Magnetic-inductive Flowmeter
In-Line

EPM

Technical Information

- High measuring accuracy: 0,5 % of full scale
- Maintenance free
- Measurement without pressure loss
- PTFE- and hard rubber lining
- Wide selection of electrode materials
- Wide selection of process connections

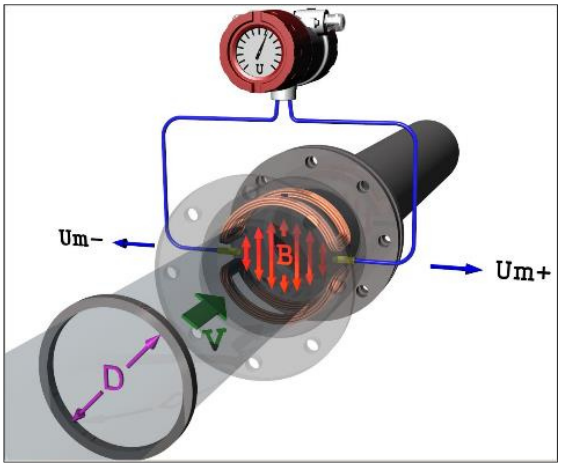
HART COMMUNICATION PROTOCOL

Functionality

If an electrically conductive medium flows through a directed magnetic field, a voltage is induced in accordance with Faraday's law of induction. The magnitude of this measuring voltage is proportional to the average flow velocity and therefore to the volumetric flow rate.

An electromagnetic flowmeter consists of a sensor, which detects the induced measuring signal from the medium flowing through the pipeline, and a transmitter, which converts this signal into standardized output signals (4...20 mA or pulses).

The EPM sensor is operated in combination with the UMF2 transmitter from Heinrichs Messtechnik. The transmitter can either be mounted directly on the sensor or installed separately.



Application

With the EPM electromagnetic flow sensor, the volumetric flow rate of liquids, slurries, pastes and other electrically conductive media can be measured or monitored without pressure loss. Pressure, temperature, density and viscosity have no influence on the volumetric flow measurement. Solids and gas bubbles should be avoided.

In the process industry, such as the chemical, pharmaceutical, food and beverage industries, electromagnetic flowmeters are widely used. They enable precise and reliable measurement of liquids and pasty media. This is particularly important for optimizing production processes, ensuring product quality and minimizing losses.

In the water industry, electromagnetic flowmeters play an important role in monitoring water consumption and wastewater volumes. They enable accurate measurement of flow rates in pipelines and channels, which is essential for billing, resource planning and leakage monitoring.

In power plants, particularly thermal and nuclear power plants, measuring the flow rate of cooling water and other liquids is of critical importance. Electromagnetic flowmeters provide accurate flow information required to improve efficiency, protect equipment and comply with environmental regulations.

In environmental monitoring and hydrology, flowmeters play a key role in measuring water quantities in rivers, streams and channels. Electromagnetic flowmeters are particularly suitable for this purpose because they measure flow without moving parts, resulting in low maintenance requirements and making them well suited for long-term monitoring.

Overall, electromagnetic flowmeters provide precise and reliable measurement of liquid media in these and many other applications, making them an essential instrument in modern industrial processes and environmental technology.

Features:

- Liner materials
  - PTFE
  - Hard rubber
- Electrodes and grounding electrodes made of:
  - Stainless steel (AISI 316L/1.4301)
  - Hastelloy C22 (2.4819)
  - Tantalum (2.4810)
  - Platinum / Iridium
  - Titanium (3.7035)
- Wide range of process connections
- Suitable for use in harsh environmental conditions

Technical Data Sensor

Materials:

- Flanges
  - Steel (1.0460/1.0570)
  - Stainless steel (1.4404/1.4571)
- Measuring and grounding electrodes:
  - Hastelloy C22 (2.4819)
  - Stainless steel 316L (1.4307)
  - Tantalum (2.4810)
  - Titan (3.7035)
  - Platin
- Lining:
  - Hard rubber
  - PTFE
- Grounding rings: on request

