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 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, (1/3 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 1.4305 (303) stainless steel 1.4404 stainless steel 1.4571 stainless steel 1.4301, 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 1.4305, 4-pin M12 plug 1.4305 fixed cable (PVC), standard: 2.5 m
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

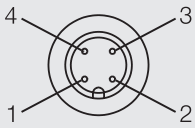
Table Reaction Time	ESF-G-DIN2-25	ESF-G1/2"-40	ESF-EH-125	ESF-KM-125
Medium temperature 90 °C				
t_{50}	5,8 s	7,8 s	8,0 s	8,0 s
t_{90}	19,0 s	21,1 s	24,0 s	24,0 s

Reaction Time

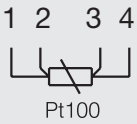
We recommend the use of heat-conductive paste to reduce the mentioned reaction times down to approx. 50 %!

Electrical connection without transmitter

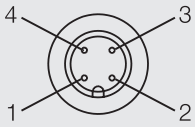
With 1 x M12 plug



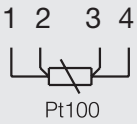
Configuration 1st M12 plug



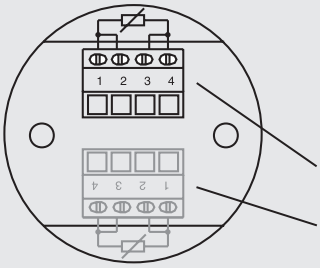
With 2 x M12 plug



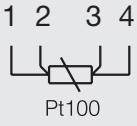
Configuration 2nd M12 plug



With cable gland



Configuration strip terminal

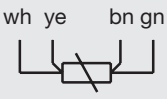


clamps for 1st Pt100

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

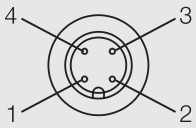
With fixed cable PVC (0...90 °C)

Fixed cable connection with 1 x Pt100



Electrical connection with transmitter

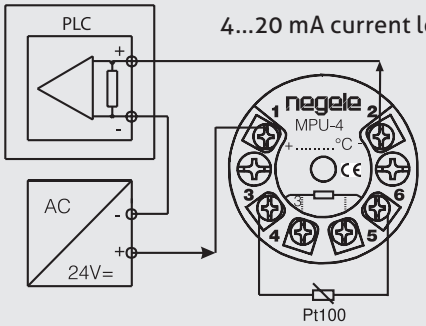
With M12 plug



Configuration M12 plug

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

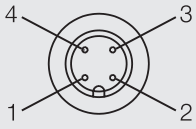
With cable gland



4...20 mA current loop

Electrical connection with two transmitter (TFP-68)

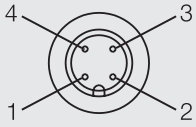
With 1 x M12-plug (sensor 1 + sensor 2)



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)

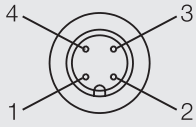
With 2 x M12-plug (sensor 1)



Configuration M12-plug

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

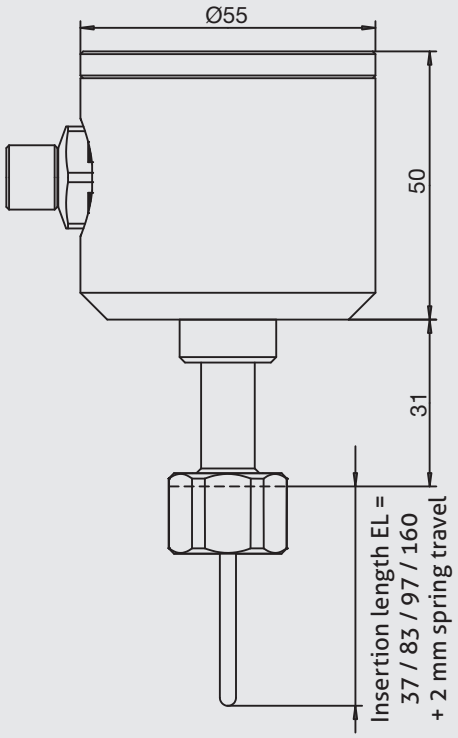
With 2 x M12-plug (sensor 2)



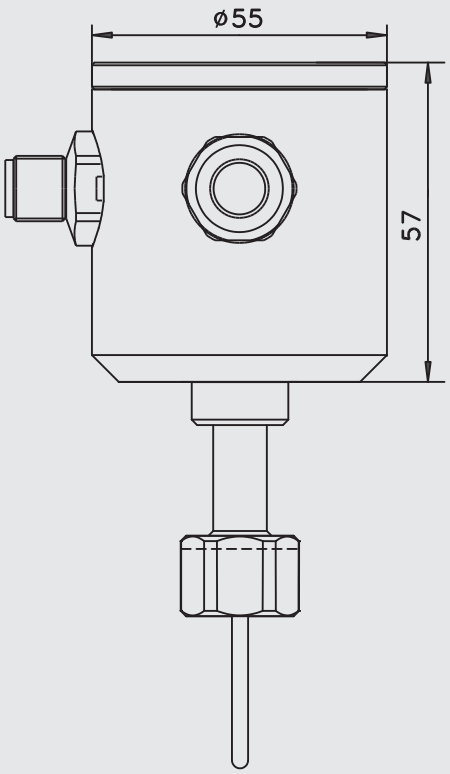
Configuration M12-plug

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

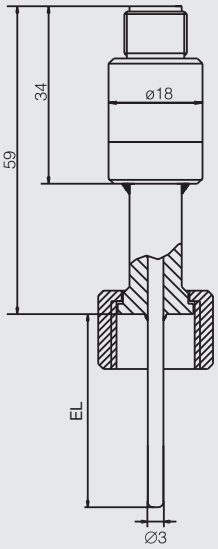
TFP-59 | TFP-59.2



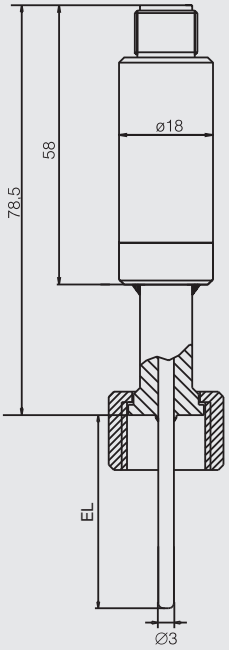
Drawing higher connection head for TFP-68



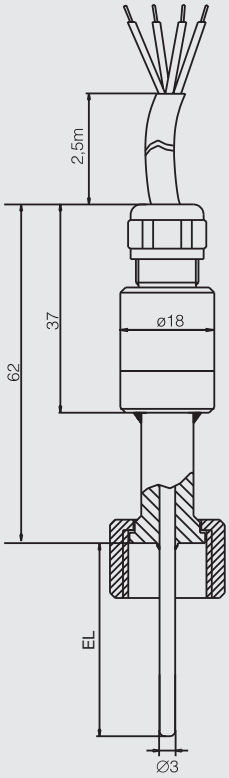
TFP-179 / ...



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 %

Conventional usage

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

Reshipment

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

Advice to EMC

- The device agrees to following standards: EMC directive 2004/108/EC.
- You have to guarantee the EMC directives for the entire equipement.

Cleaning/Maintenance

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

Mechanical connection/Installation

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

Disposal

- This instrument is not subject to the WEEE directive 2002/96/EC and the respective national laws.
- Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points.

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)

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 55 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-10 (Profibus PA)
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)

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 55 mm, 2 x Pt100, no transmitter possible!)
TFP-68 (higher connecting head Ø 55 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)

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

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