



Magnetic Inductive Flowmeter for conductivity liquids



measuring
•
monitoring
•
analysing

PIT



- Measuring range: up to 10 m/s
- Accuracy:
±1.5% of reading
± 0.5% of full scale
- p_{max} : PN40; t_{max} : -40 ... +150 °C
- Connection:
flange DN 40 ... 80,
ANSI 2" ... 3"
- Material:
stainless steel/PTFE or PFA
- Outputs: analogue with HART®,
pulse and status



CS

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Description

An electrically conductive medium induces a voltage while flowing through an arranged magnetic field in accordance to the Faraday's induction law. The electrode current is proportional to the flow velocity and therewith to the volume flow. The PIT-sensor is available with integral or remote mount transmitter. A retracting device for mounting and dismounting under process conditions is available.

The magnetic-inductive PIT flow velocity sensor is used to measure or monitor the volume flow of liquids, slurries, pastes and other electrically conductive media while minimizing pressure drop.

Pressure, temperature, density and viscosity do not affect the volume measurements. Portions of solid particles and small gas pockets should be avoided.

The PIT has following significant characteristics

- Wide variety of wetted materials
- Electrodes in Hastelloy®, tantalum, platinum and other materials available
- Retracting device for use under process conditions

Technical Details

Sensor

Material armature: stainless steel/PTFE, PFA
Material electrodes: Hastelloy®, tantalum, platinum, other materials on request

Wetted parts

Outer sensor tube: stainless steel, PTFE
Measuring and grounding electrodes: standard: Hastelloy® C4
special: tantalum, titanium

Non-wetted parts

Sensor flange: stainless steel
Welding sleeve and flange: stainless steel
Sensor neck: stainless steel

Terminal box for remote mount sensor and transmitter:

aluminium pressure casting, painted

Process connection: flanges acc. EN 1092, ASME B16.5, DIN 2512, special connections on request

Nominal pressure: PN 16, ASME CI150/300 (PFA)
PN 40, ASME CI150/300 (stainless steel/PTFE)
higher pressures on request

Process temperature: -40 ... +100 °C (stainless steel/PTFE)
-40 ... +150 °C (PFA)

Ambient temperature: -40 ... +60 °C

Protection: IP 67 / IP 68 (EN60529)

Range of application for sizes:

DN 125 ... DN 2000 (stainless steel/PTFE),
DN 125 ... DN 600 (PFA)

Ex-approval and sensor markings

Explosion protection:



BVS 03 ATEX E 150 X
II 2G Ex e [Ia Ga] IIC T6-T3 Gb



IECEx BVS 12.0034 X
Ex e [Ia Ga] IIC T6-T3 Gb



NEPSI GYJ17.1207X
Ex e [Ia Ga] IIC T6-T3 Gb

Adjustable upper range values

Standard: 1 ... 10 m/s
Special: 0.5 ... 5 m/s
Conductivity: $\geq 20 \mu\text{S/cm}$ (50 $\mu\text{S/cm}$ for demineralised water)

Transmitter

Mounting: integral or remote

Power supply: 115/250 V_{AC}
24 V_{DC}

Outputs: 1 x 0(4) - 20 mA

UMF2 (only without ATEX)

Code »F«: current output: 0)4-20 mA
pulse output: passive $U_m = 24 V_{DC}$
status output: passive $U_m = 24 V_{DC}$

Code »G«: current output: 0)4-20 mA with HART®
pulse output: passive $U_m = 24 V_{DC}$
status output: passive $U_m = 24 V_{DC}$

UMF3

Code »A« standard: not intrinsically-safe
1 x current output:
4-20 mA (passive) HART®
1 x pulse output:
1 kHz, passive 24 V_{DC} ($U_m = 30 V_{DC}$)
1 x status output:
passive 24 V_{DC} ($U_m = 30 V_{DC}$)

Technical Details (continued)

Code »C« standard: intrinsically-safe

- 1 x current output:
4-20 mA (passive) HART®
- 1 x pulse output:
1 kHz, passive 24 V_{DC} (U_m = 30 V_{DC})
- 1 x status output:
passive 24 V_{DC} (U_m = 30 V_{DC})

Ambient temperature: -20 ... +60 °C

Protection: IP 68 (EN 60529)

Communication: HART®

Accuracy: ± 1.5 % of reading
± 0.5 % adjusted full scale
(under reference conditions)