Nominal sizes:

- DIN EN 1092-1 DN15...DN600
- ANSI B16.5 ½“...24“

Process connection:

Flanges Steel or Stainless steel acc. to

- EN 1092-1
- ASME B16.5

Nominal pressure:

- PN10 / P16 / PN40

Process temperature:

- Hard rubber: max. +90 °C (194 °F)
- PTFE at 25 Bar: max. +130 °C (266 °F)
  at 40 Bar: max. +100 °C (212 °F)

Ambient temperature:

-20...+ 60 °C (-4...+ 140 °F)

Conductivity:

>= 20 µS/cm

Measuring range:

0,25...10 m/s

Accuracy:

± 0,5 % of measured value
(under reference conditions, 1...10m/s)

Repeatability:

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

Protection class:

IP67 / IP68 (EN60529)

Technical Data Transmitter

Mounting:

Compact or remote

Housing:

Die-cast aluminium, painted

Power supply:

- 220 VAC 50/60Hz, 10VA
- 24 VDC (±20%), 10W

Display:

LCD, 64x128, backlit

Languages:

- German
- English

Outputs:

- Analog:
  - 1x 0/4 ... 20mA active, galvanically isolated
- Pulse output:
  - passive, galvanically isolated
  - 24V, 60mA
  - Configurable as frequency output, max. 1kHz
- Status:
  - Optocoupler, passive, galvanically isolated
  - 24V, 60mA

Ambien temperature:

-20°C ... +60°C (-4 ...+140 °F)
Depending on the process temperature

Protection class:

IP67 / IP68 (EN60529)

Communication:

HART®

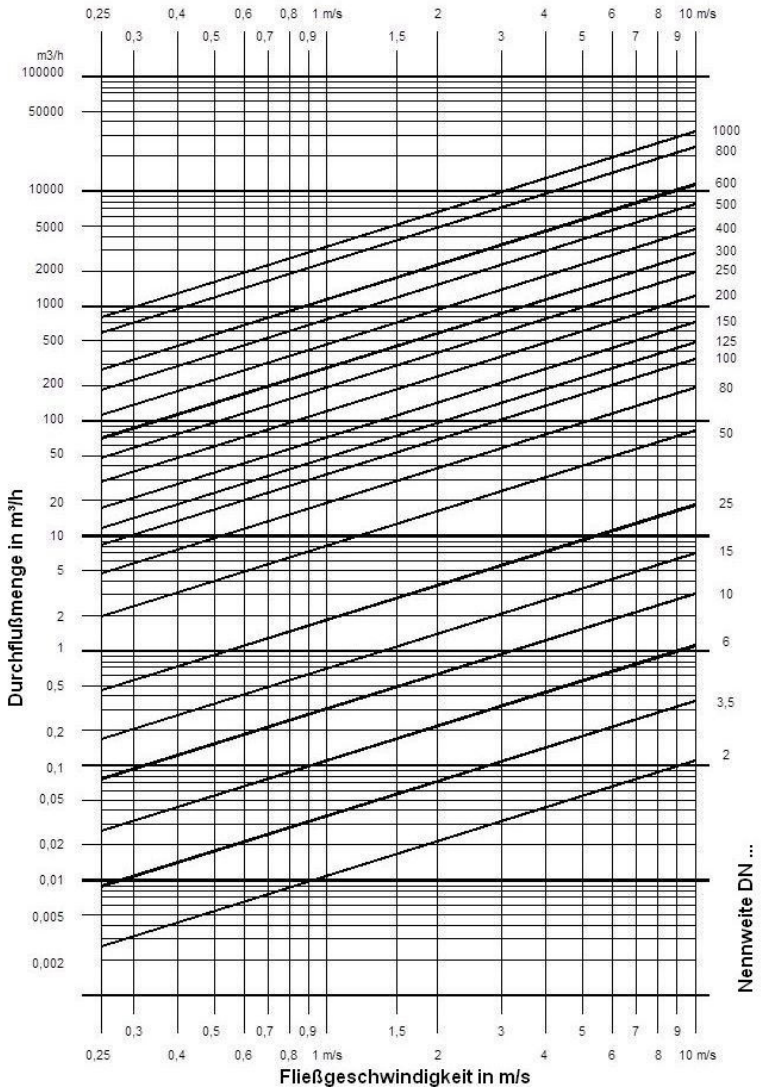
Electromagnetic compatibility:

EMC Directive 2004/108/EG

Measuring Ranges

The volumetric flow rate depends on the flow velocity and the nominal size of the flowmeter. The flow nomogram shows the flow range that can be measured by a flowmeter of a specific nominal size and which nominal size is suitable for a given flow rate.

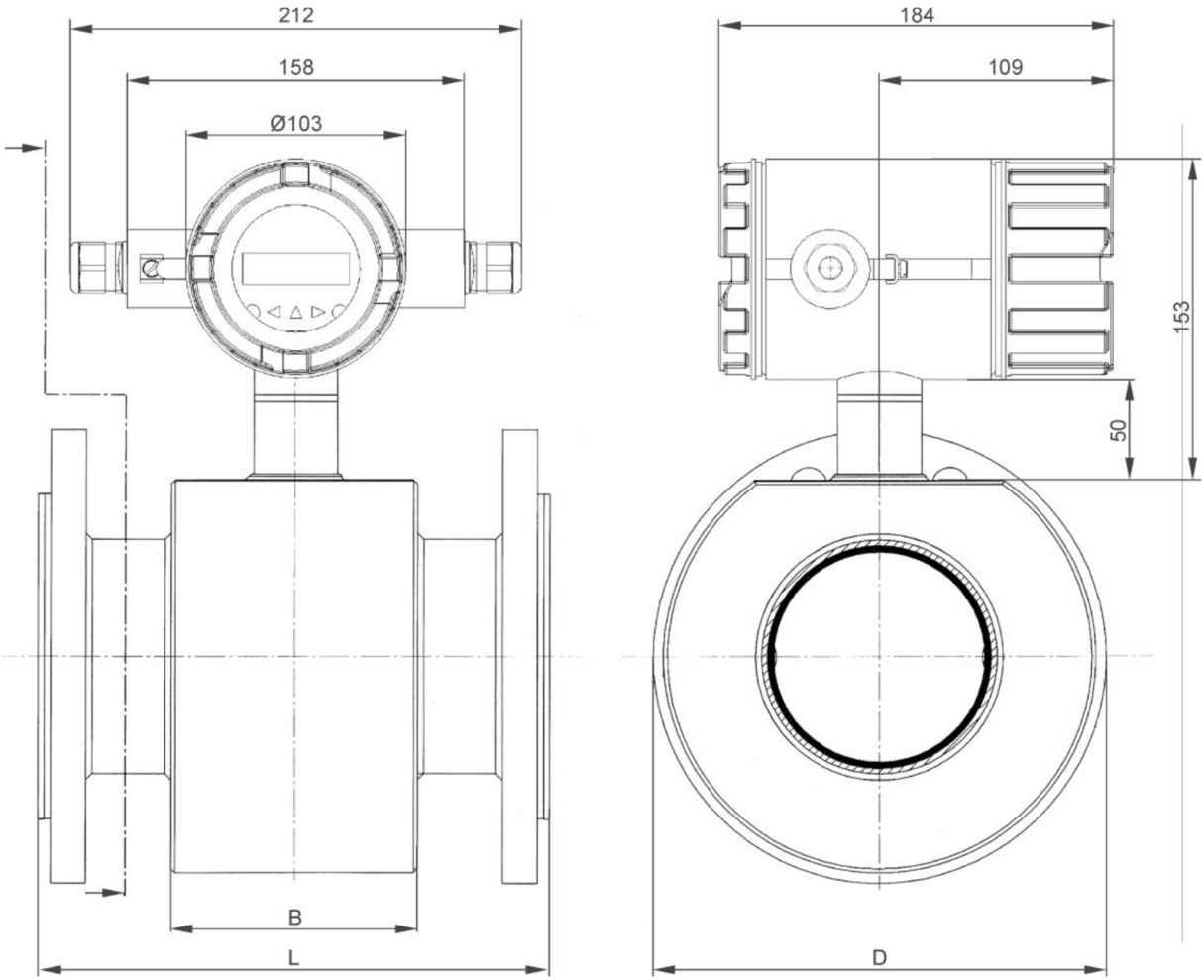
The electromagnetic flowmeter is designed to operate within the range of flow velocities typically encountered in practical applications. The full-scale flow velocity can be set between 0.25 and 10 m/s. The flow nomogram shows the volumetric flow rate in m³/h and the flow velocity in m/s as a function of the nominal size DN of the sensor.



