Temperature Sensor and Build-In System G3/8" FLEXadapt

Application / Specified Usage

· Safe temperature measuring in pipes and vessels without opening the process with prefabricated thermowells and build-in systems
· Demounting the sensor without opening the process and without electrical disconnection > avoiding downtime of the equipment at calibration and maintenance!
· Perfectly suitable at small pipe diameters with build-in system ESF-G (available for pipes DN25...DN100)

Application Examples

· Flexible applicable for nearly every temperature measuring task in pipes and vessels
· Safe temperature measuring in hotsteam- and pressure pipes (enclosed process)
· Monitoring of CIP- / SIP-cleaning

Hygienic Design / Process Connection

· Hygienic and easy sterilizable installation by using Negele build-in system **ESF**
· CIP-/ SIP-cleaning up to 140 °C
· All wetted materials compliant to FDA
· Sensor completely made of stainless steel

Features

· Short reaction time, very compact measure point
· Available with and without integrated transmitter
· Electrical connection via M12-plug (TFP-179)
· Threaded thermowells ESF-G1/2" for CLEANadapt can be combined with many other standard adapters. Therefore they are suitable for each application and process connection (e.g. TriClamp, dairy flange (DIN 11851), DRD, Varivent, APV, BioControl...)
· Quick and easy to install with an orbital welding machine (ESF-G)
· Temperature sensors and build-in systems with pre-defined, concerted standard lengths, reducing the variety and economize costs for storage and simplify the maintenance.

Options / Accessories

· Programmable transmitter **MPU-4** for TFP-59
· Programming adapter **MPU-P** (only for MPU-4)
· Transmitter Profibus PA **MPU-10**, HART-Protocol **MPU-H** (TFP-59)
· Integrated display **MPU-LCD** in connecting head
· Pt100-chip with other classes of accuracy, e. g. 1/3 DIN B, 1/10 DIN B

Authorisations

FDA

TFP-59 / 097

ESF-G1/2", ESF-EH, ESF-KM

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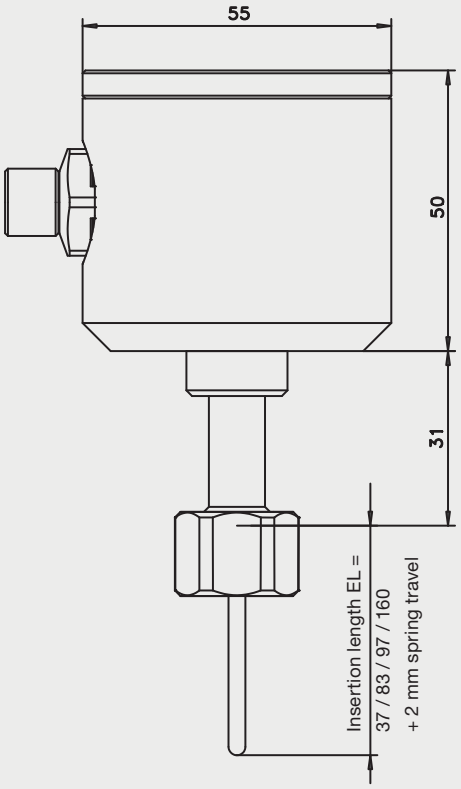
Temperature Sensor		
Process Connection	thermowell	with G3/8" external thread
Insertion Length	standard	37, 83, 97, 160 mm
Materials	connection head protection tube cap nut spacer	stainless steel 1.4305 (303) stainless steel 1.4404 stainless steel 1.4571 stainless steel 1.4301, Ø 10 mm
Temperature Ranges	ambient sensor tip	-50...+80 °C -50...+250 °C
Operating Pressure		40 bar max.
Protection Type		IP 69 K (with electrical connection M12-plug)
Sensing Resistor	acc. to IST 90	1 x Pt100 class A
Electrical Connection	TFP-59 TFP-179 TFP-199	cable gland M16 x 1,5 (PG) or M12-plug 1.4305, 4-pin M12-plug 1.4305 (303) fixed cable (PVC), standard: 2,5 m