Repeatability: ± 0.75 % of reading
± 0.25 % adjusted full scale
(under reference conditions)

Protection Class Markings**Transmitter mounted as compact version**

Ex d e ib [ia IIC Ga] IIB T4/T3 Gb
Ex tb ib [ia Da] IIIC T125 °C/T150 °C Db
Ex d e ib IIB T4/T3 Gb
Ex tb ib IIIC T125 °C/T150 °C Db

Separately mounted transmitter with terminal box

Ex d e [ib Gb] [ia IIC Ga] IIB T4/T3 Gb
Ex tb [ib Db] [ia Da] IIIC T125 °C/T150 °C Db
Ex d e [ib IIB] T4/T3 Gb
Ex tb [ib] IIIC T125 °C/T150 °C Db

Separately mounted transmitter with pigtail cable (max. 10 m)

Ex d ib [ia IIC Ga] IIB T4/T3 Gb
Ex tb ib [ia Da] IIIC T125 °C/T150 °C Db
Ex d ib IIB T4/T3 Gb
Ex tb ib IIIC T125 °C/T150 °C Db

Approval Certificate

BVS 15 ATEX E 067 X



IECEx BVS 15.0120 X



NEPSI GYJ17.1208X
NEPSI GYJ17.1209X

Order Details Sensor for UMF2 (Example: PIT-S 317B 163 H 0 1 0 0 0K) (continuation next page)

Model/ material/version	Process connection flange	Sensor length	Elektrodes material	Measuring range/medium velocity	Sensor configuration	Approvals
PIT-S³⁾ = stainless steel (1.4571/1.4404)/ PTFE for nominal diameters DN125 - DN2000 (PN16) (PIT-520)	317B = DN40 PN40 form B1 DIN EN 1092-1 321B = DN50 PN40 form B1 DIN EN 1092-1 326B¹⁾ = DN65 PN40 form B1 DIN EN 1092-1	163 = 163 mm xxx = special length, 3 digits in mm (PIT-S: DN700- DN1200 = 263, DN1400- DN2000 = 363). PIT-U: sensor length must be calculated (see manual)	H = Hastelloy® C-4 T = tantalum (only for model PIT-A) N = platinum (only for model PIT-A)	O = 1-10 m/s L = 0,5 - 5 m/s	1 = integrated transmitter, IP 67 4²⁾ = remote moun- ted transmitter, IP 67 5²⁾ = remote moun- ted transmitter, IP 68	0 = without
PIT-A = PFA for nominal diameters DN125 - DN600 (PN40) (PIT-571) with grounding electrode	331B = DN80 PN40 form B1 DIN EN 1092-1 206R = 2" Class 150 RF ASME B16.5-2003 208R = 3" Class 150 RF ASME B16.5-2003					
PIT-U³⁾ = stainless steel (1.4571/1.4404) for nominal diameters DN125 - DN2000 (PN40) (PIT-571) model including installation/ex- traction device, mounting adaptor and valve	317B = DN40 PN40 form B1 DIN EN 1092-1					

¹⁾ Not for PIT-A (PFA)²⁾ Order cable and cable glands separately³⁾ Without grounding electrode



Order Details Sensor (continued)

Certificates	Supplementary equipment
0 = without 1 = certificate of compliance with the order, 2.1 2 = test report, 2.2 B = inspection certificate with material certificate 3.1 C = inspection certificate with material certificate 3.2	0K = without XK = special version

Order Details Transmitter UMF2 (Example: UMF2- A 1 1 F0BK)

Model	Mounting/ thread for cable gland	Display-/ interface board	Power supply	Outputs/version	Interconnecting cable
UMF2-	A = integrated transmitter IP67 standard / ½" NPT (f) B = integrated transmitter IP67 standard / M20x1.5 C = remote transmitter incl. tube/wall mounting bracket, cable >10 m with box to transmitter / ½" NPT (f) D = remote transmitter incl. tube/wall mounting bracket, cable >10 m with box to transmitter / M20x1.5 G = remote transmitter incl. tube/wall mounting bracket, connecting box to transmitter standard / ½" NPT (f) H = remote transmitter incl. tube/wall mounting bracket, connecting box to transmitter standard / M20x1.5	1 = with display/ interface board	1 = 230 V _{AC} (+10%, -15%), 50/60 Hz 2 = 115 V _{AC} (+10%, -15%), 50/60 Hz 4 = 24 V _{DC} (±15%)	F0BK = analogue output 1: 0(4)-20 mA pulse output: passive, U _m =24 V _{DC} status output: passive, U _m =24 V _{DC} G0BK = analogue output 1: 0(4)-20 mA with HART® protocol pulse output: passive, U _m =24 V _{DC} status output: passive, U _m =24 V _{DC}	Compact version 0 = no cable Remote version (cable prefabricated on transmitter) IP67 0 = 2,5 m standard (on remote version) 1 = 5 m 2 = 10 m Remote version (junction box on transmitter) IP67 3 = 15 m 4 = 20 m 5 = 30 m 6 = 40 m 7 = 50 m IP68 A = 2,5 m standard (on remote version) B = 5 m remote version C = 10 m remote version D = 15 m remote version E = 20 m remote version F = 30 m remote version G = 40 m remote version H = 50 m remote version

