

Temperature Sensor Tri-Clamp

Application/Specified usage

- Temperature Measurement in vessels and pipes

Application examples

- Monitoring of CIP-/SIP-process
- Temperature monitoring in milk vessels

Hygienic design/Process connection

- Tri-Clamp sealing system without adapter
- Versions compliant to 3-A Standard 74- available
- Product contacting materials compliant to FDA
- Sensor completely made of stainless steel

Features/Advantages

- Direct Connection without adapter
- Integrated transmitter optional
- Different electrical connections available

Options/Accessories

- 2x Pt100 (not retrofittable)
- 2x Pt100 with two transmitters (not retrofittable)
- Pt100 chip with other classes of accuracy (A, AA, AAA)
- Programmable transmitters with output 4...20 mA, 2-wire
- Programming adapter MPU-P 9701
- Integrated transmitters for HART-protocol
- Integrated transmitter MPU-LCD with display in connecting head
- Fast response sensor tip 3 mm and 4 mm
- Pre-assembled connecting cable in other lengths and other material

Temperature sensor TFP-47



Temperature Transmitter MPU-LCD with Display

Application / Specified Usage

- 4...20 mA transmitter with LCD for Pt100 temperature sensor
- For installation in temperature sensor
- Sensor monitoring

Features

- 4-digit display with green backlight
- Temperature measurement in °C and °F
- Easy range select by one button
- Lower costs for wiring because of 2-wire technology

Note

See product information „MPU-LCD“ for details.



Option MPU-LCD (display in the connection head)



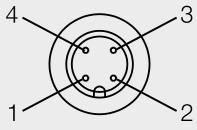
Temperature sensor		
Process connection		Tri-Clamp
Materials	connecting head thermowell and Tri-Clamp	stainless steel 1.4301 (AISI 304) stainless steel 1.4404 (AISI 316L)
Surface quality		$R_a \leq 0.8 \mu\text{m}$
Insertion length EL		20...500 mm in steps of 5 mm
Operating pressure		10 bar maximum
Temperature ranges	ambient process CIP-/SIP-cleaning	-50...80 °C (-58 °F...176 °F) -50...250 °C (-58 °F...482 °F) 150 °C (302 °F) max. for 120 minutes (with transmitter)
Sensing resistor	acc. to DIN EN 60751	Pt100
Electrical connection	cable gland cable connection	M16 x 1.5 M12 plug 1.4301 (AISI 304), 4-pins
Protection class	cable gland cable connection	IP 67 IP 69 K

Transmitter MPU-4, MPU-H, MPU-M		
Temperature ranges	ambient storage	-40...85 °C (-40...185 °F) -55...90 °C (-67...194 °F)
Measuring ranges	MPU-4, MPU-H, MPU-M	standard: -10...40 °C, 0...50 / 100 / 150 / 200 °C special ranges free programmable
Accuracy	input	$< \pm 0.25 \text{ °C}$
Temperature drift	zero, span	$< 0.01 \% / \text{K}$
Supply	MPU-4, MPU-H, MPU-M accuracy	8...35 V DC 0.01 % / V (reference: 12 V DC)
Output	signal accuracy burden	analog 4...20 mA $< \pm 0.1 \%$ of measurement range $< 600 \Omega$ (at $U_B = 24 \text{ V}$)
Humidity	without condensation	0...98 %

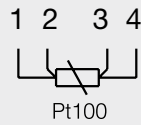
Accuracy classes of temperature sensors Tolerances for Pt100 acc. to DIN EN 60751			
Pt100	Class A	Class AA / 1/3 DIN B	Class AAA / 1/10 DIN B
0 °C / 100 Ω	$\pm 0.15 \text{ K} / \pm 0.06 \Omega$	$\pm 0.10 \text{ K} / \pm 0.04 \Omega$	$\pm 0.03 \text{ K} / \pm 0.01 \Omega$
100 °C / 138.5 Ω	$\pm 0.35 \text{ K} / \pm 0.13 \Omega$	$\pm 0.27 \text{ K} / \pm 0.10 \Omega$	$\pm 0.08 \text{ K} / \pm 0.03 \Omega$