Transmitter MPU-4		
Temperature Ranges	ambient storage	-40...+85 °C -55...+90 °C
Measurement Ranges	standard MPU-4	-10...40 °C, 0...50 / 100 / 150 / 200 °C free programmable
Accuracy		< ± 0,1 % of full scale
Temperature Drift	zero, gain	< 0,01 % of full scale / K
Electrical Connection	supply	8...35 V DC
Output	analog	4...20 mA
Humidity	without condensation	0...98 %

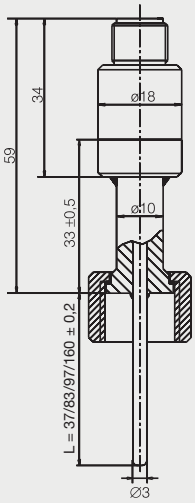
Transmitter MPU-M		
Temperature Ranges	ambient	-40...+85 °C
Measurement Ranges	standard	-10...40 °C, 0...100 / 150 °C
Accuracy		< ± 0,2 % of full scale
Temperature Drift	zero, gain	< 0,02 % of full scale / K
Electrical Connection	supply	12...36 V DC
Output	analog	4...20 mA

Dimensioned Drawing TFP-59

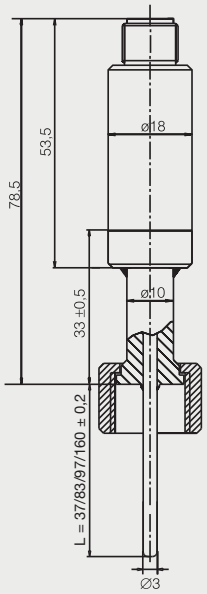


Option MPU-LCD (display in connection head)

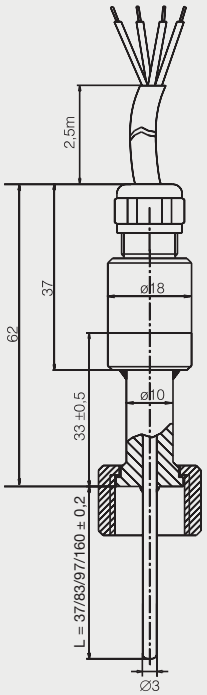
TFP-179 / ...



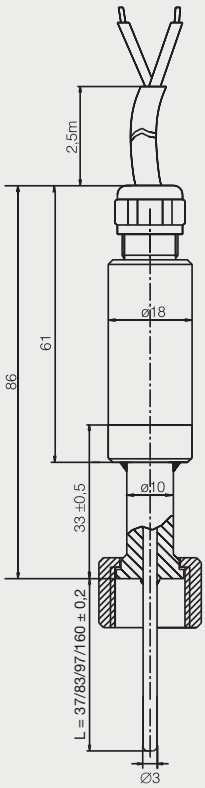
TFP-179 / ... / MPU-M



TFP-199 / ...



TFP-199 / ... / MPU-M



Conventional Usage

· Not suitable for applications in explosive areas.

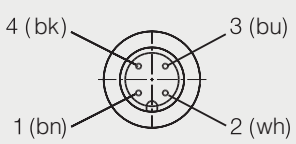
· Not suitable for applications in security-relevant equipments (SIL).

Mechanical Connection / Installation

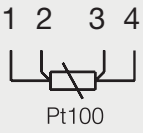
· To guarantee a definite function use the Negele **FLEXadapt**-system ESF!

Electrical connection without transmitter

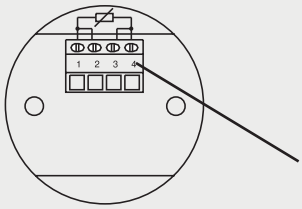
M12-plug



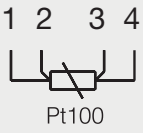
Configuration M12-plug



Cable gland



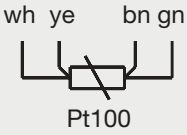
Config. strip terminal



clamps for Pt100

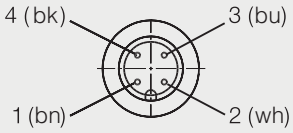
Fixed cable PVC (0...90 °C)

