Product Information TFP-641, -642, -661, -681, -841, -842, -861, -881 **PHARMA**

Temperature Sensor PHARMadapt EPA

Application / Specified Usage

- Developed for applications in pharmaceutical industy and biotechnology
- Temperature measurement especially at small pipe diameters
- In connection with build-in system **PHARMadapt EPA** suitable for pipes DN10...100

Authorisations

Application Examples

- Process monitoring
- Monitoring of CIP-/ SIP-cleaning

Hygienic Design / Process Connection

- Hygienic and easy sterilizable installation by using Negele build-in system **PHARMadapt EPA**
- CIP-/ SIP-cleaning up to 140 °C
- All product contacting materials compliant to FDA
- Sensor completely made of stainless steel
- Sealing ring according to USP Class VI
- Conforming to 3-A Sanitary Standard for DIN 11866 series A with DN ≥ 25, DIN 11866 series B with DN ≥ 20, DIN 11866 series C with DN ≥ 1"

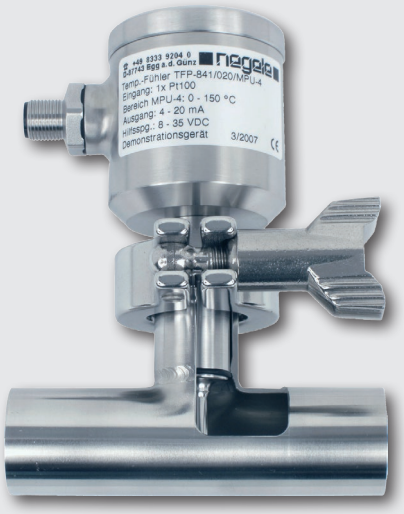
Features

- For small pipe diameters from DN10
- Easy demounting for cleaning and calibration by clamp system
- Short reaction time, very compact measure point with leackage control
- Integrated transmitter available
- Light weight sensor head, non-sensitive to vibrations
- Hygienic lid design
- Electrical connection via M12 plug
- Material 1.4435, material certificate 3.1 in scope of delivery (for all product contacting parts)
- Quick and easy to install with an orbital welding machine

Options / Accessories

- 2x Pt100, optional (not retrofittable)
  2x Pt100 with two transmitters (not retrofittable)
- Programmable transmitter MPU-4 and MPU-M with 4...20 mA output, 2-wire
- Integrated transmitter for HART-protocol
- Programming adapter MPU-P 9701
- Integrated display MPU-LCD in connecting head
- Pt100-chip with other classes of accuracy (1/3 B, 1/10 B)
- Preassemled cable for M12 plug
- Fixed cable in other length or material available
- Calibration certificate (just available with order placement)
- Customer specific label and TAG-number plate (stainless steel)

Temperature sensor TFP-641 with build-in system EPA-18



Temperature sensor TFP-661 with transmitter MPU-M and TAG-number plate

Temperature sensor		
Process connection	gap free	with clamp-ring SRC-05 resp. SRC-10
Insertion length EL	TFP-6xx TFP-8xx	10 mm, 25 mm, 50 mm, 100 mm 20 mm, 50 mm
Materials	connection head protection tube sealing ring	stainless steel 1.4301 (AISI 304) stainless steel 1.4435 (AISI 316L) EPDM, USP Class VI, FDA 21 CFR 177.2600
Temperature ranges	ambient sensor tip	-50...+80 °C -50...+250 °C
Operating pressure		10 bar max.
Sensing resistor	acc. to DIN EN 60751	Pt100
Electrical connection	TFP-64x, TFP-84x TFP-661, TFP-861 TFP-681, TFP-881	cable gland M16x1.5 (PG) or M12 plug 1.4301 (AISI 304), 4-pin M12 plug 1.4301 (AISI 304) fixed cable (PTFE, 4x 0.14 mm²), standard: 2.5 m
Protection type		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_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

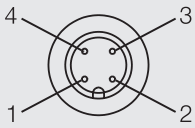
Table reaction time	EPA-8, EPA-18
t_{50}	4.4 s
t_{90}	13.1 s

Reaction time

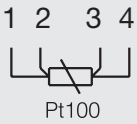
The mentioned times were measured by emersing a temperature sensor from room temperature into boiling water.