Order Details Sensor for UMF3 (Example: PIT-S 317B 163 H 0 1 E 0 0K)

Model/ material/version	Process connection	Sensor length	Electrodes material	Measuring range/medium velocity	Sensor configuration	Approvals
PIT-S¹⁾ = stainless steel (1.4571/1.4404)/ PTFE for nominal diameters DN125 - DN2000 (PN16) (PIT-520)	317B = DN40 PN40 form B1 DIN EN 1092-1 standard 321B = DN50 PN40 form B1 DIN EN 1092-1	163 = 163 mm (up to diame- ters <DN600) XXX = special length, 3 digits in mm (PIT-S: DN700- DN1200 = 263, DN1400- DN2000 = 363)	H = Hastelloy® C-4 T = tantalum (only for model PIT-A) N = platinum (only for model PIT-A) X = special on request	0 = 1-10 m/s L = 0,5 - 5 m/s	1 = integrated transmitter, IP 67 3 = remote trans- mitter IP65, (junction box on transmitter)	E = ATEX + IEC Ex - gas Ex B = NEPSI
PIT-A = PFA for nominal diameters DN125 - DN600 (PN40) (PIT-571) with grounding electrode	206R = 2" Class 150 RF ASME B16.5- 2013 326B = DN65 PN40 form B1 DIN EN 1092-1 331B = DN80 PN40 form B1 DIN EN 1092-1 208R = 3" Class 150 RF ASME B16.5-2013					
PIT-U¹⁾ = stainless steel for nominal diameters DN125 - DN2000 (PN16) model including installation/ex- traction device, mounting adaptor and valve	317B = DN40 PN40 form B1 DIN EN 1092-1 326B = DN65 PN40 form B1 DIN EN 1092-1					

¹⁾ Without grounding electrode

Order Details Sensor for UMF3 (continued)

Certificates	Supplementary equipment
0 = without 1 = works certificate 2.1 2 = works certificate 2.2 B = material certificate 3.1 incl. material analysis (DIN EN 10204:2004) C = material certificate 3.2 incl. material analysis (DIN EN 10204:2004)	0K = without XK = with (separate specification needed)



Order Details Transmitter UMF3 (Example: UMF3- 1 A 3 A 1 1K 1)

Model	Power supply	Transmitter layout	Approval	Output	Transmitter design	Threads for cable entries (signal and power supply)
UMF3-	1 = 90-253 V _{AC} , 50/60 Hz 2 = 24 V _{DC} ± 20 %	A ¹⁾³⁾ = compact mounting C ¹⁾⁵⁾ = junction box (intrinsically safe)	3 = NEPSI A = ATEX + IEC EX - Gas Ex	A = standard: 1 x current output: 4-20 mA (passive) HART® 1 x pulse output: 1 kHz, passive 24 V _{DC} (U _m = 30 V _{DC}) 1x status output: passive 24 V _{DC} (U _m = 30 V _{DC}) (not intrinsically-safe)	1 = compact mounted transmitter IP67 3 = remote transmitter IP65 (junction box on transmitter)	1K = M20x1,5 (Ex-proof and not Ex-proof) 3K = ½" NPT(f) Ex d (via adaptor)
		B ²⁾⁴⁾ = compact mounting D ²⁾⁶⁾ = junction box (not intrinsically safe)		C = standard: 1 x current output: 4-20 mA (passive) HART® 1 x pulse output: 1 kHz, passive 24 V _{DC} (U _m = 30 V _{DC}) 1 x status output: passive 24 V _{DC} (U _m = 30 V _{DC}) (intrinsically-safe)		