Electrical connection without transmitter

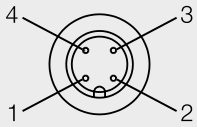
With 1 x M12 plug



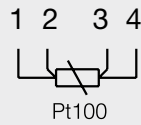
Configuration 1st M12 plug



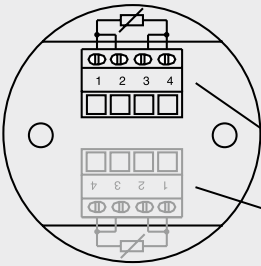
With 2 x M12 plug



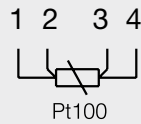
Configuration 2nd M12 plug



With cable gland

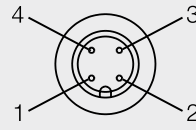


Configuration strip terminal



Electrical connection with transmitter

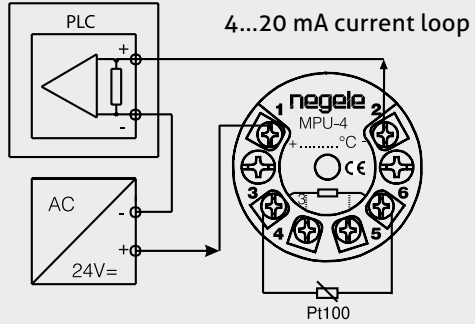
With M12 plug



Configuration M12 plug

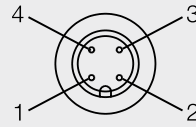
- 1: + supply
- 2: - supply 4...20 mA
- 3: not connected
- 4: not connected

With cable gland



Electrical connection with two transmitter (TFP-67)

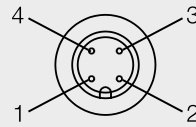
With 1 x M12 plug (sensor 1 + sensor 2)



Configuration M12 plug

- 1: + supply (sensor 1)
- 2: - supply 4...20 mA (sensor 1)
- 3: - supply 4...20 mA (sensor 2)
- 4: + supply (sensor 2)

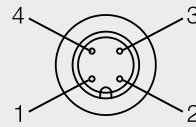
With 2 x M12 plug (sensor 1)



Configuration M12 plug

- 1: + supply (sensor 1)
- 2: - supply 4...20 mA (sensor 1)
- 3: not connected
- 4: not connected

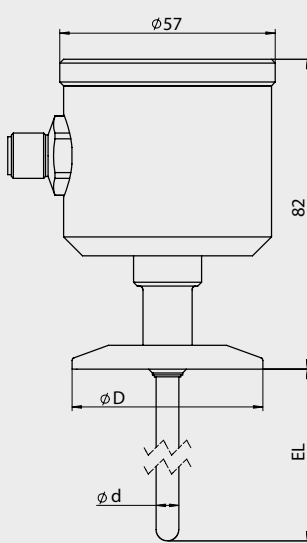
With 2 x M12 plug (sensor 2)



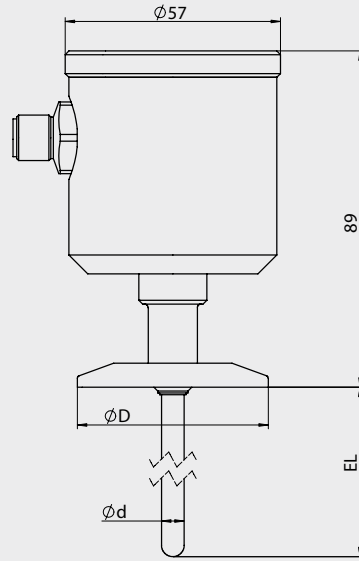
Configuration M12 plug

- 1: + supply (sensor 2)
- 2: - supply 4...20 mA (sensor 2)
- 3: not connected
- 4: not connected

