

Temperature Sensor Fermenter Connection



Application

- for plants in the pharmaceutical industries
- temperature measurement in fermenter connection

Application Examples

- process monitoring
- controlling of CIP-/ SIP-process
- temperature monitoring

Hygienic Design

- easily cleanable measurement point
- CIP-/ SIP-cleaning up to 150°C
- food compatible materials according to FDA
- sensor completely made of stainless steel
- protection class IP69K

Features

- sensor probe e-polished $Ra \leq 0.8\mu m$ (standard)
- material of wetted parts 1.4435 (316L)
- available with or without integrated transmitter
- material certificate acc. EN 10204-3.1.B

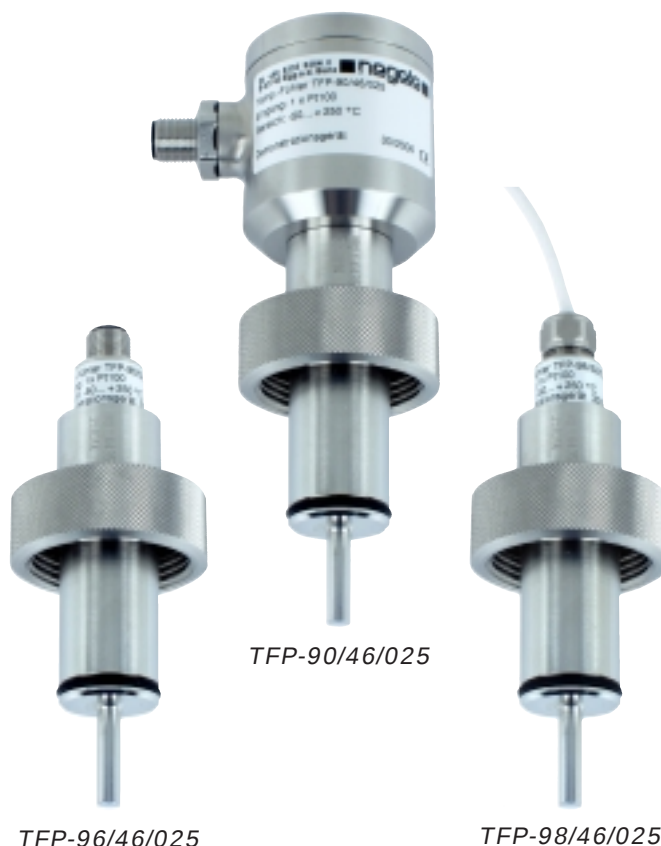
Options / Accessories

- 2xPt100
- Pt100 with other classes of accuracy e.g. 1/3B or 1/10B
- other sensor length and diameter on request
- electrical connection by M12-plug
- readymade connecting cable for M12-plug
- fixed cable in PTFE and other length available
- programable transmitter MPU-4 with output 4-20mA
- programming tool MPU-P
- transmitter for Profibus PA MPU-10, HART-Protocoll MPU-H and with ATEX certificate
- transmitter with LC-display MPU-LCD
- calibration certificate

Specification

Temperature Sensor TFP-90, TFP-96, TFP-98

Process connection	Fermenter	DN25, external thread G1 1/4"
Insertion length	standard	25mm
Material	connecting head and cap nut	stainless steel 1.4305
	Fermenter socket	e-polished 1.4435 (316L)
		$Ra \leq 0,8\mu m$
	sealing ring	EPDM
Temperature range	ambient	-50...+85°C
	sensor tip	-50...+250°C
Sensing resistor	acc. DIN IEC 751	1xPt100, class A
Electr. connection	cable gland	PG (M16x1,5)
		2pol. 1.5mm ²
TFP-90 / TFP-96	M12-plug	4-pins
TFP-98	fixed cable	2.5m PVC
Operating pressure		max. 10bar
Protection class		IP69K



Transmitter MPU-4

Temperature ranges	standard	-10...+40, 0...50°C
		0...100 / 150 / 200°C
Accuracy		<±0.1% of full scale
Temperature drift	zero, span	<0.01% o.f. scale/K
Supply		8...35VDC
Output	analog	4-20mA 2-wire
Operating conditions	ambient	-40...+85°C
	storage	-55...+90°C
Humidity	without frost	0...98%

