Product Information TFP-90, -96, -98 **PHARMA**

Pharma-Temperature Sensor with Fermenter Connection

Application/Specified usage

· Temperature measurement in plants of pharmaceutical industry
· Temperature measurement in fermenter connection

Application examples

· Process monitoring
· Monitoring of CIP-/SIP-process
· Temperature monitoring

Hygienic design/Process connection

· Fermenter process connection, standard length 46 mm/52 mm
· Easy sterilizable measuring point
· CIP-/SIP-cleaning up to 150 °C
· Product contacting materials compliant to FDA
· Sensor completely made of stainless steel

Features/Advantages

· Temperature sensor electro polished $R_a \leq 0.8$ µm (standard)
· Fermenter connection made of stainless steel 316L (1.4435)
· Integrated transmitter (optional)
· Inspection certificate 3.1 in scope of delivery
· Protection class IP 69 K (with electrical connection M12-plug)

Options/Accessories

· 2 x Pt100 (not retrofittable)
· Programmable transmitter 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 (1/3B, 1/10B)
· Sensor tips with diameter 3 mm and 4 mm
· Pre-assembled connecting cable for M12 plug
· Fixed cable in other lengths and other material available
· Calibration certificate, DKD-laboratory certificate
· Surfaces with $R_a \leq 0.4$ µm resp. 0.6 µm available optional

Authorizations

FDA

Temperature sensor TFP-90

Temperature sensor TFP-98

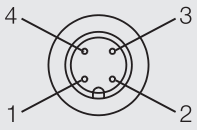
Temperature sensor		
Process connection	Fermenter sleeve	DN25 with coupling nut, G1¼"
Insertion length	standard	25 mm
Connection length	standard	46 mm and 52 mm
Materials	connecting head and coupling nut fermenter connection sealing ring	stainless steel 1.4305 stainless steel 316L (1.4435), electro polished, $R_a \leq 0.8$ µm, $R_a \leq 0.6$ µm and $R_a \leq 0.4$ µm optional EPDM
Operating pressure		10 bar maximum
Temperature ranges	ambient sensor tip	-50...+85 °C -50...+250 °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 1.4305, 4-pins LIYY 4 x 0.25 mm² PTFE 4 x 0.14 mm²
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 %

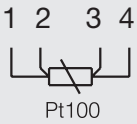
Accuracy classes of temperature sensors | Tolerances for Pt100 acc. to DIN EN 60751			
Pt100	**A**	**1/3 B**	**1/10 B**
0 °C / 100 Ω	±0.15 K / ±0.06 Ω	±0.10 K / ±0.04 Ω	±0.03 K / ±0.01 Ω
100 °C / 138.5 Ω	±0.35 K / ±0.13 Ω	±0.27 K / ±0.10 Ω	±0.08 K / ±0.03 Ω

Electrical connection without transmitter

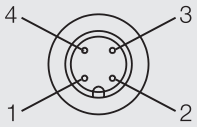
With 1 x M12 plug



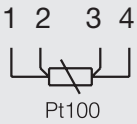
Configuration 1st M12 plug



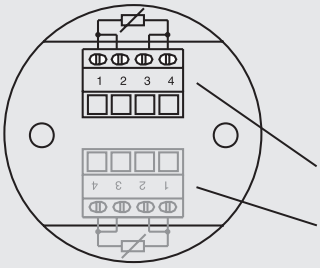
With 2 x M12 plug



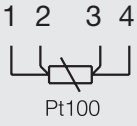
Configuration 2nd M12 plug



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
rd	rd	wh	wh

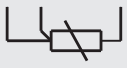
standard
PTFE

Fixed cable connection with 2 x Pt100 (LIYY)

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

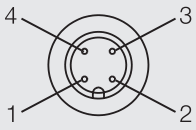
Fixed cable connection with 2 x Pt100 (PTFE)

