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
· 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 TTB.H and TTB.D using IO-Link available
· IO-Link Master (IOM-1)
· Add-On Instructions are available at www.anderson-negele.com/aoi

Configurable design

Communication

IO-Link 4...20 mA

Certifications

Temperature sensor TSBA with Tri-Clamp

Temperature sensor TSBA with NPT

Temperature sensor		
Process connection	Tri-Clamp NPT NPT Spring Loaded Thermowell	1/2", 3/4", 1½", 2" (DIN 32676)
Dimensions	insertion length rod diameter	1⅛...43½" 5/32", 1/4", 3/8", 3/4", 41247 Well
Materials	connecting head, spacer wetted parts	stainless steel AISI 304 stainless steel AISI 316L
Surface quality		$R_a \leq 25$ µin
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: ±(0.15 + 0.002 × | t |) °C
Electrical connection	plug connection cable gland	M12 plug AISI 304 M16 x 1.5
Protection class		IP 69 K (with electrical connection M12 plug)

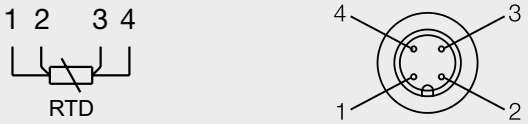
Transmitter TTB.H, TTB.D		
Temperature ranges	ambient (with display) storage	-40...85 °C (-40...185 °F) 0...70 °C (32...158 °F) -55...90 °C (-67...194 °F)
Measuring ranges		standard °C: -10...40, 0...50 / 100 / 150 / 200 / 250 °C standard °F: 0...100 / 150 /200 / 250 / 300, 30...230 °F custom ranges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

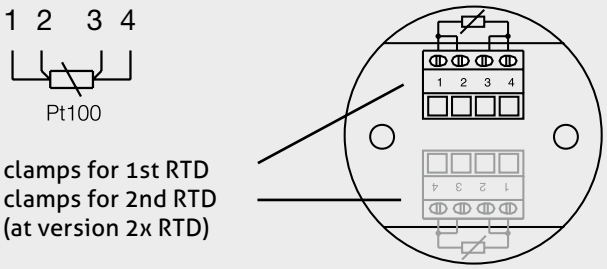
With 1x or 2x M12 plug

same connection for 2nd M12 plug



With 1x or 2x cable gland

Configuration strip terminal

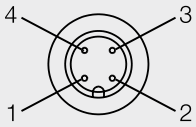


Electrical connection with transmitter

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

same connection for 2nd M12 plug

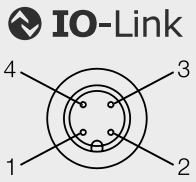
1: + power supply
2: - power supply 4...20 mA
3: not connected
4: not connected



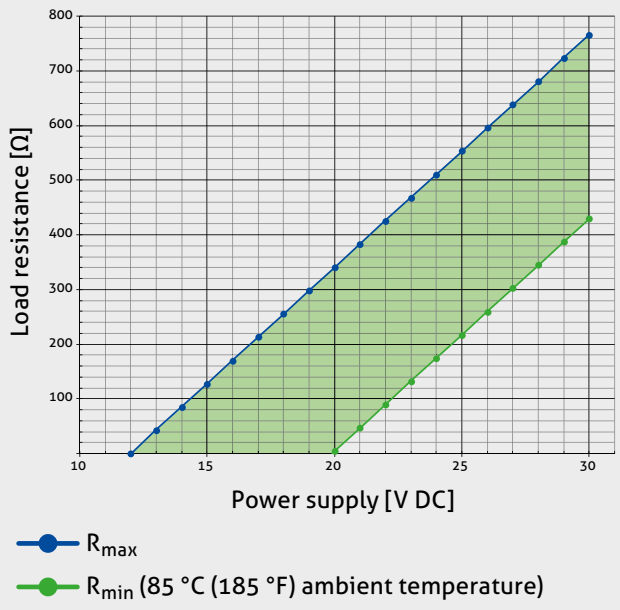
1x or 2x RTD with M12 plug for IO-Link operation

same connection for 2nd M12 plug

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

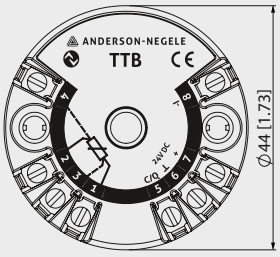


Load resistance diagram at ambient temperature 85 °C



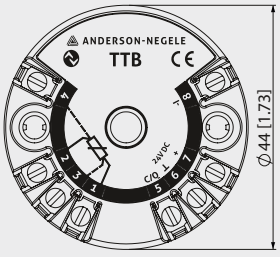
Connection with IO-Link output

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



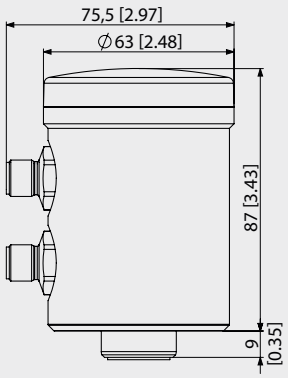
Connection with 4...20 mA output

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)