ANSI	DIN	$Q_{max.}$ [m³/h] Factory setting	$Q_{max.}$ [m³/h] optionally
½″	DN 15	3	6,36
1″	DN 25	10	17,67
1¼″	DN 32	10	28,95
1½″	DN 40	10	45,24
2″	DN 50	20	70,69
2½″	DN 65	50	119,5
3″	DN 80	50	181,0
4″	DN 100	70	282,7
5″	DN 125	100	447,8
6″	DN 150	150	636,2
8″	DN 200	250	1 131
10″	DN 250	400	1 767
12″	DN 300	500	2 545
14″	DN 350	700	3 464
16″	DN 400	1 200	4 524
18″	DN 450	1 200	5 726
20″	DN 500	1 200	7 069
24″	DN 600	1 200	8 553
28″	DN 700	3 600	10 179
32″	DN 800	3 600	18 096

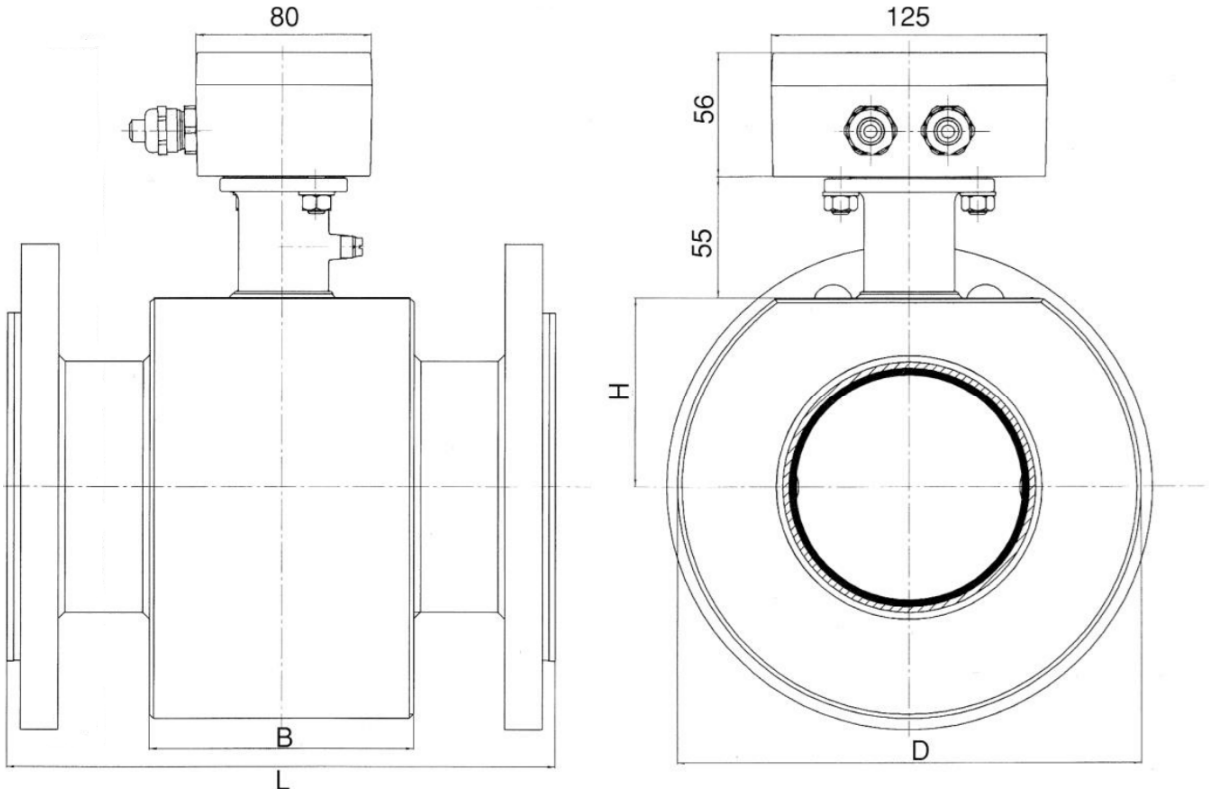
Dimensions

Compact design



Nominal size				Installation length L				Dimensions of the sensor housing			
DIN		ANSI		Hart rubber	PTFE		Tolerance	B	D	H	Weight in kg (DIN flange)
					without protective / grounding ring	with protective / grounding ring					
DN 15	PN 40	½"	150 RF	200	200	206	+0 / -3	80	130	53	5
DN 25	PN 40	1"	150 RF	200	200	206	+0 / -3	80	130	53	6
DN 32	PN 40	1 ¼"	150 RF	200	200	206	+0 / -3	80	130	53	7
DN 40	PN 40	1 ½"	150 RF	200	200	206	+0 / -3	80	130	53	7,5
DN 50	PN 40	2"	150 RF	200	200	206	+0 / -3	80	140	57	9
DN 65	PN 16	2 ½"	150 RF	200	200	206	+0 / -3	80	155	63	10
DN 80	PN 16	3"	150 RF	200	200	206	+0 / -3	80	170	70	13
DN 100	PN 16	4"	150 RF	250	250	256	+0 / -3	120	210	86	15
DN 125	PN 16	5"	150 RF	250	250	256	+0 / -3	120	240	98	19
DN 150	PN 16	6"	150 RF	300	300	306	+0 / -3	120	285	117	23
DN 200	PN 10	8"	150 RF	350	350	360	+0 / -3	200	350	143	36
DN 250	PN 10	10"	150 RF	450	450	460	+0 / -4	200	440	180	52
DN 300	PN 10	12"	150 RF	500	500	510	+0 / -4	200	520	213	62
DN 350	PN 10	14"	150 RF	550	550	560	+0 / -5	225	474	237	95
DN 400	PN 10	16"	150 RF	600	600	610	+0 / -5	250	524	262	115
DN 450	PN 10	18"	150 RF	600	600	610	+0 / -5	270	584	292	135
DN 500	PN 10	20"	150 RF	600	600	610	+0 / -5	300	629	315	150
DN 600	PN 10	24"	150 RF	600	600	610	+0 / -5	360	734	367	182

