

Temperature Sensor M12 hygienic Pharma

Application

- temperature measurement in pipes with small diameter
- perfectly for closely build-in situations
- suitable for pipe diameters from DN15

Application Examples

- process monitoring
- monitoring of CIP- / SIP-process
- temperature monitoring in hot steam piping

Hygienic Design / Process Connection

- hygienic and easy to sterilize measurement point (EHEDG)
- because of elastomere free sealing system, the connection will be without gaps and crevices
- CIP-/ SIP-cleaning up to 140°C
- food compatible materials according to FDA
- sensor completely made of stainless steel
- adapter available for all current process connections

Features

- short reaction time, very compact measurement point
- material certificate 3.1.B
- probe e-polished Ra<0,8µm (standard)
- available with and without integrated transmitter

Options / Accessories

- integrated programable transmitter **MPU-4** (TFP-42P, -52P, -62P)
- programming adapter **MPU-P** for **MPU-4**
- integr. transm. for Profibus PA **MPU-10**, HART-protocol **MPU-H** (TFP-42P, -52P)
- integrated transmitter for EX-zone
- integrated transmitter with display **MPU-LCD**
- Pt100-chip with other classes of accuracy, e.g. 1/3B, 1/10B
- spacer version for TFP-62P (option -H)
- material certificate according to EN10204-3.1.B for build-in systems, e.g. **EHG...**
- ex factory cable for M12 plug-in



Attention: Use only Negele weld-in systems, to ensure a safety function of the measurement point!

Specification

Process connection	gap free M12x1,5	weld-in sleeves e.g. EMK-032 or EHG-15/M12
	torque	5...10Nm
Insertion length	standard	17mm
Materials	head	SS 1.4305
	probe tube	SS 1.4435
Temperature ranges	ambient	-50...+80°C
	sensor tip	-50...+250°C
Operating pressure		16bar max
Sensing resistor	IEC 751/DIN EN 60751	1xPt100 class A
Electrical connection	TFP-42P, -52P, 62P	PG (M16x1.5) or M12 plug-in
		1.4305, 4 pin
	TFP-162P	M12 plug-in
	TFP-182P	fixed cable PVC option: PTFE standard: 2,5m
Type of protection		IP69K

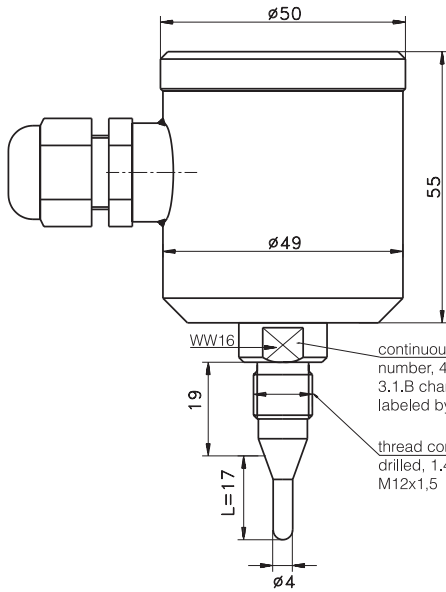
Transmitter MPU-4, -4-EX, -10, -10-EX, -H, -H-EX

Temperature ranges	ambient	-40...+80°C
	storage	-40...+120°C
Humidity	without condensation	0...98%
Measurement ranges	standard	-10...40°C, 0...50°C
	MPU-4	0...100/150/200°C
Accuracy		programmable
Accuracy		<±0.1% of full scale
Temperature drift	zero point, slope	<0.01% of f. s. / K
Electr. connection	power supply	8...35VDC
Output	analog	4...20mA