Electrical connection without transmitter

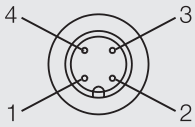
With 1x M12 plug



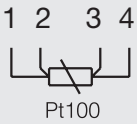
Configuration 1st M12 plug



With 2x M12 plug

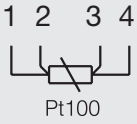


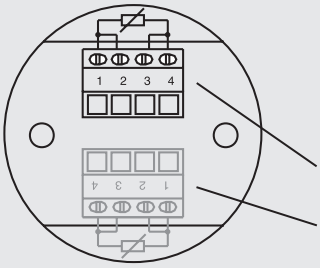
Configuration 2nd M12 plug



With cable gland

Configuration strip terminal





clamps for 1st Pt100

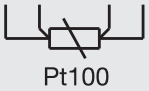
clamps for 2nd Pt100
(at version 2x Pt100)

With fixed cable

Fixed cable connection with 1x Pt100

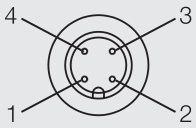
wh	ye	bn	gn
rd	rd	wh	wh

standard PTFE



Electrical connection with transmitter

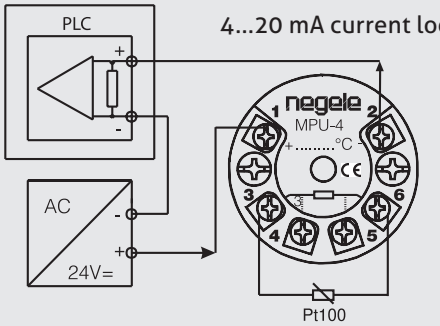
With M12 plug



Configuration M12 plug

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

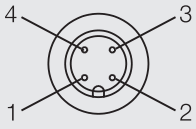
With cable gland



4...20 mA current loop

Electrical connection with two transmitter (TFP-642, -842)

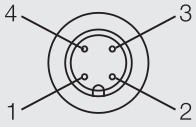
With 1x M12 plug (sensor 1 + sensor 2)



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)

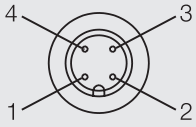
With 2x M12 plug (sensor 1)



Configuration M12 plug

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

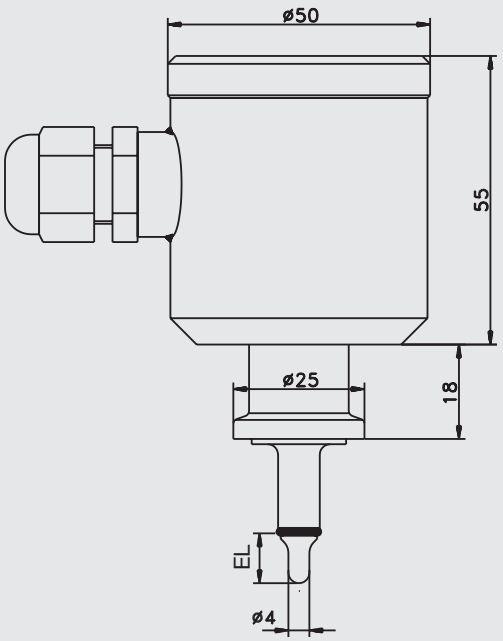
With 2x M12 plug (sensor 2)



