

Product Information TFP-EX PHARMA FOOD

Pharma Temperature Sensor TFP-EX

Application/Specified Usage

- Temperature measurement:
- of liquid media in vessels and pipes
 - suitable for applications in potentially explosive atmospheres

Application Examples

- Process monitoring
- Monitoring of CIP-/SIP-cleaning
- Safe temperature measuring in hotsteam- and pressure pipes (enclosed process)

Hygienic Design/Process Connection

- All wetted materials compliant to FDA
- Sensor completely made of stainless steel
- Sealing ring according to USP Class VI
- CIP-/SIP-cleaning up to 140 °C
- Characteristics of process connections: see product information PHARMadapt ESP, PHARMadapt EPA, CLEANadapt

Features

- Protection class IP 69 K
- Material (1.4435), inspection certificate 3.1 in scope of delivery (for all product contacting parts)
- Different types of electrical connections possible
- Weight reduced connecting head: non-sensitive to vibrations
- Quick and easy to install with an orbital welding machine

Options/Accessories

- Programmable transmitters
- Pt100 chip with other classes of accuracy (1/3B, 1/10B)
- Surface quality $R_a \leq 0.6 \mu\text{m}$ and $\leq 0.4 \mu\text{m}$ on request
- Calibration certificate

Authorisations



TFP-58PEX



TFP-47PEX



TFP-90EX



TFP-52PEX



TFP-641EX



TFP-841EX



Temperature Sensor TFP-xxxPEX		
Process connection	build-in system ESP build-in system EPA CLEANadapt thread G1/2" Fermenter sleeve Tri-Clamp	with G3/8" external thread and thermowell with clamp-ring SRC-05 resp. SRC-10 M12 CLEANadapt; combined with Negele weld-in sleeves, build-in systems, adaptor sleeves gap-free with weld-in thermowell, e.g. ESH-G1/2"/50 DN25 with coupling nut, G1½" Tri-Clamp
Insertion length EL	build-in system ESP, EPA CLEANadapt, Tri-Clamp thread G1/2" Fermenter sleeve	predefined, suitable for build-in systems 20...500 mm (in steps of 5 mm) 35...500 mm (inclusive thread) 25 mm
Materials	connecting head process connection sealing ring	stainless steel 1.4305 stainless steel 1.4435 EPDM, USP Class VI, FDA approval number 21 CFR 177.2600
Surface quality		$R_a \leq 0.8 \mu\text{m}$ (optional: $R_a \leq 0.6 \mu\text{m}$ and $R_a \leq 0.4 \mu\text{m}$)
Temperature ranges	storage operating temperature	-20...+80 °C see table page 3
Operating pressure	build-in system ESP, CLEANadapt, with weld-in thermowell build-in system EPA, Fermenter sleeve, Tri-Clamp	max. 50 bar max. 10 bar
Sensing resistor	acc. to DIN EN 60751	Pt100
Electrical connection	cable gland cabel connection	M16 x 1.5 M12-plug 1.4305, 4-pins
Protection class		IP 69 K (with cable gland only by using suitable cable!)

Transmitter MPU-EX		
Measuring ranges	standard	-10...40 °C, 0...50 / 100 / 150 / 200 °C special ranges free programmable configuration via programming adaptor
Accuracy	-100...+200 °C	±0.2 K (acc. to URL)
Temperature stability	acc. to URL 20 mA	±0.005 %/K deviation from 22 °C
Long term stability	calibration conditions, % refer to selected span	≤ 0.1 K/a or ≤ 0.05 %/a (higher value counts)
Supply voltage error	acc. to URL 20 mA	≤ ±0.01 %/V deviation from 24 V
Burden error		≤ ±0.02 %/100 Ω

Authorizations EX for TFP without transmitter



- ATEX: II 2G Ex ia IIC T6-T4 Gb
- IECEx: Ex ia IIC T6-T4 Gb

Authorizations EX for TFP with transmitter



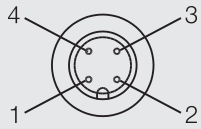
- ATEX: II 1G Ex ia IIC T6-T4 Ga

Electrical connection with transmitter MPU-EX

Electrical connection without transmitter

Electrical connection with M12 plug

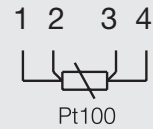
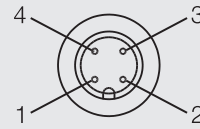
Configuration M12 plug



