSBA / 001 / X / 0 / 0100 / 20 / XX / 1 / H / 000 / 4 / X / 0

## Accessories

**PVC-cable with M12 connection, brass nickel-plated, IP69K, shielded**

**M12-PVC/5G-8m** 5 pin, length 8 m

**M12-PVC/5G-15m** 5 pin, length 15 m

**M12-PVC/5G-30m** 5 pin, length 30 m