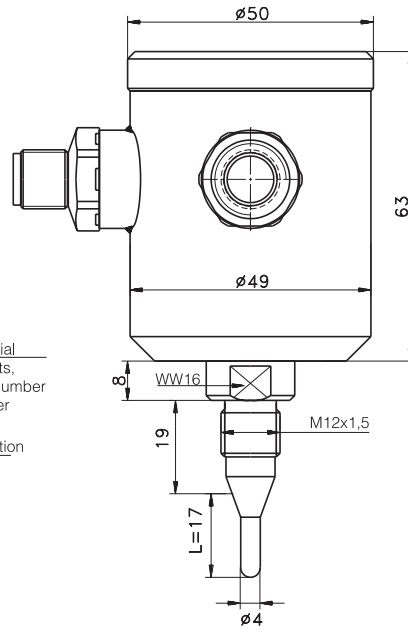
Transmitter MPU-M

Temperature range	ambient	-40...+80°C
Measurement ranges	standard	-10...+40, 0...100°C, 0...150°C
Accuracy		<±0.2% of full scale
Temperature drift	zero point, slope	<0.02% of f. s. / K
Electr. connection	power supply	12...36VDC
Output	analog	4...20mA

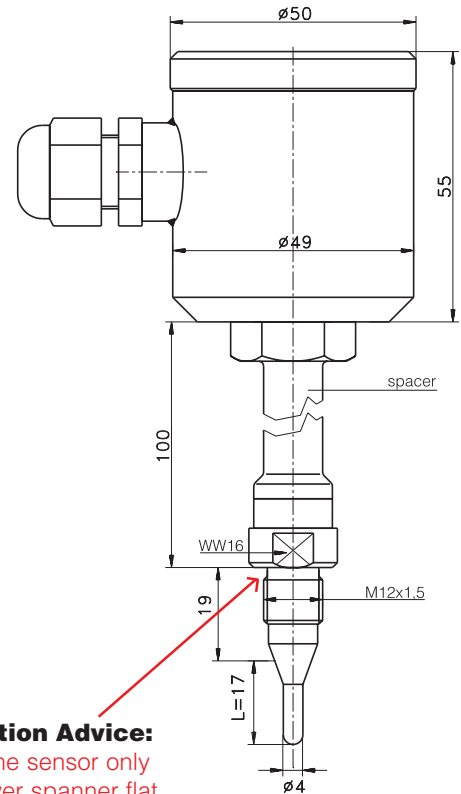
Dimensioned Drawings



TFP-42P / 017

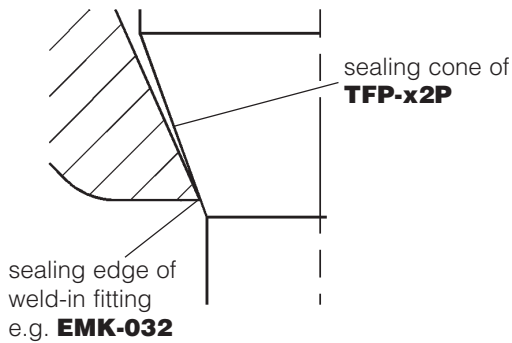


TFP-62P / 017 / 2xM12

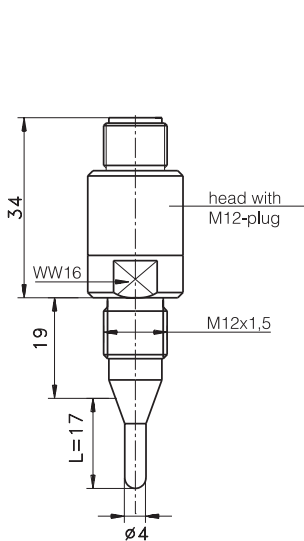


TFP-52P / 017

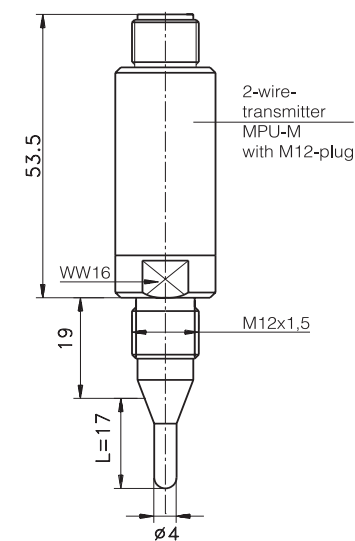
Principle of the metal sealing



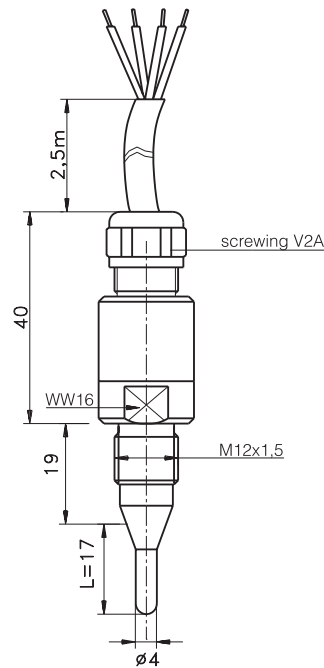
Installation Advice:
Tighten the sensor only at the lower spanner flat (WW16)!