Configuration cable



Electrical connection with transmitter

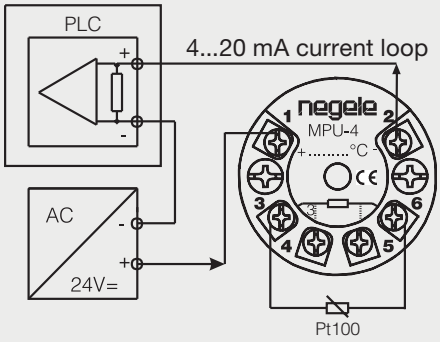
M12-plug



Configuration M12-plug

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

Cable gland



Fixed cable PVC (0...90 °C)

Configuration cable

bk: + supply
bu: - supply
4...20 mA

Table Reaction Time	ESF-G-DIN2-25	ESF-G1/2"-40	ESF-EH-125	ESF-KM-125
Medium temperature 90 °C				
T50	5,8 s	7,8 s	8,0 s	8,0 s
T90	19,0 s	21,1 s	24,0 s	24,0 s

We recommend the use of heat-conductive paste to reduce the reaction times down to approx. 50 % as named above!

Specification of Measure Point and Adapter		
Pipe Style	DIN 2 ISO ASME	DIN 11850 series 2, DIN 11866 series A DIN 11866 series B, ISO 1127 DIN 11866 series C, OD-Tube
Material	pipe and thermowell	stainless steel 1.4404 (316L)
Surface	wetted parts optional	$R_a \leq 0{,}8$ µm (not in welded areas) electro polished $R_a \leq 0{,}6$ µm, $R_a \leq 0{,}4$ µm
Diameter		see Tables
Tolerances	DN25...DN40 DN50...	DN: ± 0,3 mm, length: ± 1,0 mm DN: ± 0,5 mm, length: ± 1,0 mm
Sensor Connection	thread	G3/8"
Sealing Principle		weld-in thermowell
Operating Pressure		40 bar max.

Advice

The technical specification of pipes is according to DIN 11866 if no other is defined.

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 0...40 °C
- Relative humidity max. 80 %

Reshipment

- Sensors shall be clean and must not be contaminated with dangerous media!
- Use suitable transport packaging only to avoid damage of the equipment!

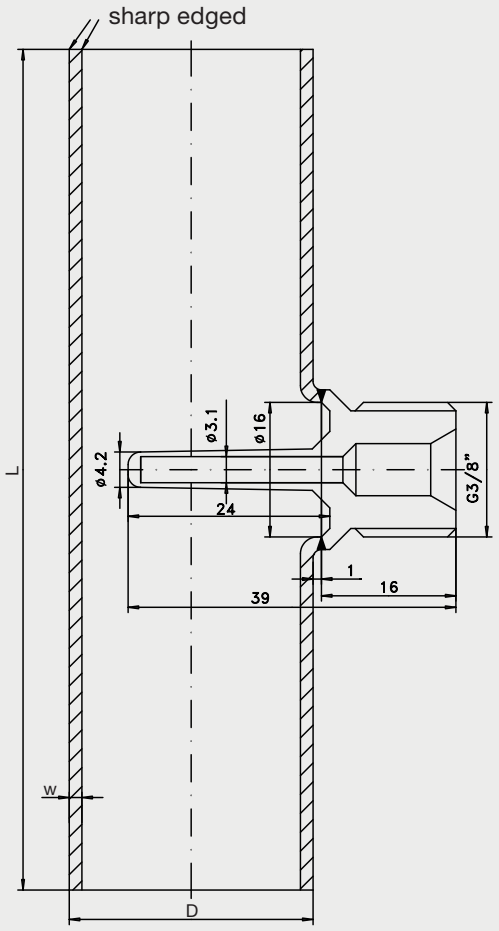
Cleaning / Maintenance

- In case of using pressure washers, dont‘t point nozzle directly to electrical connections!

Advice to EMC

- The device agrees to following standards: EMC directive 2004/108/EG.
- You have to guarantee the EMC directives for the entire equipement.