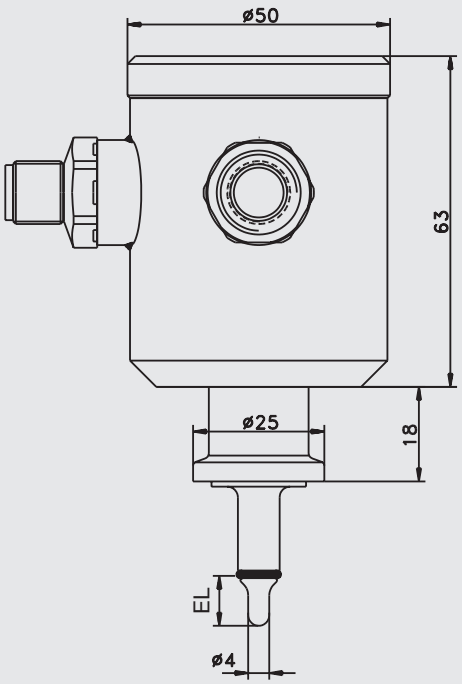
Configuration M12 plug

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

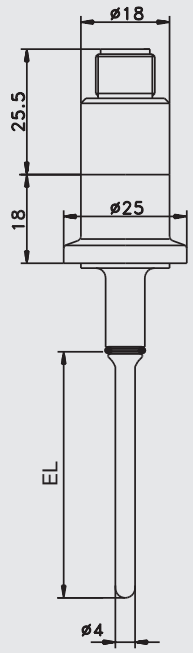
TFP-641 | TFP-641.2 with cable gland



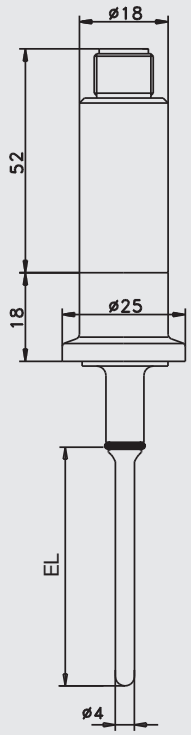
TFP-642 with M12 plug



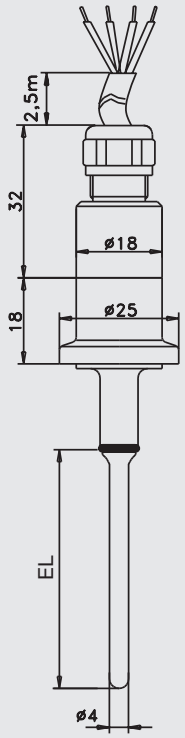
TFP-661



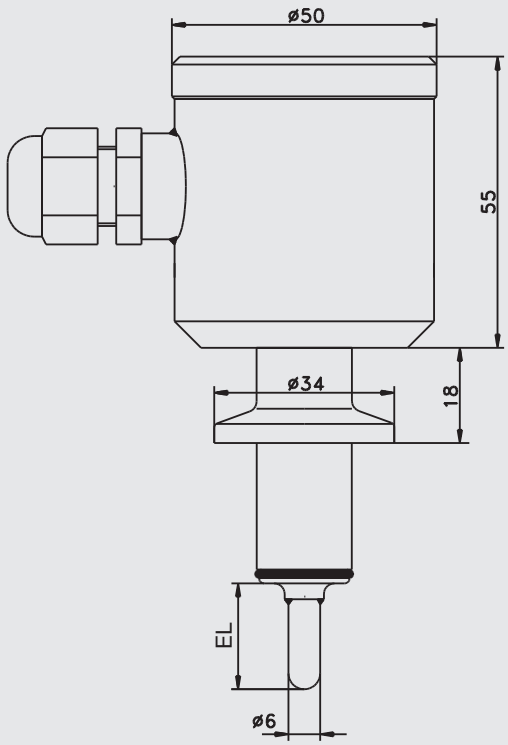
TFP-661 / ... / MPU-M



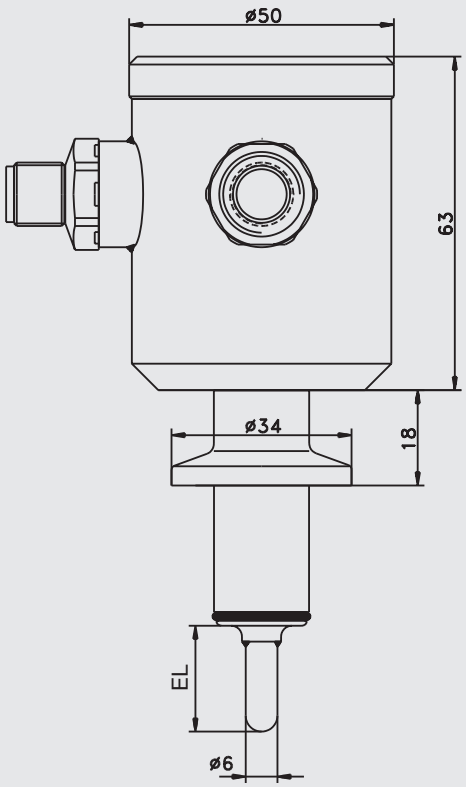
TFP-681



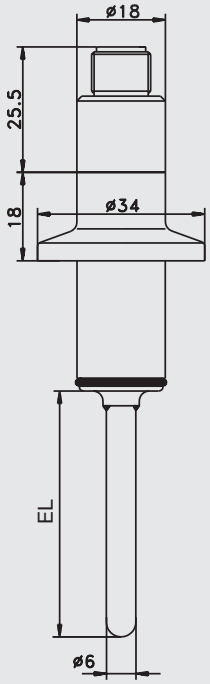
TFP-841 | TFP-841.2 with cable gland



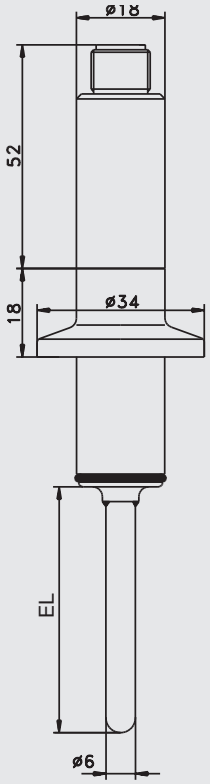
TFP-842 with M12 plug



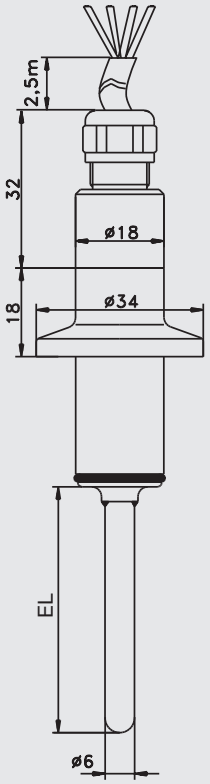
TFP-861



TFP-861 / ... / MPU-M



TFP-881



Mechanical Connection / Installation

· The sensors are only for use with pharmaceutical build-in system **PHARMadapt EPA**.

Mounting Advice

· The suitable insertion length depends on the pipe diameter of the measuring point. See dimension tables in product information **PHARMadapt EPA**.

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 %

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, dont't point nozzle directly to electrical connections!

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

· 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.

Conditions for a measuring point according to 3-A Sanitary Standard 74-06

· The sensors TFP-641, -642, -661, -681, -841, -842, -861, -881 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 **PHARMadapt EPA** allowed.
· Mounting position, self draining and the position of the leackage hole must be in accordance to current 3-A Sanitary Standard.

Accessories

PVC-cable with M12-connection made of 1.4305, IP 69 K, unshielded
M12-PVC/4 PVC-cable 4-pin, length 5 m, 10 m, 25 m

PVC-cable with M12-connection, brass nickel-plated, IP 67, shielded
M12-PVC/4G PVC-cable 4-pin, length 5 m, 10 m, 25 m

Programming adapter
MPU-P 9701 Programming adapter for MPU-4, MPU-H and MPU-M

Sealing ring
DRE-5 Sealing ring for EPA-8, Ø 5 x 1.5 mm, material EPDM (FDA compliant, USP class VI)
DRE-15 Sealing ring for EPA-18, Ø 15 x 1.5 mm, material EPDM (FDA compliant, USP class VI)

