

## Product Information TFP-42, -52, -62, -162, -182

## FOOD

# Temperature Sensor with M12 hygienic



## Application / Specified Usage

- Temperature Measurement in pipes DN15...DN80
- Temperature measurement in thin-walled pipes and vessels

## Application Examples

- Process monitoring
- Monitoring of CIP- / SIP-process
- Temperature measurement in UHT-plants

## Hygienic Design / Process Connection

- Flow optimized, hygienic and easy sterilizable installation by using Negele weld-in sleeve, e.g. EMK-032 or build-in system, e.g. EHG-... / M12
- Additional process connections: adapters for TriClamp, 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

## Features / Advantages

- Integrated transmitter optional
- Different electrical connections available

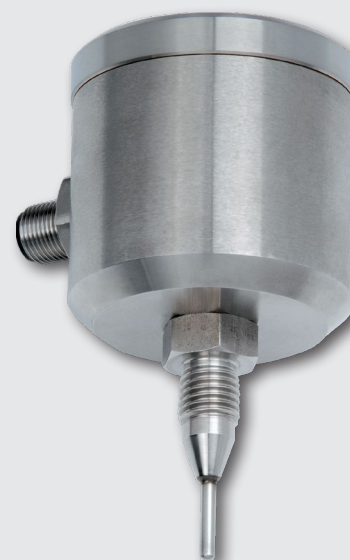
## Options / Accessories

- 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 HART-protocol
- Integrated transmitter MPU-LCD with display in connecting head
- Programming adapter MPU-P 9701
- Pt100 chip with other classes of accuracy (1/3B, 1/10B)
- Sensor tips with diameter 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
- Calibration certificate (optional with order)

## Authorizations



## Temperature Sensor TFP-42



## Temperature Sensor TFP-162 with transmitter MPU-M



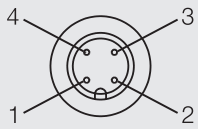
Temperature sensor		
Process connection	thread	M12 CLEANadapt; combined with Negele weld-in sleeves, build-in-systems, adapter sleeves
Tightening torque		10 Nm
Insertion length	standard	20...500 mm
Materialis	connecting head thermowell	stainless steel 1.4301 (AISI 304) stainless steel 1.4404 (AISI 316L)
Operating pressure		50 bar maximum
Temperature ranges	ambient sensor tip	-50...+80 °C -50...+250 °C
Sensing resistor	acc. to DIN EN 60751	Pt100
Electrical connection	cable gland cabel connection fixed cable 2,5 m fixed cable 2,5 m (>90 °C)	M16 x 1,5 M12 plug 1.4301 (AISI 304), 4-pins LIYY 4 x 0,25 mm <sup>2</sup> PTFE 4 x 0,14 mm <sup>2</sup>
Protection class		IP 69 K (with electrical connection M12 plug)

Transmitter MPU-4, MPU-H, MPU-M		
Temperature ranges	ambient storage	-40...+85 °C -55...+90 °C
Measuring ranges	MPU-4, MPU-H, MPU-M	standard: -10...40 °C, 0...50 / 100 / 150 / 200 °C special ranges free programable
Accuracy	input	< ±0.25 °C
Temperature drift	zero, span	< 0.01 % / 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 < ±0.1 % of measurement range < 600 Ω (at U <sub>B</sub> = 24 V)
Humidity	without condensation	0...98 %

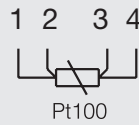
Accuracy classes of temperature sensors   Tolerances for Pt100 acc. to DIN EN 60751			
Pt100	A	1/3 B	1/10 B
0 °C / 100 Ω	±0,15 K / ±0,06 Ω	±0,10 K / ±0,04 Ω	±0,03 K / ±0,01 Ω
100 °C / 138,5 Ω	±0,35 K / ±0,13 Ω	±0,27 K / ±0,10 Ω	±0,08 K / ±0,03 Ω

