

Product Information TFP-47, -57, -67, -167

FOOD

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
- Product contacting materials compliant to FDA
- Sensor completely made of stainless steel
- Conforming to 3-A Sanitary Standard 74-06

Features/Advantages

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

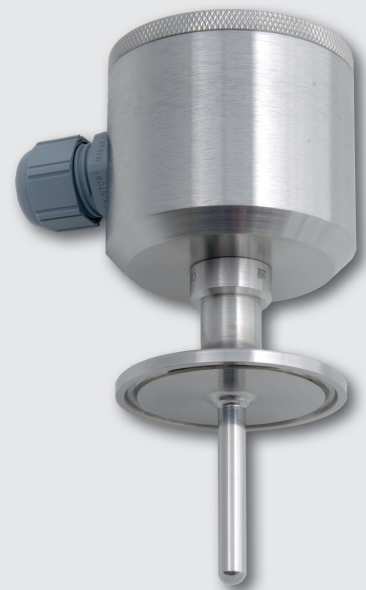
Options/Accessories

- 2 x Pt100 (not retrofittable)
- 2 x Pt100 with two transmitters (not retrofittable)
- Pt100 chip with other classes of accuracy (1/3B, 1/10B)
- Programmable transmitters with output 4...20 mA, 2-wire
- Programming adapter MPU-P 9701
- Integrated transmitters for Profibus PA and 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

Authorizations



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)



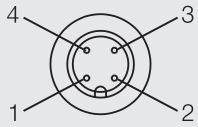
Temperature sensor		
Process connection		Tri-Clamp
Materials	connecting head thermowell and Tri-Clamp	stainless steel 1.4305 stainless steel 1.4404
Surface quality		$R_a \leq 0.8 \mu\text{m}$
Insertion length EL		20...500 mm in steps of 5 mm
Operating pressure		10 bar maximum
Temperature ranges	ambient process CIP-/ SIP-cleaning	-50...+80 °C -50...+250 °C 150 °C 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 1.4305, 4-pins
Protection class	cable gland cable connection	IP 67 IP 69 K

Transmitter MPU-4, MPU-10, MPU-H, MPU-M		
Temperature ranges	ambient storage	-40...+85 °C -55...+90 °C
Measuring ranges	MPU-4, MPU-H, MPU-M MPU-10	standard: -10...40 °C, 0...50 / 100 / 150 / 200 °C special ranges free programmable standard: -200...850 °C configuration occurs with Profibus
Accuracy	input	< ± 0.25 °C
Temperature drift	zero, span	< 0.01 % / K
Supply	MPU-M, MPU-4 MPU-10 accuracy	8...35 V DC 9...32 V DC 0.01 % / V (reference: 12 V DC)
Output	signal accuracy burden	analog 4...20 mA (not for MPU-10) < ± 0.1 % of measurement range < 600 Ω (at $U_B = 24$ V)
Humidity	without condensation	0...98 %

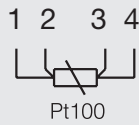
Accuracy classes of temperature sensors Tolerances for Pt100 acc. to DIN EN 60751			
Pt100	A	1/3 B	1/10 B
0 °C / 100 Ω	± 0.15 K / ± 0.06 Ω	± 0.10 K / ± 0.04 Ω	± 0.03 K / ± 0.01 Ω
100 °C / 138.5 Ω	± 0.35 K / ± 0.13 Ω	± 0.27 K / ± 0.10 Ω	± 0.08 K / ± 0.03 Ω

