

Temperature Sensors for PHARMadapt EPA

Application

- For pharmaceutical applications
- Temperature measurement, especially in pipes with very small diameters
- Suitable for pipes DN10... DN100

Examples of use

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

Hygienic Design / Process Connection

- Using the Negele **EPA** system a flow-optimized, hygienic and easily sterilizable installation situation is achieved
- CIP-/ SIP-cleaning up to 140°C
- Food compatible materials according to FDA
- Sensor completely made of stainless steel
- Sealing ring made of EPDM (FDA conform)

Features

- Short reaction time, very compact measure point
- Available with and without integrated transmitter
- Lightweight sensor head : non-sensitive for vibrations, hygienic design of the lid (TFP-841)
- Electrical connection by M12 plug-in
- Material stainless steel (1.4435), material certificate 3.1 for all mounting accessories inclusive

Options / Accessories

- Programmable integrated transducer **MPU-4** for TFP-641, -841
- Adapter for programming **MPU-P** (for MPU-4)
- Integr. transm. Profibus PA **MPU-10**, HART-Protocol **MPU-H** (TFP-641, -841)
- Integrated transmitter for EX-zone
- Integrated LC-Display **MPU-LCD** in the connecting head (TFP-641, -841)
- Pt100-chip with other classes of accuracy, e.g. 1/3 DIN B, 1/10 DIN B
- 2 x Pt100 with two transmitters

Important information:

This sensors are made for use in "PHARMadapt EPA" systems only (see separate product information in chapter 1).

Conditions for a measuring point according to 3-A-Standard 74-03:

- The sensors TFP-641, -661, -681, -841, -861, -881 are approved according to the 3-A-Standard.
- Only with the build-in system EPA for tubes $\geq$ DN25, ISO 20 and 1" allowed.
- Self draining has to be warranted by the build-in position (pos. 1, 2, or 3).
- The process connection needs a self-draining leakage hole.

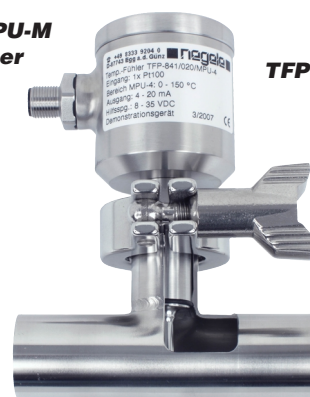
Specification Temperature Sensor

Process connection	gap free	with Clamp ring DN 10...15
Insertion length	TFP-6xx TFP-8xx	9,5 25 and 50 mm 20 and 50 mm
Materials	connecting head protection tube sealing ring	SS (1.4305) SS (1.4435) EPDM
Temperature ranges	ambient sensor tip	-50...+80 °C -50...+250 °C
Operating pressure		10 bar max.
Type of protection		IP69K
Sensing resistor	acc. to DIN IEC 751	Pt100 class A
Electr. connection	TFP-64x, -84x TFP-661, -861 TFP-681, -881	PG (M16x1,5) or M12-plug SS M12-plug SS fixed cable (PTFE) standard: 2,5 m

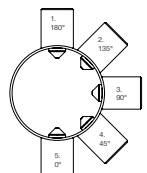
**TFP-661 / 010 / MPU-M
with TAG-number
plate**