Dimensioned Drawing ESF-G-... DN25...DN80



DIN 11850 series 2 / DIN 11866 series A

Type	DN	L [mm]	pipe D x w	for insertion length
ESF-G-DIN2-25	25	100	29 x 1,5	TFP-... /037
ESF-G-DIN2-40	40	120	41 x 1,5	TFP-... /037
ESF-G-DIN2-50	50	140	53 x 1,5	TFP-... /037
ESF-G-DIN2-65	65	160	70 x 2,0	TFP-... /037
ESF-G-DIN2-80	80	180	85 x 2,0	TFP-... /037
ESF-G-DIN2-100	100	200	104 x 2,0	TFP-... /037

DIN 11866 series B / ISO 1127

Type	DN	L [mm]	pipe D x w	for insertion length
ESF-G-ISO-20	20	110	26,9 x 1,6	TFP-... /037
ESF-G-ISO-25	25	120	33,7 x 2,0	TFP-... /037
ESF-G-ISO-32	32	130	42,4 x 2,0	TFP-... /037
ESF-G-ISO-40	40	130	48,3 x 2,0	TFP-... /037
ESF-G-ISO-50	50	190	60,3 x 2,0	TFP-... /037
ESF-G-ISO-65	65	220	76,1 x 2,0	TFP-... /037
ESF-G-ISO-80	80	260	88,9 x 2,3	TFP-... /037

Order Code build-in system ESF-G

ESF-G build-in system straight series

Pipe style
DIN2 (see specification of pipes)
ISO (see specification of pipes)
ASME (see specification of pipes)

Diameter
25...100 (DIN2)
20...80 (ISO)
1"...4" (ASME)

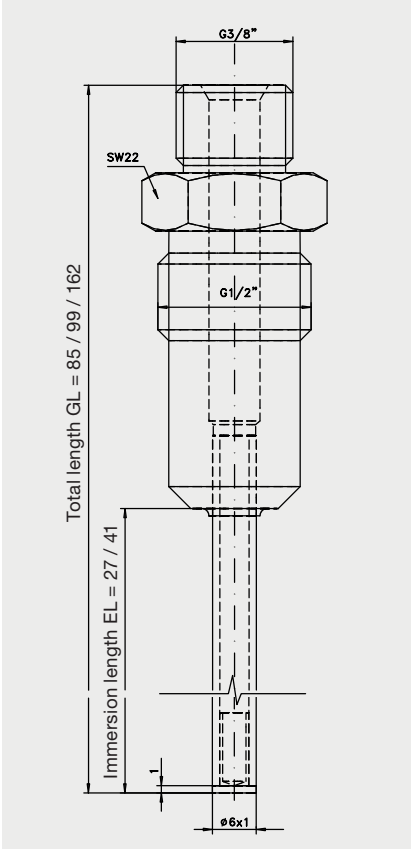
Surface
0,8 $R_a \leq 0{,}8$ µm
0,6 $R_a \leq 0{,}6$ µm
0,4 $R_a \leq 0{,}4$ µm

ESF-G / DIN2 / 40 / 0,8

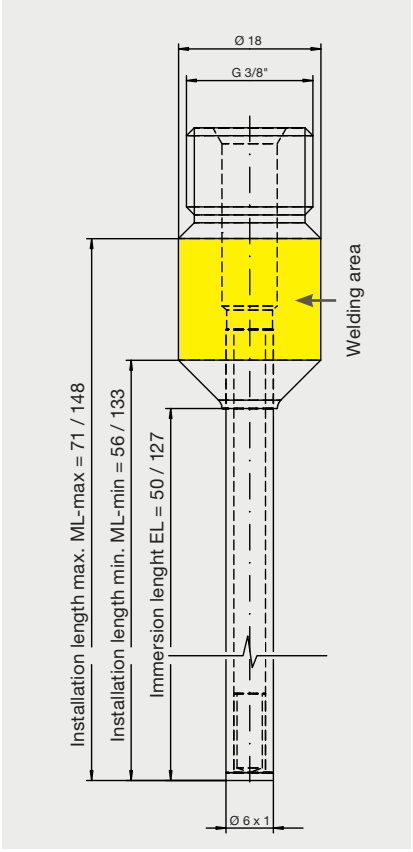
DIN 11866 series C / OD-Tube

Type	DN	L [mm]	pipe D x w	for insertion length
ESF-G-ASME-1"	1"	108	25,4 x 1,65	TFP-... /037
ESF-G-ASME-1½"	1½"	120,5	38,1 x 1,65	TFP-... /037
ESF-G-ASME-2"	2"	146	50,8 x 1,65	TFP-... /037
ESF-G-ASME-2½"	2½"	160	63,5 x 1,65	TFP-... /037
ESF-G-ASME-3"	3"	170	76,2 x 1,65	TFP-... /037
ESF-G-ASME-4"	4"	210	101,6 x 2,11	TFP-... /037