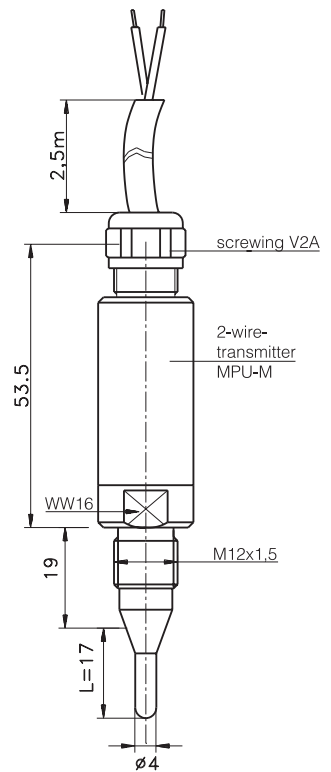
TFP-162P / 017



**TFP-162P / 017 / MPU-M
with integrated transmitter**



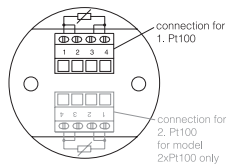
TFP-182P / 017



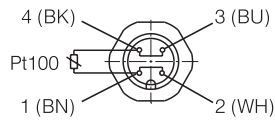
**TFP-182P / 017 / MPU-M
with integrated transmitter**

