



Magnetic-inductive flow meter for hazardous areas

EPX / UMF3

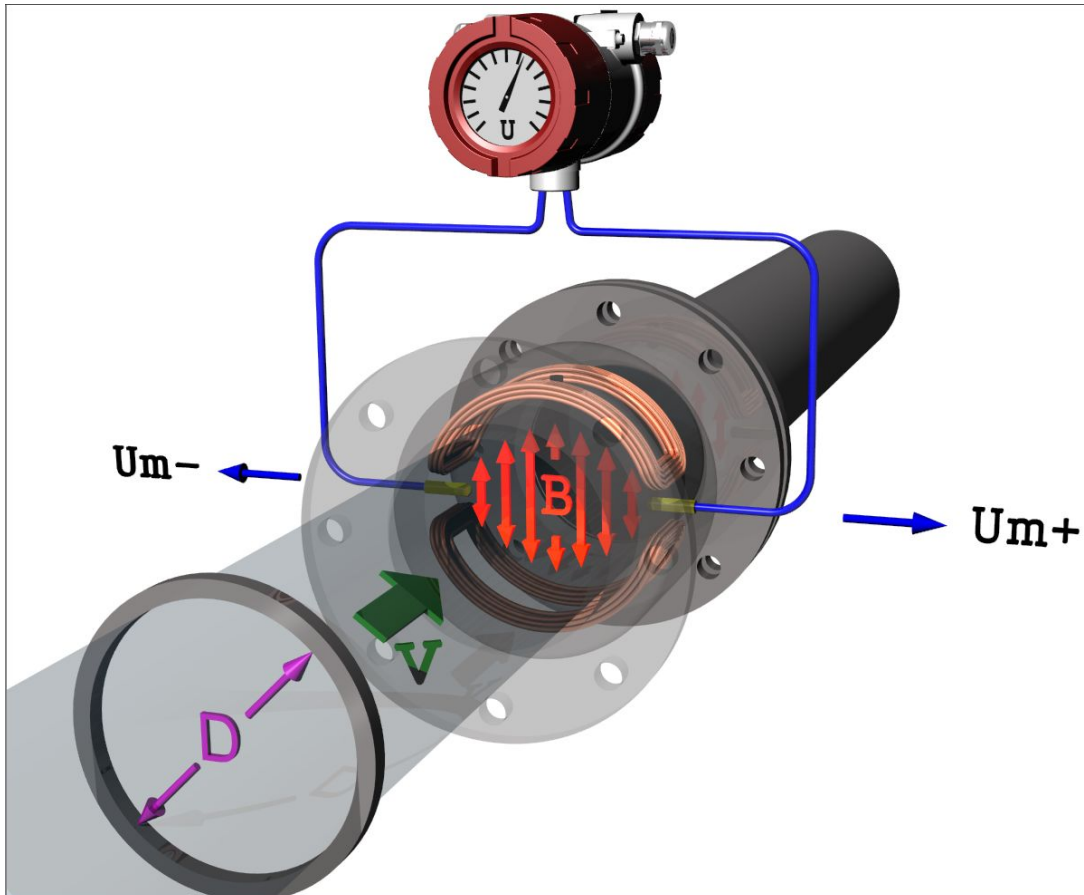
Technical Datasheet



- high accuracy: 0.3 % of actual
- maintenance-free
- no pressure drop
- numerous lining materials
- numerous electrode materials
- low-cost grounding electrode instead of earthing rings, also available in special materials e.g. Tantalum.

Function

An electrically conductive medium flowing through an orientated magnetic field in accordance to Faraday's law of induction will induce a voltage proportional to the mean flow velocity rate and hence the volumetric flow. A magnetic inductive flowmeter consists of an isolated lined tube, through which a conductive liquid flows, a magnetic field coil and two electrodes. The electrode voltage is detected by a transmitter and converted into standardized electrical signal such as 4-20 mA or pulses. The sensor EPX can be used in combination with the Heinrichs Messtechnik UMF3 transmitter. The transmitter can be mounted compact or separately to the sensor.



Application

The magnetic-inductive flow sensor EPX is used to measure the volume flow of liquids, slurries, pastes and other electrically conductive media without any pressure drop. Pressure, temperature, density and viscosity do not affect the volume measurements. Solid particles and small gas bubbles should be avoided.

The sensor EPX has the following significant characteristics:

- Wide variety of lining materials
- Electrodes in Hastelloy C4, Tantalum, Platinum
- Deployable in harsh environments



Technical Data Sensor EPX

Armature	painted steel (Ex IIG), stainless steel (Ex IID)	
Nominal sizes:	DN15 to DN300 - ½" to 12" ANSI	
Process connections:	Flanges of steel or stainless steel (1.4301) (EN1092 und ASME B16.5),	
Lining material:	Wagunit (Hard-rubber), Soft-rubber, PTFE, E-CTFE	
Electrode material:	Hastelloy C4, stainless steel 1.4571/316 TI Titanium, Tantalum and Platinum-Rhodium Grounding rings (optional)	
Nominal pressure:	PN 40, (40 bar) PN 16, (16 bar) PN 10, (10 bar) <i>(higher pressure on request)</i>	DN 15-50 (½"-2") DN 65-200 (½"-8") DN 250-300 (10"-12")
Process temperature:	-35 °C to +64 °C +5 °C to +64 °C -35°C to +64 °C -35°C to +79 °C -35°C to +114 °C -35°C to +139 °C	Wagunit (Hard rubber) Soft rubber PTFE / E-CTFE PTFE / E-CTFE PTFE / E-CTFE PTFE
Ambient temperature:	-35 °C to +60 °C, depending on process temperature	
Conductivity:	≥ 5 µS/cm ≥ 20 µS/cm for demineralised water	
Measuring range:	0,1 m/s – 10 m/s	
Accuracy:	± 0,3 % of measured value ± 0,01 % * (Q at 10 m/s) (under reference conditions)	
Repeatability:	± 0,15 % of measured value ± 0,005 % * (Q at 10 m/s) (under reference conditions)	
Degree of protection:	IP 67 (EN60529), IP68 on request	
Explosion protection:	Ex II 2G Ex e ia IIC Gb Ex II 2D Ex tb IIIC Db	