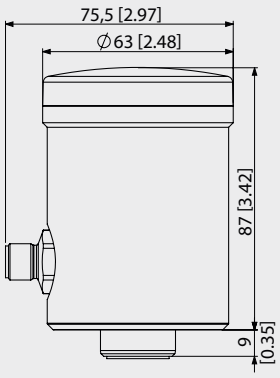


Electrical connection | Head Big

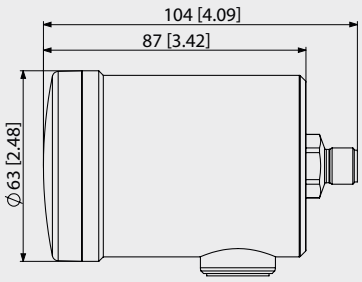
Head unit with 2 Transmitter (Display optional)



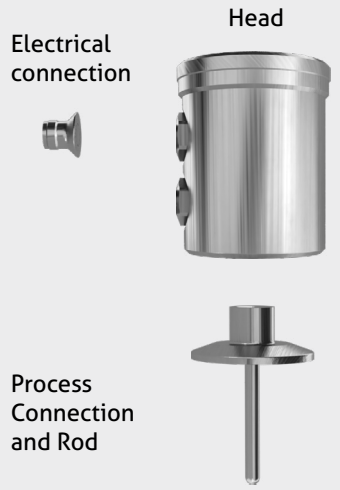
Head-unit with 1 Transmitter and Display and M12-plug



Head-unit horizontal with 1 or 2 Transmitter with Display

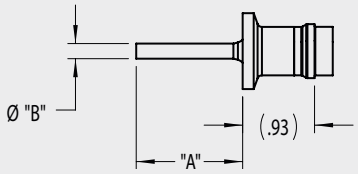


Configurable design

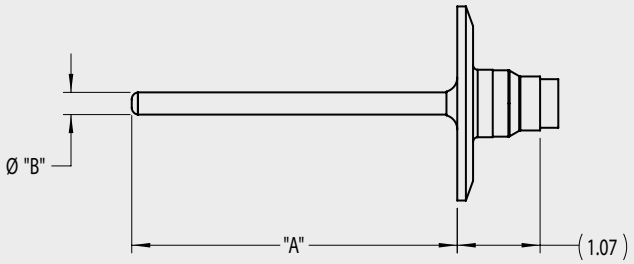


Process Connection and Rod

1/2" and 3/4" Tri-Clamp®



1½" and 2" Tri-Clamp®



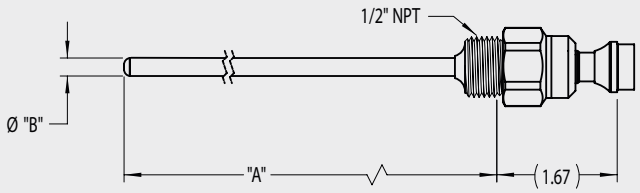
Dimensions table 1/2" and 3/4" Tri-Clamp®

Code	Description	Typical Length "A"	Dim. Custom Length "A"	Dim. "B"
001	1/2" Tri-Clamp®	1⅛"	1⅛" Min. - 6" Max	5/32"
002	3/4" Tri-Clamp®	1¼" and 2¾"	1⅛" 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. - 43½" Max.	1/4"
		2¾"	2¾" Min. - 43½" Max.	3/4"
005	2" Tri-Clamp®	3½"	1¾" Min. - 43½" Max.	1/4"
		3½"	2¾" Min. - 43½" Max.	3/4"

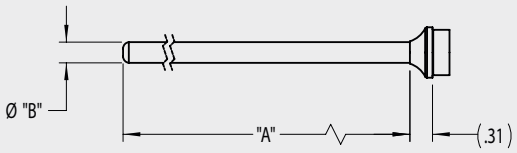
1/2" NPT Spring Loaded

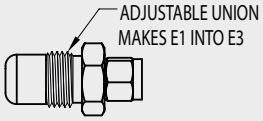


Dimensions table 1/2" NPT Spring Loaded

Code	Description	Typical Length "A"	Dim. Custom Length "A"	Dim. "B"
174	1/2" NPT - Spring Loaded	6" and 9"	2¼" Min. - 43½" Max.	1/4"