Transmitter MPU-M

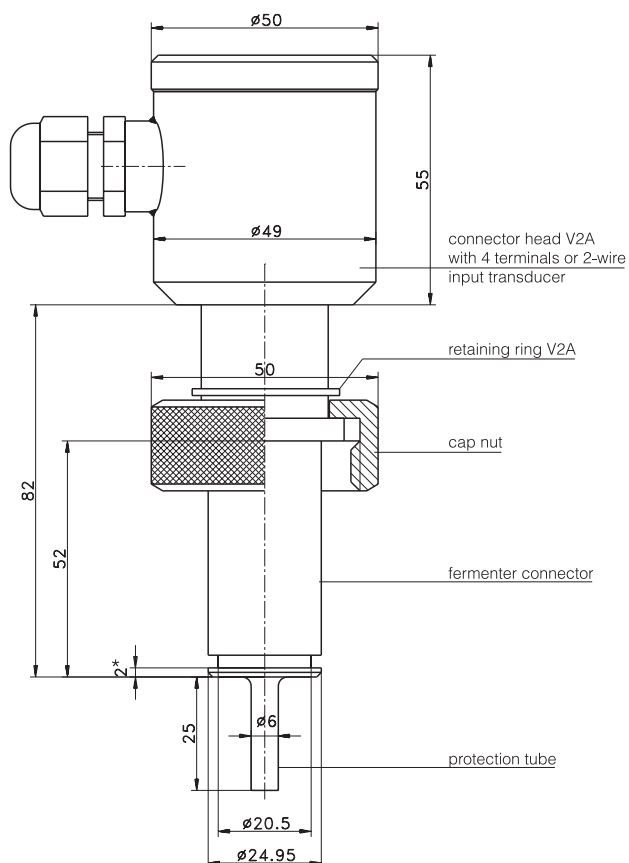
Temperature ranges	standard	-10...+40, 0...50°C
		0...100/150/200°C
Accuracy		<±0.2% o.f. scale
Temperature drift	zero, span	<0.02% o.f. scale/K
Supply		12...36VDC
Output	analog	4-20mA 2-wire
Operating conditions	ambient	-50...+80°C

Transmitters MPU-LCD, -10, -H, ...-EX,

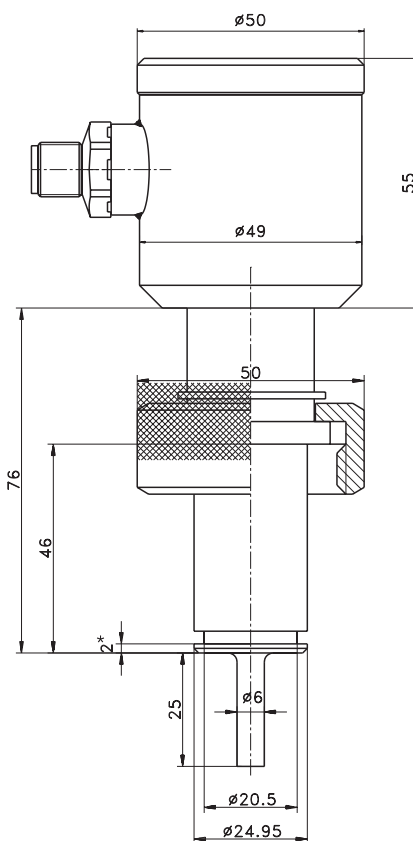
Specification: see separate produkt information



Drawings

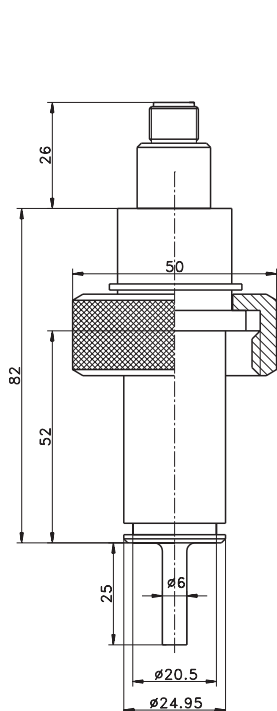


TFP-90 / 52 / 025 / 6 / ...