TFP-42P, -52P 1x Pt100

without transmitter

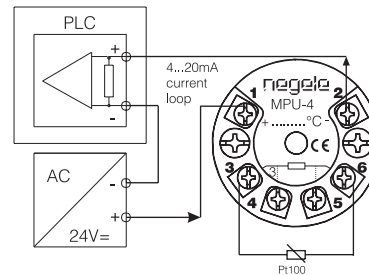


cable entry

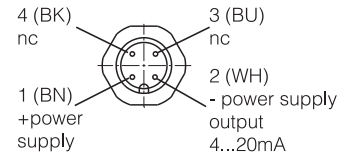


M12 plug-in

with transmitter MPU-4



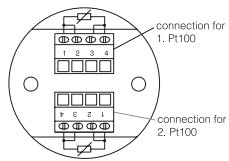
cable entry



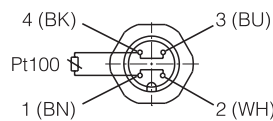
M12 plug-in

TFP-42P.2, -52P.2, 2x Pt100

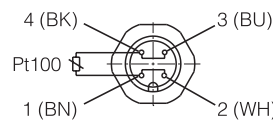
without transmitter



cable entry

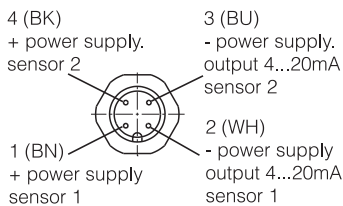


with 2x M12 plug-in

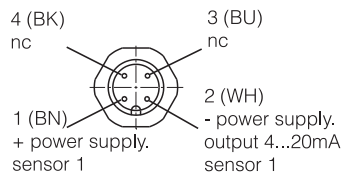


TFP-62P 2x Pt100

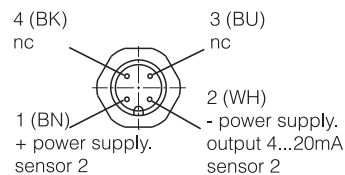
with 2x transmitter MPU-4



with 1x M12 plug-in

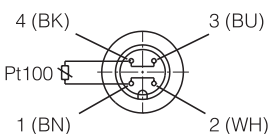


with 2x M12 plug-in

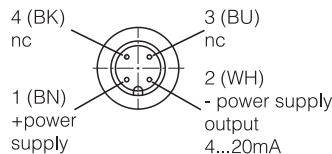


TFP-162P

without transmitter

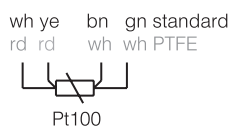


with transmitter MPU-M



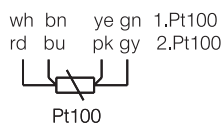
TFP-182P

without transmitter

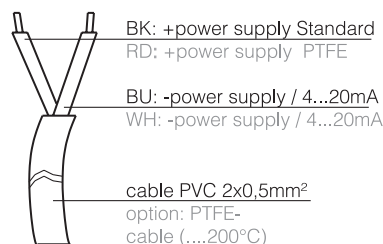


TFP-182P.2

2x Pt100 (only with PVC-cable)



with transmitter MPU-M



Specification

Pipe specification	DIN 2	DIN 11850 series 2
Nominal diameter	standard	DN15, 25, 40, 50, DN65, 80,
Tolerances	DN15...DN40 DN50...	DN:±0.3; L:±1,0mm DN:±0.5; L:±1,0mm
Material	pipes and sleeves	stainless steel SS 1.4435, 316L with 3.1.B
Process connection	thread	M12x1.5 hygienic
Sealing principle	metal sealing	sealing edge
Torque		5...10Nm
Operating pressure		16bar max
PG-Position	marker	on the sleeve for marking the end position of the cable entry

Surfaces	product contacted areas	$R_a \leq 0.8\mu\text{m}$ (not in welded areas) electro-polished
	option	$R_a \leq 0.6\mu\text{m}$ $R_a \leq 0.4\mu\text{m}$
Delta ferrite DF	standard	<1.0% (weld seam <3%)
	option	<0.5% (weld seam <3%) Baseler Norm II (BN II)
Sulfure content	standard	0.030% max
	acc. to ASME	0.005% min 0.017% max

Dimensions DIN11850 series 2: see tables page 5.

Note

The technical specification of pipes is according to DIN 11865 if no other is defined.

Identification of Pipes with Option 3.1.B

each pipe will be permanently labeled with following data:

- charge number of the pipe
- charge number of the weld-in sleeve

Order Code

EHG-DIN2- (build-in system for Negele-sensors, pipe specification DIN11850 series 2)

EHG-DIN1- (build-in system for Negele-sensors, pipe specification DIN11850 series 1)

EHG-ASME- (build-in system for Negele-sensors, pipe specification ASME-BPE-2002)

Pipe diameter

15	DN15 resp. 3/4"
25	DN25 resp. 1"
40	DN40 resp. 1 1/2"
50	DN50 resp. 2"
65	DN65 resp. 2 1/2"
80	DN80 resp. 3"

Process connection

M12 thread M12 hygienic

Certificate / Material

3.1.B	certificate acc. to EN10204
2.2	factory certificate
1.4435	special material

Surface

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

X	without
RAC	Certificate surface roughness

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 seam <3%)
BN	Baseler Norm II

Certificate delta-ferrite content

X	without
DFC	certificate delta-ferrite content incl. measuring protocol with 3 measuring points

Example:

EHG-DIN2 - 15 / M12 / 3.1.B / 0,8 / RAC / DP / DF / DFC

Note: Additional prices for certificates are quoted per work piece!

Product Information Buil-In System M12

Table Torque

Thread size	Sealing system	Torque min. [Nm]	Torque max. [Nm]
M12x1.5	SS	5	10

Attention: Use only Negele weld-in systems, to guarantee a safety function of the measurement point!

Process connection M12 hygienic

Cyl. fitting with weld-on ring (standard)	Weld-in fitting with collar	Weld-in ball	Dummy flange BST		Welding mandrel ESD*
for installation in pulled-out pipes	for thick-walled vessels	for sloped installation	to close existing measurement point		for welding without deformation
					M12 x 1,5 ESD-030

*To prevent deformation while welding, we recommend to use the welding mandrel ESD-030.
Weld-in and installation: see product information CLEANadapt in chapter 1.

