

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

## FOOD

## Temperature Sensor with G1/2" hygienic



## 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 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

## Accessories

## PVC-cable with M12-connection made of 1.4305, IP 69 K, unshielded

M12-PVC / 4-5 m  
M12-PVC / 4-10 m  
M12-PVC / 4-25 m

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

## Authorizations

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

## Temperature sensor TFP-41



## PVC-cable with M12-connection



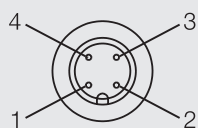
Temperature sensor		
Process connection	thread	G1/2" combined with Negele weld-in sleeves, build-in systems, adapter sleeves
Tightening torque	sensor sealing PEEK sensor sealing stainless steel	10 Nm 20 Nm
Insertion length EL	TFP-41, -51, -61, -161, -181 TFP-44, -54, -164, -184	20...500 mm front flush
Materials	connecting head thermowell at TFP-44, -54, -164, -184	stainless steel 1.4301 (AISI 304) stainless steel 1.4404 (AISI 316L) 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 1.4301 (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 programmable
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 %

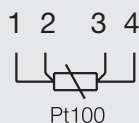
Accuracy classes of temperature sensors   Tolerances for Pt100 acc. to DIN EN 60751			
Pt100	A	1/3 B	1/10 B
0 °C / 100 Ω	±0,15 K / ±0,06 Ω	±0,10 K / ±0,04 Ω	±0,03 K / ±0,01 Ω
100 °C / 138,5 Ω	±0,35 K / ±0,13 Ω	±0,27 K / ±0,10 Ω	±0,08 K / ±0,03 Ω

## Electrical connection without transmitter

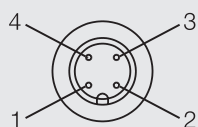
## With 1 x M12 plug



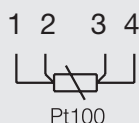
## Configuration 1st M12 plug



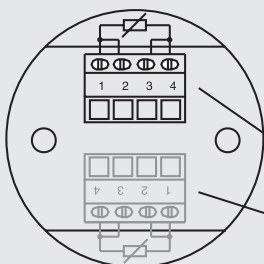
## With 2 x M12 plug



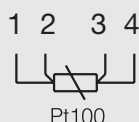
## Configuration 2nd M12 plug



## With cable gland



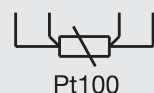
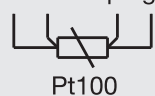
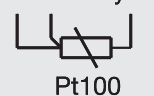
## Configuration strip terminal



clamps for 1st Pt100

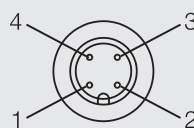
clamps for 2nd Pt100  
(at version 2 x Pt100)

## 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

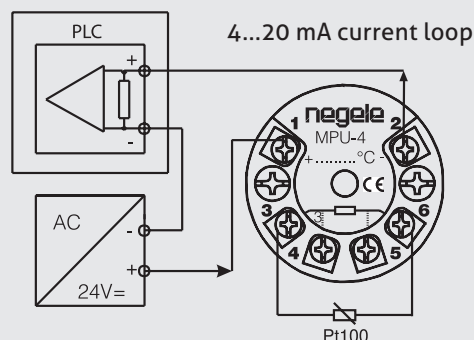
## With M12 plug



## Configuration M12 plug

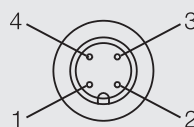
1: + supply  
2: - supply 4...20 mA  
3: not connected  
4: not connected

## With cable gland



## Electrical connection with two transmitter (TFP-61)

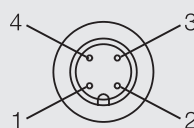
## With 1 x M12 plug (sensor 1 + sensor 2)



## 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)

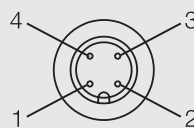
## With 2 x M12 plug (sensor 1)