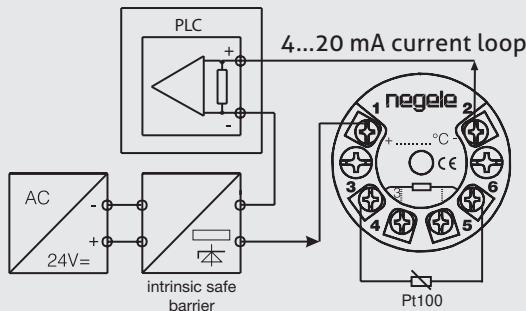
- 1: + supply
2: - supply 4...20 mA
3: not connected
4: not connected

Electrical connection M12 plug

Configuration M12 plug



Electrical connection with cable gland



Advice



In potentially explosive areas the usage of an intrinsic safe power supply or evaluation unit is mandatory.

Temperature range TFP with transmitter MPU-EX

Temperature range at II 2 G and II 3 G	$T_{amb}/^{\circ}\text{C}$	II 2 G $T_{med}/^{\circ}\text{C} \leq$		
		T6	T5	T4
	-20...+25	69	90	105
	-20...+30	66	90	101
	-20...+40	58	84	93
Temperature range at II 1 G	$T_{amb}/^{\circ}\text{C}$	II 1 G $T_{med}/^{\circ}\text{C} \leq$		
		T6	T5	T4
	-20...+25	43	61	78
	-20...+30	39	57	74
	-20...+40	-	49	67
Supply circuit				
Upper limiting values at clamps 1(+) and 2(-)	$U_i = 30 \text{ VDC}$ $I_i = 100 \text{ mA}$ $P_i = 750 \text{ mW}$			
Internal inductance and capacity	$L_i = \text{negligible}$ $C_i = \text{negligible}$			

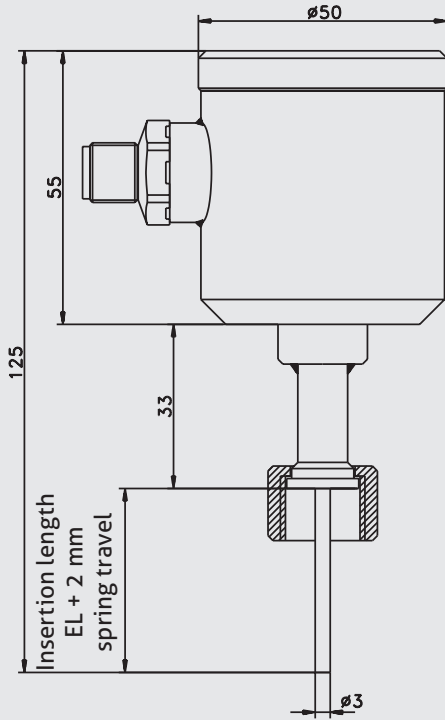
Temperature range TFP without transmitter

Maximum media temperature T_{med} = maximum ambient temperature T_{amb} :

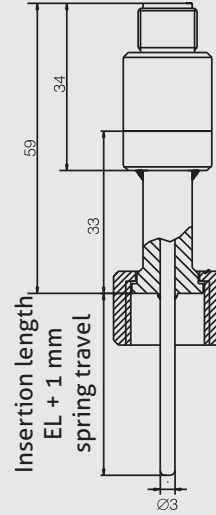
Temperature class	Maximum power of the connected intrinsic safe unit				
	$P_0 \leq 30 \text{ mW}$	$P_0 \leq 50 \text{ mW}$	$P_0 \leq 70 \text{ mW}$	$P_0 \leq 100 \text{ mW}$	$P_0 \leq 200 \text{ mW}$
T4 (125 °C)	113 °C	105 °C	96 °C	84 °C	43 °C
T5 (100 °C)	83 °C	75 °C	66 °C	54 °C	13 °C
T6 (85 °C)	68 °C	60 °C	51 °C	39 °C	-2 °C