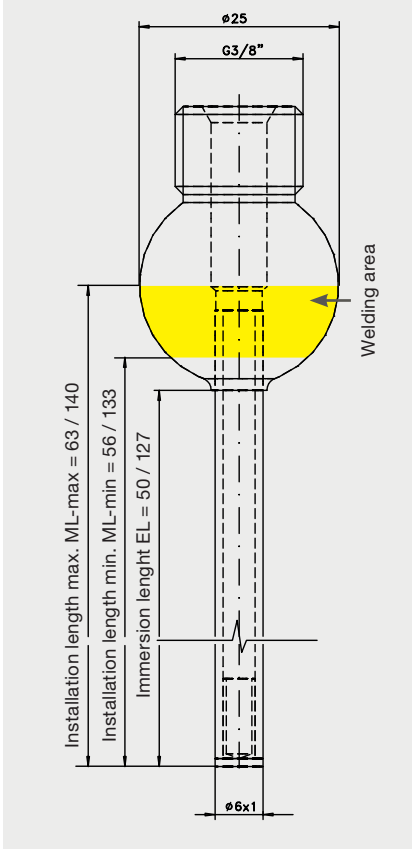
Adapter ESF-G1/2"



Adapter ESF-EH



Adapter ESF-KM



Adapter ESF-G1/2"

Type		Immersion length	Installation length	For insertion length
ESF-G1/2"-25	Threaded thermowell for installation into existing G1/2" CLEANadapt measure point	27 mm	–	TFP-... / 083
ESF-G1/2"-40		41 mm	–	TFP-... / 097
ESF-G1/2"-100		104 mm	–	TFP-... / 160

Adapter ESF-EH

Type		Immersion length	Installation length	For insertion length
ESF-EH-50	Weld-in thermowell for retrofit mounting of clamp connection (Type: EMK-25/76 or KEV-25/76) or for mounting into pipes and vessels	50 mm	56 ... 71 mm	TFP-... / 083
ESF-EH-125		127 mm	133 ... 148 mm	TFP-... / 160

Adapter ESF-KM

Type		Immersion length	Installation length	For insertion length
ESF-KM-50	Weld-in thermowell with weld-in ball for mounting into pipe elbows or vessels	50 mm	56 ... 63 mm	TFP-... / 083
ESF-KM-125		127 mm	133 ... 140 mm	TFP-... / 160

Order Code

TFP-59 Temperature sensor with connection head Ø 55 mm and spring mounted gauge slide
TFP-179 Temperature sensor with head Ø 18 mm, electrical connection via M12-plug
TFP-199 Temperature sensor with head Ø 18 mm, electrical connection via 2,5 m PVC-cable

Sensor Length
037 (length 37 mm)
083 (length 83 mm)
097 (length 97 mm; for threaded thermowell ESF-G1/2”-40)
160 (length 160 mm)

Diameter thermowell in mm
3

Diameter Sensor Tip in mm
3

Accuracy Class
A
1/3B
1/10B

Electrical Connection (only selectable with TFP-59)
PG (cable gland M16x1,5)
M12 (M12-plug 1.4305, standard with MPU-LCD)

Transmitter for TFP-59
X (without)
MPU-4 (programmable)
MPU-10 (Profibus PA)
MPU-H (HART-Protocol)
MPU-LCD (with display)

Transmitter for TFP-179 and TFP-199
X (without)
MPU-M

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-59 / 083 / 3 / 3 / A / M12 / MPU-4 / 0...100

Accessories

PVC-cable with M12-connection 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
MPU-P	Programming adapter for MPU-4

PVC-Cable with M12-Connection

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