Flow specific values

Recommended flow according to sensor size EPX

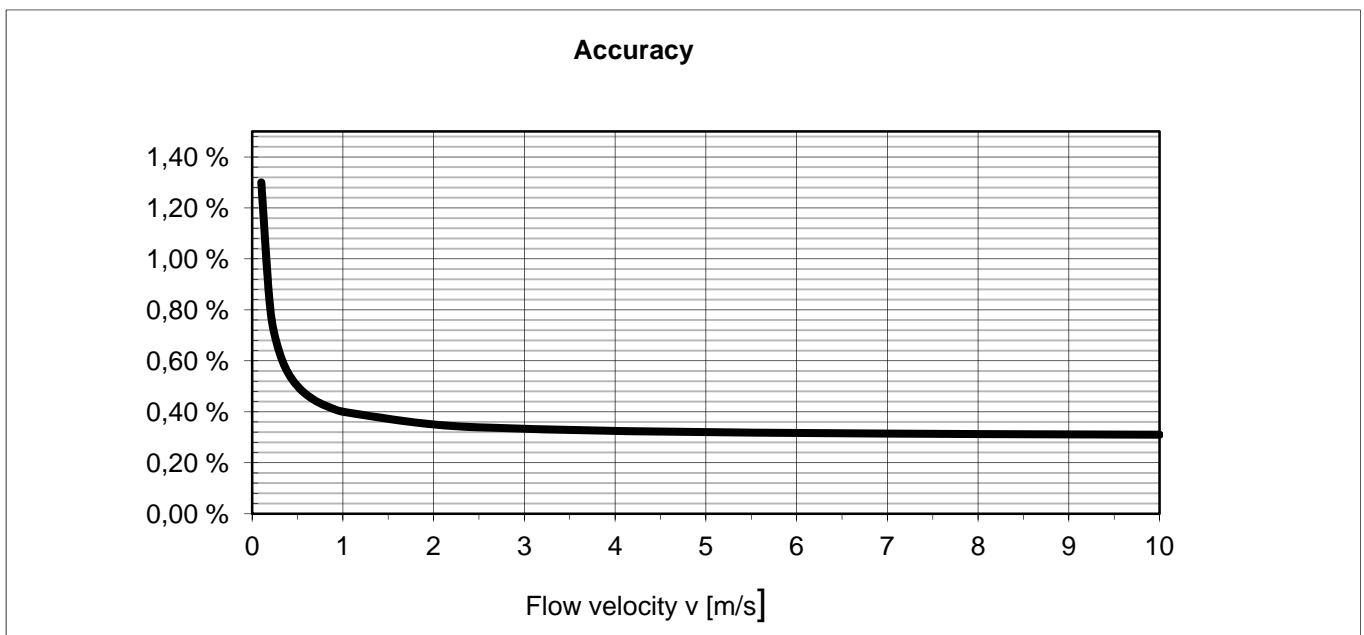
Measuring ranges					
Nominal diameter		Min/Max flow (0,1-10m/s)		Recommended measuring range (0,5-5m/s)	
[mm]	[inch]	Qmin (0,1m/s)	Qmax (10m/s)	Qmin (0,5m/s)	Qmax (5m/s)
15	1/2"	0,065 m³/h	6,5 m³/h	0,325 m³/h	3,25 m³/h
20	3/4"	0,12 m³/h	12 m³/h	0,6 m³/h	6 m³/h
25	1	0,18 m³/h	18 m³/h	0,9 m³/h	9 m³/h
32	-	0,3 m³/h	30 m³/h	1,5 m³/h	15 m³/h
40	1-1/2	0,45 m³/h	45 m³/h	2,25 m³/h	22,5 m³/h
50	2	0,72 m³/h	72 m³/h	3,6 m³/h	36 m³/h
65	-	1,2 m³/h	120 m³/h	6 m³/h	60 m³/h
80	3	1,8 m³/h	180 m³/h	9 m³/h	90 m³/h
100	4	2,8 m³/h	280 m³/h	14 m³/h	140 m³/h
125	-	4,3 m³/h	430 m³/h	21,5 m³/h	215 m³/h
150	6	6,5 m³/h	650 m³/h	32,5 m³/h	325 m³/h
200	8	11,5 m³/h	1150 m³/h	57,5 m³/h	575 m³/h
250	10	18 m³/h	1800 m³/h	90 m³/h	900 m³/h
300	12	25,2 m³/h	2520 m³/h	126 m³/h	1260 m³/h

Accuracy

+/- 0,3 % of measured value + 0,0001 * (Q at 10 m/s)

Repeatability

+/- (0,15 % of measured value + 0,00005 * (Q at 10 m/s))





Installation conditions

To avoid vacuum, emptying of pipes or gas aggregation please take notice of the following mounting advice



