



Magnetic Inductive Flow Meter

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} : PN 40; 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 (stainless steel/PTFE)
PN 40, ASME CI150/300 (PFA)
higher pressures on request
Process temperature: integrated transmitter
-20°C ... +80°C (st. st./PTFE)
-20°C ... +80°C (PFA)
remote mounted transmitter
-40°C ... +100°C (st. st./PTFE)
-40°C ... +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-S²⁾ = stainless steel (1.4571/1.4404)/ PTFE for nominal diameters DN125 - DN2000 (PN16)	317B = DN40 PN40 form B1 DIN EN 1092-1 321B¹⁾ = DN50 PN40 form B1 DIN EN 1092-1	163 = 163 mm 263 = 263 mm 363 = 363 mm XXX³⁾ = special length	H = Hastelloy® C-4 T = tantalum (only for model PIT-A) N = platinum (only for model PIT-A)	0 = 1-10 m/s L = 0,5 - 5 m/s	1⁴⁾ = integrated transmitter, IP67	0 = without 1¹⁾ = ships approval without Ex
PIT-A = PFA for nominal diameters DN125 - DN600 (PN40) with grounding electrode	326B¹⁾ = DN65 PN40 form B1 DIN EN 1092-1 331B¹⁾ = DN80 PN40 form B1 DIN EN 1092-1 206R¹⁾ = 2" Class 150 RF ASME B16.5-2003	163 = 163 mm			4 = remote mounted transmitter, IP67, junction box on the sensor	
PIT-U²⁾ = stainless steel (1.4571/1.4404) for nominal diameters DN125 - DN2000 (PN16) model including installation/ext- raction device, mounting adaptor and valve	208R¹⁾ = 3" Class 150 RF ASME B16.5-2003	163 = 163 mm 263 = 263 mm 363 = 363 mm XXX⁴⁾ = special length			5 = remote mounted transmitter, IP68, junction box potted on the sensor	

¹⁾ Not for PIT-U²⁾ Without grounding electrode³⁾ 3 digits in mm (PIT-S: DN700-DN1200 = 263, DN1400-DN2000 = 363).⁴⁾ PIT-U: sensor length must be calculated⁵⁾ Not for ships approval



Order Details Sensor for UMF2 (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-	A²⁾ = integrated transmitter IP67 standard / ½" NPT (f) B²⁾ = 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} FSBH = analogue output 1: 0(4)-20 mA pulse output: passive U _m =24 V _{DC} status output: passive U _m =24 V _{DC} with ships approval GSBH = analogue output 1: 4-20 mA with HART® protocol pulse output: passive U _m =24 V _{DC} status output: passive U _m =24 V _{DC} with ships approval	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 IP68¹⁾ 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

¹⁾ Only with mounting option G and H

²⁾ Not for ships approval

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)	317B = DN40 PN40 form B1 DIN EN 1092-1 standard 321B²⁾ = DN50 PN40 form B1 DIN EN 1092-1	163 = 163 mm 263 = 263 mm 363 = 363 mm XXX³⁾ = special length	H = Hastelloy® C-4 T = tantalum (only for model PIT-A) N = platinum (only for model PIT-A)	0 = 1-10 m/s L = 0,5 - 5 m/s	1⁵⁾ = integrated transmitter, IP67 3 = remote trans- mitter IP65, (junction box on transmitter)	E = ATEX + IEC Ex - gas Ex II Ex e [ia Ga] IIC T6-T3 Gb B = NEPSI Ex e IIC T3-T6 Ga/Gb S = ships approval with Ex (only IEC Ex - Gas)
PIT-A = PFA for nominal diameters DN125 - DN600 (PN40) with grounding electrode	206R²⁾ = 2" Class 150 RF ASME B16.5- 2013 326B²⁾ = DN65 PN40 form B1 DIN EN 1092-1	163 = 163 mm (up to diame- ters <DN600)				
PIT-U¹⁾ = stainless steel for nominal diameters DN125 - DN2000 (PN16) model including installation/ extraction device, mounting adaptor and valve	331B²⁾ = DN80 PN40 form B1 DIN EN 1092-1 208R²⁾ = 3" Class 150 RF ASME B16.5-2013	XXX⁴⁾ = special length				

¹⁾ Without grounding electrode²⁾ Not for PIT-U³⁾ 3 digits in mm (PIT-S: DN700-DN1200 = 263, DN1400-DN2000 = 363).⁴⁾ PIT-U: sensor length must be calculated⁵⁾ Not for ships approval

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 ⁷⁾ = remote transmitter IP65 (junction box on transmitter) 6 ⁸⁾ = remote transmitter IP67 (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)	S = ships approval (only IEC Ex - Gas Ex)	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	
IP 65: 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	IP 68: 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