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



Electrical connection with transmitter

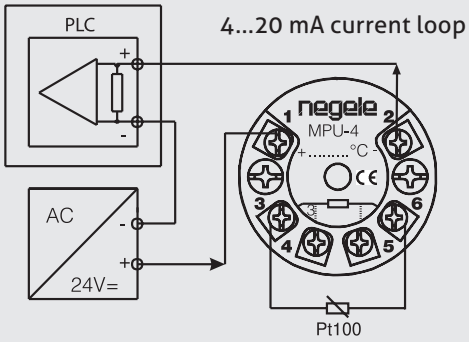
With M12 plug



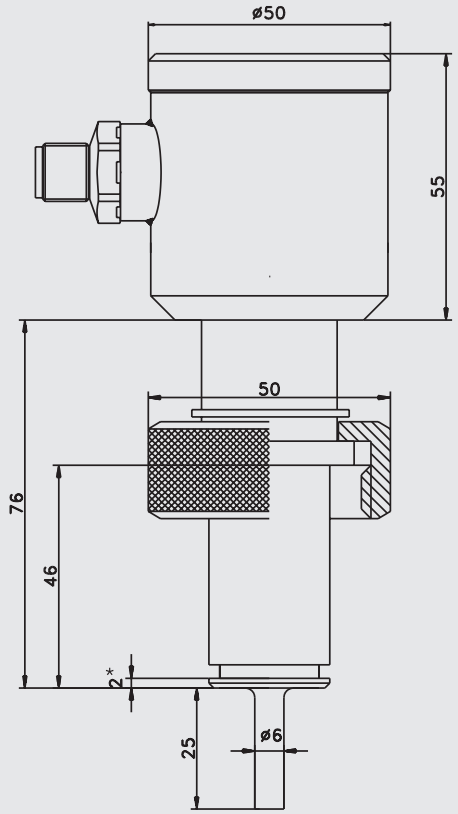
Configuration M12 plug

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

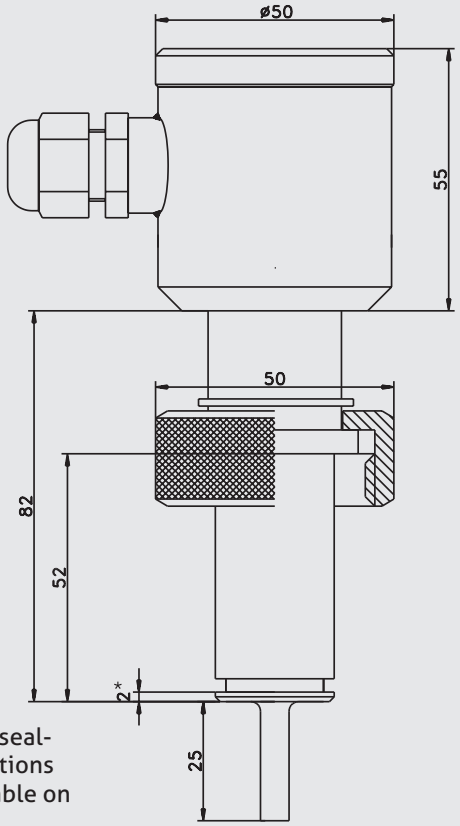
With cable gland



TFP-90 / 46 / ... | TFP-90.2 / 46 / ...

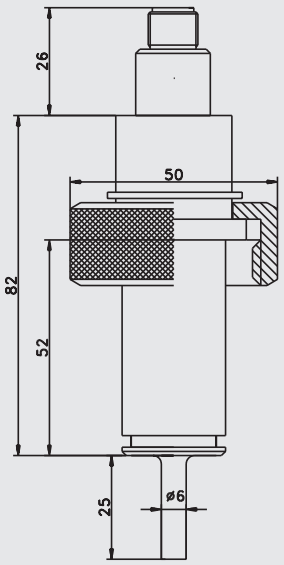


TFP-90 / 52 / ... | TFP-90.2 / 52 / ...

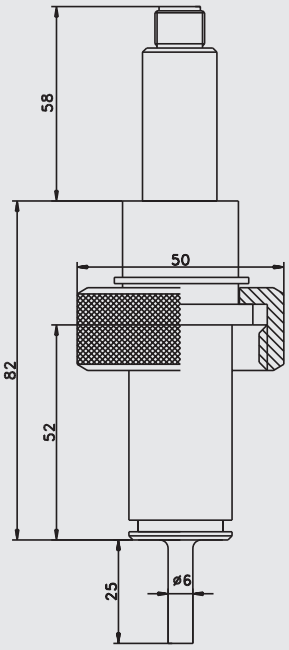


* Other sealing positions deliverable on request.

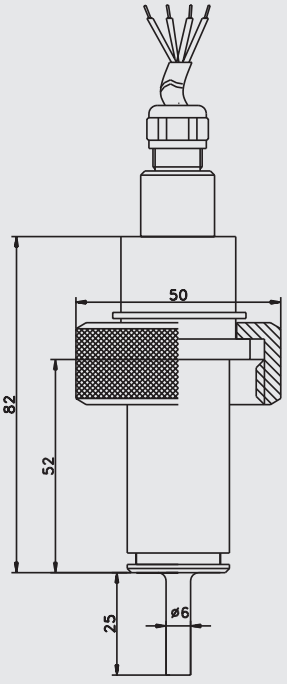
TFP-96 / 52 / ...