Remote design



Nominal size				Installation length L				Dimensions of the sensor housing			Weight in kg (EN flange)
DIN		ANSI		Hart rubber	PTFE without protective / grounding ring	PTFE with protective / grounding ring	Tolerance	B	D	H	
DN 15	PN 40	½"	150 RF	200	200	206	+0 / -3	80	130	53	5
DN 25	PN 40	1"	150 RF	200	200	206	+0 / -3	80	130	53	6
DN 32	PN 40	1 ¼"	150 RF	200	200	206	+0 / -3	80	130	53	7
DN 40	PN 40	1 ½"	150 RF	200	200	206	+0 / -3	80	130	53	7.5
DN 50	PN 40	2"	150 RF	200	200	206	+0 / -3	80	140	57	9
DN 65	PN 16	2 ½"	150 RF	200	200	206	+0 / -3	80	155	63	10
DN 80	PN 16	3"	150 RF	200	200	206	+0 / -3	80	170	70	13
DN 100	PN 16	4"	150 RF	250	250	256	+0 / -3	120	210	86	15
DN 125	PN 16	5"	150 RF	250	250	256	+0 / -3	120	240	98	19
DN 150	PN 16	6"	150 RF	300	300	306	+0 / -3	120	285	117	23
DN 200	PN 10	8"	150 RF	350	350	360	+0 / -3	200	350	143	36
DN 250	PN 10	10"	150 RF	450	450	460	+0 / -4	200	440	180	52
DN 300	PN 10	12"	150 RF	500	500	510	+0 / -4	200	520	213	62
DN 350	PN 10	14"	150 RF	550	550	560	+0 / -5	225	474	237	95
DN 400	PN 10	16"	150 RF	600	600	610	+0 / -5	250	524	262	115
DN 450	PN 10	18"	150 RF	600	600	610	+0 / -5	270	584	292	135
DN 500	PN 10	20"	150 RF	600	600	610	+0 / -5	300	629	315	150
DN 600	PN 10	24"	150 RF	600	600	610	+0 / -5	360	734	367	182

Sensor Order Code

EPM	
-	Lining
H	Hard rubber
P	PTFE
-	Process connection
305B	DN15 PN40 Form B1 DIN EN 1092-1
309B	DN25 PN40 Form B1 DIN EN 1092-1
317B	DN40 PN40 Form B1 DIN EN 1092-1
321B	DN50 PN40 Form B1 DIN EN 1092-1
325B	DN65 PN16 Form B1 DIN EN 1092-1
326B	DN65 PN40 Form B1 DIN EN 1092-1
330B	DN80 PN16 Form B1 DIN EN 1092-1
331B	DN80 PN40 Form B1 DIN EN 1092-1
335B	DN100 PN16 Form B1 DIN EN 1092-1
336B	DN100 PN40 Form B1 DIN EN 1092-1
340B	DN125 PN16 Form B1 DIN EN 1092-1
341B	DN125 PN40 Form B1 DIN EN 1092-1
345B	DN150 PN16 Form B1 DIN EN 1092-1
346B	DN150 PN40 Form B1 DIN EN 1092-1
349B	DN200 PN10 Form B1 DIN EN 1092-1
350B	DN200 PN16 Form B1 DIN EN 1092-1
351B	DN200 PN40 Form B1 DIN EN 1092-1
355B	DN250 PN10 Form B1 DIN EN 1092-1
356B	DN250 PN16 Form B1 DIN EN 1092-1