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

⁷⁾ Only for cable: 1, 2, 3, 4, 5, 6, 7, 8

⁸⁾ Only for cable: A, B, C, D, E, F, G, H

**Order Details Welding Socket**

Order number	Version
60 020 621	stainless steel (1.4571 / 1.4404), DN40 PN40 DIN/EN 1092, standard length
60 020 328	stainless steel (1.4571 / 1.4404), DN50 PN40, standard length
60 018 833	stainless steel (1.4571 / 1.4404), 2" Class 150 RF ASME B16.5-2013, standard length
60 019 917	stainless steel (1.4571 / 1.4404), DN65 PN16, standard length for installation- / extracting device, on PIT-U included
60 020 405	stainless steel (1.4571 / 1.4404), DN80 PN40, standard length
60 019 025	stainless steel (1.4571 / 1.4404), 3" Class 150 RF ASME B16.5-2013, standard length
X	special on request

Screws on request

Order Details Installation-, Extracting Device (already included with PIT-U)

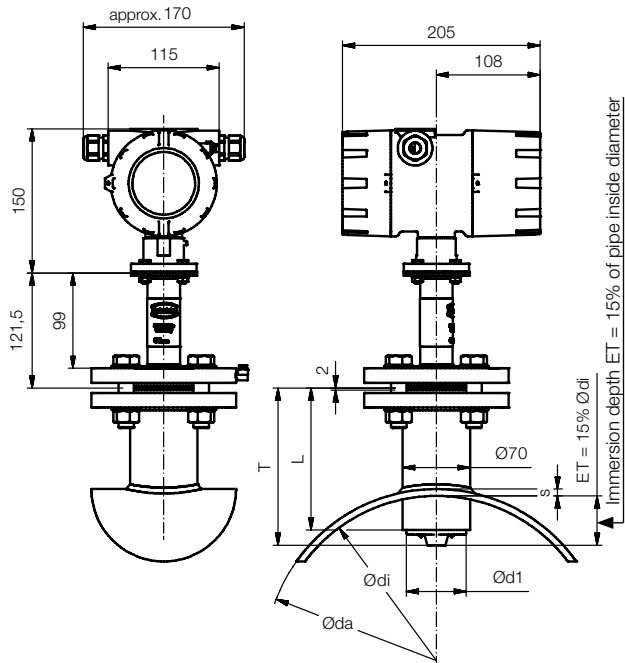
Model	Version	Length
PIT - EWVS	valve lock 1.4408 (ball valve + mounting socket, DN40 PN40 to DN65 PN16) welding socket not included	
PIT - EVDS1G	pressure screw (standard) for use with remote mounted version only	$l \leq 1000 \text{ mm}$
PIT - EVDS1A	pressure screw (standard) for use with integrated mounted version only	$l \leq 1000 \text{ mm}$
XX	special on request	

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

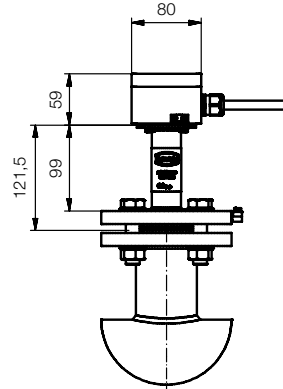
Sensor in special version PIT-U317B, welding socket 60019917, valve lock PIT-EVVS and pressure screw set PIT-EVD...

Dimensions [mm]

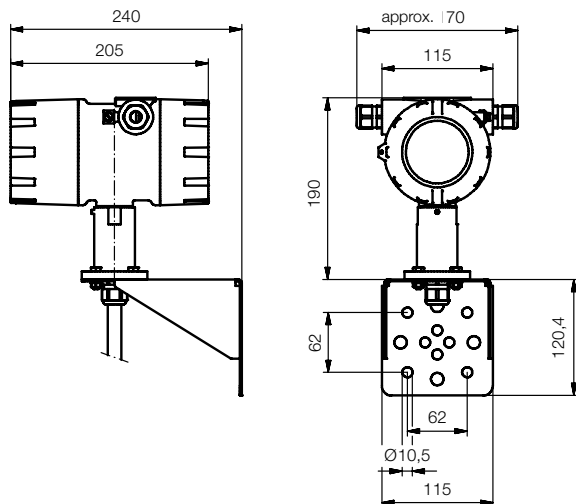
UMF2-transmitter compact version



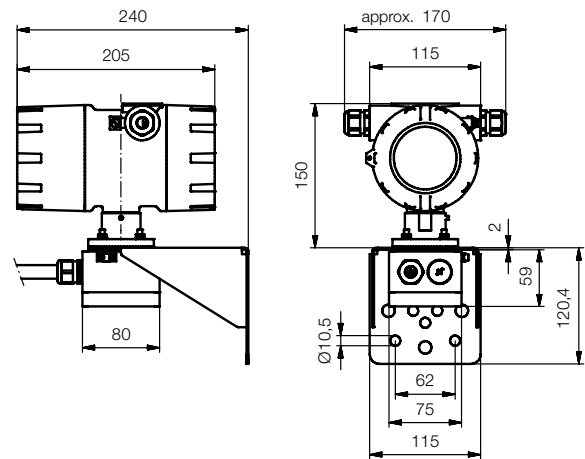
Sensor remote version



UMF2-remote transmitter (up to 10 m cable)