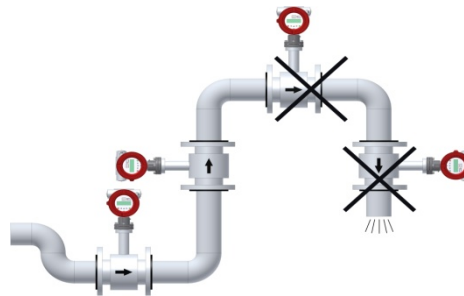
Emptying possible



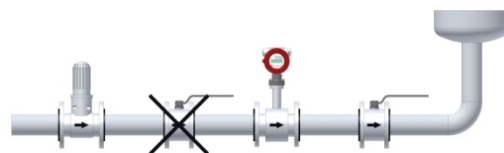
Emptying avoided



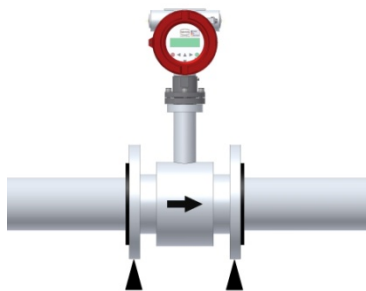
Upstream of pump, vacuum possible



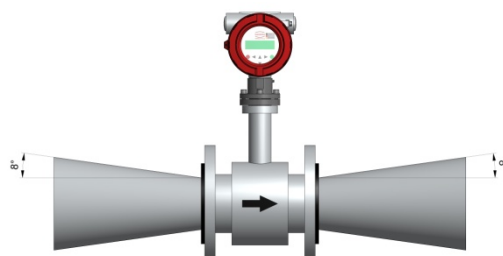
Mount in ascending main



Do not mount downstream of a valve



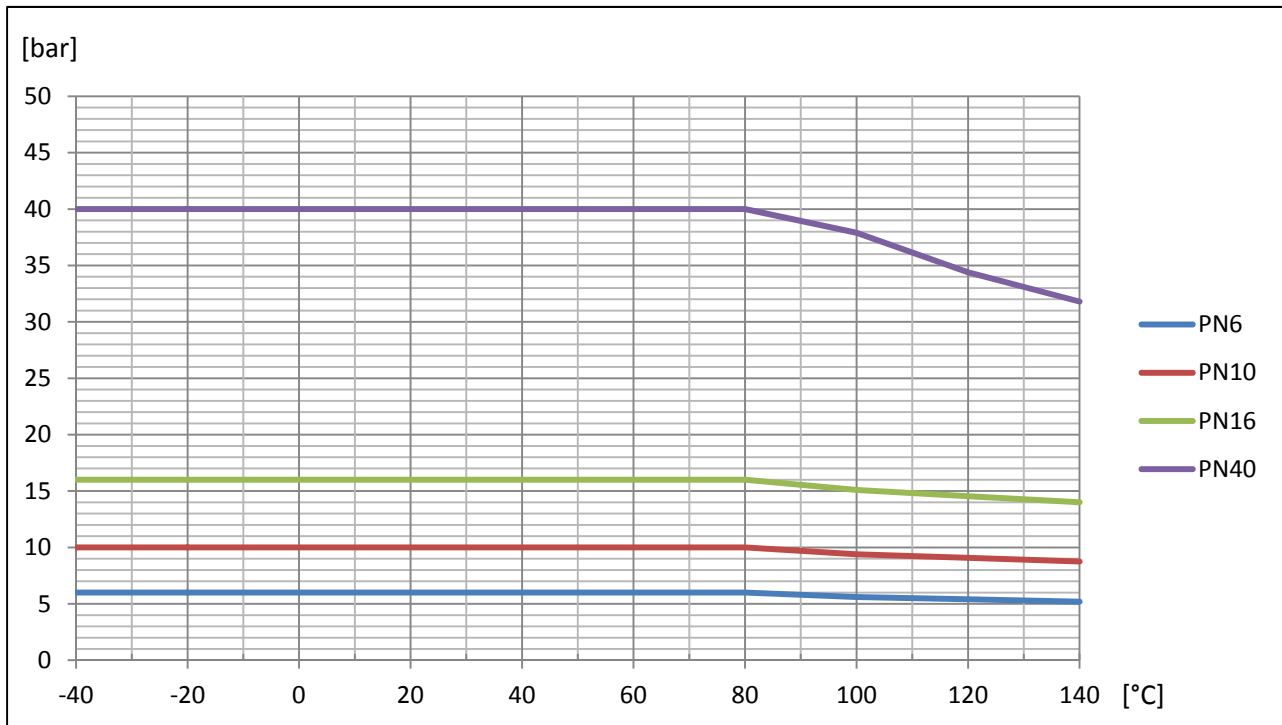
Use support to prevent vibrations



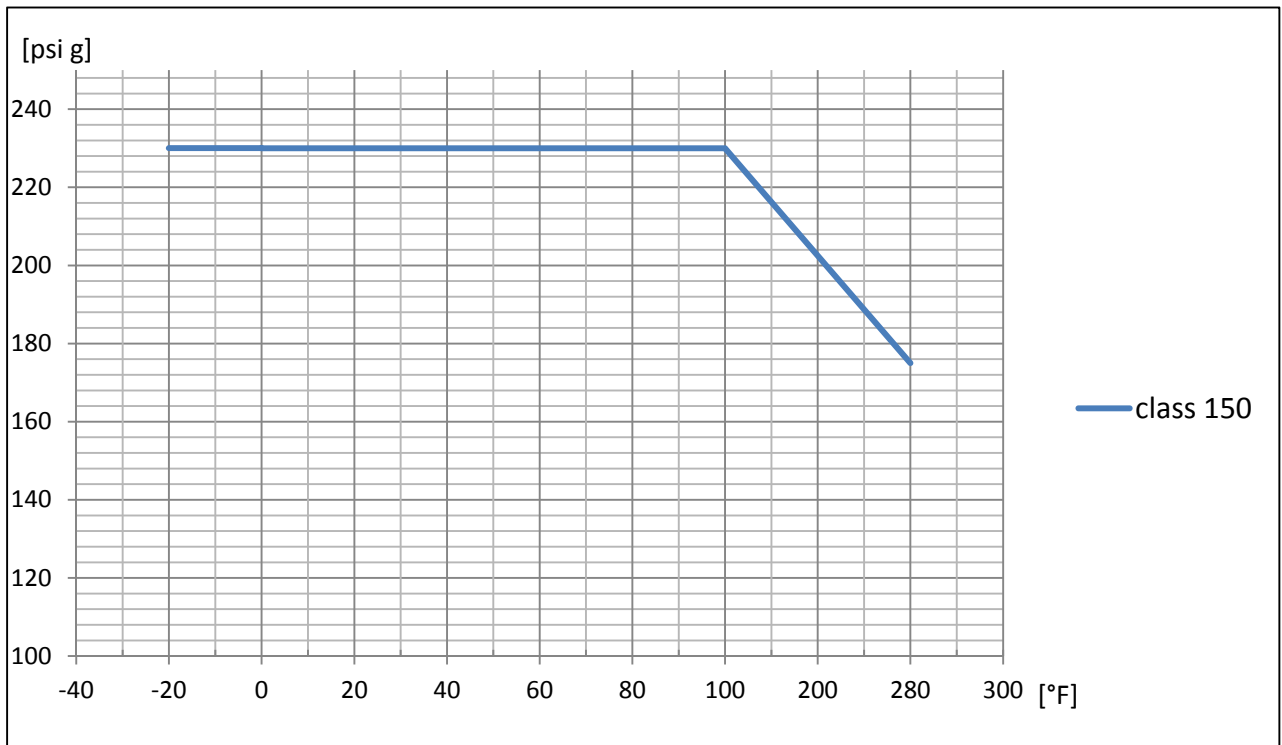
Pipe narrowing with maximum 8° angle



Material load curves



For stainless steel flanges (1.4404 / 316L) according to EN1092-1



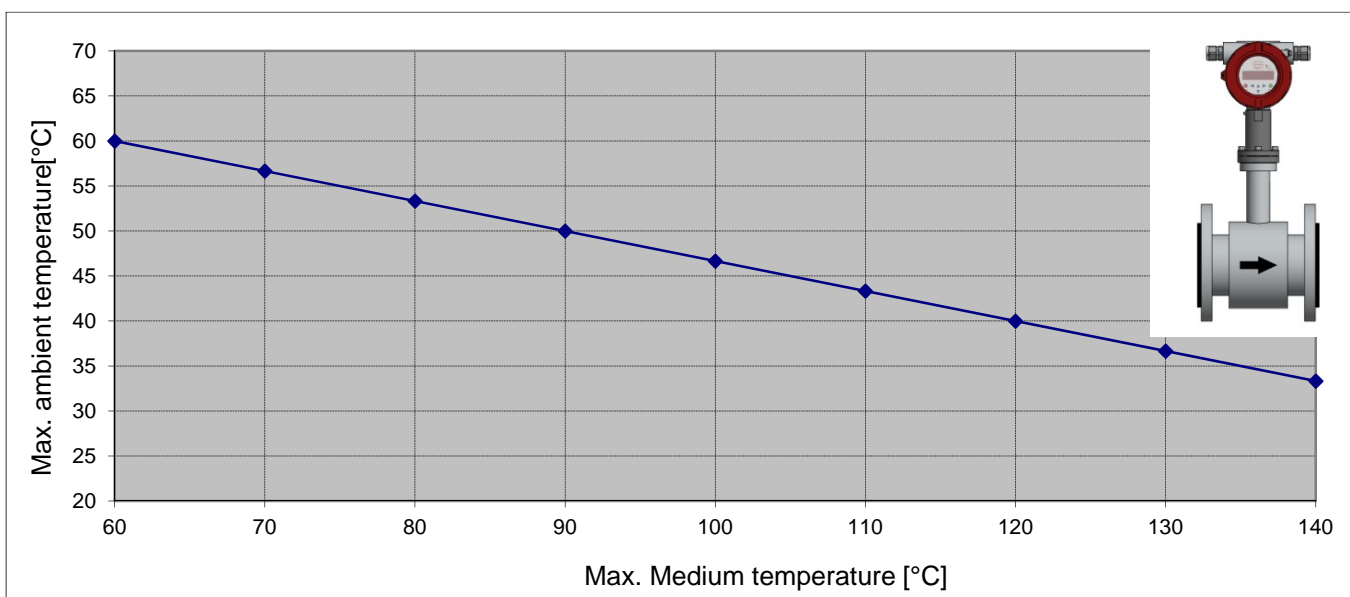
For stainless steel flanges (1.4404 / 316L) according to ASME B16.5



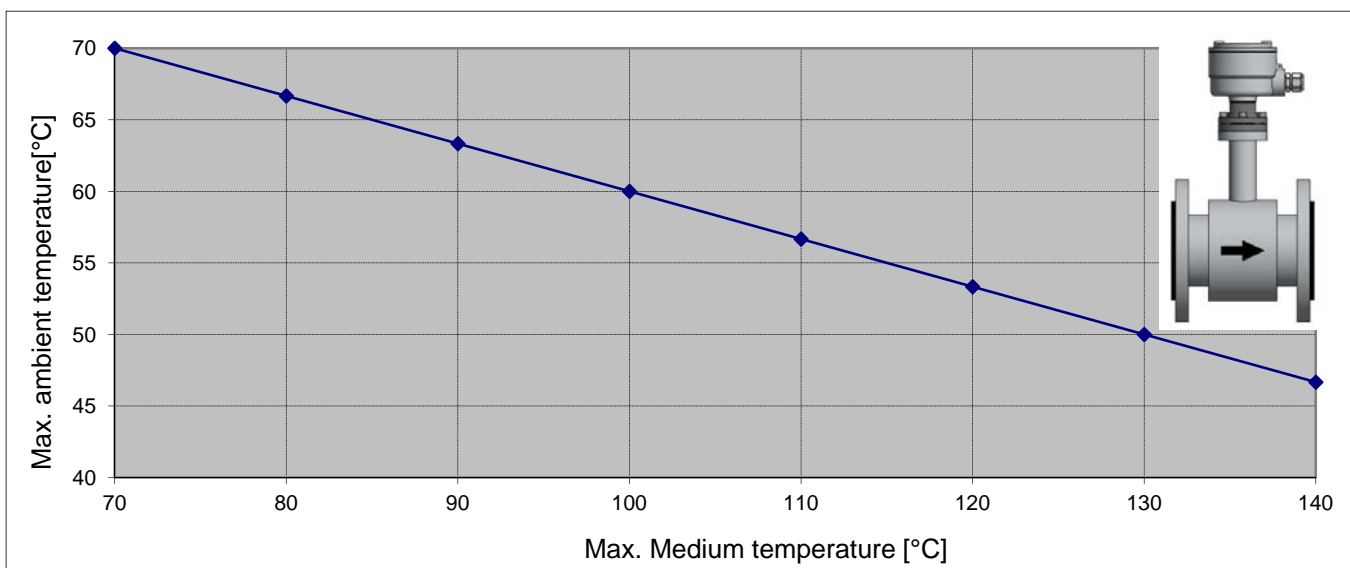
Ambient conditions

As the sensors are an element of the pipe, these are normally thermally isolated when installed to save energy and prevent accidental physical contact. The heat of the process temperature will be transferred through the supports neck of the compact mounted transmitter or the terminal box. For this reason the thermal insulation of the sensor should only extend half way up the support of the transmitter. It is essential not to include the transmitter or the terminal box into the thermal insulation. The maximum permissible fluid temperature range is stated on the rating plate of the respective version.

Maximum ambient temperature according to medium temperature with a direct mounted transmitter