Electrical connection without transmitter

With 1 x M12 plug

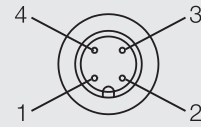


Configuration 1st M12 plug



Electrical connection with transmitter

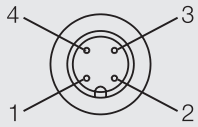
With M12 plug



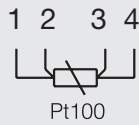
Configuration M12 plug

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

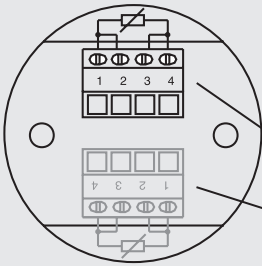
With 2 x M12 plug



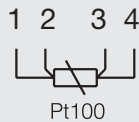
Configuration 2nd M12 plug



With cable gland



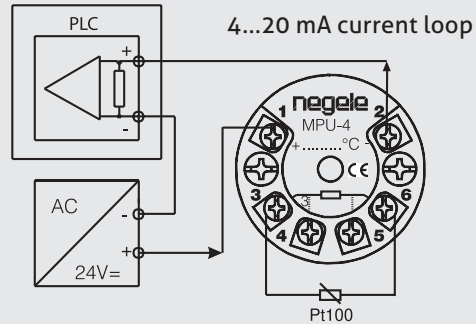
Configuration strip terminal



clamps for 1st Pt100

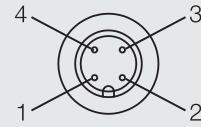
clamps for 2nd Pt100
(at version 2 x Pt100)

With cable gland



Electrical connection with two transmitter (TFP-67)

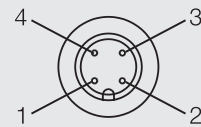
With 1 x M12-plug (sensor 1 + sensor 2)



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)

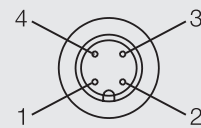
With 2 x M12-plug (sensor 1)



Configuration M12-plug

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

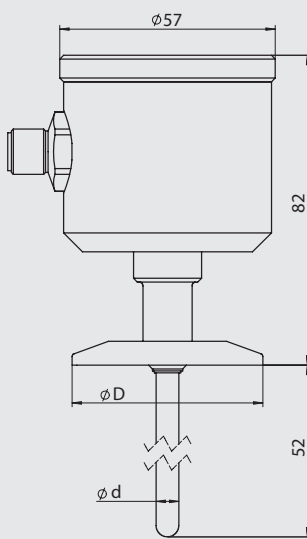
With 2 x M12-plug (sensor 2)