Order Details Transmitter UMF3 (continued)

Interconnecting cable
0 = none (compact version) 1 = 2,5 m standard (on remote version) 2 = 5 m remote version 3 = 10 m remote version 4 = 15 m remote version 5 = 20 m remote version 6 = 30 m remote version 7 = 40 m remote version 8 = 50 m remote version

¹⁾ Protection signal output: intrinsically-safe

²⁾ Protection signal output: not intrinsically-safe

³⁾ Certification marking: output C; Ex d e ib [ia IIC Ga] IIB T4-T3 Gb; Ex tb ib [ia Da] IIIC T125°C/T150°C Db

⁴⁾ Certification marking: output A; Ex d e ib IIB T4-T3 Gb; Ex tb ib IIIC T125°C/T150°C Db

⁵⁾ Certification marking: output C; Ex d e [ib Gb] [ia Ga] IIB T4-T3 Gb; Ex tb [ib Db] [ia Da] IIIC T125°C/T150°C Db

⁶⁾ Certification marking: output A; Ex d e [ib] IIB T4-T3 Gb; Ex tb [ib] IIIC T125°C/T150°C Db



Order Details Welding Socket

Order number	Version
60 000 519	stainless steel (1.4571 / 1.4404), DN40 PN40, standard length
60 018 833	stainless steel (1.4571 / 1.4404), 2" Class 150 RF ASME, standard length
60 020 328	stainless steel (1.4571 / 1.4404), DN50 PN40, standard length
60 019 025	stainless steel (1.4571 / 1.4404), 3" Class 150 RF ASME, standard length
60 019 917	stainless steel (1.4571 / 1.4404), DN65 PN16, standard length for installation- / extracting device

Screws on request

Order Details Installation-, Extracting Device

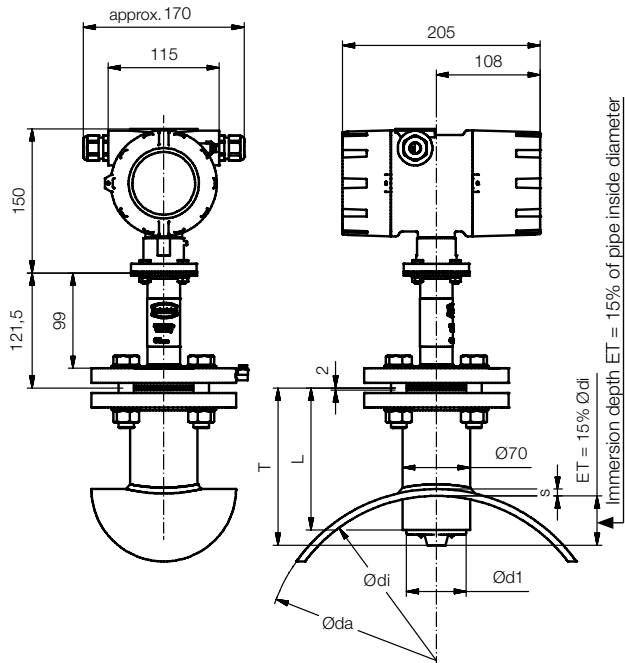
Model	Version	Length
PIT - EVVS	valve lock 1.4408 (ball valve + mounting socket), DN65 PN40	
PIT - EVDS1G	pressure screw for remote mounted version	$l \leq 1000 \text{ mm}$
PIT - EVDS2G	pressure screw for remote mounted version	$l \leq 2000 \text{ mm}$
PIT - EVDS1A	pressure screw for integrated mounted version	$l \leq 1000 \text{ mm}$
PIT - EVDS2A	pressure screw for integrated mounted version	$l \leq 2000 \text{ mm}$

For mounting the installation-, extracting device following things are necessary:

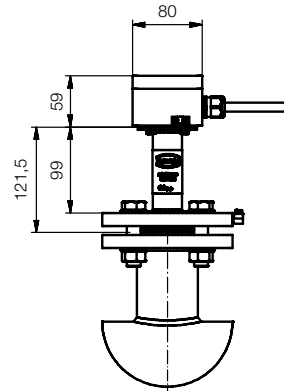
Sensor in special version PIT-U326B, welding socket 60019917, valve lock PIT-EWS and pressure screw set PIT-EVD...

