Product Information TFP-41, -44, -51, -54, -61, -161, -164, -181, -184 **FOOD**

Temperature Sensor with G1/2" hygienic

CLEANadapt

Application/Specified usage

- Temperature Measurement in vessels and pipes
- Front flush temperature measurement available

Application examples

- Monitoring of CIP-/ SIP-process
- Measurement in vessels with agitators with front flush version
- Temperature monitoring in milk vessels

Hygienic design/Process connection

- Flow optimized, hygienic and easy sterilizable installation by using Negele weld-in sleeve, e.g. EMZ-132 or build-in system, e.g. EHG-... / 1/2"
- Additional process connections: adapters for Tri-Clamp, dairy flange (DIN 11851), Varivent, DRD, APV et al
- Sealing system free of elastomers, the connection will be without gaps and crevices
- Product contacting materials compliant to FDA
- Sensor completely made of stainless steel resp. PEEK (front flush sensor)
- Conforming to 3-A Sanitary Standard 74-06 for front flush sensors

Features/Advantages

- Front flush mounting possible
- Integrated transmitter optional
- Different electrical connections available

Options/Accessories

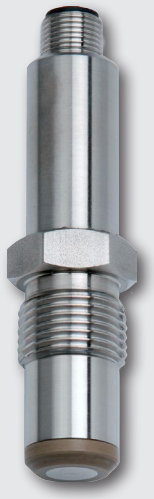
- 2 x Pt100 (not retrofittable)
- 2 x Pt100 with two transmitters (not retrofittable)
- Programmable transmitters MPU-4 as well as MPU-M with output 4...20 mA, 2-wire
- Integrated transmitters for Profibus PA and HART-protocol
- Programming adapter MPU-P 9701
- Integrated transmitter MPU-LCD with display in connecting head
- Pt100 chip with other classes of accuracy (1/3B, 1/10B)
- Fast response sensor tip 3 mm and 4 mm
- Spacer for high temperature up to 250 °C
  permanent temperature up to 450 °C (on request)
- Pre-assembled connecting cable for M12-plug
- Fixed cable in other lengths and other material available

Authorizations

FDA

3-A 74-06

Temperature sensor TFP-164 / ... / MPU-M



Temperature sensor TFP-41

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

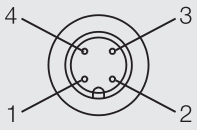
Temperature sensor		
Process connection	thread	G1/2" combined with Negele weld-in sleeves, build-in systems, adapter sleeves
Tightening torque	sensor sealing PEEK sensor sealing stainless steel	10 Nm 20 Nm
Insertion length EL	TFP-41, -51, -61, -161, -181 TFP-44, -54, -164, -184	20...500 mm front flush
Materials	connecting head thermowell at TFP-44, -54, -164, -184	stainless steel 1.4305 stainless steel 1.4404 PEEK
Operating pressure	TFP-41, -51, -61, -161, -181 TFP-44, -54, -164, -184	50 bar maximum 10 bar maximum
Temperature ranges	ambient sensor tip TFP-xx1 sensor tip TFP-xx4	-50...+80 °C -50...+250 °C -50...+140 °C
Sensing resistor	acc. to DIN EN 60751	Pt100
Electrical connection	cable gland cable connection fixed cable 2.5 m fixed cable 2.5 m (≥ 90 °C)	M16 x 1,5 M12-plug 1.4305, 4-pins LIYY 4 x 0,25 mm² PTFE 4 x 0,14 mm²
Protection class		IP 69 K (with electrical connection M12-plug)

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 programable 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 %

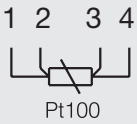
Accuracy classes of temperature sensors | Tolerances for Pt100 acc. to DIN EN 60751			
Pt100	**A**	**1/3 B**	**1/10 B**
0 °C / 100 Ω	±0.15 K / ±0.06 Ω	±0.10 K / ±0.04 Ω	±0.03 K / ±0.01 Ω
100 °C / 138.5 Ω	±0.35 K / ±0.13 Ω	±0.27 K / ±0.10 Ω	±0.08 K / ±0.03 Ω