## Electrical connection without transmitter

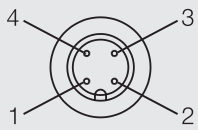
## With 1 x M12 plug



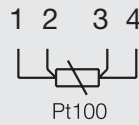
## Configuration 1st M12 plug



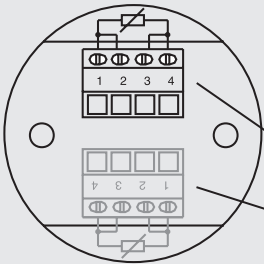
## With 2 x M12 plug



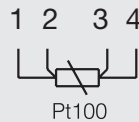
## Configuration 2nd M12 plug



## With cable gland



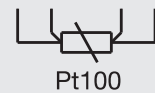
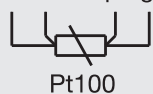
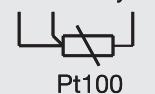
## Configuration strip terminal



clamps for 1st Pt100

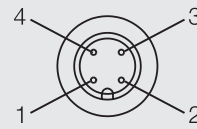
clamps for 2nd Pt100  
(at version 2 x Pt100)

## With fixed cable

Fixed cable connection  
with 1 x Pt100wh ye bn gn standard  
rd rd wh wh PTFEFixed cable connection  
with 2 x Pt100 (LIYY)wh ye bn gn 1st Pt100  
rd bu pk gy 2nd Pt100Fixed cable connection  
with 2 x Pt100 (PTFE)rd rd wh 1st Pt100  
vt vt ye 2nd Pt100

## Electrical connection with transmitter

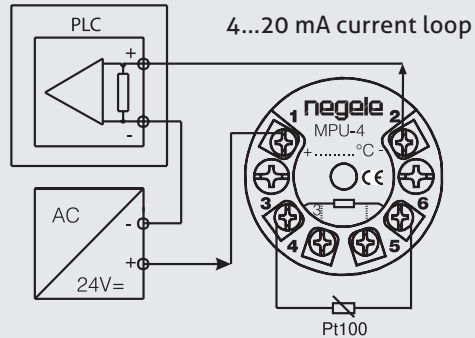
## With M12 plug



## Configuration M12 plug

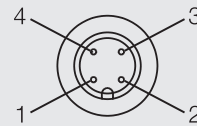
1: + supply  
2: - supply 4...20 mA  
3: not connected  
4: not connected

## With cable gland



## Electrical connection with two transmitter (TFP-62)

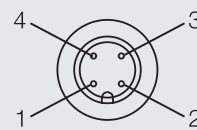
## With 1 x M12 plug (sensor 1 + sensor 2)



## 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)

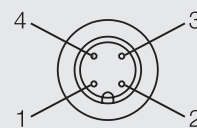
## With 2 x M12 plug (sensor 1)



## Configuration M12 plug

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

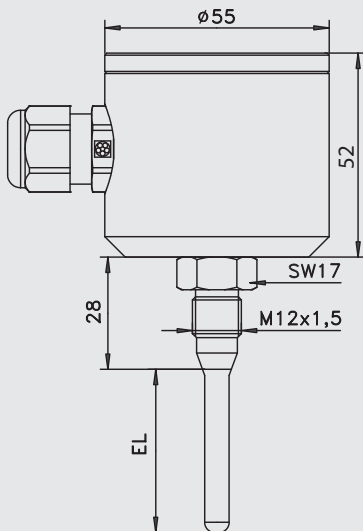
## With 2 x M12 plug (sensor 2)