Process connection build-in system PHARMadapt ESP

TFP-58PEX

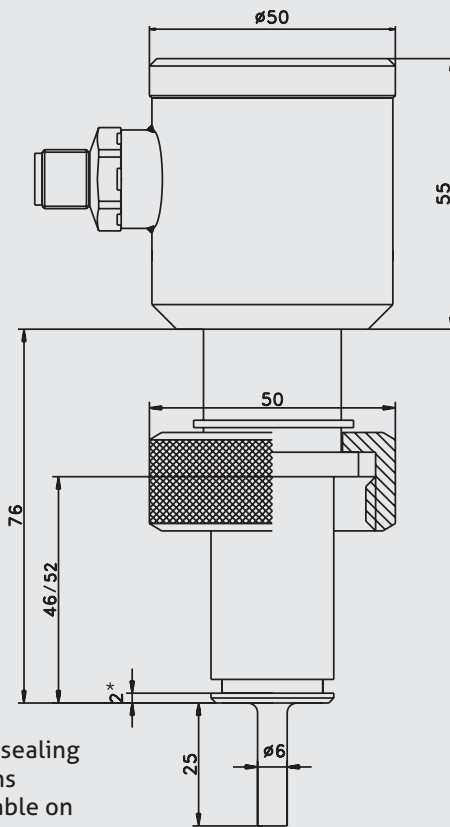


TFP-168PEX



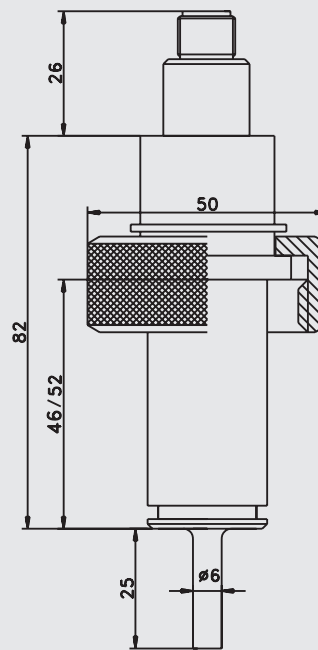
Process connection Fermenter sleeve

TFP-90EX



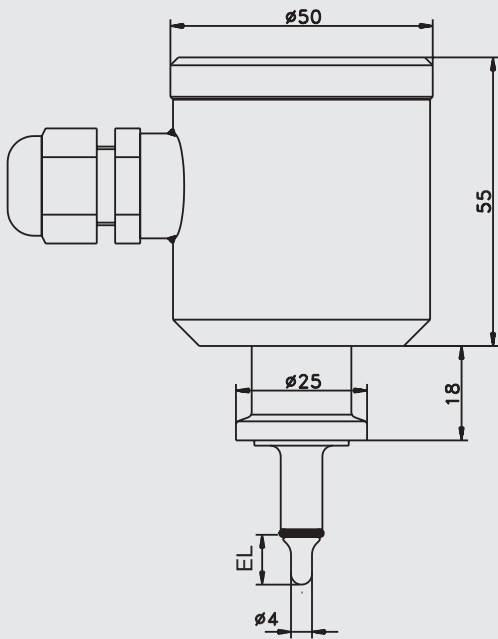
* Other sealing positions deliverable on request.