Dimensions [mm]

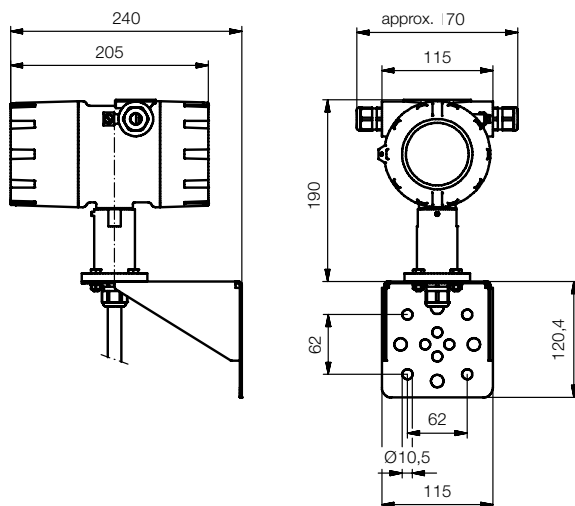
UMF2-transmitter compact version



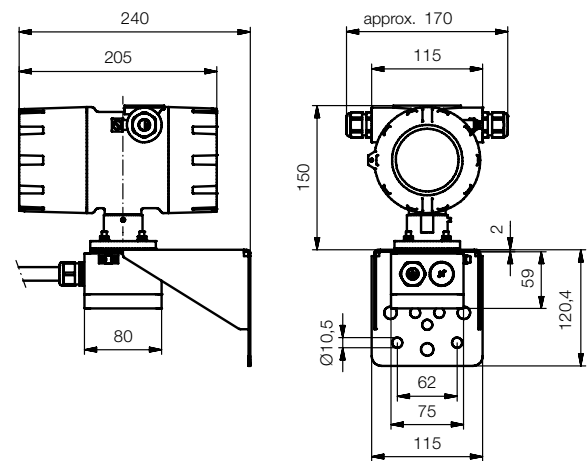
Sensor remote version



UMF2-remote transmitter (up to 10 m cable)



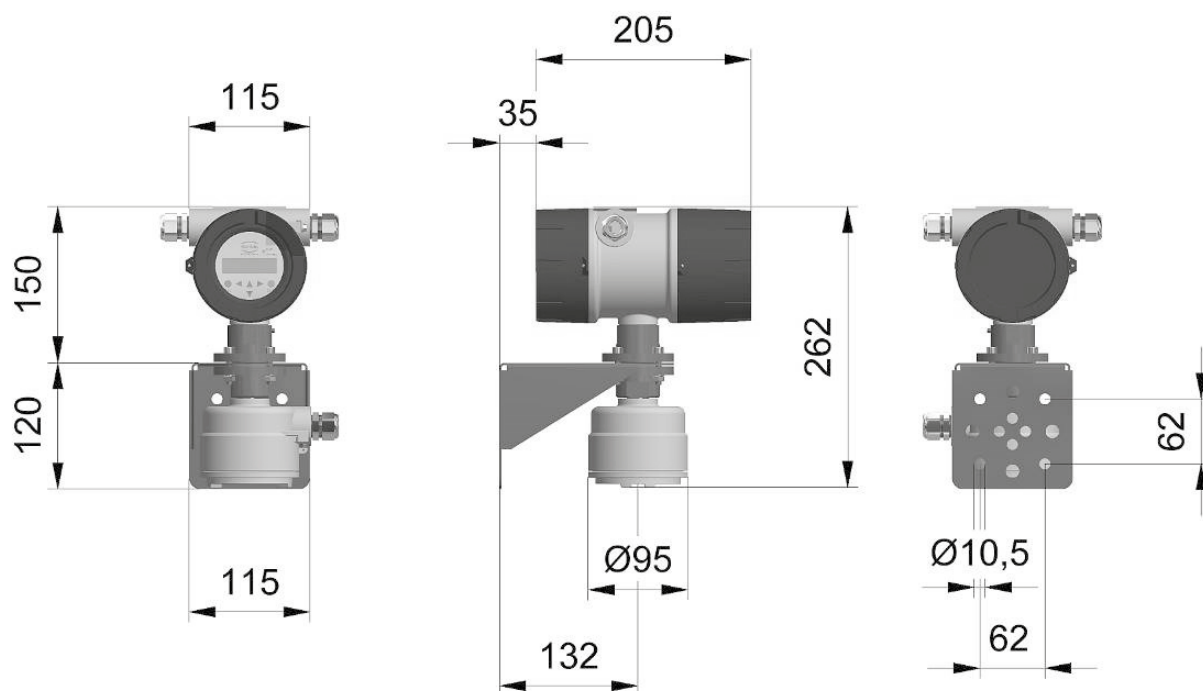
UMF2-remote transmitter with connecting box