Maximum ambient temperature according to medium temperature with a mounted connection box



Apply the medium temperatures of the lining materials.



Transmitter UMF3



Mounting options:	compact or remote
Degree of protection:	IP68 (EN60529)
Housing:	die cast Aluminum, painted
Power supply:	90-253 VAC 50/60Hz, 10 VA 24 VDC +/- 20%, 10W
Indication:	LCD, 2-lines, 16 digits, background lighted
Interface language:	English, German
Output:	
<u>Standard</u>	
1x Analogue:	1 x 0/4-20 mA HART [®] , passive, galvanically isolated
2x Binary output:	passive, galvanically isolated 1 pulse output - max. 1 kHz free configurable 1 status output - free configurable e.g. empty pipe
<u>Option</u>	
1x Analogue:	1 x 0/4-20 mA HART [®] , passive, galvanically isolated
3x Binary output:	passive, galvanically isolated 1 pulse output - max. 1 kHz free configurable 1 status output - free configurable e.g. empty pipe 1 status output - free configurable
1x Binary input:	passive, galvanically isolated
Ambient temperature:	-40 °C to +60 °C, dependant on process temperature
Communication:	HART [®]
Diagnostic functions:	Empty pipe detection, coil current surveillance
Electromagnetic tolerance:	EMC-Directive 2004/108/EG



Explosion protection:

For compact mounted transmitter

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

For remote transmitter with junction box (>10m)