358B	DN250 PN40 Form B1 DIN EN 1092-1
362B	DN300 PN10 Form B1 DIN EN 1092-1
363B	DN300 PN16 Form B1 DIN EN 1092-1
365B	DN300 PN40 Form B1 DIN EN 1092-1
369B	DN350 PN10 Form B1 DIN EN 1092-1
370B	DN350 PN16 Form B1 DIN EN 1092-1
375B	DN400 PN10 Form B1 DIN EN 1092-1
376B	DN400 PN16 Form B1 DIN EN 1092-1
3B1B	DN450 PN10 Form B1 DIN EN 1092-1
3B2B	DN450 PN16 Form B1 DIN EN 1092-1
380B	DN500 PN10 Form B1 DIN EN 1092-1
381B	DN500 PN16 Form B1 DIN EN 1092-1
384B	DN600 PN10 Form B1 DIN EN 1092-1
385B	DN600 PN16 Form B1 DIN EN 1092-1
201R	½" Class 150 RF ASME B16.5-2003
221R	½" Class 300 RF ASME B16.5-2003
203R	1" Class 150 RF ASME B16.5-2003
223R	1" Class 300 RF ASME B16.5-2003
204R	1¼" Class 150 RF ASME B16.5-2003
224R	1¼" Class 300 RF ASME B16.5-2003
205R	1½" Class 150 RF ASME B16.5-2003
225R	1½" Class 300 RF ASME B16.5-2003
206R	2" Class 150 RF ASME B16.5-2003
226R	2" Class 300 RF ASME B16.5-2003
207R	2½" Class 150 RF ASME B16.5-2003
227R	2½" Class 300 RF ASME B16.5-2003
208R	3" Class 150 RF ASME B16.5-2003
228R	3" Class 300 RF ASME B16.5-2003
210R	4" Class 150 RF ASME B16.5-2003
230R	4" Class 300 RF ASME B16.5-2003
211R	5" Class 150 RF ASME B16.5-2003
231R	5" Class 300 RF ASME B16.5-2003
212R	6" Class 150 RF ASME B16.5-2003
232R	6" Class 300 RF ASME B16.5-2003
213R	8" Class 150 RF ASME B16.5-2003
233R	8" Class 300 RF ASME B16.5-2003
214R	10" Class 150 RF ASME B16.5-2003
234R	10" Class 300 RF ASME B16.5-2003
215R	12" Class 150 RF ASME B16.5-2003
235R	12" Class 300 RF ASME B16.5-2003
216R	14" Class 150 RF ASME B16.5-2003
236R	14" Class 300 RF ASME B16.5-2003
217R	16" Class 150 RF ASME B16.5-2003
237R	16" Class 300 RF ASME B16.5-2003
218R	18" Class 150 RF ASME B16.5-2003
238R	18" Class 300 RF ASME B16.5-2003
219R	20" Class 150 RF ASME B16.5-2003
239R	20" Class 300 RF ASME B16.5-2003
220R	24" Class 150 RF ASME B16.5-2003
240R	24" Class 300 RF ASME B16.5-2003
-	Material process connection
1	Flange steel, painted
2	Flange Stainless steel
-	Material Measuring electrode
S	Stainless steel
H	Hastelloy
T	Tantalum
N	Platin
M	Titan