TFP-681 / 010



**TFP-841 / 020 / MPU-4
with EPA-18**



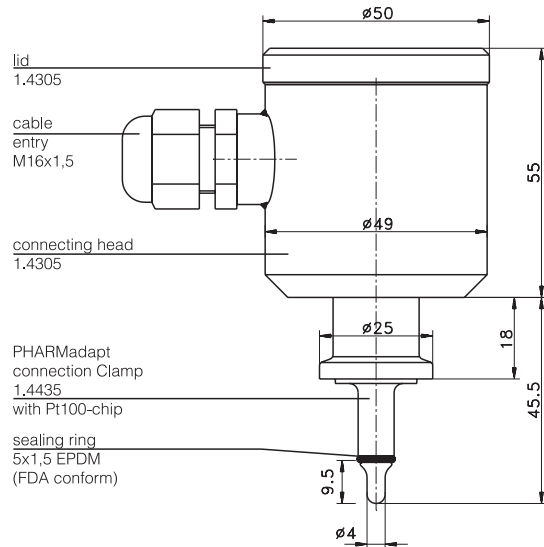
Transmitter MPU-4, -10, -H,

Temperature ranges	ambient	-40...+80 °C
	storage	-40...+120 °C
Humidity	without condensation	0...98 %
Measurement ranges	standard	-10...40 °C, 0...50 °C 0...100/150/200 °C
	MPU-4	programmable
Accuracy		< $\pm 0,1$ % of full scale
Temperature drift	zero point, slope	< 0,01 % of f. s. / K
Electr.connection	power supply	8...35 V DC
Output	analog	4...20 mA

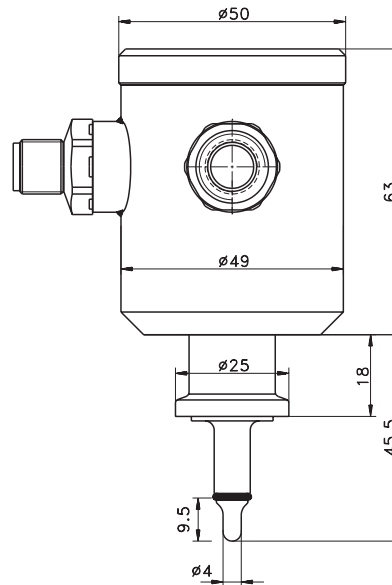
Transmitter MPU-M

Temperature range	ambient	-40...+80 °C
Measurement ranges	standard	-10...+40 °C, 0...100 °C 0...150 °C
Accuracy		< $\pm 0,2$ % of full scale
Temperature drift	zero point, slope	< 0,02 % of f. s. / K
Electr.connection	power supply	12...36 V DC
Output	analog	4...20 mA

TFP-641, TFP-641.2



TFP-642 / ... / 2xM12



Clamp ring SRC*

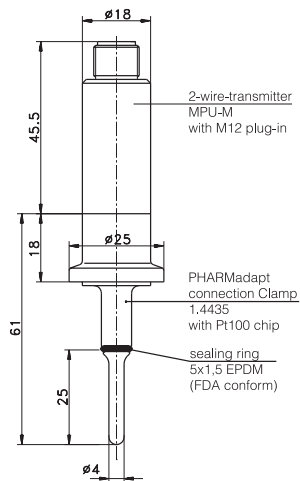
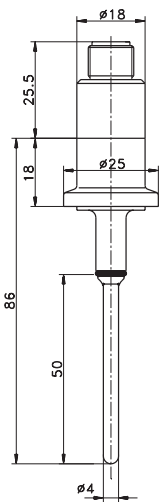


SRC-05 for TFP-6xx

*Note:

the Clamp ring is not included in delivery and must be ordered separately.

TFP-661



Note

The suitable insertion length depends on the pipe diameter of the measuring point. See page 7 for our recommendation.

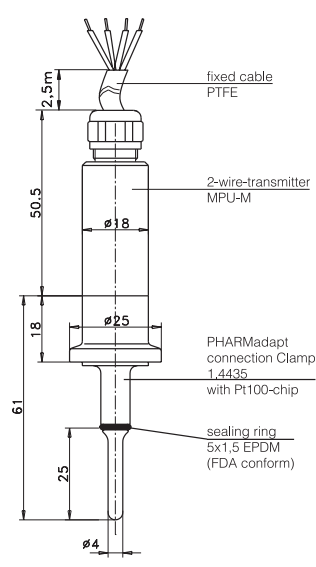
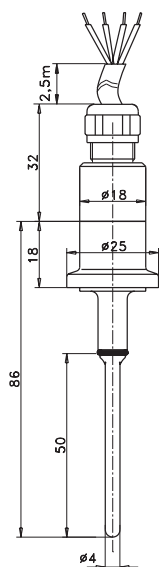
Insertion lengths

