



**TFP Ø 50 mm / 55 mm**

Available until 31.03.2022

**TFP Ø 18 mm**

No longer available!



**Successor: TSB**

One sensor for all applications!

**Successor: TSM**

New, modular and better!

All advantages at [anderson-negele.com](http://anderson-negele.com)



HYGIENIC BY DESIGN

**ANDERSON-NEGELE**

**Product Information TFP-59, -68, -179, -199**

**FOOD**

# Temperature Sensor for Build-In System G3/8" FLEXadapt



## Application/Specified usage

- Temperature measuring in pipes and vessels without opening the process with prefabricated thermowells and build-in systems
- Demounting the sensor without opening the process and without electrical disconnection > avoiding downtime of the equipment at calibration and maintenance!
- Suitable at small pipe diameters with build-in system ESF-G (available for pipes DN25...DN100)

## Application examples

- Flexible applicable for nearly every temperature measuring task in pipes and vessels
- Safe temperature measuring in hotsteam- and pressure pipes (enclosed process)
- Monitoring of CIP- / SIP-cleaning

## Hygienic design/Process connection

- Hygienic and easy sterilizable installation by using Negele build-in system ESF
- CIP-/SIP-cleaning up to 140 °C
- Product contacting materials are compliant to FDA
- Sensor completely made of stainless steel

## Features

- Short reaction time, very compact measure point
- Integrated transmitter (optional)
- Threaded thermowells ESF-G1/2" for CLEANadapt can be combined with many other standard adapters. Therefore they are suitable for each application and process connection (e.g. Tri-Clamp, dairy flange (DIN 11851), DRD, Varivent, APV, BioControl...)
- Quick and easy to install with an orbital welding machine (ESF-G)
- Temperature sensors and build-in systems with pre-defined, concerted standard lengths, reducing the variety and economize costs for storage and simplify the maintenance.
- Different types of electrical connection available
- Protection class IP 69 K (with electrical connection M12 plug)

## Options/Accessories

- 2 x Pt100 (not retrofittable)
- 2 x Pt100 with two transmitters (not retrofittable)
- Programmable transmitters MPU-4 and MPU-M with output 4...20 mA, 2-wire
- Integrated transmitter for HART-protocol
- Programming adapter MPU-P 9701
- Integrated transmitter MPU-LCD with display in connecting head
- Pt100-chip with other classes of accuracy, (1/3 B, 1/10 B)
- Pre-assembled connecting cable for M12 plug
- Fixed cable in other lengths and material available

## Authorisations



## Temperatur sensor TFP-59



## Build-in system ESF ESF-G1/2", ESF-EH, ESF-KM



Temperature Sensor		
Process connection	thermowell	G3/8" external thread
Insertion length	standard	37, 83, 97, 160 mm
Materialis	connection head protection tube cap nut spacer	stainless steel 1.4301 (AISI 304) stainless steel 1.4404 (AISI 316L) stainless steel 1.4571 (AISI 316Ti) stainless steel 1.4301 (AISI 304), Ø 10 mm
Temperature ranges	ambient sensor tip	-50...+80 °C -50...+250 °C
Sensing resistor	acc. to DIN EN 60751	Pt100
Electrical connection	TFP-59 or TFP-179 TFP-199	cable gland M16 x 1.5 M12 plug 1.4301 (AISI 304), 4-pin M12 plug 1.4301 (AISI 304) fixed cable (PVC), standard: 2.5 m
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

Table Reaction Time	ESF-G-DIN2-25	ESF-G1/2"-40	ESF-EH-125	ESF-KM-125
Medium temperature 90 °C				
t <sub>50</sub>	5,8 s	7,8 s	8,0 s	8,0 s
t <sub>90</sub>	19,0 s	21,1 s	24,0 s	24,0 s

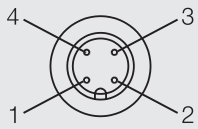
### Reaction Time



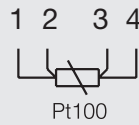
We recommend the use of heat-conductive paste to reduce the mentioned reaction times down to approx. 50 %!