Electrical connection without transmitter

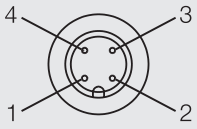
With 1 x M12 plug



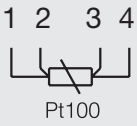
Configuration 1st M12 plug



With 2 x M12 plug

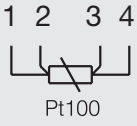


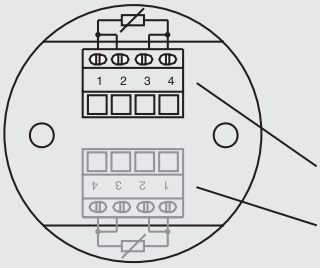
Configuration 2nd M12 plug



With cable gland

Configuration strip terminal





clamps for 1st Pt100

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

With fixed cable

Fixed cable connection with 1 x Pt100

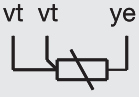
wh ye	bn gn	standard
rd rd	wh wh	PTFE

Fixed cable connection with 2 x Pt100 (LIYY)

wh ye	bn gn	1st Pt100
rd bu	pk gy	2nd Pt100

Fixed cable connection with 2 x Pt100 (PTFE)

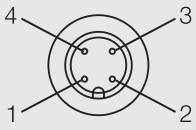
rd rd	wh	1st Pt100
vt vt	ye	2nd Pt100



Electrical connection with transmitter

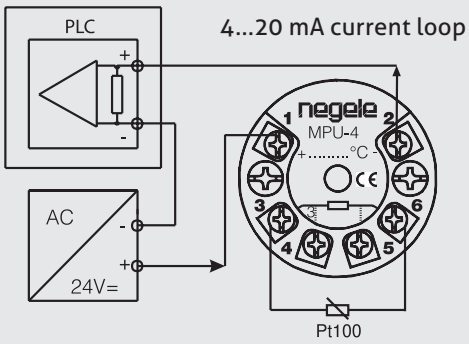
With M12 plug

Configuration M12 plug



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

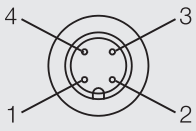
With cable gland



Electrical connection with two transmitter (TFP-61)

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

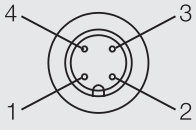
Configuration M12-plug



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)

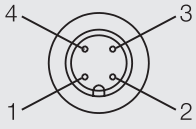
Configuration M12-plug



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

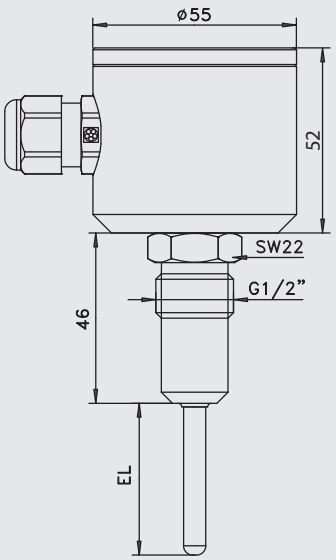
With 2 x M12-plug (sensor 2)

Configuration M12-plug

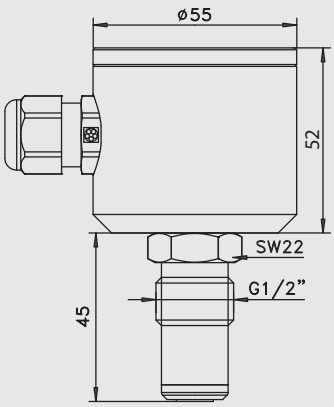


1: + supply (sensor 2)
2: - supply 4...20 mA (sensor 2)
3: not connected
4: not connected