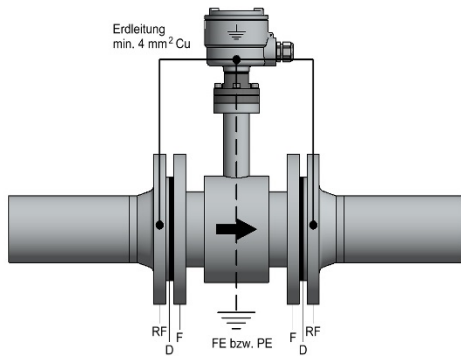
Ex de [ib IIB Gb][ia IIC Ga] IIB T4/T3 Gb
Ex tb [ib Db][ia Da] IIIC T125°C / T150°C Db
Ex de [ib IIB] T4/T3 Gb
Ex tb [ib] IIIC T125°C / T150°C Db

For remote transmitter with cable tail (bis 10m)

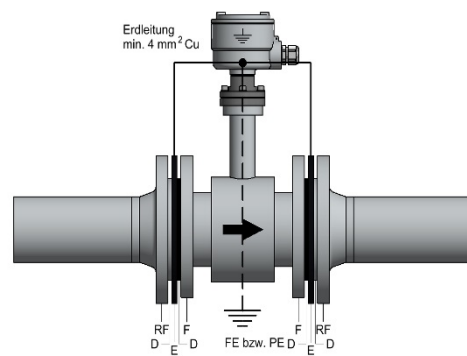
Ex d [ia IIC Ga] IIB T4/T3 Gb
Ex tb ib [ia Da] IIIC T125°C / T150°C Db
Ex d ib IIB T4/T3 Gb
Ex tb ib IIIC T125°C / T150°C Db

Potential equalization

The potential equalization is achieved via the grounding terminal of the junction box.



For metallic pipelines we recommend connecting the grounding terminal to the pipe.

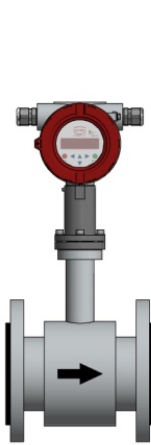


For non-metallic pipelines we recommend connecting the grounding terminal to the grounding discs.

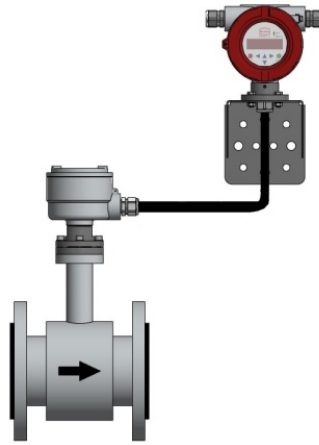


Electrical connections

Mounting types

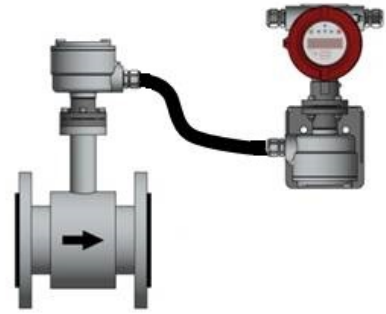


Compact IP65 according to DIN/EN 60529
Dust tight, protected against powerful water jets.



Remote IP65 according to DIN/EN 60529
Dust tight, protected against powerful water jets.

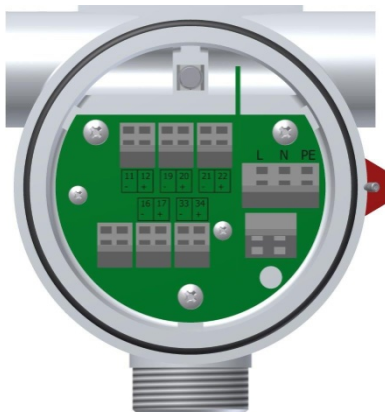
with 2.5m, 5m and 10m factory mounted cable on transmitter



Remote IP68 according to DIN/EN 60529
Dust tight, suitable for continuous immersion.

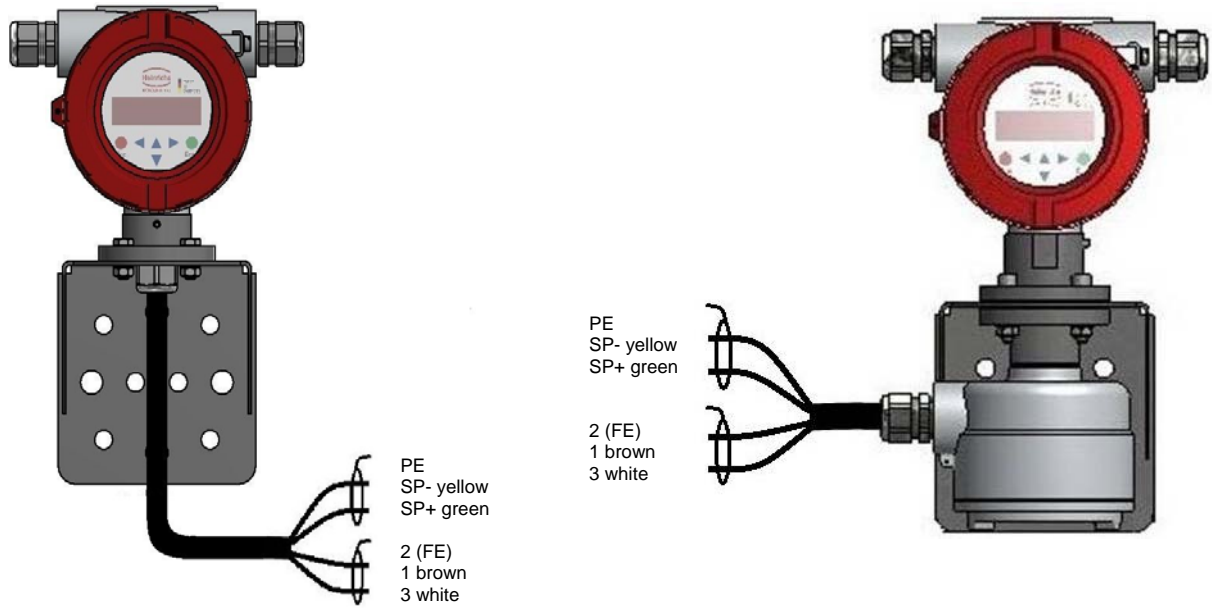
For distances > 10m, factory mounted cable on transmitter, junction box on sensor resin filled.