TFP-96 / 52 / ... / MPU-M



TFP-98 / 52 / ... | TFP-98.2 / 52 / ...

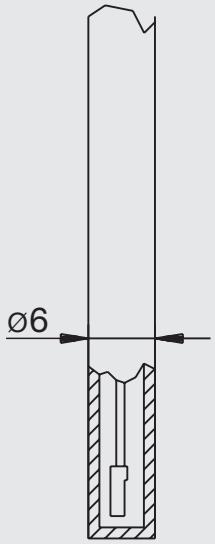


Sensor tip diameter and response time

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 with room temperature into boiling water.

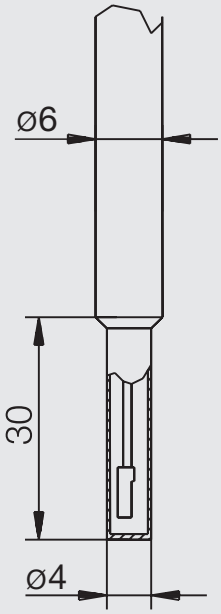
Sensor tip Ø 6 mm

50 %-time: $t_{50} \leq 3.0$ s
90 %-time: $t_{90} \leq 8.0$ s



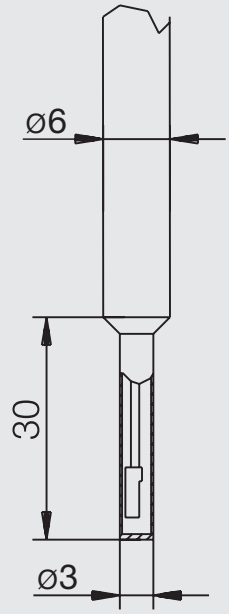
Sensor tip Ø 4 mm

50 %-time: $t_{50} \leq 2.4$ s
90 %-time: $t_{90} \leq 6.5$ s



Sensor tip Ø 3 mm

50 %-time: $t_{50} \leq 0.5$ s
90 %-time: $t_{90} \leq 1.5$ s



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.

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.

Standards and guidelines

- You have to comply with applicable regulations and directives.

Cleaning/Maintenance

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

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)

Order code for version with 1 x Pt100

TFP-90 (connecting head Ø 50 mm, non-sensitive design to vibrations)
TFP-96 (connecting head Ø 18 mm, electrical connection M12 plug)
TFP-98 (connecting head Ø 18 mm, electrical connection 2.5 m PTFE-cable; no transmitter possible!)

Connection length in mm (delivery incl. sealing ring)
46
52

Sensor length in mm
025
xxx (special length on request)

Diameter sensor tip in mm
3 (on request)
4 (on request)
6

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

Electrical connection (not selectable at TFP-96 and -98)
PG (cable gland M16x1.5)
M12 (M12 plug, standard with MPU-LCD)

Transmitter

X (without)

only for TFP-90
MPU-4 (programmable)
MPU-10 (Profibus PA)
MPU-H (HART-protocol)
MPU-LCD (with display)

only for TFP-96

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-90 /	**52 /**	**025 /**	**6 /**	**A /**	**PG /**	**MPU-4 /**	**0...100**

Order code for version with 2 x Pt100

TFP-90.2 (connecting head Ø 50 mm, non-sensitive design to vibrations, no transmitter possible!)
TFP-98.2 (connecting head Ø 18 mm, electrical connection 2.5 m PTFE-cable; no transmitter possible!)

Connection length in mm (delivery incl. sealing ring)
46
52

Sensor length in mm
025
xxx (special length on request)

Diameter sensor tip in mm
3 (on request)
4 (on request)
6

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

Electrical connection only for TFP-90.2
PG (cable gland M16x1.5)
2xPG (2 x cable gland M16x1.5)
2xM12 (2 x M12 plug)

TFP-90.2 /	**52 /**	**025 /**	**6 /**	**A /**	**2xM12**

Accessories

PVC-cabel 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 made of brass plated, IP 69 K, 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

Sealing ring for Fermenter connection, material EPDM

DRF-20

PVC-cable with M12-connection

Programming adapter MPU-P 9701

NEGELE MESSTECHNIK GMBH
Raiffeisenweg 7
87743 Egg an der Guenz

Phone +49 (0) 83 33 . 92 04 - 0
Fax +49 (0) 83 33 . 92 04 - 49
sales@anderson-negele.com

Tech. Support:
support@anderson-negele.com
Phone +49 (0) 83 33 . 92 04 - 720