## Configuration M12 plug

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

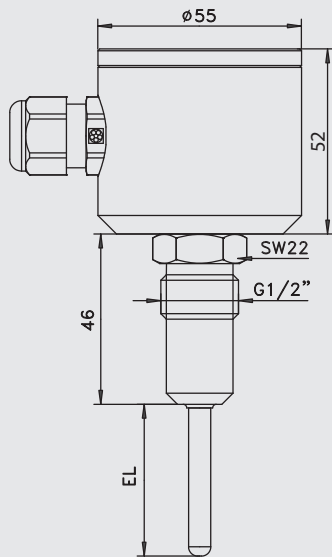
## With 2 x M12 plug (sensor 2)



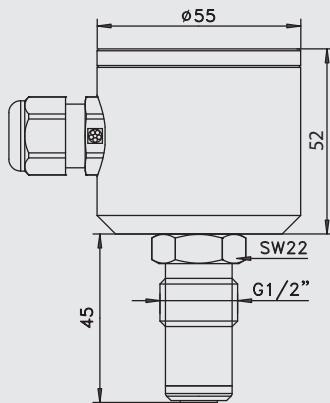
## Configuration M12 plug

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

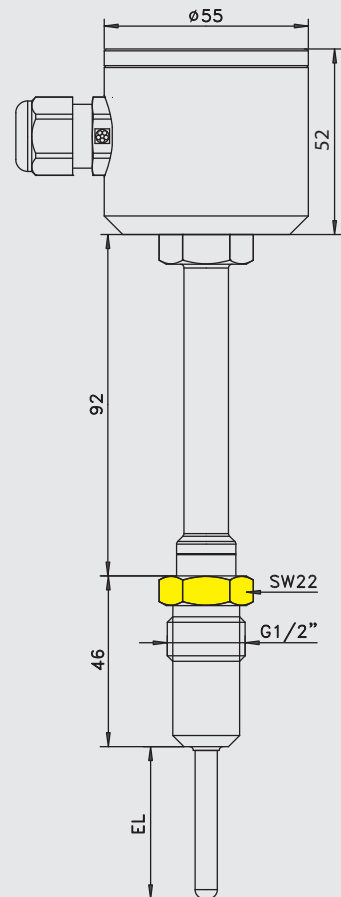
TFP-41 | TFP-41.2



TFP-44

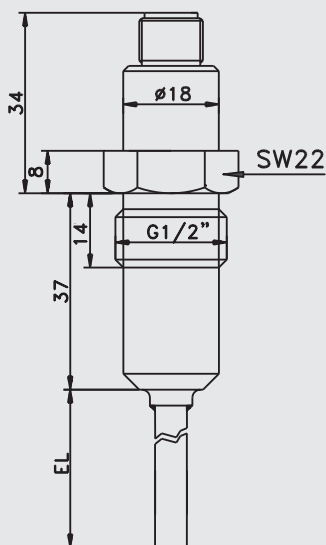


TFP-51 | TFP-51.2

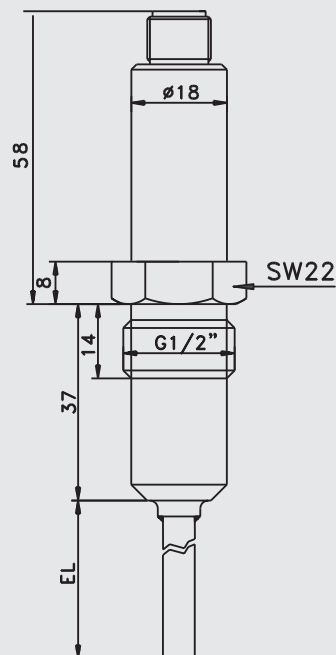
**Important advice for TFP-51, -51.2 and TFP-54**