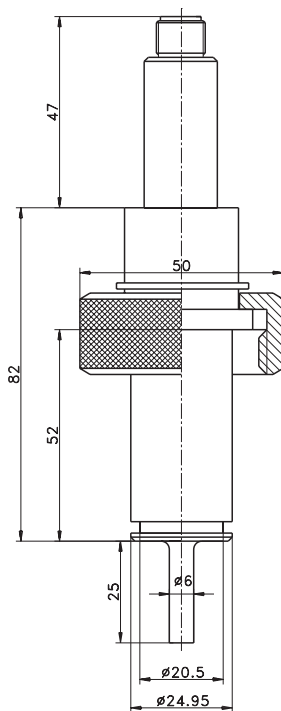


TFP-90 / 46 / 025 / 6 / ... / M12 / ...

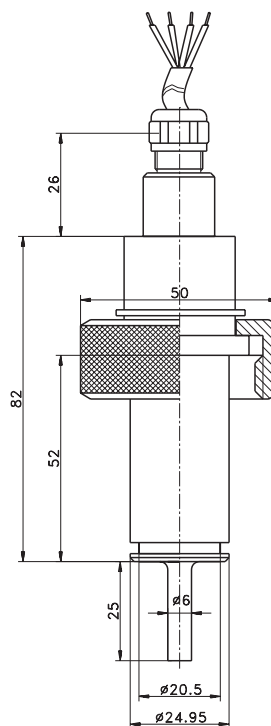
* Other position of the sealing ring on request.



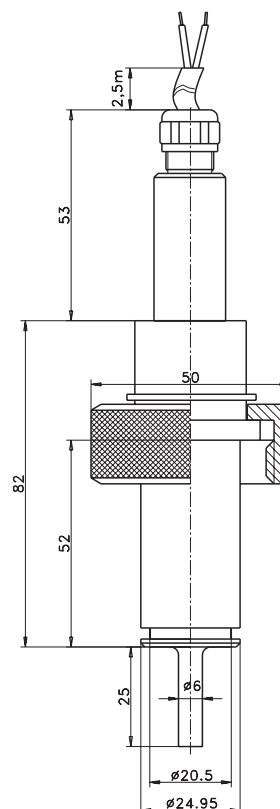
TFP-96 / 52 / 025 / 6 / ... / X



TFP-96 / 52 / 025 / 6 / ... / MPU-M / ...



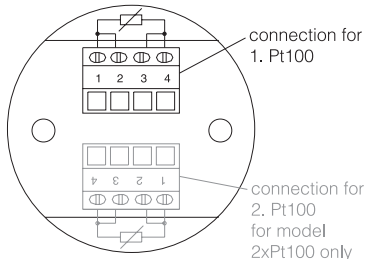
TFP-98 / 52 / 025 / 6 / ... / X



TFP-98 / 52 / 025 / 6 / ... / MPU-M / ...

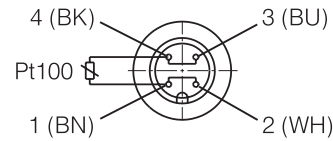
Electrical Connection without Transmitter