Model	DN	T	$\varnothing d1$	L
PIT-A (PFA)	150 - 600	163 mm	62 mm	145 mm
PIT-S (SS/PTFE)	150 - 600	163 mm	60.3 mm	145 mm
PIT-S (SS/PTFE)	700 - 1200	263 mm	60.3 mm	170 mm
PIT-S (SS/PTFE)	1400 - 2000	363 mm	60.3 mm	170 mm

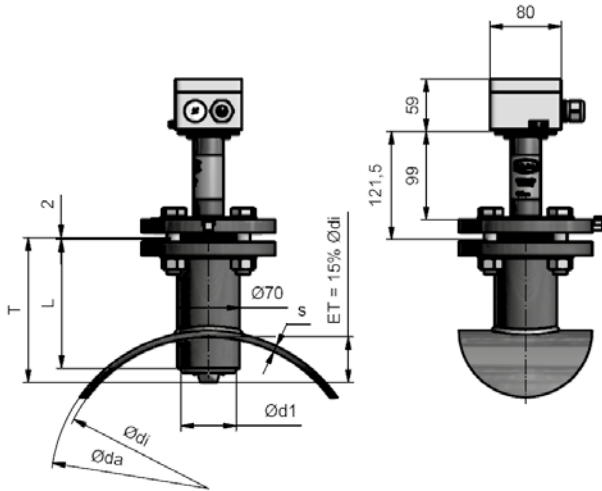
Dimensions [mm] (continued)

UMF3 transmitter with terminal box and wall bracket for separate montage
(Dimensions also apply for the UMF3 transmitter with pigtail cable)



Dimensions [mm] (continued)

PIT-S with terminal box for separate montage



IP67 terminal connection box: 57 x 75 x 80 mm

Weight: 3.6 kg

DN: nominal diameter

T: length of sensor

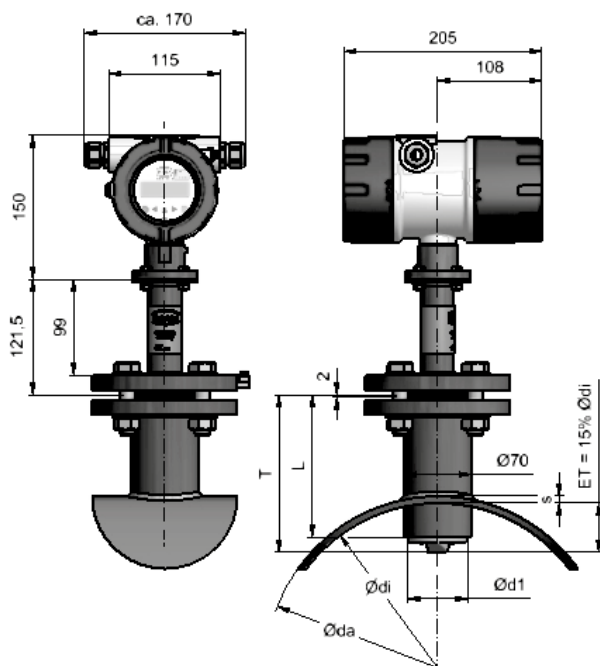
Ød: diameter of sensor

L: length of socket weld fitting

ET: immersion depth in % of pipe diameter

Version	DN	T [mm]	Ød1 [mm]	L [mm]
PIT-A (PFA)	150-600	163	62	145
PIT-S (SS/PTFE)	150-600	163	60.3	145
PIT-S (SS/PTFE)	700-1200	263	60.3	170
PIT-S (SS/PTFE)	1400-2000	363	60.3	170

with direct mounted transmitter UMF3



Weight:	5.5 kg
DN:	nominal diameter
T:	length of sensor
Ød:	diameter of sensor
L:	length of socket weld fitting

Version	DN	T [mm]	Ød1 [mm]	L [mm]
PIT-A (PFA)	150-600	163	62	145
PIT-S (SS/PTFE)	150-600	163	60.3	145
PIT-S (SS/PTFE)	700-1200	263	60.3	170
PIT-S (SS/PTFE)	1400-2000	363	60.3	170