E1 Plain Probe and E3 Plain Probe with Adjustable Union

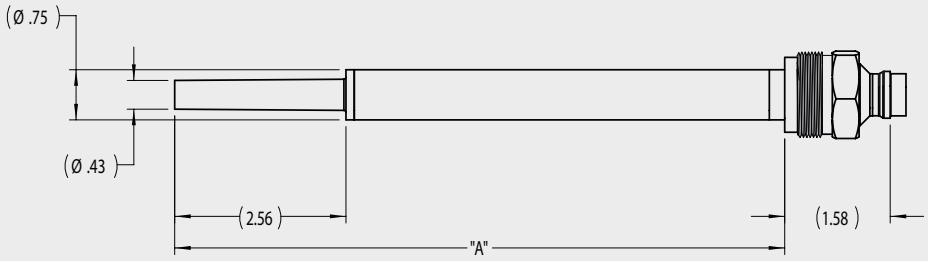




Dimensions table E1 Plain Probe and E3 Plain Probe with Adjustable Union

Code	Description	Typical Length "A"	Dim. Custom Length "A"	Dim. "B"
074	E1 - Plain probe	12"	4" Min. - 43½" Max.	1/4"
075	E1 - Plain probe	18"	4" Min. - 43½" Max.	3/8"
079	E3 - Probe with adjustable union	12"	4" Min. - 43½" Max.	1/4"
080	E3 - Probe with adjustable union	18"	4" Min. - 43½" Max.	3/8"

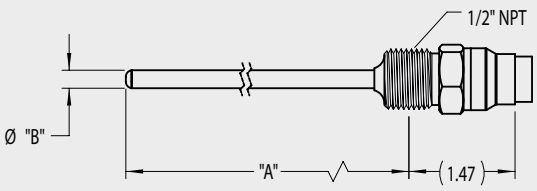
Thermowell 41247



Dimensions table - Thermowell 41247

Code	Description	Typical Length "A"	Dim. Custom Length "A"	Dim. "B"
062	Thermowell 41247	9⅛"	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. - 43½" 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

Click on the PDF icon to download the document.

PDF

Click or Scan

Warning

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

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.

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 coduit connection for ease of connection to field wiring before final tightening.

Accessories

PVC-cable with M12 connection made of AISI 303, IP 69 K, unshielded

M12-PVC / 4-5 m	4 pin, length 5 m
M12-PVC / 4-10 m	4 pin, length 10 m
M12-PVC / 4-25 m	4 pin, length 25 m

TPE-cable with M12 connection made of AISI 316Ti, IP 69, shielded

M12-TPE / 8-5 m	8 pin, length 5 m
M12-TPE / 8-10 m	8 pin, length 10 m

IOM-1	Anderson-Negele USB IO-Link Master for IO-Link Sensors incl. power supply, USB cable, M12 connection cable (1.5 m/59.1 inch)

IOM-1, PVC-cable with M12-connection

Order code

TSBA Temperature Sensor Big

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

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

X **Fixed character**

RTD type

0	1x Pt100 A, 3-wire
2	2x Pt100 A, 3-wire

Insertion length [inches]

01...43 in steps of 1 inch

Insertion length [sixteenth]

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

Rod diameter (process connection specific)

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

XX **Fixed character**

Surface finish

1	$R_a \leq 25$ µin

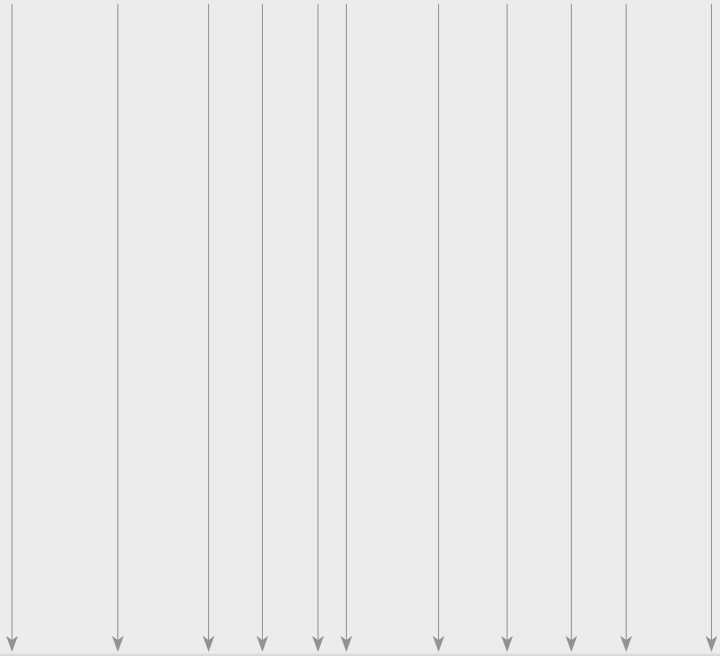
Transmitter

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

Measurement range (*-full range value)

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

Order code



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

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

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