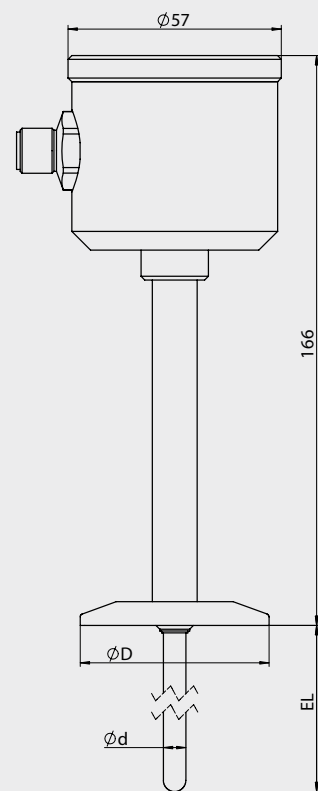
TFP-47 | TFP-47.2



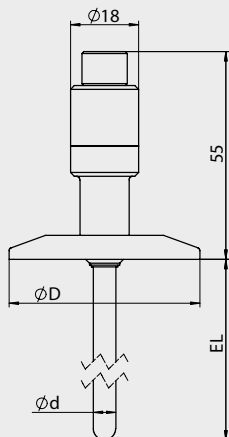
TFP-67



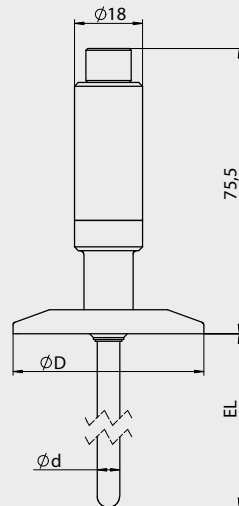
TFP-57 | TFP-57.2



TFP-167



TFP-167 / ... / MPU-M

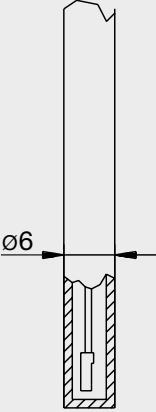
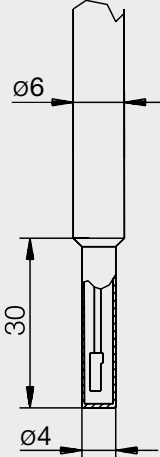
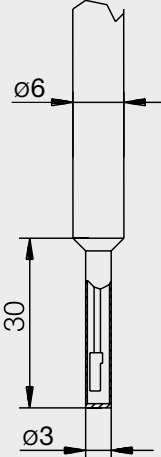


Dimension table Tri-Clamp

Type	Order code	Clamp size D [mm]	Suitable for pipe diameter	Pipe style
C25	TFP-.../C25	25.0	DN 6...8 ISO 6...10 1/4", 3/8", 1/2", 3/4"	DIN 11866 series A DIN 11866 series B / ISO 1127 DIN 11866 series C
C34	TFP-.../C34	34.0	DN 10...20	DIN 11866 series A
C50	TFP-.../C50	50.5	DN 25...40 ISO 15...25 1" + 1 1/2"	DIN 11866 series A DIN 11866 series B / ISO 1127 DIN 11866 series C
C64	TFP-.../C64	64.0	DN 50 2"	DIN 11866 series A DIN 11866 series C
C77	TFP-.../C77	77.5	2 1/2"	DIN 11866 series C
C91	TFP-.../C91	91.0	DN 65 3"	DIN 11866 series A DIN 11866 series C

Sensor tip diameter and response time

All temperature sensors are available with smaller sensor tips, to ensure a shorter response time. The below-mentioned times were measured by immersing a temperature sensor from room temperature into boiling water.

Sensor tip \varnothing 6 mm	Sensor tip \varnothing 4 mm	Sensor tip \varnothing 3 mm
50 %-time: $t_{50} \leq 3.0$ s 90 %-time: $t_{90} \leq 8.0$ s	50 %-time: $t_{50} \leq 2.4$ s 90 %-time: $t_{90} \leq 6.5$ s	50 %-time: $t_{50} \leq 0.5$ s 90 %-time: $t_{90} \leq 1.5$ s
		

Accessories | Spare parts

Diameter pipe		Clamp size D [mm] (see page 4)		
DIN 11866 series A	DIN 11866 series C		Clamp ring Tri-Clamp	Sealing ring Tri-Clamp
DN10		34.0	SRC-10	DRC-10
DN15		34.0	SRC-10	DRC-15
DN20		34.0	SRC-10	DRC-20
DN25		50.5	SRC-25	DRC-25
DN32		50.5	SRC-25	DRC-32
DN40		50.5	SRC-25	DRC-40
DN50		64.0	SRC-50	DRC-50
DN65		9.0	SRC-65	DRC-65
	1/2"	25.0	SRC-5	DRC-1/2"
	3/4"	25.0	SRC-5	DRC-3/4"
	1"	50.5	SRC-25	DRC-1"
	2"	64.0	SRC-50	DRC-50
	2½"	77.5	SRC-2½"	DRC-2½"
	3"	91.0	SRC-65	DRC-65

Transport / Storage

- No outdoor storage
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration
- Storage temperature -55...90 °C (-67...194 °F)
- Relative humidity maximum 98 %

Cleaning / Maintenance

- In case of using pressure washers, don't point nozzle directly to electrical connections!