Dimension Table EHG-DIN2-... / M12

Type	DN	L	A	Da x w
EHG-DIN2-...	15	70	10	19x1.5
EHG-DIN2-...	25	100	15	29x1.5
EHG-DIN2-...	40	120	22	41x1.5
EHG-DIN2-...	50	140	29	53x1.5
EHG-DIN2-...	65	160	38	70x2.0
EHG-DIN2-...	80	180	46	85x2.0

All dimensions in millimeter [mm]. Other pipe specifications (e.g. DIN11850 series 1, ASME, ISO) on request.

Overview of further adapters

Thread size	TriClamp	Milchrohr (DIN 11851)	DRD (press ring is optional deliverable)	Varivent-Inline	APV-Inline	SMS
adapter M12						
Nominal diameter						
DN10	AMC-032/10	-		AMV-032/10	-	-
DN15	AMC-032/10	AMK-032/15		AMV-032/10	-	-
DN25	-	AMK-032/25		AMV-032/25	-	-
DN40	-	AMK-032/40		AMV-032/40	AMA-032	AMK-032/40
DN50	-	AMK-032/50	AMK-032/50	AMV-032/40	AMA-032	AMK-032/50
DN65	-	AMK-032/65		AMV-032/40	AMA-032	-
DN80	-	AMK-032/80	(only one size)	AMV-032/40	AMA-032	-
DN100	-	AMK-032/100		AMV-032/40	AMA-032	-

Accuracy Classes Temperature Sensor

Tolerances for Pt100 acc. to IEC 751 / DIN EN 60751

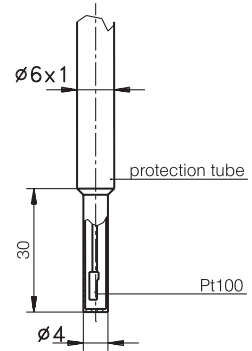
Pt100	class B	class A	sub-class 1/3B	sub-class 1/10B
0°C	±0.3K	±0.15K	±0.10K	±0.03K
100Ω	±0.12Ω	±0.06Ω	±0.04Ω	±0.01Ω
100°C	±0.8K	±0.35K	±0.27K	±0.08K
138,5Ω	±0.30Ω	±0.13Ω	±0.10Ω	±0.03Ω

Response Time

The below-mentioned times are according to a Pt100-sensor in boiling water.

Sensor Tip ø4mm

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



Accessories

Details: see separate product informations



Precise temperature measurement device HTM-P

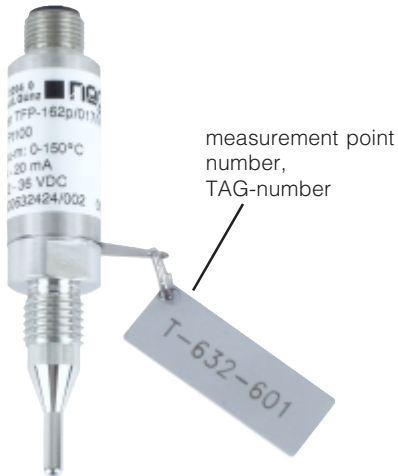


Simulator HSG-3



Calibration device HTR

Identification of Sensors



TFP-162P / 017 / MPU-M with identification plate



Programming adapter for temperature-transmitter MPU-P



Transmitter MPU-...



PVC-cable with M12-fitting M12-PVC

Customised labelling of the packaging

Bestell-Nr.: 994559967310
Typ: TFP-58p/160 m 0-150°C
Modernisierung H84,
Warenam. Baufeld, G74, Halle 1
Gewicht: 550g

TYP: ESP-G-ASME-G 1,5"
Telekommunikation, ZEW 511
Modernisierung H84,
Warenam. Baufeld, G74, Halle 1
Inhalt: 10 Stück

Anlieferung Projekt
Modernisierung H84,
Warenam. Baufeld, G74, Halle 1

Temperature Transmitter with Display

Application

- 4...20mA transmitter with LCD for Pt100 temperature sensor
- for installation in temperature sensors TFP-42P and TFP-52P
- sensor monitoring