## Electrical connection without transmitter

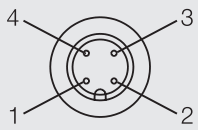
## With 1 x M12 plug



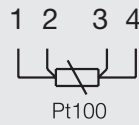
## Configuration 1st M12 plug



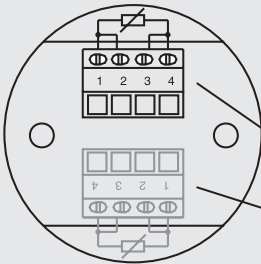
## With 2 x M12 plug



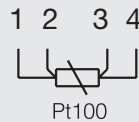
## Configuration 2nd M12 plug



## With cable gland



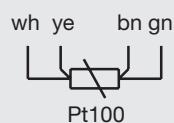
## Configuration strip terminal



clamps for 1st Pt100

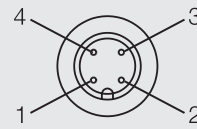
clamps for 2nd Pt100  
(at version 2 x Pt100)

## With fixed cable PVC (0...90 °C)

Fixed cable connection  
with 1 x Pt100

## Electrical connection with transmitter

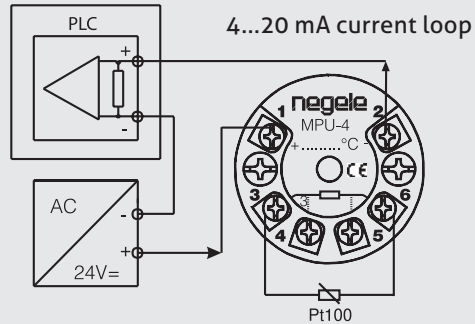
## With M12 plug



## Configuration M12 plug

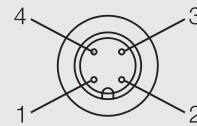
- 1: + supply
- 2: - supply 4...20 mA
- 3: not connected
- 4: not connected

## With cable gland



## Electrical connection with two transmitter (TFP-68)

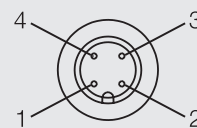
## With 1 x M12 plug (sensor 1 + sensor 2)



## 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)

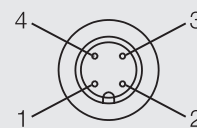
## With 2 x M12 plug (sensor 1)



## Configuration M12 plug

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

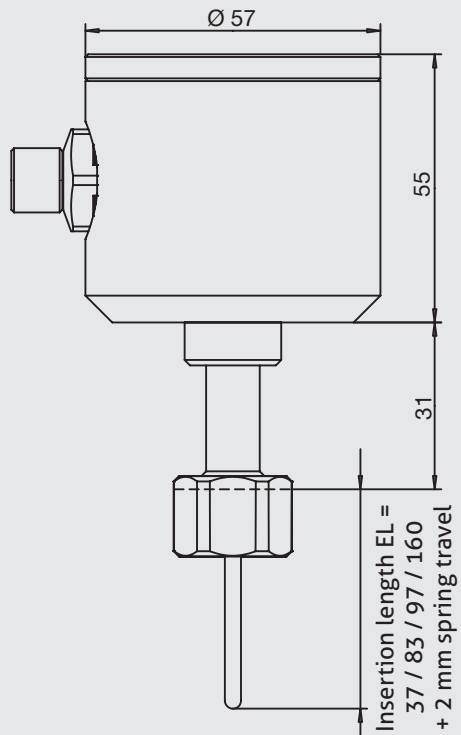
## With 2 x M12 plug (sensor 2)