EL=10 mm
EL=25 mm
EL=50 mm

Response time T90

half-period: $t_{50} < 3 \text{ s}$
90 %-time: $t_{90} < 6 \text{ s}$

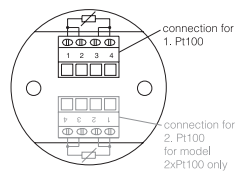
TFP-681



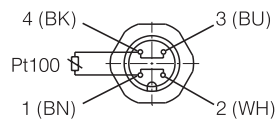
Option integrated
LC-Display **MPU-LCD**
(see separate product
information in chapter 2)

TFP-641 1x Pt100

without transmitter

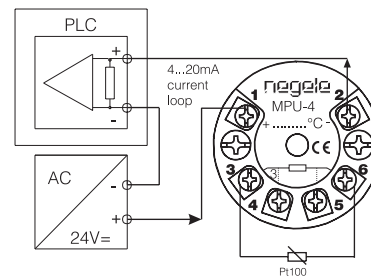


cable entry

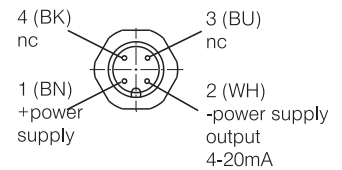


M12-plug

with transmitter MPU-4



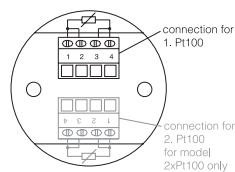
cable entry



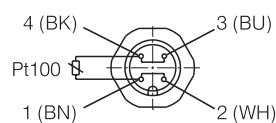
M12-plug

TFP-641.2, TFP-642 2x Pt100

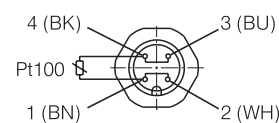
without transmitter



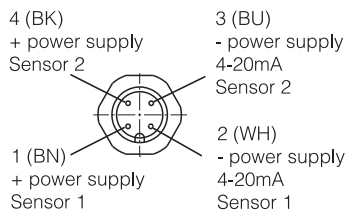
cable entry



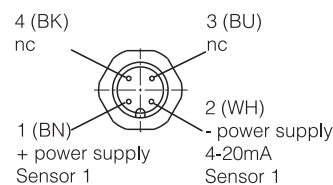
with 1x M12-plug



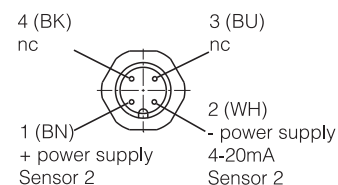
with 2x transmitter MPU-4



with 1x M12-plug

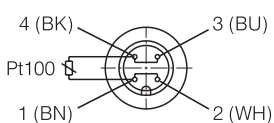


with 2x M12-plug

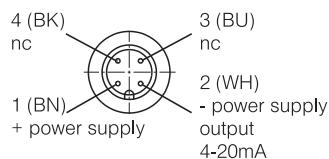


TFP-661

without transmitter