Continued on next page ...

	Material Grounding electrode
0	Without
S	Stainless steel
H	Hastelloy
T	Tantalum
N	Platin
M	Titan

	Transmitter arrangement
1	Compact-mounted transmitter IP67
2	Remote-mounted transmitter IP67
3	Remote-mounted transmitter IP68

	Certificate
0	Without
1	Inspection certificate 2.1
2	Inspection certificate 2.2
B	Inspection certificate 3.1 with material certificate (DIN EN 10204:2004)

Transmitter Order Code

UMF2			
-	Transmitter arrangement	Protection class	Thread for cable gland
A	Compact-mounted transmitter	IP 67	½" NPT (f)
B	Compact-mounted transmitter	IP 67	M20x1,5
C	Remote-mounted transmitter	IP 67	½" NPT (f)
D	Remote-mounted transmitter	IP 67	M20x1,5

	Display board
1	Integral within transmitter housing

	Power supply
1	230V AC (-15 % ... +10 %), 50/60 Hz
2	115V AC (-15 % ... +10 %), 50/60 Hz
4	24V DC (±20 %)

	Output
F	1 × current output: 4 ... 20 mA, active 1 × pulse output: passive, Um = 24 V DC 1 × status output: passive, Um = 24 V DC
G	1 × current output: 4 ... 20 mA, active, with HART® protocol 1 × pulse output: passive, Um = 24 V DC 1 × status output: passive, Um = 24 V DC

	Design
0BH	Heinrichs
0BK	Kobold

	Connection cable for the remote version
1	5 m
2	10 m
3	15 m
4	20 m
5	30 m
6	40 m