with cable entry

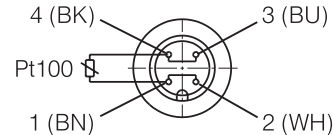


with M12-plug

1. Pt100



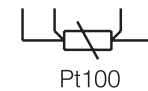
2. Pt100



with cable connection

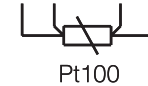
1x Pt100

wh ye bn gn standard
rd rd wh wh PTFE



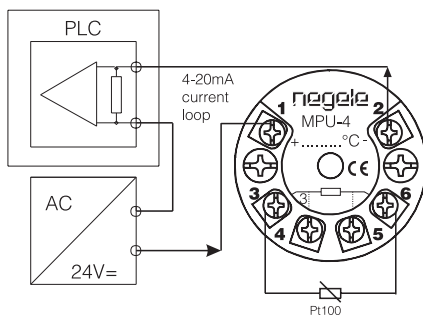
2x Pt100

wh bn ye gn 1.Pt100
rd bu pk gy 2.Pt100

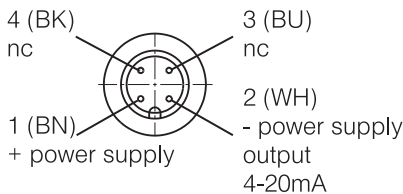


Electrical Connection with Transmitter

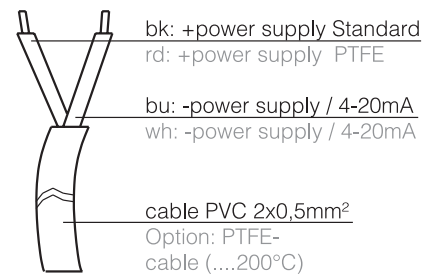
with cable entry



with M12-plug



with cable connection



Accuracy Class Pt100

Tolerances of Pt100 acc. ITS 90

Pt100	class B	class A	class 1/3B	class 1/10B
0°C	±0.3K	±0.15K	±0.10K	±0.03K
100Ω	±0.12Ω	±0.06Ω	±0.04Ω	±0.01Ω
100°C	±0.8K	±0.35K	±0.27K	±0.08K
138,5Ω	±0.30Ω	±0.13Ω	±0.10Ω	±0.03Ω

Sensor tip diameter and response time

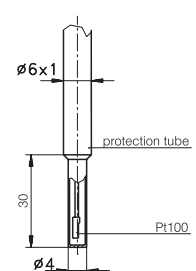
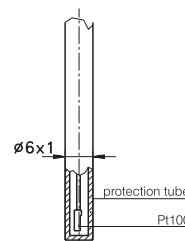
All temperature sensors are available with smaller sensor tips, to ensure a shorter response time. The below-mentioned times are according to a PT100 sensor in boiling water.

Sensor tip ø6mm

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

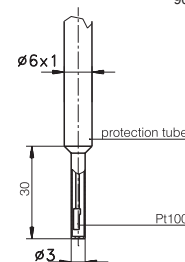
Sensor tip ø4mm

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



Sensor tip ø3mm

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



Option: MPU-LCD

integrated LC-Display in the connection head

Specifications: please look on separate product information



temperatur sensor
with MPU-LCD
(view from top)

Features

- 4-digit display with green backlight
- temperature measurement in °C und °F
- easy range select by one button
- direct connection to the PLC
- lower costs for wiring because of 2-wire technology
- suitable for sensor monitoring

Order Code

TFP-90	1xPt100, head d=55mm
TFP-90.2	2xPt100, head d=55mm
TFP-96	1xPt100, head d=18mm, electrical connection M12-plug
TFP-98	1xPt100, head d=18mm, electrical connection PVC-cable
TFP-98.2	2xPt100, head d=18mm, electrical connection PVC-cable

Socket Length in mm

46

52

Sensor Length in mm

025

special length on request

Sensor tip diameter in mm

3 on request

4 on request

6

Accuracy

A

1/3B

1/10B

Electrical Connection for TFP-90 and TFP-90.2

PG cable gland M16x1,5

M12 M12-plug

2xPG 2x cable gland M16x1,5 (TFP-90.2 only)

2xM12 2x M12-plug (TFP-90.2 only)

Transmitter

x without

for TFP-90

MPU-4 (programable)

MPU-4-EX* (with ATEX-certificate)

MPU-10 (Profibus PA)

MPU-10-EX* (with ATEX-certificate)

MPU-H (HART-Protokoll)

MPU-H-EX* (with ATEX-certificated)

MPU-LCD* (with display)

for TFP-96 and TFP-98

MPU-M

Range (only if with transmitter, not needed for MPU-LCD)

-10...40°C

0...50°C

0...100°C

0...150°C

0...200°C

Sample: xx...yy special range

TFP-90 / 52 / 025 / 6 / A / PG / MPU-4 / 0...100°C

* For following types the electrical connection is fixed defined and without extra charge:

Transmitter MPU-LCD: electrical connection always via M12-plug, 10 fix temperature ranges selectable.

Transmitter MPU-...-EX: electrical connection always with blue cable gland.