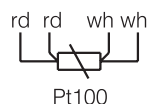


with transmitter MPU-M



TFP-681

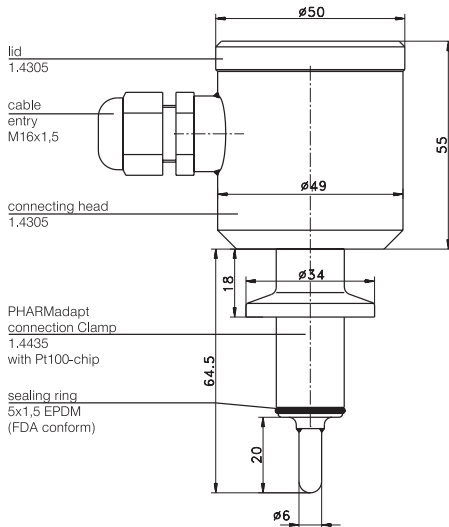
without transmitter



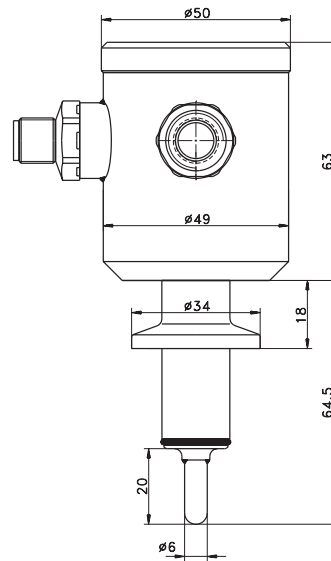
with transmitter MPU-M

red: + power supply
white: 4...20 mA current signal

TFP-841, TFP-841.2



TFP-842 / ... / 2xM12



Clamp ring SRC*

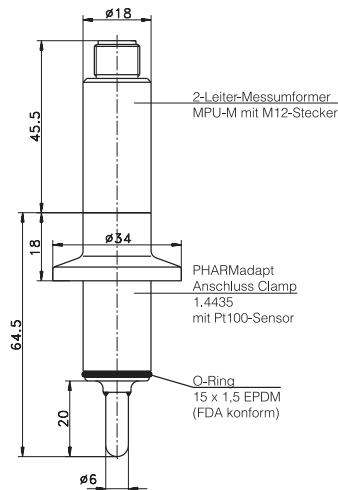
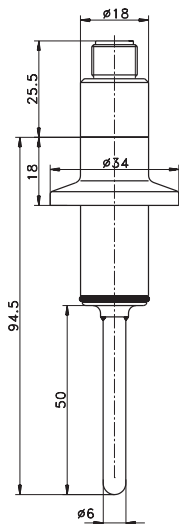


SRC-10 for TFP-8xx

*Note:

the Clamp ring is not included in delivery and must be ordered separately.

TFP-861



Note

The suitable insertion length depends on the pipe diameter of the measuring point. See page 7 for our recommendation.

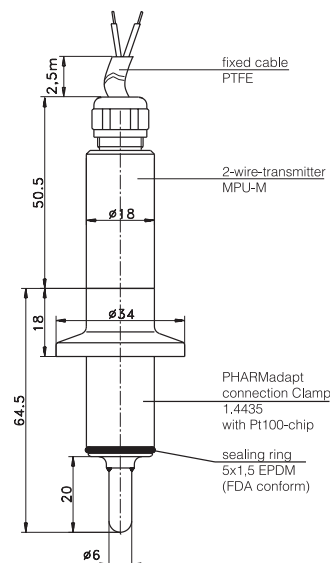
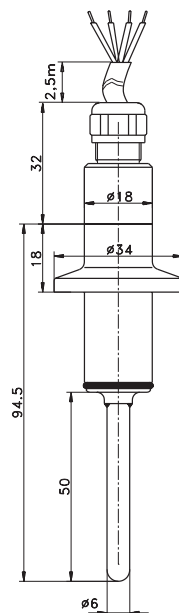
Insertion lengths

EL=10 mm
EL=25 mm
EL=50 mm

Response time T90

half-period: $t_{50} < 3 \text{ s}$
90 %-time: $t_{90} < 6 \text{ s}$

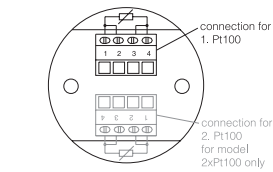
TFP-881



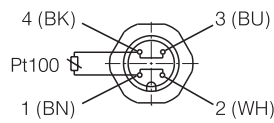
Option integrated LC-Display **MPU-LCD** (see separate product information in chapter 2)