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 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.

Conventional Usage

- Not suitable for applications in explosive areas.
- Not suitable for applications in security-relevant equipments (SIL).

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!

Standards and Guidelines

- You have to comply with applicable regulations and directives.

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.

Accessories**PVC-cable with M12-connection made of 1.4305 (AISI 303), IP 69 K, unshielded**

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

PVC-cable with M12-connection, brass nickel-plated, IP 67, shielded

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

Programming adapter MPU-P 9701

Programming adapter for MPU-4, MPU-H and MPU-M

PVC-cable with M12-connection**Programming adapter MPU-P 9701**

Order code for version with 1x Pt100 (Ⓐ: 3-A compliant)

TFP-47 connecting head \varnothing 57 mm Ⓐ
 TFP-57 connecting head \varnothing 57 mm, with spacer Ⓐ
 TFP-167 connecting head \varnothing 18 mm, electrical connection via M12 plug Ⓐ

Sensor length EL in mm

020...500 in steps of 5 mm
 xxx special length

Diameter thermowell in mm

6
 8

Diameter sensor tip in mm

X no reduction
 3 only for thermowell 6 mm
 4 only for thermowell 6 mm and 8 mm
 6 only for thermowell 8 mm

Accuracy class Pt100

A
 1/3B
 1/10B

Electrical connection (not selectable for TFP-167)

PG cable gland M16x1.5
 M12 M12 plug, standard with MPU-LCD

Transmitter

X without

only for TFP-47, -57

MPU-4 programmable
 MPU-H HART-protocol
 MPU-LCD with display

only for TFP-167

MPU-M programmable

Measuring range MPU

(only for types with transmitter; not for MPU-LCD)

-10...40 measurement range -10...40 °C
 0...50 measurement range 0...50 °C
 0...100 measurement range 0...100 °C
 0...150 measurement range 0...150 °C
 0...200 measurement range 0...200 °C
 xx...yy special range

Tri-Clamp size

C25 Pipe diameter: see "Dimension
 Table Tri-Clamp" on page 4



TFP \varnothing 18 mm
 no longer available!



Successor: TSMF
 New, modular and better!

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TFP-47/ 100/ 6/ X/ A/ PG/ MPU-4/ 0...100/ C25

Order code for version with 2x Pt100 (A: 3-A compliant)

TFP-47.2 connecting head \varnothing 57 mm, 2x Pt100, no transmitter possible (A)
TFP-57.2 connecting head \varnothing 57 mm, 2x Pt100, with spacer, no transmitter possible! (A)
TFP-67 high connecting head \varnothing 57 mm, 2x Pt100, prepared for 2x transmitter (A)

Sensor length EL in mm

020...500 in steps of 5 mm
xxx special length

Diameter thermowell in mm

6
8

Diameter sensor tip in mm

X no reduction
3 only for thermowell 6 mm
4 only for thermowell 6 mm and 8 mm
6 only for thermowell 8 mm

Accuracy class Pt100

A
1/3B
1/10B

Electrical connection (only for TFP-47.2 and 57.2)

PG cable gland M16x1.5
2PG 2x cable gland M16x1.5
2M12 2x M12 plug

Electrical connection (only for TFP-67)

M12 M12 plug
2M12 2x M12 plug

1st Transmitter

MPU-4 programmable

Measuring range 1st transmitter

-10...40 measurement range -10...40 °C
0...50 measurement range 0...50 °C
0...100 measurement range 0...100 °C
0...150 measurement range 0...150 °C
0...200 measurement range 0...200 °C
xx...yy special range

2nd Transmitter

MPU-4 programmable

Measuring range 2nd transmitter

-10...40 range -10...40 °C
0...50 range 0...50 °C
0...100 range 0...100 °C
0...150 range 0...150 °C
0...200 range 0...200 °C
xx...yy special range

Tri-Clamp size

C25 Pipe diameter:
C34 see "Dimension
C50 table Tri-Clamp" on
C64 page 4
C77
C91

 **TFP \varnothing 18 mm**
no longer available!

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TFP-67/ 100/ 6/ X/ A/ M12/ MPU-4/ 0...100/ MPU-4/ 0...100/ C25