Terminal compartment Transmitter



L	Power supply
N	Power supply
PE	Protective conductor
11	Current output active (-)
12	Current output active (+)
16	Pulse output passive (-)
17	Pulse output passive (+)
19	Status output passive (-)
20	Status output passive (+)
21	Reserved
22	Reserved
33	Reserved
34	Reserved

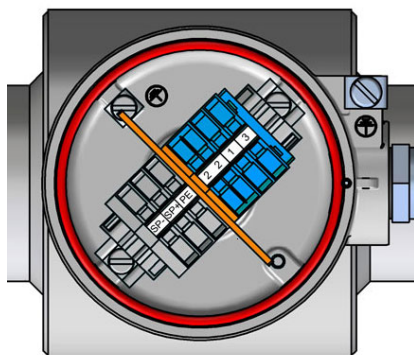
L, N max. 90-253V AC, 50/60Hz or 24V DC



Remote version up to 10m cable

Remote version >10m cable

Ex d junction box (remote version, Sensor and Transmitter)



- | | |
|-----|---|
| SP- | Field coil (-) yellow |
| SP+ | Field coil (+) green |
| PE | Shield protective conductor |
| 2 | FE (Sensor protective conductor) |
| 1 | Electrode (intrinsically safe circuit Ex i) brown |
| 3 | Electrode (intrinsically safe circuit Ex i) white |

For remote configuration with 2.5m, 5m or 10m cables, the connecting cable is factory mounted on the transmitter. The terminal configuration is valid for the sensor junction box. For greater distances between sensor and transmitter there are two junction boxes mounted as in the above image, one on the sensor and one on the transmitter.

To sustain best possible interference free measurements, you may consider the following hints:

To avoid errors from cable movement for media with low conductivity, use a protective conduit and/or fasten the interconnecting cable.

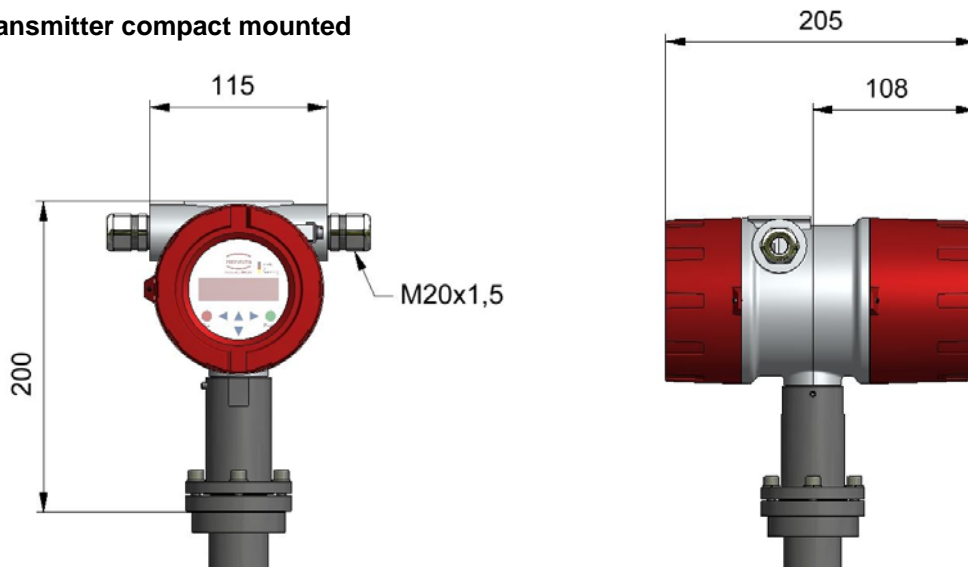
Avoid laying the cable close to electrical machines, control gears or other electrical fields.

Make sure you have the potential equalization between sensor and transmitter connected.

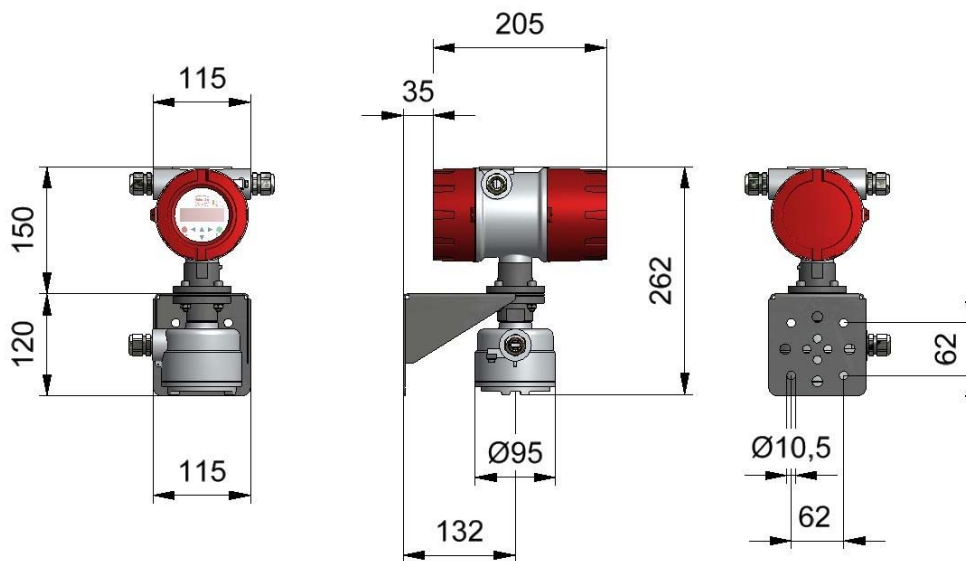


Dimensions of the Transmitter UMF3
(All measures in mm)