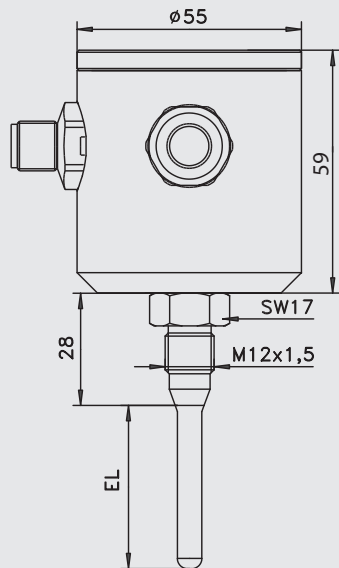
## Configuration M12 plug

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

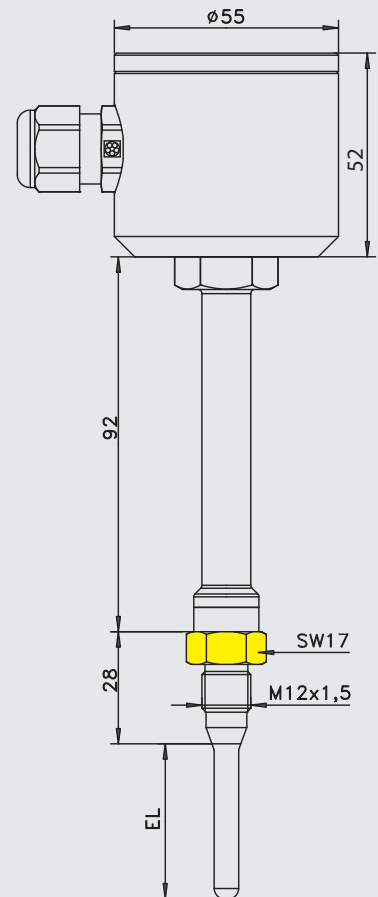
TFP-42 | TFP-42.2



TFP-62

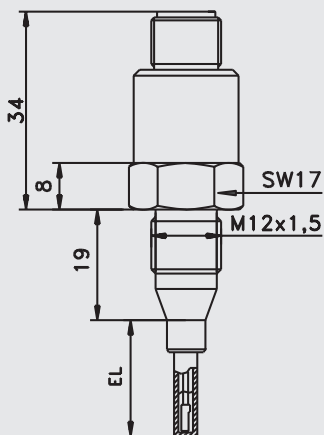


TFP-52 | TFP-52.2

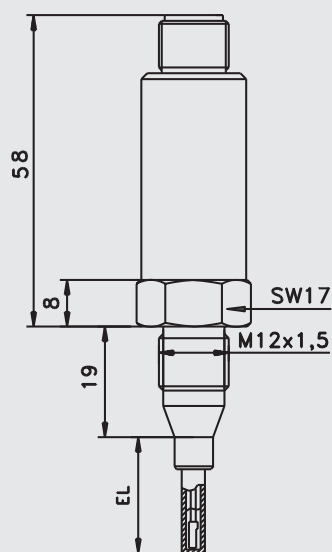
**Important advice for TFP-52 und -52.2**

Tighten the sensor only at the lower, marked in yellow spanner flat (BE = 17 mm)!

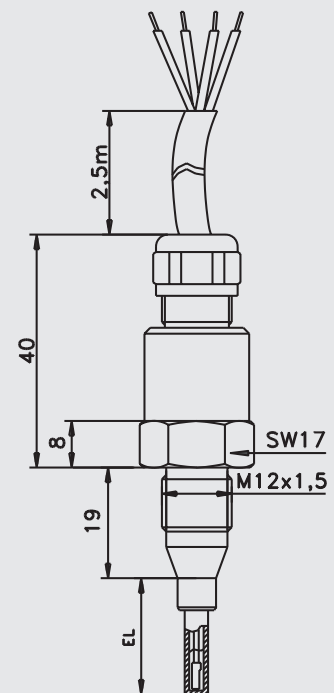
TFP-162



TFP-162 / ... / MPU-M



TFP-182 | TFP-182.2



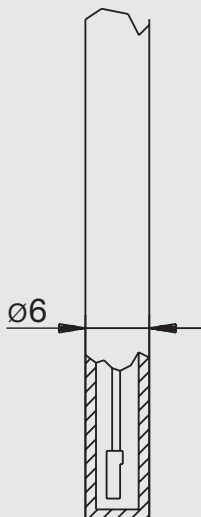
**Sensor tip diameter and response time**

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 tipe Ø 6 mm**

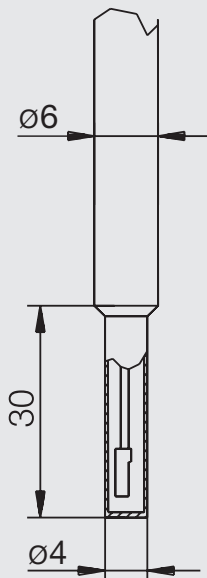
50 %-time:  $t_{50} \leq 3,0$  s

90 %-time:  $t_{90} \leq 8,0$  s

**Sensor tip Ø 4 mm**

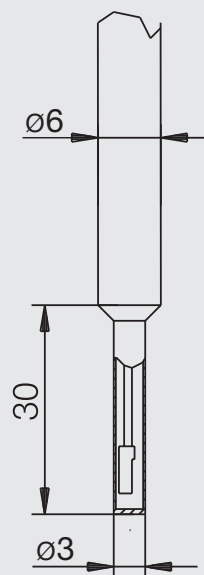
50 %-time:  $t_{50} \leq 2,4$  s

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



**Mechanical Connection / Installation**

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

**Conventional Usage**

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

**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 %

**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!

**Cleaning / Maintenance**

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

**Standards and Guidelines**

- You have to comply with applicable regulations and directives.