TFP-96EX

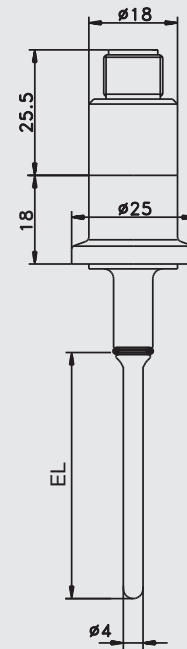


Process connection build-in system PHARMadapt EPA

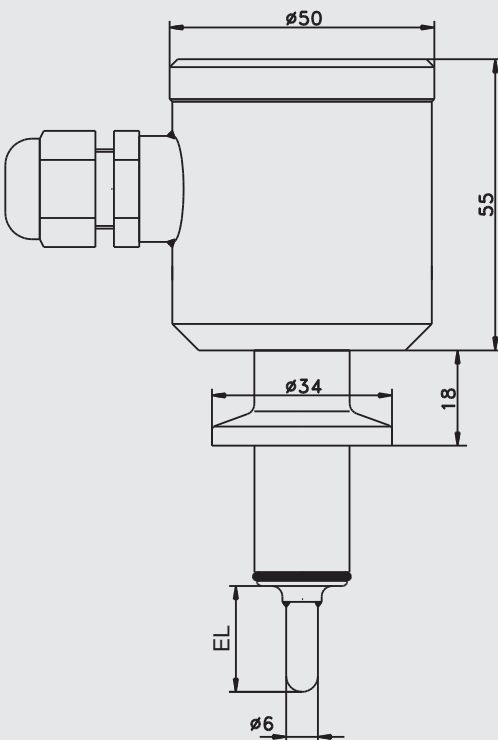
TFP-641EX



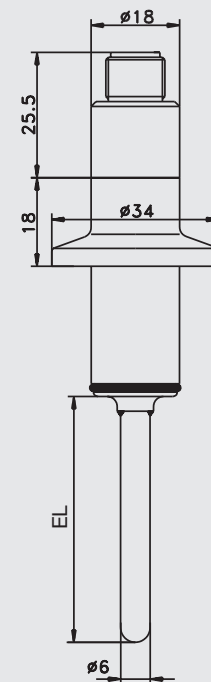
TFP-661EX



TFP-841EX

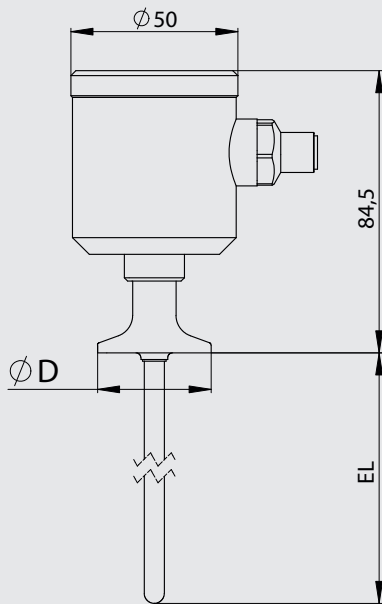


TFP-861EX

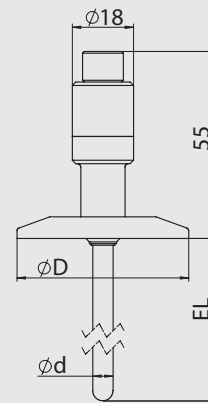


Process connection Tri-Clamp

TFP-47PEX



TFP-167PEX

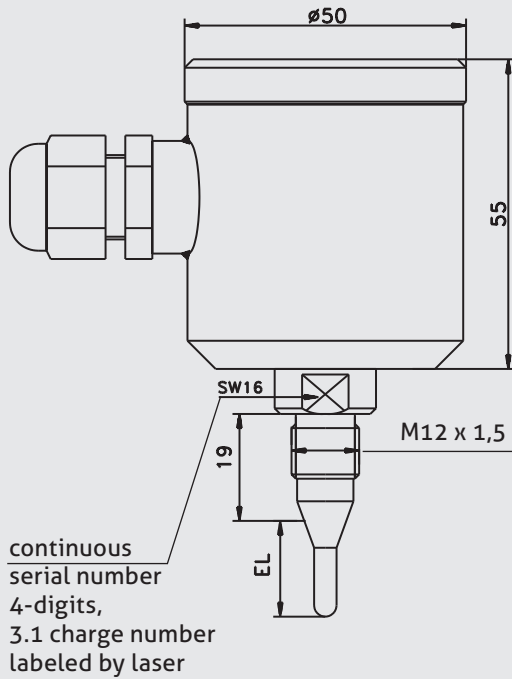


Dimension table Tri-Clamp

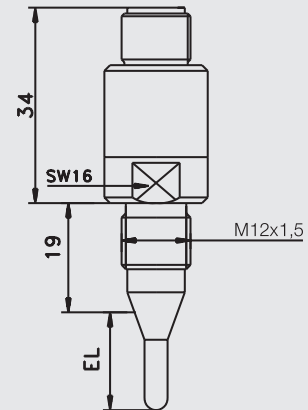
Type	Order code	Clamp size D [mm]	Suitable for pipe diameter	Pipe style
C25	TFP-.../C25	25.0	DN 6...8 ISO 6...10 1/4", 3/8", 1/2", 3/4"	DIN 11866 series A DIN 11866 series B / ISO 1127 DIN 11866 series C
C34	TFP-.../C34	34.0	DN 10...20	DIN 11866 series A
C50	TFP-.../C50	50.5	DN 25...40 ISO 15...25 1" + 1/2"	DIN 11866 series A DIN 11866 series B / ISO 1127 DIN 11866 series C
C64	TFP-.../C64	64.0	DN 50 2"	DIN 11866 series A DIN 11866 series C
C77	TFP-.../C77	77.5	2 1/2"	DIN 11866 series C
C91	TFP-.../C91	91.0	DN 65 3"	DIN 11866 series A DIN 11866 series C