TFP-841 1x Pt100

without transmitter

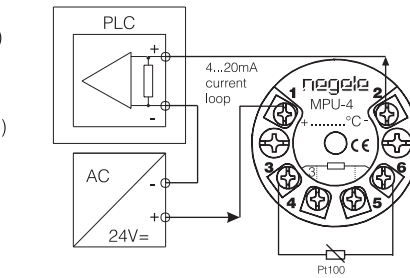


cable entry

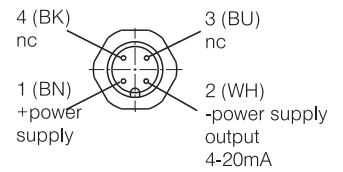


M12-plug

with transmitter MPU-4



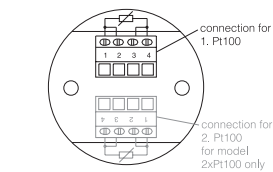
cable entry



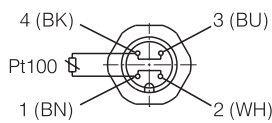
M12-plug

TFP-841.2, TFP-842 2x Pt100

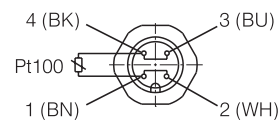
without transmitter



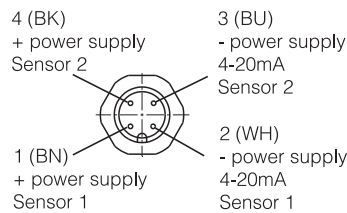
cable entry



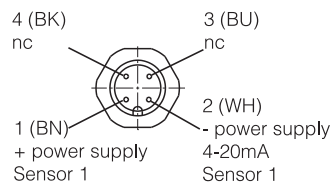
with 1x M12-plug



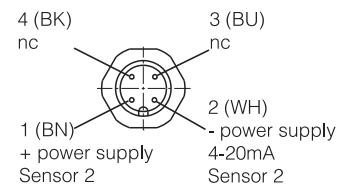
with 2x transmitter MPU-4



with 1x M12-plug

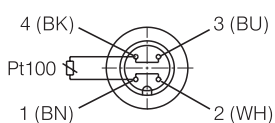


with 2x M12-plug

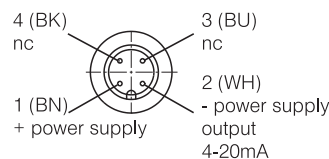


TFP-861

without transmitter

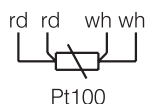


with transmitter MPU-M



TFP-881

without transmitter



with transmitter MPU-M

red: + power supply
white: 4...20 mA current signal

Specification

Pipe specification	DIN 1	DIN 11850 series 1	Delta ferrite DF	standard	< 1,0 % (weld seam < 3 %)
	DIN 2	DIN 11850 series 2		option	< 0,5 % (weld seam < 3 %)
	ISO	DIN 11866 series A		Baseler Norm II	(BN II)
	ASME	DIN 11866 series B ISO 1127 DIN 11866 C OD-Tube		Sulfure content	standard acc. to ASME 0.030 % max. 0.005 % min. 0.017 % max.
Material	pipes and sleeves	stainless steel SS (1.4435, 316L) with 3.1	Nominal diameter	standard	see tables
Surfaces	product contacted areas	$R_a \leq 0,8 \mu\text{m}$ (not in welded areas) electro-polished	Tolerances	DN10...DN40 DN50...	DN: $\pm 0,3$; L: $\pm 1,0$ mm DN: $\pm 0,5$; L: $\pm 1,0$ mm
	option	$R_a \leq 0,6 \mu\text{m}$ $R_a \leq 0,4 \mu\text{m}$	Sensor connection	EPA-8 EPA-18	Clamp ring DN10...20 Clamp ring DN25...40
			Sealing principle	sealing ring	EPDM (FDA listed)
			Operating pressure		10 bar max.

Note

The technical specification of pipes is according to DIN 11865 if no other is defined. DF values are valid for delivery condition. Mechanical treatment after delivery can increment the DF value.

Order Code

EPA-8 (Pharma conform build-in system, for sensor diameter 8 mm)
EPA-18 (Pharma conform build-in system, for sensor diameter 18 mm)

Pipe Specification

DIN1 DIN 11850 series 1

A DIN 11850 series 2
DIN 11866 series A

B DIN 11866 series B
ISO 1127

C DIN 11866 series C
OD-Tube

Diameter

see tables

Surface Quality

0,8 $R_a \leq 0,8 \mu\text{m}$
 0,6 $R_a \leq 0,6 \mu\text{m}$
 0,4 $R_a \leq 0,4 \mu\text{m}$