Features

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

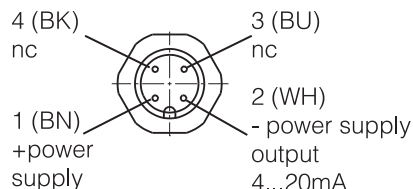
Specification

Display	4-digits LCD	with backlight
	Units	°C / °F
Display resolution		0.2°C bzw. 0.5°F
Messauflösung		ca. 0.1K
Accuracy	(range 100°C)	max. ±0.25%
Repeatability	(range 100°C)	±0.1%
Lowest current step		ca. 25µA
Range of signal		4...20.5mA
Temperature range	ambient	-40...+70°C
Measurement ranges	selectable	-10...40°C 0...50/100/150/200°C 0...100/150/200°F 30...230°F / 0...300°F
Power supply	(short cut)	15...30VDC
	(R _{shunt} =500Ohm)	22...36VDC
Output if failure	Sensor break	output >21mA
	Sensor short cut	output <3.6mA
Electrical connection		M12-plug 4pins



Temperature Sensor with integrated display transmitter MPU-LCD

Electrical Connection M12-plug



Order Code

Temperature Transmitter

MPU-LCD

Please note that you can order the MPU-LCD with temperature sensor only!

Order example: **TFP-42P/017/4/A/M12/MPU-LCD**

Installation possibilities for MPU-LCD

Process connection	Temperature sensor
M12x1,5 hygienic	TFP-42P
M12x1,5 hygienic	TFP-52P

Programming

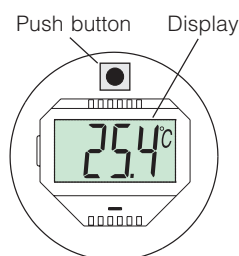


fig. 1



fig. 2



fig. 3

By pushing the button above the display, the actual measurement range will be shown (fig. 2). Pushing again the button further ranges can be selected. After approx. 3s "Star" will be shown on the display (fig. 3). Press now again the button to save the selected range. Afterwards the actual temperature value will be shown again (fig. 1).

Order Code

TFP-42P	(connecting head d=50mm, non-sensitive design for vibrations)
TFP-42P.2	(connecting head d=50mm, 2xPt100, non-sensitive design for vibrations, no transmitter possible)
TFP-52P	(connecting head d=50mm, non-sensitive design for vibrations, with neck tube)
TFP-52P.2	(connecting head d=50mm, 2xPt100, non-sensitive design for vibrations, with neck tube, no transmitter possible)
TFP-62P	(connecting head d=50mm, 2xPt100, non-sensitive design for vibrations, prepared for 2x transmitter)
TFP-62P-H	(like TFP-62P, but with neck tube)
TFP-162P	(head d=18mm, electrical connection via M12 plug-in)
TFP-182P	(head d=18mm, electrical connection via 2.5m PVC-cable; other cable and other lengths: on request)
TFP-182P.2	(head d=18mm, 2xPt100, electrical connection via 2.5m PVC-cable; other lengths: on request)

Sensor Length in mm

017	17mm
xxx	special length (up to 40mm max)

Diameter Sensor Tip

4	4mm
6	6mm (only on request)

Accuracy Class Pt100

A
1/3B
1/10B

Electrical Connection for TFP-42P and 52P

PG	cable entry M16x1.5
M12	M12 plug-in

Electrical Connection for TFP-42P.2 and TFP-52P.2

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

Electrical Connection for TFP-62P and TFP-62P-H

M12	M12 plug-in
2xM12	2xM12 plug-in

Transmitter

X	without
for TFP-42P and TFP-52P	
MPU-4	(programmable)
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-162P and TFP-182P

MPU-M

1. Transmitter (only for TFP-62P and TFP-62P-H!)

MPU-4	(programmable)
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Measurement Range 1. MPU

(only for types with transmitter, not at MPU-LCD)	
-10...40°C	
0...50°C	
0...100°C	
0...150°C	
0...200°C	
xx...yy°C	special range

2. Transmitter (only for TFP-62P and -62P-H!)

MPU-4	(programmable)
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Measurement Range 2. MPU

(only with 2x transmitter)	
-10...40°C	
0...50°C	
0...100°C	
0...150°C	
0...200°C	
xx...yy°C	special range

Example:

TFP-62P / 017 / 4 / A / M12 / MPU-4 / 0...100°C / MPU-4 / 0...100°C