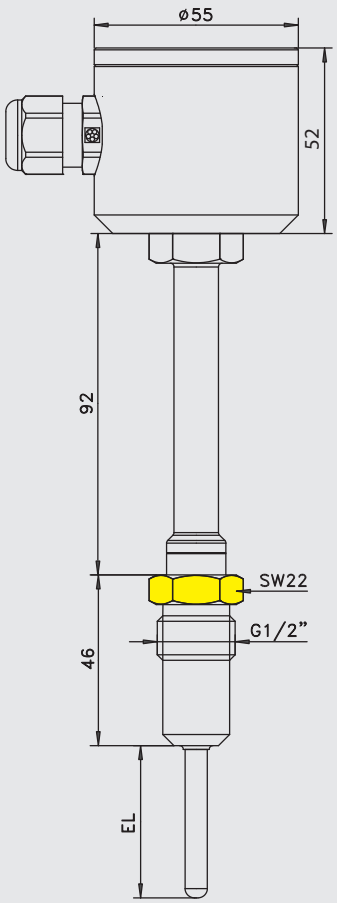
TFP-41 | TFP-41.2



TFP-44



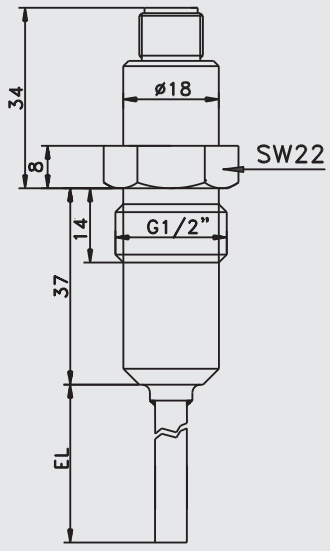
TFP-51 | TFP-51.2



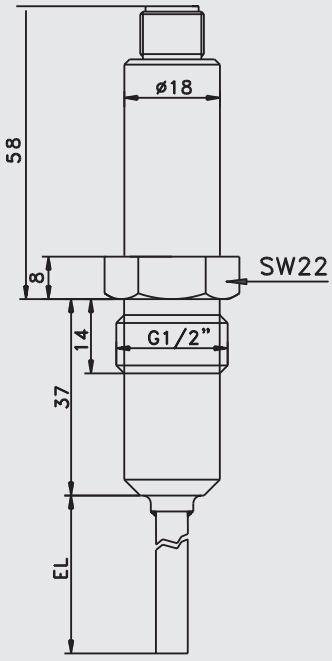
Important advice for TFP-51, -51.2 and TFP-54

Tighten the sensor only at the lower, marked in yellow spanner flat (BE = 22 mm)!