Certificate Surface Quality

X without
 RAC Certificate surface quality

Pressure Test

X without
 DP Pressure test incl. certificate acc. to DIN EN 10204-3.1

Delta-ferrite Content

X < 1,0 % (weld-seam < 3 %)
 DF < 0,5 % (weld-seym < 3 %)
 BN Baseler Norm II

Certificate Delta-ferrite Content

X without
 DFC Certificate delta-ferrite content incl. measuring protocol

Example:

EPA-18 / A / 50 / 0,8 / RAC / DP / DF / DFC

DIN 11850 Series 1

DIN 11850 Series 1				
Order Code	DN	L [mm]	Pipe D _{ext}	suitable for
EPA-8 / DIN1 / 10	10	70	12 x 1,0	NWM-641, TFP-6.../010
EPA-8 / DIN1 / 15	15	70	18 x 1,0	NWM-641, TFP-6.../010
EPA-8 / DIN1 / 20	20	80	22 x 1,0	NWM-641, TFP-6.../010
EPA-8 / DIN1 / 25	25	100	28 x 1,5	NWM-641, TFP-6.../025
EPA-8 / DIN1 / 32	32	110	34 x 1,5	NWM-641, TFP-6.../025
EPA-8 / DIN1 / 40	40	120	40 x 1,5	NWM-641, TFP-6.../025

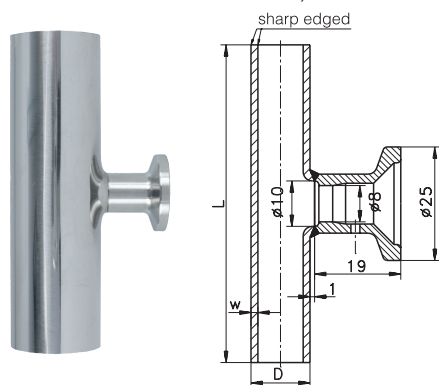
DIN 11850 Series 1				
Order Code	DN	L [mm]	Pipe D _{ext}	suitable for
EPA-18 / DIN1 / 25	25	100	28 x 1,5	NWM-841, TFP-8.../020
EPA-18 / DIN1 / 32	32	110	34 x 1,5	NWM-841, TFP-8.../020
EPA-18 / DIN1 / 40	40	120	40 x 1,5	NWM-841, TFP-8.../020
EPA-18 / DIN1 / 50	50	140	52 x 1,5	NWM-841, TFP-8.../020

DIN 11866 Series B ISO 1127

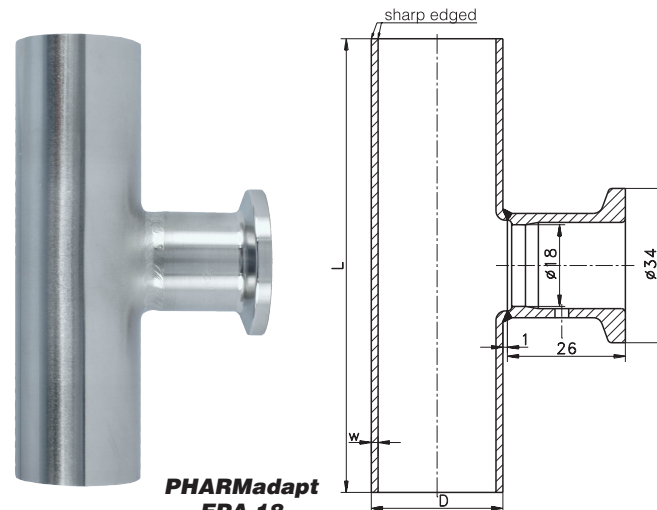
DIN 11866 Series B / ISO 1127				
Order Code	DN	L [mm]	Pipe D _{ext}	suitable for
EPA-8 / B / 8	ISO8	64	13,5 x 1,6	NWM-641, TFP-6.../010
EPA-8 / B / 10	ISO10	68	17,2 x 1,6	NWM-641, TFP-6.../010
EPA-8 / B / 15	ISO15	72	21,3 x 1,6	NWM-641, TFP-6.../010
EPA-8 / B / 20	ISO20	110	26,9 x 1,6	NWM-641, TFP-6.../010
EPA-8 / B / 25	ISO25	120	33,7 x 2,0	NWM-641, TFP-6.../025
EPA-8 / B / 32	ISO32	130	42,4 x 2,0	NWM-641, TFP-6.../025
EPA-8 / B / 40	ISO40	130	48,3 x 2,0	NWM-641, TFP-6.../025
EPA-8 / B / 50	ISO50	180	60,3 x 2,0	NWM-641, TFP-6.../025
EPA-8 / B / 65	ISO65	220	76,1 x 2,0	NWM-641, TFP-6.../050
EPA-8 / B / 80	ISO80	260	88,9 x 2,3	NWM-641, TFP-6.../050