Process connection CLEANadapt

TFP-42PEX

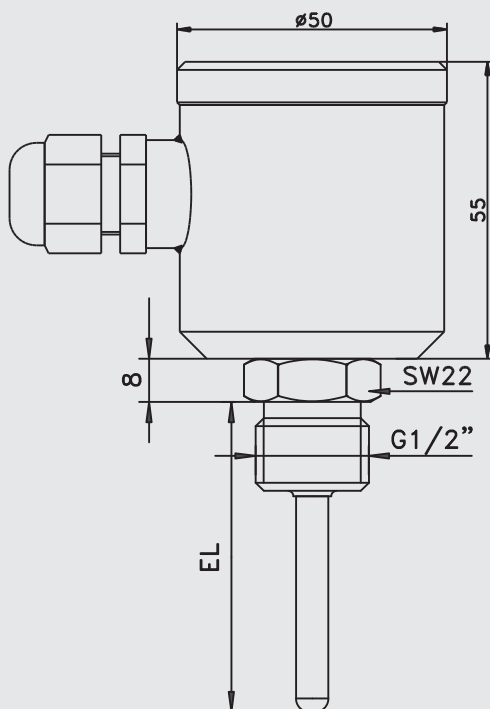


TFP-162PEX

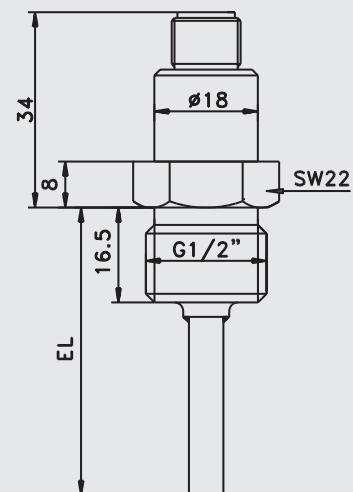


Process connection standard thread G1/2"

TFP-40EX



TFP-160EX



Information

Following sensors are available as variants with spacer (100 mm):
TFP-50EX, -52PEX und -57PEX.



Advices for TFP-58PEX, -641EX, -841EX, -42PEX, -52PEX, -40EX, -50EX, -90EX, -47PEX und -57PEX (sensors with MPU transmitter)

Mechanical connection/Installation

- Check the compatibility of the sensor length to the used thermowell.
- For the physical connection to the measurement location (e. g. pipe or tank) it is proposed to use appropriate tools. For devices with screw connection the right torque range has to be met. An open-end wrench with torque lock-in positions is the preferable tool. To handle with special process connections please refer the product information.
- The devices has to be connected to a power supply of nominal 24 V, pin 1 to (+) and pin 2 to (-). Please consider the right polarity. In potentially explosive atmospheres the power supply has to have an intrinsic safe barrier, which represents the transition to the safe area. Between the barrier and the actual power supply, the current is the measure for the temperature. In which one of the wires the shunt has to be inserted, depends on the residual wiring of the equipment (normally the shunt is inserted in the minus wire, and the voltage across the shunt would be the measure for the line control or SPS).

Configuring the device

- The device can be already prepared for the desired operating mode and range before the final installation. For this the programming adaptor can be used. Please note that the adaptor is **not allowed to be used in potentially explosive atmosphere**. The configuration must be done **before the final installation in the safe area**. Please follow the instructions of the programming adaptor.

Identifying and treatment of malfunction

- The measured current resp. The voltage across the shunt has to be proved for plausibility. If the current values exceed the limits $< 4 \text{ mA}$ or $> 20 \text{ mA}$ it has to be checked, if the sensing element's temperature is really beyond the programmed range.
- If there are determined currents $< 3.6 \text{ mA}$, sensor short circuit is likely, otherwise if current is $> 22 \text{ mA}$, sensor break is likely.

Start-up procedure

- After careful examination of the error-free installation, the device is ready for power-on. For supplying across the barrier module it shall be ensured, that the shunt is inserted. This limits already **by itself** the maximum current.

Connection values of the intrinsic safe barrier

- $U_i = 30 \text{ V DC}$
- $I_i = 100 \text{ mA}$
- $P_i = 750 \text{ mW}$

Advices for TFP -168PEX, -661EX, -861EX, -162PEX, -160EX, -96EX und -167PEX (sensors without transmitter)

Mechanical connection/Installation

- Check the compatibility of the sensor length to the used thermowell.
- For the physical connection to the measurement location (e. g. pipe or tank) it is proposed to use appropriate tools. For devices with screw connection the right torque range has to be met. An open-end wrench with torque lock-in positions is the preferable tool. To handle with special process connections please refer the product information.
- The devices have to be connected to a suitable evaluating device. In explosive atmospheres this device has to be intrinsic safe and must not exceed the given connection values.

