



**TFP Ø 18 mm**  
no longer available!



**Successor: TSMF**  
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HYGIENIC BY DESIGN

**ANDERSON-NEGELE**

**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



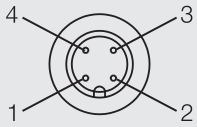
<b>Temperature sensor</b>		
<b>Process connection</b>	thread	G1/2" combined with Negele weld-in sleeves, build-in systems, adapter sleeves
<b>Tightening torque</b>	sensor sealing PEEK sensor sealing stainless steel	10 Nm 20 Nm
<b>Insertion length EL</b>	TFP-41, -51, -61, -161, -181 TFP-44, -54, -164, -184	20...500 mm front flush
<b>Materials</b>	connecting head thermowell at TFP-44, -54, -164, -184	stainless steel 1.4301 (AISI 304) stainless steel 1.4404 (AISI 316L) PEEK
<b>Operating pressure</b>	TFP-41, -51, -61, -161, -181 TFP-44, -54, -164, -184	50 bar maximum 10 bar maximum
<b>Temperature ranges</b>	ambient sensor tip TFP-xx1 sensor tip TFP-xx4	-50...+80 °C -50...+250 °C -50...+140 °C
<b>Sensing resistor</b>	acc. to DIN EN 60751	Pt100
<b>Electrical connection</b>	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>
<b>Protection class</b>		IP 69 K (with electrical connection M12 plug)

<b>Transmitter MPU-4, MPU-H, MPU-M</b>		
<b>Temperature ranges</b>	ambient storage	-40...+85 °C -55...+90 °C
<b>Measuring ranges</b>	MPU-4, MPU-H, MPU-M	standard: -10...40 °C, 0...50 / 100 / 150 / 200 °C special ranges free programmable
<b>Accuracy</b>	input	< ±0.25 °C
<b>Temperature drift</b>	zero, span	< 0.01 % / K
<b>Supply</b>	MPU-4, MPU-H, MPU-M accuracy	8...35 V DC 0.01 % / V (reference: 12 V DC)
<b>Output</b>	signal accuracy burden	analog 4...20 mA < ±0.1 % of measurement range < 600 Ω (at U <sub>B</sub> = 24 V)
<b>Humidity</b>	without condensation	0...98 %

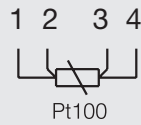
<b>Accuracy classes of temperature sensors   Tolerances for Pt100 acc. to DIN EN 60751</b>			
<b>Pt100</b>	<b>A</b>	<b>1/3 B</b>	<b>1/10 B</b>
<b>0 °C / 100 Ω</b>	±0,15 K / ±0,06 Ω	±0,10 K / ±0,04 Ω	±0,03 K / ±0,01 Ω
<b>100 °C / 138,5 Ω</b>	±0,35 K / ±0,13 Ω	±0,27 K / ±0,10 Ω	±0,08 K / ±0,03 Ω

Electrical connection without transmitter

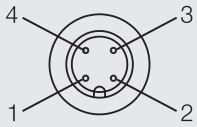
With 1 x M12 plug



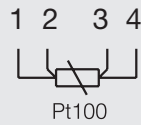
Configuration 1st M12 plug



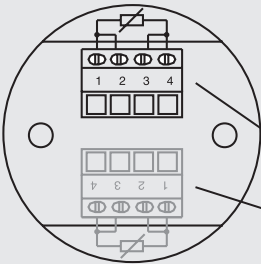
With 2 x M12 plug



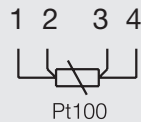
Configuration 2nd M12 plug



With cable gland



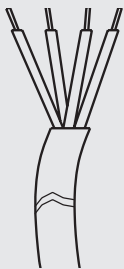
Configuration strip terminal



clamps for 1st Pt100

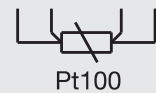
clamps for 2nd Pt100  
(at version 2 x Pt100)

With fixed cable



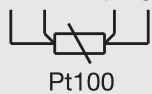
Fixed cable connection with 1 x Pt100

wh ye bn gn standard  
rd rd wh wh PTFE



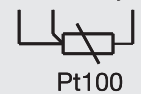
Fixed cable connection with 2 x Pt100 (LIYY)

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



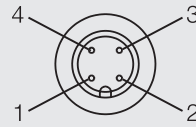
Fixed cable connection with 2 x Pt100 (PTFE)