DIN 11866 Series B / ISO 1127				
Order Code	DN	L [mm]	Pipe D _{ext}	suitable for
EPA-18 / B / 20	ISO20	110	26,9 x 1,6	NWM-841, TFP-8.../020
EPA-18 / B / 25	ISO25	120	33,7 x 2,0	NWM-841, TFP-8.../020
EPA-18 / B / 32	ISO32	130	42,4 x 2,0	NWM-841, TFP-8.../020
EPA-18 / B / 40	ISO40	130	48,3 x 2,0	NWM-841, TFP-8.../020
EPA-18 / B / 50	ISO50	180	60,3 x 2,0	NWM-841, TFP-8.../020
EPA-18 / B / 65	ISO65	220	76,1 x 2,0	NWM-841, TFP-8.../050
EPA-18 / B / 80	ISO80	260	88,9 x 2,3	NWM-841, TFP-8.../050

Dimensioned Drawings of Pipes (dimensions: see tables above)



**PHARMadapt
EPA-8**



**PHARMadapt
EPA-18**

DIN 11850 Series 2 DIN 11866 Series A

DIN 11866 Series A / DIN 11850 Series 2				
Order Code	DN	L [mm]	Pipe D _{ext}	suitable for
EPA-8 / A / 10	10	70	13 x 1,5	NWM-641, TFP-6.../010
EPA-8 / A / 15	15	70	19 x 1,5	NWM-641, TFP-6.../010
EPA-8 / A / 25	25	100	29 x 1,5	NWM-641, TFP-6.../025
EPA-8 / A / 32	32	110	35 x 1,5	NWM-641, TFP-6.../025
EPA-8 / A / 40	40	120	41 x 1,5	NWM-641, TFP-6.../025
EPA-8 / A / 50	50	160	53 x 1,5	NWM-641, TFP-6.../025
EPA-8 / A / 65	65	210	70 x 2,0	NWM-641, TFP-6.../050
EPA-8 / A / 80	80	260	85 x 2,0	NWM-641, TFP-6.../050
EPA-8 / A / 100	100	310	104 x 2,0	NWM-641, TFP-6.../050

DIN 11866 Series A / DIN 11850 Series 2				
Order Code	DN	L [mm]	Pipe D _{ext}	suitable for
EPA-18 / A / 25	25	100	29 x 1,5	NWM-841, TFP-8.../020
EPA-18 / A / 32	32	110	35 x 1,5	NWM-841, TFP-8.../020
EPA-18 / A / 40	40	120	41 x 1,5	NWM-841, TFP-8.../020
EPA-18 / A / 50	50	160	53 x 1,5	NWM-841, TFP-8.../020
EPA-18 / A / 65	65	210	70 x 2,0	NWM-841, TFP-8.../050
EPA-18 / A / 80	80	260	85 x 2,0	NWM-841, TFP-8.../050
EPA-18 / A / 100	100	310	104 x 2,0	NWM-841, TFP-8.../050

DIN 11866 Series C OD-Tube

DIN 11866 Series C / OD-Tube / ASME BPE				
Order Code	DN	L [mm]	Pipe D _{ext}	suitable for
EPA-8 / C / 3/4"	3/4"	102	19,05 x 1,65	NWM-641, TFP-6.../010
EPA-8 / C / 1"	1"	108	25,4 x 1,65	NWM-641, TFP-6.../010
EPA-8 / C / 1 1/2"	1 1/2"	120,5	38,1 x 1,65	NWM-641, TFP-6.../025
EPA-8 / C / 2"	2"	146	50,8 x 1,65	NWM-641, TFP-6.../025
EPA-8 / C / 2 1/2"	2 1/2"	160	63,5 x 1,65	NWM-641, TFP-6.../050
EPA-8 / C / 3"	3"	170	76,2 x 1,65	NWM-641, TFP-6.../050
EPA-8 / C / 4"	4"	210	101,6 x 2,11	NWM-641, TFP-6.../050