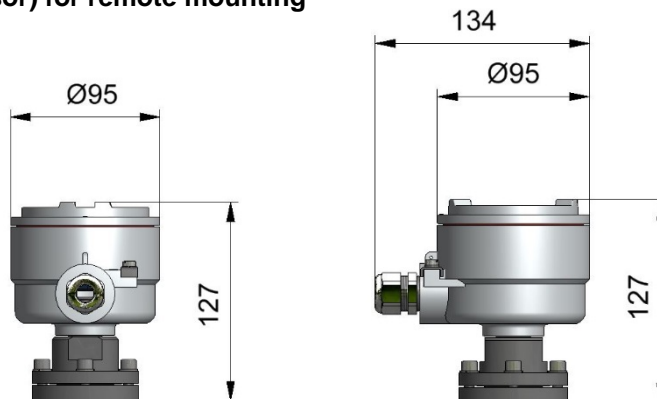
Transmitter compact mounted



Transmitter for remote mounting



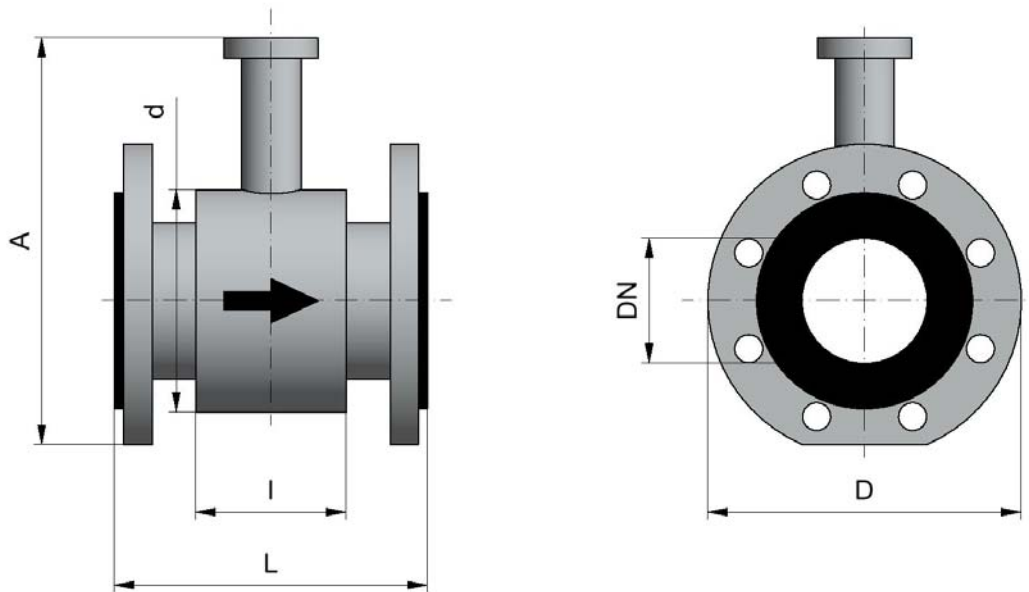
Junction box (sensor) for remote mounting





Dimensions of the Sensor EPX

(All measures in mm)



(standard pressure rating)	DN	ASME**	D DIN/EN Flange	D ANSI Flange	d	A DIN/EN Flange	A ANSI Flange	L	l	weight [kg]
PN 40*	15	½"	95	88,9	62	164	172	200	66	3
	20	¾"	105	98,4	62	170	177	200	66	3
	25	1"	115	107,9	72	180	187	200	96	3
	32	1¼"	140	117,5	82	199	197	200	96	4
	40	1½"	150	127	92	209	207	200	96	4
	50	2"	165	152,4	107	223	227	200	96	6
PN16*	65	2½"	185	177,8	127	244	249	200	96	9
	80	3"	200	190,5	142	260	263	200	96	14
	100	4"	220	228,6	162	280	292	250	96	16
	125	5"	250	254	192	310	320	250	126	19
	150	6"	285	279,4	218	340	346	300	126	25
	200	8"	340	342,9	274	398	405	350	211	41
PN 10*	250	10"	395	406,4	370	480	485	450	211	54
	300	12"	445	482,6	420	535	548	500	320	77

Approximate weights are stated.

Take into account an additional weight of 2,4kg for the transmitter.

* (other pressure ratings on request)

** pressure rating on ASME flanges is Class 150 for all diameters



Modelcode

EPX-	Lining	Temperature	
V	Wagunit (Hardrubber)	Standard 3 stainless steel electrodes	0°C...80°C
W	Softrubber	Standard 3 stainless steel electrodes	
P	PTFE	Standard 3 Hastelloy electrodes	-20°C...150°C
-	Process Connection	Max. measuring range (Water 20°C, 1 mPas)	Installation length
305B	DN15 PN40 Form B1 DIN EN 1092-1	6 m³/h	200 mm
3A5B	DN20 PN40 Form B1 DIN EN 1092-1	8 m³/h	200 mm
309B	DN25 PN40 Form B1 DIN EN 1092-1	17 m³/h	200 mm
313B	DN32 PN40 Form B1 DIN EN 1092-1	28 m³/h	200 mm
317B	DN40 PN40 Form B1 DIN EN 1092-1	38 m³/h	200 mm
321B	DN50 PN40 Form B1 DIN EN 1092-1	62 m³/h	200 mm
325B	DN65 PN16 Form B1 DIN EN 1092-1	112 m³/h	200 mm
326B	DN65 PN40 Form B1 DIN EN 1092-1	112 m³/h	200 mm
330B	DN80 PN16 Form B1 DIN EN 1092-1	163 m³/h	200 mm
331B	DN80 PN40 Form B1 DIN EN 1092-1	154 m³/h	200 mm
335B	DN100 PN16 Form B1 DIN EN 1092-1	288 m³/h	250 mm
336B	DN100 PN40 Form B1 DIN EN 1092-1	288 m³/h	250 mm
340B	DN125 PN16 Form B1 DIN EN 1092-1	456 m³/h	250 mm
341B	DN125 PN40 Form B1 DIN EN 1092-1	456 m³/h	250 mm
345B	DN150 PN16 Form B1 DIN EN 1092-1	670 m³/h	300 mm
346B	DN150 PN40 Form B1 DIN EN 1092-1	670 m³/h	300 mm
349B	DN200 PN10 Form B1 DIN EN 1092-1	1188 m³/h	350 mm
350B	DN200 PN16 Form B1 DIN EN 1092-1	1188 m³/h	350 mm
351B	DN200 PN40 Form B1 DIN EN 1092-1	1188 m³/h	350 mm
355B	DN250 PN10 Form B1 DIN EN 1092-1	1896 m³/h	450 mm
356B	DN250 PN16 Form B1 DIN EN 1092-1	1896 m³/h	450 mm
358B	DN250 PN40 Form B1 DIN EN 1092-1	1896 m³/h	450 mm
362B	DN300 PN10 Form B1 DIN EN 1092-1	2717 m³/h	500 mm
363B	DN300 PN16 Form B1 DIN EN 1092-1	2682 m³/h	500 mm
365B	DN300 PN40 Form B1 DIN EN 1092-1	2682 m³/h	500 mm
362B	DN300 PN10 Form B1 DIN EN 1092-1 / ECTFE	2717 m³/h	500 mm
201R	½" Class 150 RF ASME B16.5-2003	6 m³/h	200 mm
221R	½" Class 300 RF ASME B16.5-2003	6 m³/h	200 mm
202R	¾" Class 150 RF ASME B16.5-2003	8 m³/h	200 mm
222R	¾" Class 300 RF ASME B16.5-2003	8 m³/h	200 mm
203R	1" Class 150 RF ASME B16.5-2003	17 m³/h	200 mm
223R	1" Class 300 RF ASME B16.5-2003	17 m³/h	200 mm
204R	1¼" Class 150 RF ASME B16.5-2003	28 m³/h	200 mm
224R	1¼" Class 300 RF ASME B16.5-2003	28 m³/h	200 mm
205R	1½" Class 150 RF ASME B16.5-2003	38 m³/h	200 mm
225R	1½" Class 300 RF ASME B16.5-2003	38 m³/h	200 mm
206R	2" Class 150 RF ASME B16.5-2003	62 m³/h	200 mm
226R	2" Class 300 RF ASME B16.5-2003	62 m³/h	200 mm
207R	2½" Class 150 RF ASME B16.5-2003	112 m³/h	200 mm
227R	2½" Class 300 RF ASME B16.5-2003	112 m³/h	200 mm
208R	3" Class 150 RF ASME B16.5-2003	163 m³/h	200 mm
228R	3" Class 300 RF ASME B16.5-2003	163 m³/h	200 mm
210R	4" Class 150 RF ASME B16.5-2003	288 m³/h	250 mm
230R	4" Class 300 RF ASME B16.5-2003	288 m³/h	250 mm
211R	5" Class 150 RF ASME B16.5-2003	456 m³/h	250 mm
231R	5" Class 300 RF ASME B16.5-2003	456 m³/h	250 mm
212R	6" Class 150 RF ASME B16.5-2003	670 m³/h	300 mm
232R	6" Class 300 RF ASME B16.5-2003	670 m³/h	300 mm
213R	8" Class 150 RF ASME B16.5-2003	1188 m³/h	350 mm
233R	8" Class 300 RF ASME B16.5-2003	1188 m³/h	350 mm
214R	10" Class 150 RF ASME B16.5-2003	1896 m³/h	450 mm
234R	10" Class 300 RF ASME B16.5-2003	1896 m³/h	450 mm
215R	12" Class 150 RF ASME B16.5-2003	2717 m³/h	500 mm
235R	12" Class 300 RF ASME B16.5-2003	2717 m³/h	500 mm
XXXX	Special	XXX m³/h	XXX mm
-	Material flanges		
1	steel (painted)		
2	stainless steel (1.4301)	required for ATEX Gas & Dust	
X	Special		
-	Material electrodes		
SS	Stainless steel incl. grounding electrode	standard for hard rubber, soft rubber	
HH	Hastelloy C-4 incl. grounding electrode	standard for PTFE	
TT	Tantalum		
NN	Platin		
MM	Titanium		
XX	Special		