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

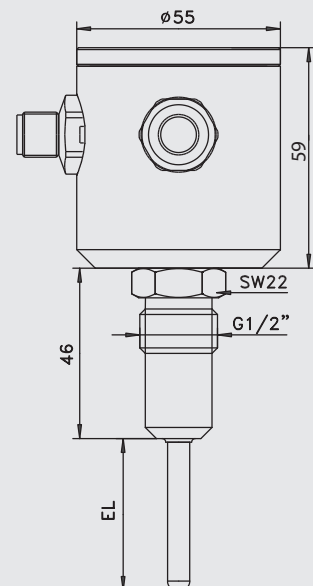
TFP-161

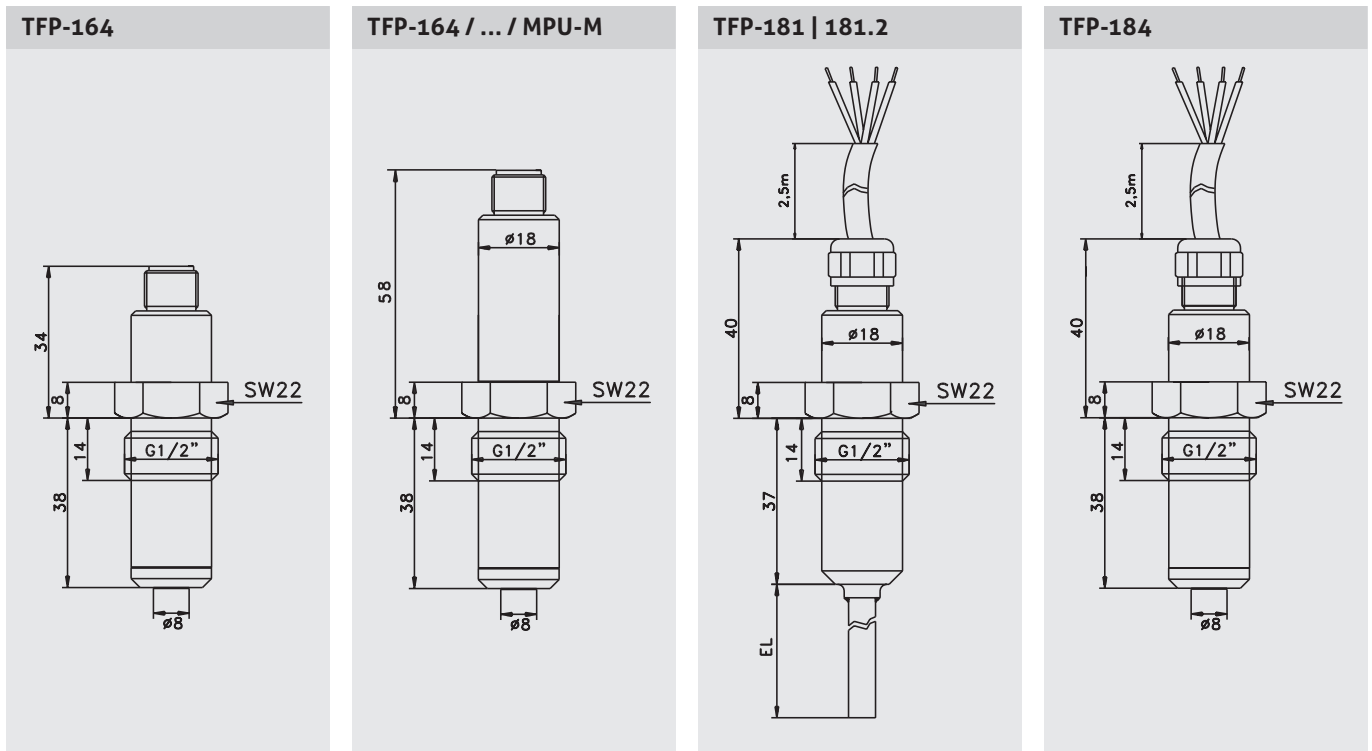


TFP-161 / ... / MPU-M



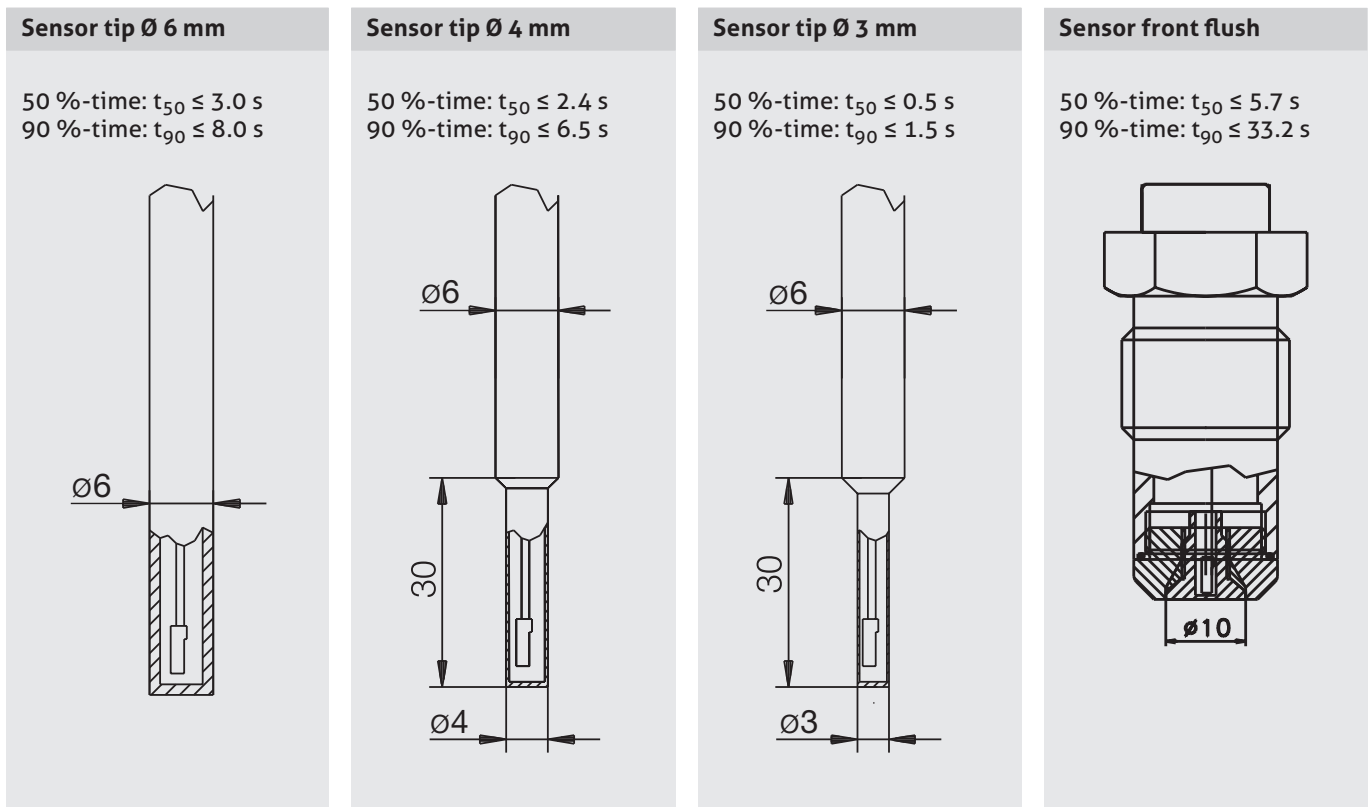
TFP-61





#### 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.



**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 leakage 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!

**Conventional usage**

- Not suitable for applications in explosive areas.
- Not suitable for applications in safety-relevant system parts (SIL).

**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%

**Standards and guidelines**

- Compliance with the applicable regulations and directives is mandatory.

**Cleaning/Maintenance**

- When using a pressure washer, do not point the nozzle directly at the electrical connections.

**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.

**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!

**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

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

<b>020...500</b>	(in steps of 5 mm)
<b>xxx</b>	(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)

<b>X</b>	(no reduction)
<b>3</b>	(only for thermowell 6 mm)
<b>4</b>	(only for thermowell 6 mm and 8 mm)
<b>6</b>	(only for thermowell 8 mm and 10 mm)
<b>8</b>	(only for thermowell 12 mm)

## Accuracy class Pt100

**A**  
**1/3B**  
**1/10B**

## Electrical connection

(not selectable for TFP-161, -164, -181, -184)

<b>PG</b>	(cable gland M16x1.5)
<b>M12</b>	(M12 plug, standard with MPU-LCD)

## Transmitter

**X** (without)

only for TFP-41, -44, -51 and -54

<b>MPU-4</b>	(programmable)
<b>MPU-H</b>	(HART-protocol)
<b>MPU-LCD</b>	(with display)

only for TFP-161 and -164

**MPU-M** (programmable)

## Measuring range MPU

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

<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)

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**