Order code for version with 1x Pt100

TFP-641 (for PHARMadapt EPA-8, connection head Ø 49 mm, non-sensitive to vibrations)
TFP-661 (for PHARMadapt EPA-8, connection head Ø 18 mm, electrical connection via M12 plug)
TFP-681 (for PHARMadapt EPA-8, connection head Ø 18 mm, electrical connection via 2.5 m PTFE-cable)
TFP-841 (for PHARMadapt EPA-18, connection head Ø 49 mm, non-sensitive to vibrations)
TFP-861 (for PHARMadapt EPA-18, connection head Ø 18 mm, electrical connection via M12 plug)
TFP-881 (for PHARMadapt EPA-18, connection head Ø 18 mm, electrical connection via 2.5 m PTFE-cable)

Sensor Length EL for TFP-6xx in mm
010 (length 10 mm)
025 (length 25 mm)
050 (length 50 mm)
100 (length 100 mm)

Sensor Length EL for TFP-8xx in mm
020 (length 20 mm)
050 (length 50 mm)

Accuracy Class Pt100
A
1/3B
1/10B

Electrical Connection for TFP-641 and TFP-841
PG (cable gland M16x1.5)
M12 (M12 plug, standard with MPU-LCD)

Transmitter

X (without)

Transmitter for TFP-641 and TFP-841
MPU-4 (programmable)
MPU-H (HART-protocol)
MPU-LCD (with display)

Transmitter for TFP-661 and TFP-861

MPU-M (programmable)

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

TFP-641 / 025 / A / M12 / MPU-4 / 0...100

Note

The clamp ring is not included in scope of delivery and must be ordered separately.

SRC-05 Clamp-tension ring for EPA-8, material 1.4301
SRC-10 Clamp-tension ring for EPA-18, material 1.4301

Build-In systems

Suitable build-in systems for temperature sensors TFP-641, -642, -661, -681, -841, -842, -861, -881 you will find in product information **Process Connection PHARMadapt EPA**.

Order code for version with 2x Pt100

TFP-641.2 (for PHARMadapt EPA-8, connection head Ø 49 mm, 2x Pt100, non-sensitive to vibrations, no transmitter possible!)
TFP-642 (for PHARMadapt EPA-8, like TFP-641.2, but higher connection head and prepared for 2x transmitter)

TFP-841.2 (for PHARMadapt EPA-18, connection head Ø 49 mm, 2x Pt100, non-sensitive to vibrations, no transmitter possible!)
TFP-842 (for PHARMadapt EPA-18, like TFP-841.2, but higher connection head and prepared for 2x transmitter)

Sensor Length EL for TFP-6xx in mm
010 (length 10 mm)
025 (length 25 mm)
050 (length 50 mm)

Sensor Length EL for TFP-8xx in mm
020 (length 20 mm)
050 (length 50 mm)

Accuracy Class Pt100
A
1/3B
1/10B

Electrical Connection for TFP-641.2 and TFP-841.2
PG (cable gland M16x1.5)
2xPG (2x cable gland M16x1.5)
2xM12 (2x M12 plug)

Electrical Connection for TFP-642 and TFP-842
M12 (M12 plug)
2xM12 (2x M12 plug)

Continue if TFP-642 or TFP-842 is selected!
No further options for TFP-641.2 or TFP-841.2!

1. Transmitter

MPU-4 (programmable)

Measurement Range 1. MPU
-10...40 (measurement range -10...+40 °C)
0...50 (measurement range 0...+50 °C)
0...100 (measurement range 0...+100 °C)
0...150 (measurement range 0...+150 °C)
0...200 (measurement range 0...+200 °C)
xx...yy (special range)

2. Transmitter

MPU-4 (programmable)

Measurement Range 2. MPU
-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-642 / 025 / A / M12 / MPU-4 / 0...50 / MPU-4 / 0...50

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