Connection values of the connected intrinsic safe unit

- $U_i = 30 \text{ V DC}$
- $I_i = 100 \text{ mA}$
- $P_i = 750 \text{ mW}$

Cleaning/Maintenance

- In case of using pressure washers, don't point nozzle directly to electrical connections!
- As the device is stated as **intrinsic safe**, maintenance work is allowed during normal operation. But the used facilities must not produce undesirable sparks, which could lead onto an explosion.
- If the transmitter module is working faulty and has to be exchanged, an original spare part must be used, which displays exactly the same certification imprint like the faulty module. An ATEX certified module has to provide the same ATEX label imprint.
- If there is defect in between the sensor chip (Pt100, protection tube), repair is possible at the manufacturer only.

Transport/Storage

- Do not store outside
- Store in an area that is dry and dust-free
- Do not expose to corrosive media
- Protect against solar radiation
- Avoid mechanical shock and vibration
- Storage temperature -20...+80 °C
- Relative humidity maximum 98 %

Reshipment

- Sensors and process connection must be clean and must not be contaminated with hazardous media and/or heat-conductive paste. Note the cleaning information!
- Use suitable transport packaging only to avoid damage of the equipment!

Standards and Guidelines

- Compliance with the applicable regulations and directives is mandatory.

Notice on conformity

Applicable guidelines:

- Electromagnetic Compatibility Directive 2014/30/EU
- The CE label confirms compliance of this product with the applicable EC directives.
- You have to guarantee the compliance of all guidelines applicable for the entire equipment.

Conventional usage

- The devices are made for measuring temperature and to transform this to an electrical measure (DC current of 4 mA ... 20 mA). The connection values corresponding to the product information have to be absolutely kept.
- For an error-free function the device must be mounted on a suitable process connection. This is defined by the architecture of the device.
- The limits of the ambient conditions – especially temperature and humidity – are stated in the product information and type label and they have to be stringently kept too.
- Special attention must be paid to the informations about the explosion protection. For the application field and operating conditions please refer the type label.
- The TFP-devices have to be connected via an intrinsic barrier, which is located in the safe area.
- Specifications for suitable cables have to cover the explosion protection.
- The TFP-devices are inappropriate for the use in safety-relevant installations according to EN 61508.

Warning about misuse

- The TFP-devices may not be used other than the above stated purposes. On any misuse the warranty claim will expire.
- It is forbidden to make any change at the devices, which differ from any normal handling. Opening is allowed for connecting, service or programming (adapting parameters or programming) only. Any further intervention warranty claim will be invalid too.
- Maintenance may be accomplished by authorized personnel only.

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.

EU Konformitätserklärung EU Declaration of Conformity

Hiermit bestätigen wir
Herewith we confirm



Negele Messtechnik GmbH
Raiffeisenweg 7
D-87743 Egg a. d. Günz – Germany

die Übereinstimmung der aufgeführten Temperaturfühler mit der Richtlinie 2014/34/EU des Europäischen Parlaments und des Rates, gemäß der
that the listed temperature sensors are in compliance with Directive 2014/34 / EU of the European Parliament and of the Council according to


EG-Baumusterprüfbescheinigungs-Nr. ZELM 14 ATEX 0526 X 2. Ergänzung
EC type examination certificate No. ZELM 14 ATEX 0526 X 2. supplement

ausgestellt durch,
issued by,

Prüf- und Zertifizierungsstelle ZELM Ex, Braunschweig, Kenn-Nr. 0820.