	Transmitter mounting	Protection class sensor		
1	compact transmitter	IP67		
2	remote transmitter	IP65		
3	remote transmitter	IP67		
Approval				
0	without			
1	ATEX -Gas			
2	ATEX -Gas & Dust		only with stainless steel flanges	
- Certificate				
0	without			
1	certificate of compliance with order 2.1			
2	test report 2.2			
3	inspection/material certificate 3.1 DIN/EN 10204:2004			
4	inspection/material certificate 3.2 DIN/EN 10204:2004			
Modelcode Description				
UMF3-				
Power supply				
1	90-253V AC, 50/60Hz			
2	24V DC +/- 20%			
Marking approval				
		configuration	output signal	
0	without			Output: A, B
A	Ex de ib [ia IIC Ga] IIB T4/T3 Gb Ex tb ib [ia Da] IIIC T125°C / T150°C Db	compact mounted	intrinsically safe	Output: C, D
B	Ex de ib IIB T4/T3 Gb Ex tb ib IIIC T125°C / T150°C Db	compact mounted	not intrinsically safe	Output: A, B
C	Ex de [ib IIB Gb] [ia IIC Ga] IIB T4/T3 Gb Ex tb [ib Db] [ia Da] IIIC T125°C / T150°C Db	junction box	intrinsically safe	Output: C, D
D	Ex de [ib IIB] T4/T3 Gb Ex tb [ib] IIIC T125°C / T150°C Db	junction box	not intrinsically safe	Output: A, B
E	Ex d [ia IIC Ga] IIB T4/T3 Gb Ex tb ib [ia Da] IIIC T125°C / T150°C Db	cable end	intrinsically safe	Output: C, D
F	Ex d ib IIB T4/T3 Gb Ex tb ib IIIC T125°C / T150°C Db	cable end	not intrinsically safe	Output: A, B
Approval				
0	without			
1	ATEX - only Gas Ex	see sensor approval		
2	ATEX - Gas Ex and Dust Ex	see sensor approval		
Output				
A	Standard: 1x Current output: 4 - 20mA (passive) HART® 1x Pulse output: 1 kHz, passive 24V DC (Um=30V DC) 1x Status output: passive 24V DC (Um=30V DC)		not intrinsically safe	
C	Standard: 1x Current output: 4 - 20mA (passive) HART® 1x pulse output: 1 kHz, passive 24V DC (Um=30V DC) 1x Status output: passive 24V DC (Um=30V DC)		intrinsically safe	
Transmitter mounting				
1	IP67 compact transmitter			
2	IP65 remote transmitter, cable factory mounted		Connecting cable: 0, 1, 2	
3	IP65 remote transmitter, junction box at transmitter		Connecting cable: 3, 4, 5, 6, 7	
5	IP68 remote transmitter, cable factory mounted		Connecting cable: A, B, C	
6	IP68 remote transmitter, junction box at transmitter		Connecting cable: D, E, F, G, H	
Thread for cable gland (signal and power supply)				
1	M20x1,5 (Ex and Not -Ex)			
2	1/2" NPT(f) non Ex (via Adaptor)		only with approval "0"	
3	1/2" NPT(f) Ex d (via Adaptor)		not with approval "0"	
Design				
H	Heinrichs			
K	Kobold			



Connecting cable			
	IP 65		
0	without		
1	2m standard on remote version	breakout cable	
2	5m	breakout cable	
3	10m	breakout cable	
4	15m	add. Junction box on transmitter	
5	20m	add. Junction box on transmitter	
6	30m	add. Junction box on transmitter	
7	40m	add. Junction box on transmitter	
8	50m	add. Junction box on transmitter	
	IP 67 / IP 68		
A	2m standard on remote version	breakout cable	
B	5m	breakout cable	
C	10m	breakout cable	
D	15m	add. Junction box on transmitter	
E	20m	add. Junction box on transmitter	
F	30m	add. Junction box on transmitter	
G	40m	add. Junction box on transmitter	
H	50m	add. Junction box on transmitter	

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