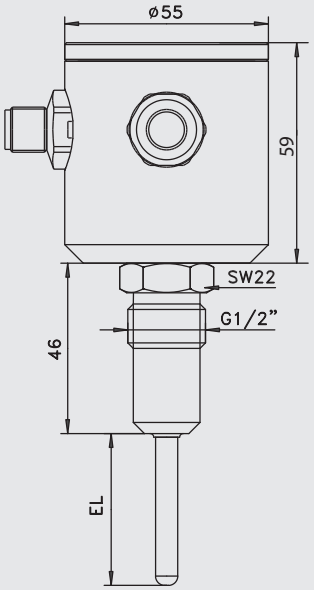
TFP-161



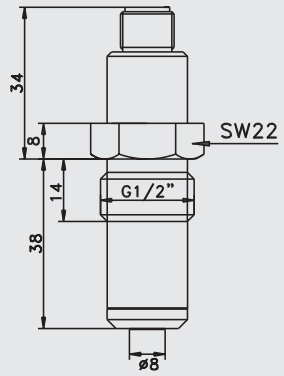
TFP-161 / ... / MPU-M



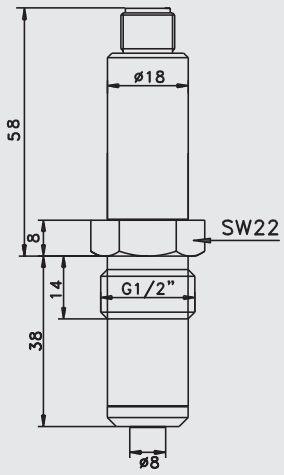
TFP-61



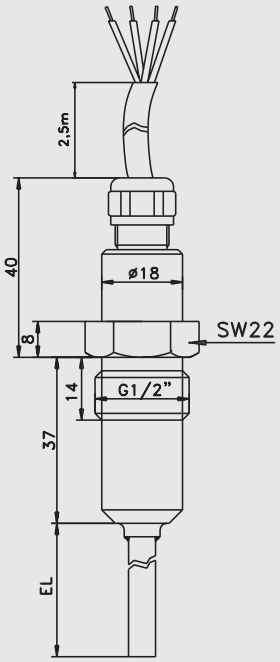
TFP-164



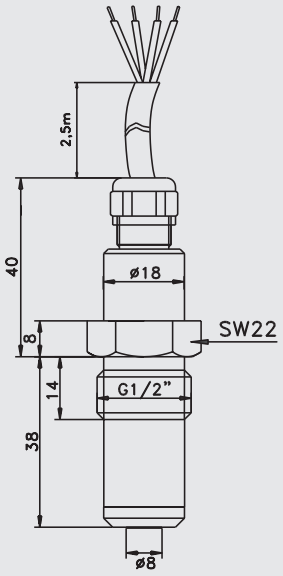
TFP-164 / ... / MPU-M



TFP-181 | 181.2



TFP-184

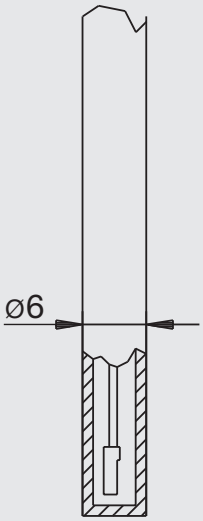


Sensor tip diameter and response time

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

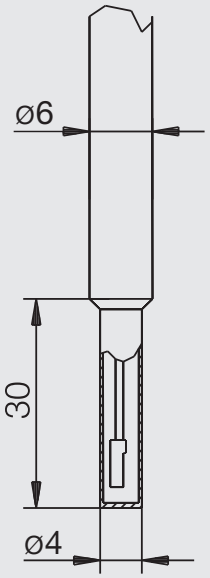
Sensor tip Ø 6 mm

50 %-time: $t_{50} \leq 3.0$ s
90 %-time: $t_{90} \leq 8.0$ s



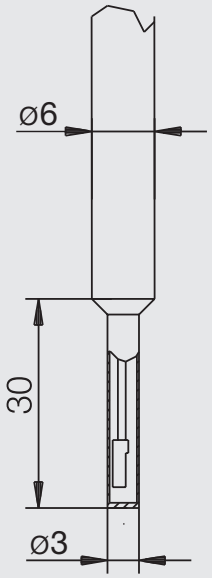
Sensor tip Ø 4 mm

50 %-time: $t_{50} \leq 2.4$ s
90 %-time: $t_{90} \leq 6.5$ s



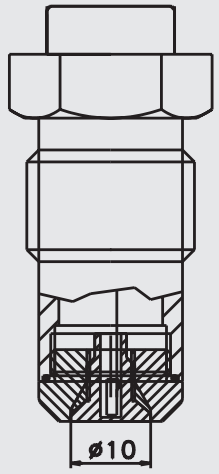
Sensor tip Ø 3 mm

50 %-time: $t_{50} \leq 0.5$ s
90 %-time: $t_{90} \leq 1.5$ s



Sensor front flush

50 %-time: $t_{50} \leq 5.7$ s
90 %-time: $t_{90} \leq 33.2$ s



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

- The sensors TFP-44, -54, -164, -184 conforming to the 3-A Sanitary Standard.
- The sensors are designed for CIP-/ SIP-cleaning. Maximum 140 °C / 120 minutes.
- Only with the build-in system CLEANadapt (EMZ, EMK, EHG with tube ≥ DN25, ISO 20 and G1", Adapter AMC and AMV) allowed.
- Using the weld in sleeve EMZ, EMK the weld must comply to the requirements of the current 3-A Sanitary Standard.
- Mounting position, self draining and the position of the leackage hole must be in accordance to current 3-A Sanitary Standard.

Mechanical connection/Installation

- Use only Negele CLEANadapt system for safe operation of measuring point!

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
- 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!