	ohne Messumformer <i>without transmitter</i>	mit Messumformer <i>with integrated transmitter</i>
Modelle: <i>Types:</i>	TFP-160EX TFP-162PEX TFP-168PEX TFP-661EX, TFP-861EX TFP-167PEX TFP-96EX	TFP-40EX, TFP-50EX TFP-42PEX, TFP-52PEX TFP-58PEX TFP-641EX, TFP-841EX TFP-47PEX, TFP-57PEX TFP-90EX
Normengrundlagen: <i>Technical Standards:</i>	EN 60079-0:2012 + A11:2013 EN 60079-11:2012 EN 80079-34:2012	
		EN 60079-26:2007 EN 61000-6-2 (Störfestigkeit/ <i>Immunity</i>) EN 61000-6-4 (Störaussendung/ <i>Emission</i>)
Richtlinien: <i>Directives:</i>	2011/65/EU Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS) <i>Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)</i> 2014/30/EU Elektromagnetische Verträglichkeit / <i>Electromagnetic Compatibility</i>	
Kennzeichnung: <i>Marking:</i>	ATEX:  II 2G Ex ia IIC T6-T4 Gb	ATEX:  II 1G Ex ia IIC T6-T4 Ga

Egg a. d. Günz, 2016-04-20


.....
Bernhard Gierl
(Geschäftsführer, *Managing Director*)


.....
i. A. Alex Kontschew
(Entwicklungsleiter, *Director R&D*)

Order code

Process connection

Fermenter

TFP-90EX

(connecting head Ø 50 mm, non-sensitive design to vibrations)

TFP-96EX

(connecting head Ø 18 mm, electrical connection via M12-plug)

Connection length in mm

46

52

Sensor Length EL in mm

020...250 (in steps of 5 mm)

Tri-Clamp

TFP-47PEX

(connecting head Ø 50 mm, non-sensitive design to vibrations)

TFP-57PEX

(connecting head Ø 55 with spacer)

TFP-167PEX

(connecting head Ø 18 mm, electrical connection via M12-plug)

G1/2"

TFP-40EX

(connecting head Ø 55 mm)

TFP-50EX

(connecting head Ø 55 with spacer)

TFP-160EX

(connecting head Ø 18 mm, electrical connection via M12-plug)

Sensor Length EL in mm

020...500 (in steps of 5 mm)

Diameter thermowell in mm

6

8

Diameter sensor tip in mm (only for TFP-xx7PEX and TFP-xx2PEX)

X (no reduction)

3 (only with thermowell 6 mm)

4 (only with thermowell 6 mm and 8 mm)

6 (only with thermowell 8 mm)

Accuracy class Pt100

A

1/3B

1/10B

Only selectable for TFP-90EX, -47PEX, -57PEX!

Electrical connection

PG (cable gland M16x1.5)

M12 (M12-plug, 1.4305)

Transmitter

X (without)

MPU-EX (programmable)

Measuring range MPU-EX

-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 range)

Tri-Clamp Size

(only for TFP-47PEX, -57PEX, -167PEX selectable)

C25

C34 (Pipe diameter: see

C50 "Dimension Table Tri-

C64 Clamp" on page 6)

C77

C91

TFP-90EX / 46 / 100 / 6 / X / A / PG / MPU-EX / 0...100 /

Order code

Process connection

PHARMadapt ESP **TFP-58PEX** (connecting head Ø 50 mm, non-sensitive design to vibrations)
TFP-168PEX (connecting head Ø 18 mm, electrical connection via M12-plug)

Sensor length EL in mm

037
059
083
160

PHARMadapt EPA-8 **TFP-641EX** (connecting head Ø 50 mm, non-sensitive design to vibrations)
TFP-661EX (connecting head Ø 18 mm, electrical connection via M12-plug)

Sensor length EL in mm

010
025
050
100

PHARMadapt EPA-18 **TFP-841EX** (connecting head Ø 50 mm, non-sensitive design to vibrations)
TFP-861EX (connecting head Ø 18 mm, electrical connection via M12-plug)

Sensor length EL in mm

020
050

CLEANadapt M12 **TFP-42PEX** (connecting head Ø 50 mm, non-sensitive design to vibrations)
TFP-52PEX (connecting head Ø 50 mm, non-sensitive design to vibrations, with spacer)
TFP-162PEX (connecting head Ø 18 mm, electrical connection via M12-plug)

Sensor length EL in mm

017
XXX special length (maximal 40 mm)

Diameter sensor tip in mm
(only selectable for TFP-42PEX, -52PEX, -162PEX)

4
6 (on request)

Accuracy class Pt100

A
1/3B
1/10B

Only selectable for TFP-58PEX, -641EX, -841EX, -42PEX!

Electrical connection

PG (cable gland M16x1.5)
M12 (M12-plug, 1.4305)

Transmitter

X (without)
MPU-EX (programmable)

Measuring range MPU-EX

-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 range)

TFP-58PEX / 083 / / A / M12 / MPU-EX / 0...100