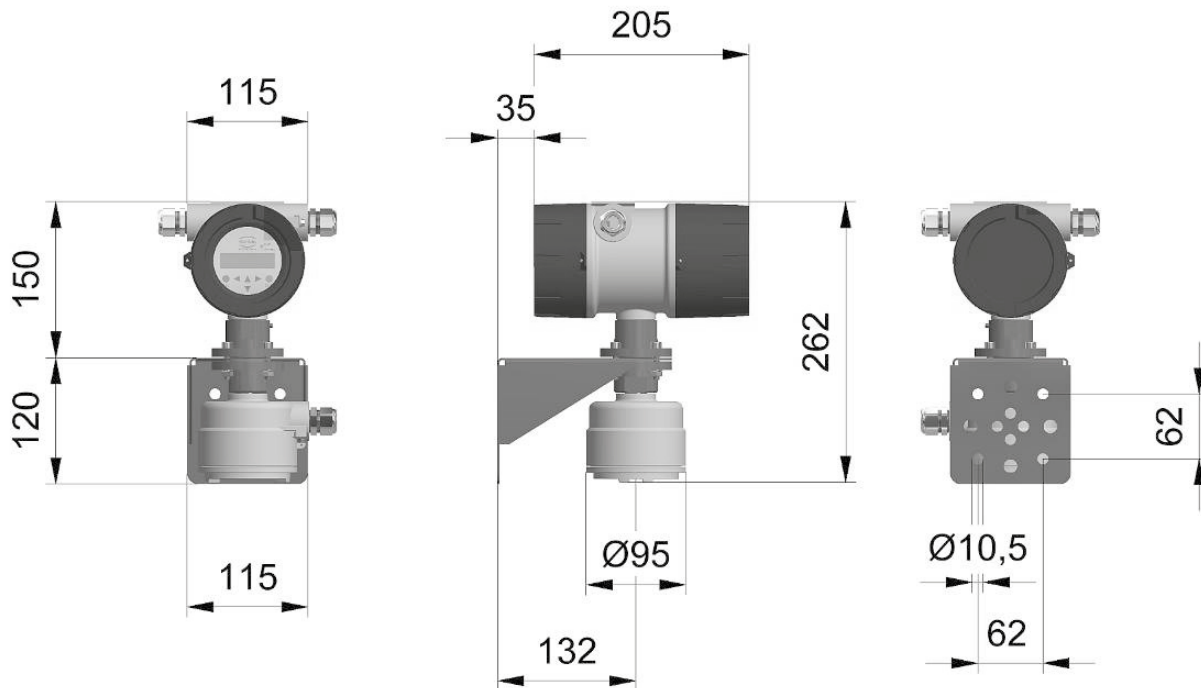
UMF2-remote transmitter with connecting box



Model	DN	T	Ød1	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

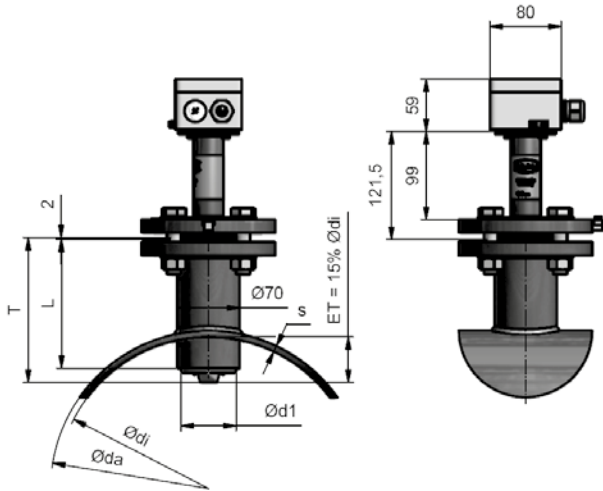
Dimensions [mm] (continued)

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

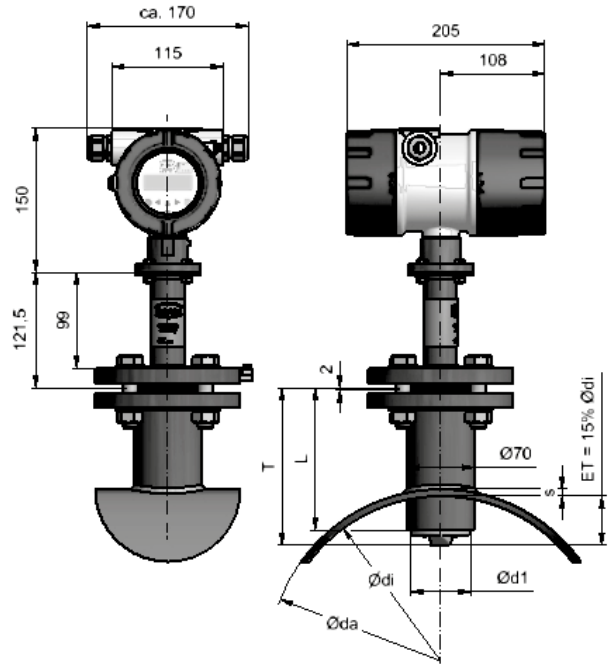
Ød: diameter of sensor

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

PIT-S dimensional drawing 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