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



Electrical connection with transmitter

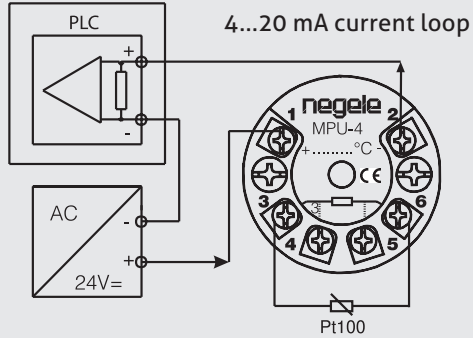
With M12 plug



Configuration M12 plug

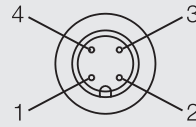
- 1: + supply
- 2: - supply 4...20 mA
- 3: not connected
- 4: not connected

With cable gland



Electrical connection with two transmitter (TFP-61)

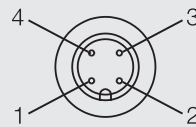
With 1 x M12 plug (sensor 1 + sensor 2)



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)

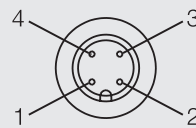
With 2 x M12 plug (sensor 1)



Configuration M12 plug

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

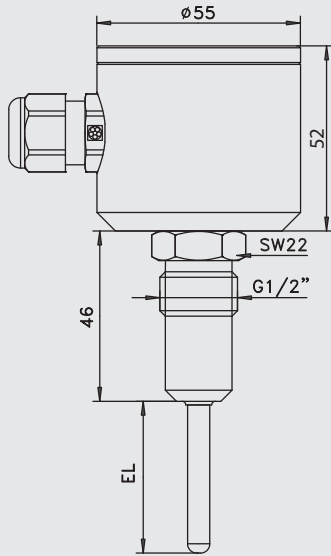
With 2 x M12 plug (sensor 2)



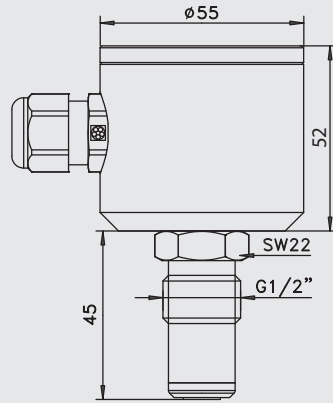
Configuration M12 plug

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

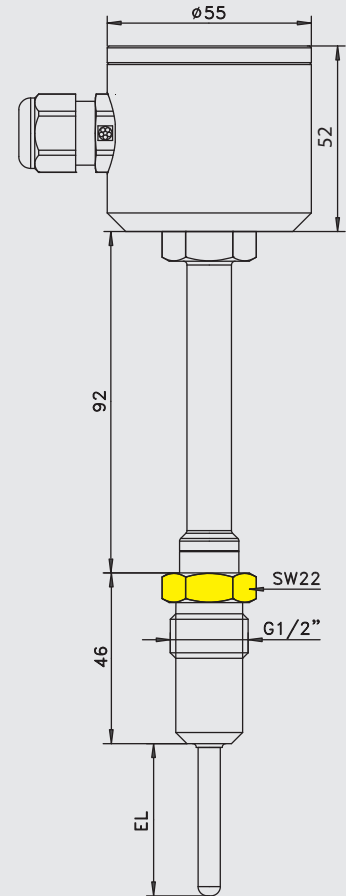
TFP-41 | TFP-41.2



TFP-44



TFP-51 | TFP-51.2

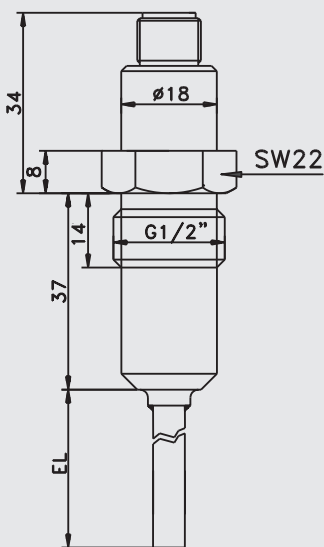


**Important advice for TFP-51, -51.2 and TFP-54**

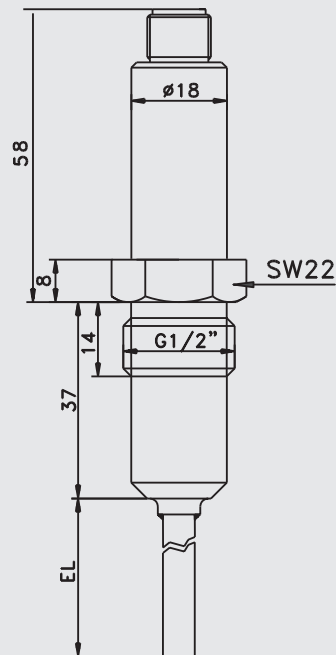


Tighten the sensor only at the lower, marked in yellow spanner flat (BE = 22 mm)!