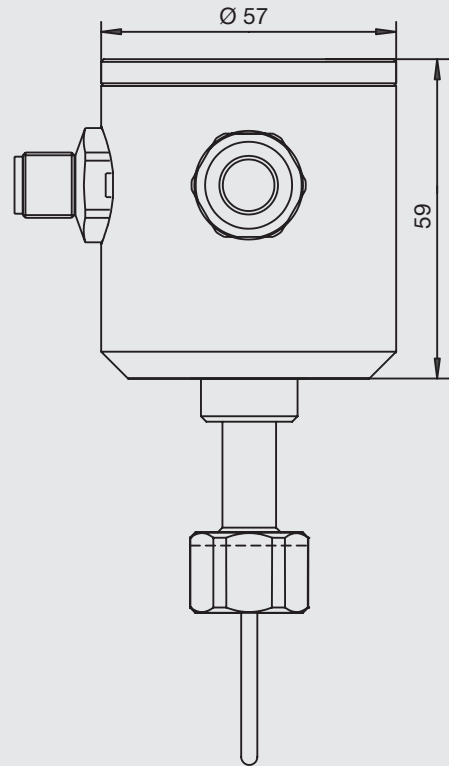
## Configuration M12 plug

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

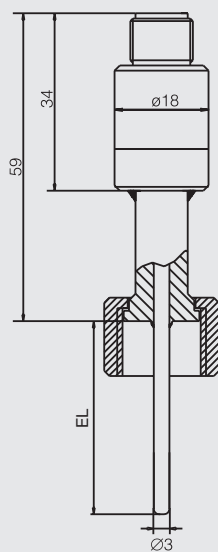
TFP-59 | TFP-59.2



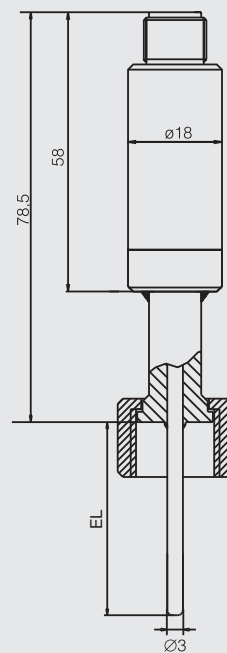
Drawing higher connection head for TFP-68



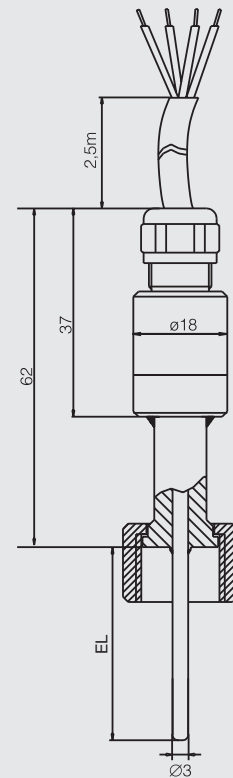
TFP-179 / ...



TFP-179 / ... / MPU-M



TFP-199 / ...



**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 max. 98 %

**Reshipment**

- Sensors shall be clean and must not be contaminated with dangerous media!
- Use suitable transport packaging only to avoid damage of the equipment!

**Standards and guidelines**

- Compliance with the applicable regulations and directives is mandatory.

**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.

**Conventional usage**

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

**Cleaning/Maintenance**

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

**Mechanical connection/Installation**

- To guarantee a definite function use the Negele **FLEXadapt-system ESF!**

**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...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)



## 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-59** (connecting head Ø 57 mm, with spring mounted gauge slide)  
**TFP-179** (connecting head Ø 18 mm, electrical connection via M12 plug)  
**TFP-199** (connecting head Ø 18 mm, electrical connection via 2.5 m PVC-cable; other lengths: see accessories; no transmitter possible)

## Sensor length EL in mm

**037** (length 37 mm)  
**083** (length 83 mm)  
**097** (length 97 mm, for threaded thermowell ESF-G1/2"-40)  
**160** (length 160 mm)

## Diameter thermowell in mm

3

## Diameter sensor tip in mm

3

## Accuracy class Pt100

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

Electrical connection  
(not selectable at TFP-179 and -199)

**PG** (cable gland M16x1.5)  
**M12** (M12 plug, standard with MPU-LCD)

## Transmitter

X (without)

## for TFP-59

**MPU-4** (programmable)  
**MPU-H** (HART-protocol)  
**MPU-LCD** (with display)

## only for TFP-179 (not for TFP-199)

MPU-M (programmable)

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



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**TFP-59 / 083 / 3 / 3 / A / M12 / MPU-4 / 0...100 °C**

## Order code for version with 2 x Pt100

**TFP-59.2** (connecting head Ø 57 mm, 2 x Pt100, no transmitter possible!)

**TFP-68** (higher connecting head Ø 57 mm, 2 x Pt100, prepared for 2 x transmitter)

## Sensor Length in mm

**037** (length 37 mm)

**083** (length 83 mm)

**097** (length 97 mm, for threaded thermowell ESF-G1/2"-40)

**160** (length 160 mm)

## Diameter thermowell in mm

3

## Diameter sensor tip in mm

3

## Accuracy class Pt100

**A**

**1/3B**

**1/10B**

## Electrical connection (only for TFP-59.2)

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

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

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

## Electrical connection (only for TFP-68)

**M12** (M12 plug)

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

**Continue if TFP-68 is selected!**

**No further options for TFP-59.2!**

## 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-68 / 083 / 3 / 3 / A / M12 / MPU-4 / 0...50 / MPU-4 / 0...50