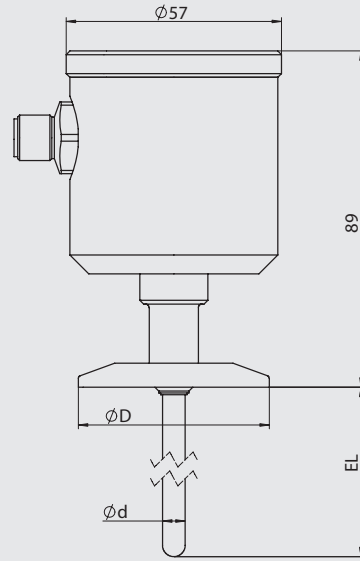
Configuration M12-plug

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

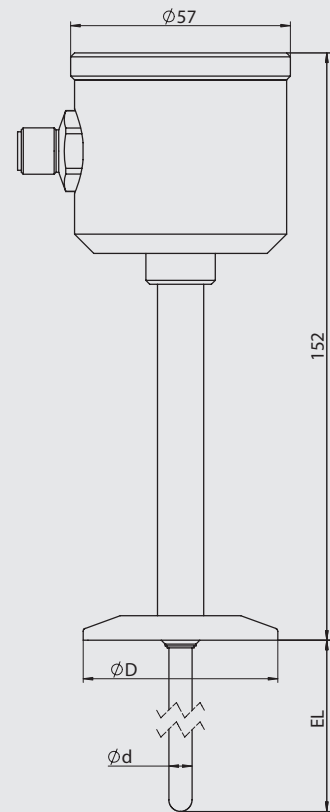
TFP-47 | TFP-47.2



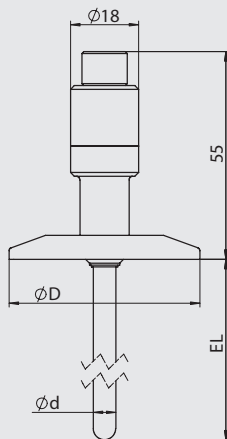
TFP-67



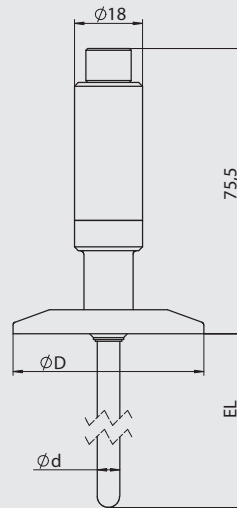
TFP-57 | TFP-57.2



TFP-167



TFP-167 / ... / MPU-M

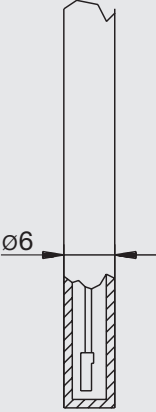
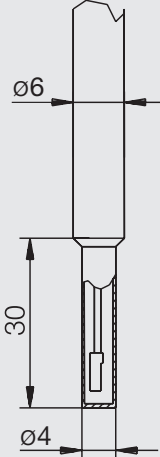
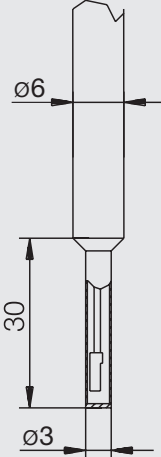


Dimension table Tri-Clamp

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 emerging a temperature sensor from room temperature into boiling water.

Sensor tip Ø 6 mm	Sensor tip Ø 4 mm	Sensor tip Ø 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	

Conditions for a measuring point according to 3-A Sanitary Standard 74-06

- The sensors TFP-47, -57, -67, -167 conforming to the 3-A Sanitary Standard.
- The sensors are designed for CIP-/ SIP-cleaning. Maximum 150 °C / 120 min.
- Only with 3-A conforming Tri-Clamp connection.
- Mounting position, self draining and the position of the leakage hole must be in accordance to current 3-A Sanitary Standard.

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
- Relative humidity maximum 98 %

Cleaning/Maintenance

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

Conventional usage

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

Standards and guidelines

- You have to comply with applicable regulations and directives.

Advice to EMC

- The device agrees to following standards: EMC directive 2004/108/EC.
- You have to guarantee the EMC directives for the entire equipment.

Disposal

- This instrument is not subject to the WEEE directive 2002/96/EC and the respective national laws.
- Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points.

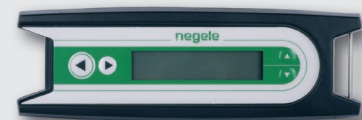
Accessories

PVC-cable with M12-connection made of 1.4305, 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 1 x Pt100

TFP-47 (connecting head Ø 55 mm)
 TFP-57 (connecting head Ø 55 mm, with spacer)
 TFP-167 (connecting head Ø 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 1.4305, standard with MPU-LCD)

Transmitter

X (without)

only for TFP-47, -57

MPU-4 (programmable)
 MPU-10 (Profibus PA)
 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)

C34
 C50
 C64
 C77
 C91

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

Order code for version with 2 x Pt100

- TFP-47.2** (connecting head Ø 55 mm, 2 x Pt100, no transmitter possible)
TFP-57.2 (connecting head Ø 55 mm, 2 x Pt100, with spacer, no transmitter possible!)
TFP-67 (high connecting head Ø 55 mm, 2 x Pt100, prepared for 2 x transmitter)

Sensor length EL in mm

020...500 (in steps of 5 mm)
xxxx (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)
2xPG (2 x cable gland M16x1.5)
2xM12 (2 x M12-plug 1.4305)

Electrical connection (only for TFP-67)

M12 (M12-plug 1.4305)
2xM12 (2 x M12-plug 1.4305)

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