DIN 11866 Series C / OD-Tube / ASME BPE				
Order Code	DN	L [mm]	Pipe D _{ext}	suitable for
EPA-18 / C / 1"	1"	108	25,4 x 1,65	NWM-841, TFP-8.../020
EPA-18 / C / 1 1/2"	1 1/2"	120,5	38,1 x 1,65	NWM-841, TFP-8.../020
EPA-18 / C / 2"	2"	146	50,8 x 1,65	NWM-841, TFP-8.../020
EPA-18 / C / 2 1/2"	2 1/2"	160	63,5 x 1,65	NWM-841, TFP-8.../050
EPA-18 / C / 3"	3"	170	76,2 x 1,65	NWM-841, TFP-8.../050
EPA-18 / C / 4"	4"	210	101,6 x 2,11	NWM-841, TFP-8.../050

Order Code

TFP-641	(for PHARMadapt EPA-8, connecting head d=55 mm, non-sensitive design to vibrations)
TFP-641.2	(for PHARMadapt EPA-8, connecting head d=55 mm, 2xPt100, non-sensitive design to vibrations)
TFP-642	(for PHARMadapt EPA-8, like TFP-641.2, but higher connecting head and prepared for 2 x transmitter)
TFP-661	(for PHARMadapt EPA-8, head d=18 mm, electrical connection via M12-plug)
TFP-681	(for PHARMadapt EPA-8, head d=18 mm, electrical connection via 2,5m PTFE-cable; other lengths: see accessories)
TFP-841	(for PHARMadapt EPA-18, connecting head d=55 mm, non-sensitive design to vibrations)
TFP-841.2	(for PHARMadapt EPA-18, connecting head d=55 mm, 2 x Pt100, non-sensitive design to vibrations)
TFP-842	(for PHARMadapt EPA-18, like TFP-641.2, but higher connecting head and prepared for 2 x transmitter)
TFP-861	(for PHARMadapt EPA-18, head d=18 mm, electrical connection via M12-plug)
TFP-881	(for PHARMadapt EPA-18, head d=18 mm, electrical connection via 2,5 m PTFE-cable; other lengths: see accessories)
SRC-05	(Clamp ring for EPA-8, material 1.4301 bright)
SRC-10	(Clamp ring for EPA-18, material 1.4301 bright)
TAG	(TAG-number plate, material 1.4301, labeled according to customer preference)

Sensor length for TFP-6xx

010	10mm
025	25mm
050	50mm

Sensor length for TFP-8xx

020	20mm
050	50mm

Accuracy Class Pt100

A
1/3B
1/10B

Electrical Connection for TFP-641 and TFP-841

PG	cable entry M16x1,5
M12	M12-plug

Electrical Connection for TFP-641.2 and TFP-841.2

PG	cable entry M16x1,5
2xPG	2x cable entry M16x1,5
2xM12	2x M12-plug

Electrical Connection for TFP-642 and TFP-842

M12	M12-plug
2xM12	2xM12-plug

Messumformer

X	without
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for TFP-641 und TFP-841

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-certificate
MPU-LCD	with display

for TFP-661, TFP-681, TFP-861 and TFP-881

MPU-M

1. Transmitter (only for TFP-642 and TFP-842!)

MPU-4	(programable)
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Measurement Range 1. MPU (only for types with transmitter)

-10...40 °C	not for MPU-LCD
0...50 °C	
0...100 °C	
0...150 °C	
0...200 °C	
xx...yy °C	special range

2. Transmitter (only for TFP-642 and TFP-842!)

MPU-4	(programable)
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Messbereich 2. MPU (only with 2. transmitter)

see measurement ranges 1. MPU

Beispiel:

TFP-642 / 010 / A / M12 / MPU-4 / 0...100 °C / MPU-4 / 0...100 °C