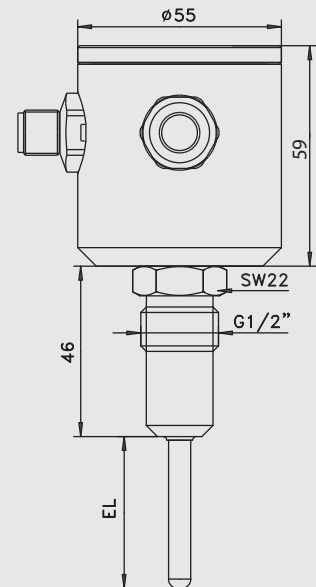
TFP-161

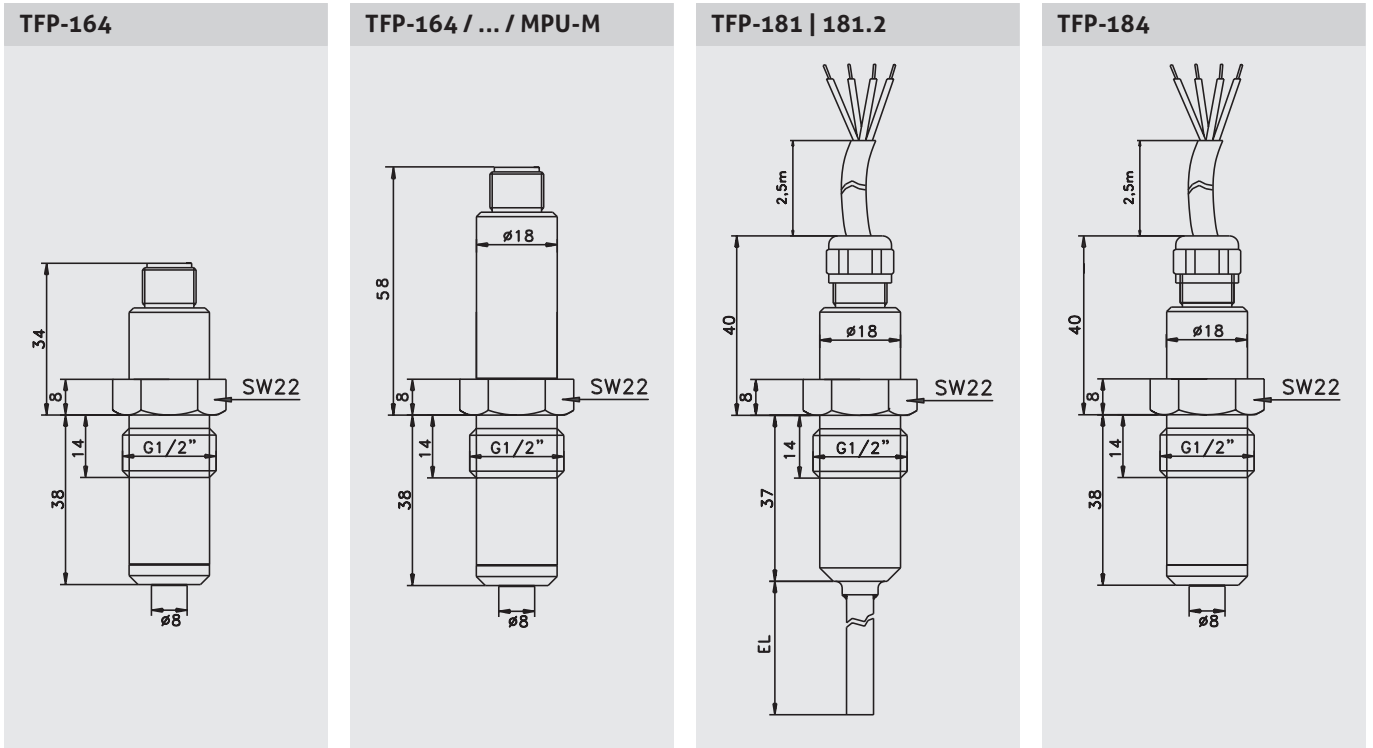


TFP-161 / ... / MPU-M



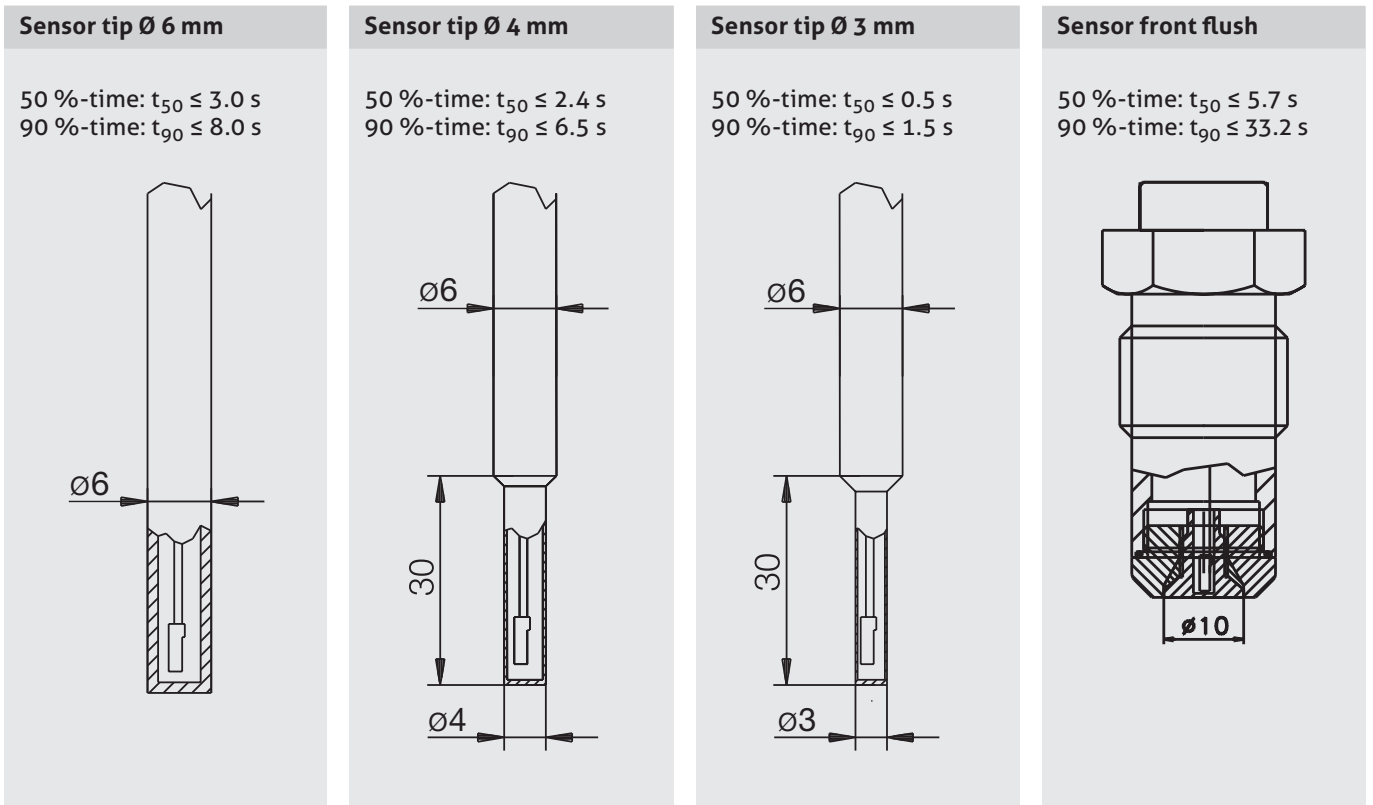
TFP-61





#### 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.



**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  $\geq$  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

**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-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 Ø 18 mm**  
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**TFP-41 / 100 / 6 / X / A / PG / MPU-4 / 0...100**

## Order code for version with 2 x Pt100

<b>TFP-41.2</b>	(connecting head Ø 55 mm, 2 x Pt100, no transmitter possible!)
<b>TFP-51.2</b>	(connecting head Ø 55 mm, 2 x Pt100, with spacer, no transmitter possible!)
<b>TFP-61</b>	(higher connecting head Ø 55 mm, 2 x Pt100, prepared for 2 x transmitter)
<b>TFP-61-H</b>	(like TFP-61, but with spacer)
<b>TFP-181.2</b>	(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)



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