**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 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.

## Temperature Transmitter MPU-LCD with Display

**Application / Specified Usage**

- 4...20mA 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)**

## Order code for version with 1 x Pt100

<b>TFP-42</b>	(connecting head Ø 55 mm)						
<b>TFP-52</b>	(connecting head Ø 55 with spacer)						
<b>TFP-162</b>	(connecting head Ø 18 mm, electrical connection via M12 plug)						
<b>TFP-182</b>	(connecting head Ø 18 mm, electrical connection via 2,5 m PVC-cable; other lengths: see accessories; no transmitter possible!)						
	<b>Sensor length EL in mm</b>						
	<b>020...500</b>	(in steps of 5 mm)					
	<b>xxx</b>	(special length)					
		<b>Diameter thermowell in mm (only selectable at sensor length &gt; 30 mm)</b>					
		<b>4</b>	(only with sensor tip 4 mm)				
		<b>6</b>					
		<b>Diameter sensor tip in mm</b>					
		<b>3</b>	(only with thermowell 6 mm)				
		<b>4</b>	(only with thermowell 6 mm, standard when sensor length ≤ 30 mm)				
		<b>6</b>	(only with thermowell 6 mm)				
		<b>Accuracy class Pt100</b>					
		<b>A</b>					
		<b>1/3B</b>					
		<b>1/10B</b>					
		<b>Electrical connection</b>					
		<b>(not selectable at TFP-162 and -182)</b>					
		<b>PG</b>	(cable gland M16x1,5)				
		<b>M12</b>	(M12 plug, standard with MPU-LCD)				
		<b>Transmitter</b>					
		<b>X</b>	(without)				
		<b>for TFP-42 and -52</b>					
		<b>MPU-4</b>	(programmable)				
		<b>MPU-H</b>	(HART-protocol)				
		<b>MPU-LCD</b>	(with display)				
		<b>only for TFP-162 (not for TFP-182)</b>					
		<b>MPU-M</b>	(programmable)				
		<b>Measuring range MPU</b>					
		<b>(only for types with transmitter; not for MPU-LCD)</b>					
		<b>-10...40</b>	(range -10...40 °C)				
		<b>0...50</b>	(range 0...50 °C)				
		<b>0...100</b>	(range 0...100 °C)				
		<b>0...150</b>	(range 0...150 °C)				
		<b>0...200</b>	(range 0...200 °C)				
		<b>xx...yy</b>	(special range)				
<b>TFP-42 /</b>	<b>050 /</b>	<b>6 /</b>	<b>4 /</b>	<b>A /</b>	<b>PG /</b>	<b>MPU-4 /</b>	<b>0...100</b>

## 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

## PVC-cable with M12-connection



## Order code for version with 2 x Pt100

**TFP-42.2** (connecting head Ø 55 mm, 2 x Pt100, no transmitter possible!)

**TFP-52.2** (connecting head Ø 55 mm, 2 x Pt100, with spacer, no transmitter possible!)

**TFP-62** (higher connecting head Ø 55 mm, 2 x Pt100, prepared for 2 x transmitter)

**TFP-62-H** (like TFP-62, but with spacer)

**TFP-182.2** (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 (only selectable at sensor length &gt; 30 mm)

**4** (only with sensor tip 4 mm)

**6**

## Diameter sensor tip in mm

**3** (only with thermowell 6 mm)

**4** (only with thermowell 6 mm, standard when sensor length ≤ 30 mm)

**6** (only with thermowell 6)

## Accuracy class Pt100

**A**

**1/3B**

**1/10B**

## Electrical connection (only for TFP-42.2 and TFP-52.2)

**PG** (cable gland M16x1,5)

**2PG** (2 x cable gland M16x1,5)

**2M12** (2 x M12 plug)

## Electrical connection (only for TFP-62 and TFP-62-H)

**M12** (M12 plug)

**2M12** (2 x M12 plug)

**Continue if TFP-62 or TFP-62-H is selected!**

**No further options for TFP-42.2, -52.2, -182.2!**

## 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-62 / 100 / 6 / X / A / M12 / MPU-4 / 0...50 / MPU-4 / 0...50