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.

Order code for version with 1 x Pt100

TFP-41 (connecting head Ø 55 mm)
TFP-44 (connecting head Ø 55 mm, front flush)
TFP-51 (connecting head Ø 55 mm, with spacer)
TFP-54 (connecting head Ø 55 mm, with spacer, front flush)
TFP-161 (connecting head Ø 18 mm, electrical connection M12 plug)
TFP-164 (connecting head Ø 18 mm, electrical connection M12 plug, front flush)
TFP-181 (connecting head Ø 18 mm, electrical connection 2.5 m PTFE-cable, other lengths: see accessories, no transmitter possible!)
TFP-184 (connecting head Ø 18 mm, electrical connection 2.5 m PTFE-cable, other lengths: see accessories, front flush, no transmitter possible!)

Sensor length in mm
020...500 (in steps of 5 mm)
xxx (special length on request)

Diameter thermowell in mm (not selectable for TFP-44, -54, -164, -184)
6
8
10
12

Diameter sensor tip in mm (not selectable for TFP-44, -54, -164, -184)
X (no reduction)
3 (only for thermowell 6 mm)
4 (only for thermowell 6 mm and 8 mm)
6 (only for thermowell 8 mm and 10 mm)
8 (only for thermowell 12 mm)

Accuracy class Pt100
A
1/3B
1/10B

Electrical connection
(not selectable for TFP-161, -164, -181, -184)
PG (cable gland M16x1.5)
M12 (M12 plug, standard with MPU-LCD)

Transmitter

X (without)

only for TFP-41, -44, -51 and -54
MPU-4 (programmable)
MPU-10 (Profibus PA)
MPU-H (HART-protocol)
MPU-LCD (with display)

only for TFP-161 and -164

MPU-M (programmable)

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

TFP-41 / 100 / 6 / X / A / PG / MPU-4 / 0...100

Order code for version with 2 x Pt100

TFP-41.2 (connecting head Ø 55 mm, 2 x Pt100, no transmitter possible!)
TFP-51.2 (connecting head Ø 55 mm, 2 x Pt100, with spacer, no transmitter possible!)
TFP-61 (higher connecting head Ø 55 mm, 2 x Pt100, prepared for 2 x transmitter)
TFP-61-H (like TFP-61, but with spacer)
TFP-181.2 (connecting head Ø 18 mm, electrical connection 2.5 m PTFE-cable; other lengths: see at accessories)

Sensor Length in mm
020...500 (in steps of 5 mm)
xxx (special length)

Diameter thermowell in mm
6
8
10
12

Diameter sensor tip in mm
X (no reduction)
3 (only with thermowell 6 mm)
4 (only with thermowell 6 mm and 8 mm)
6 (only with thermowell 8 mm and 10 mm)
8 (only with thermowell 12 mm)

Accuracy class Pt100
A
1/3B
1/10B

Electrical connection (only for TFP-41.2 and TFP-51.2)
PG (cable gland M16x1.5)
2PG (2 x cable gland M16x1.5)
2M12 (2 x M12-plug)

Electrical connection (only for TFP-61 and TFP-61-H)
M12 (M12-plug)
2M12 (2 x M12-plug)

Continue if TFP-61 oder TFP-61-H is selected!
No further options for TFP-41.2, -51.2, -181.2!

1. Transmitter
MPU-4 (programmable)

Measuring range 1. MPU
-10...40 (measuring range -10...40 °C)
0...50 (measuring range 0...+50 °C)
0...100 (measuring range 0...+100 °C)
0...150 (measuring range 0...+150 °C)
0...200 (measuring range 0...+200 °C)
xx...yy (special range)

2. Transmitter
MPU-4 (programmable)

Measuring range 2. MPU
-10...40 (-10...40 °C)
0...50 (0...+50 °C)
0...100 (0...+100 °C)
0...150 (0...+150 °C)
0...200 (0...+200 °C)
xx...yy (special)

TFP-61 /	**100 /**	**6 /**	**X /**	**A /**	**M12 /**	**MPU-4 /**	**0...50 /**	**MPU-4 /**	**0...50**