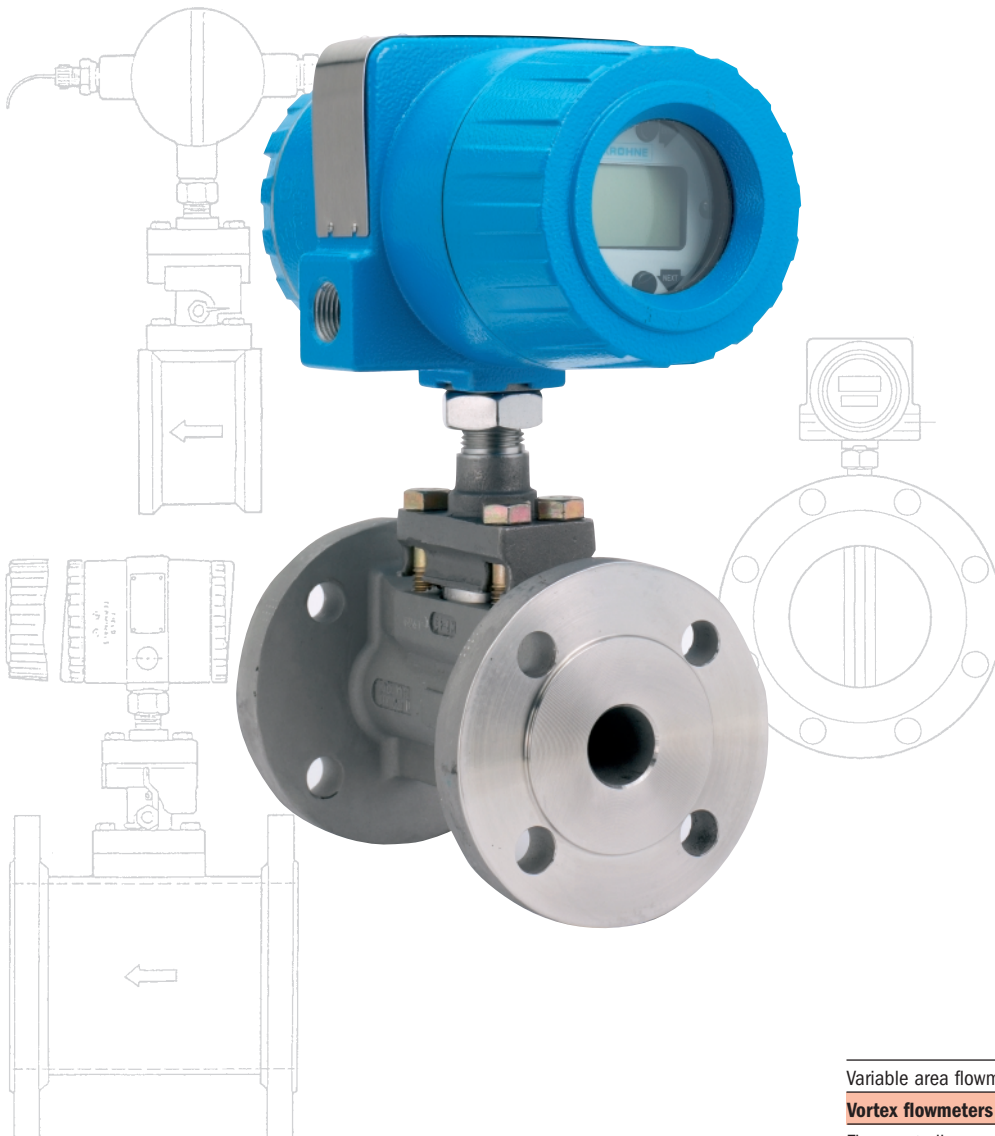


Vortex Flowmeters VFM 3100 F-T VFM 3100 W-T



Variable area flowmeters

Vortex flowmeters

Flow controllers

Electromagnetic flowmeters

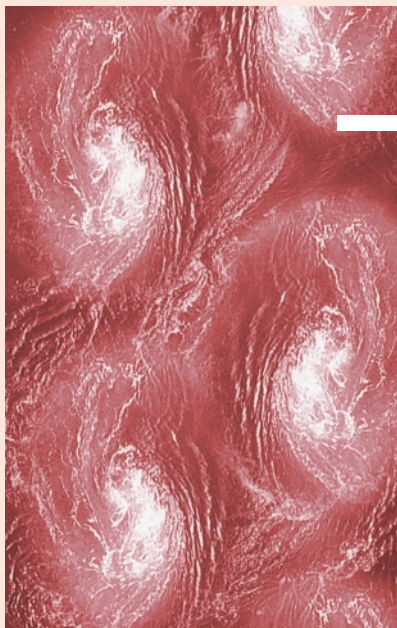
Ultrasonic flowmeters

Mass flowmeters

Level measuring instruments

Communications engineering

Engineering systems & solutions



Vortex Flowmeters

VFM 3100 F-T

VFM 3100 W-T

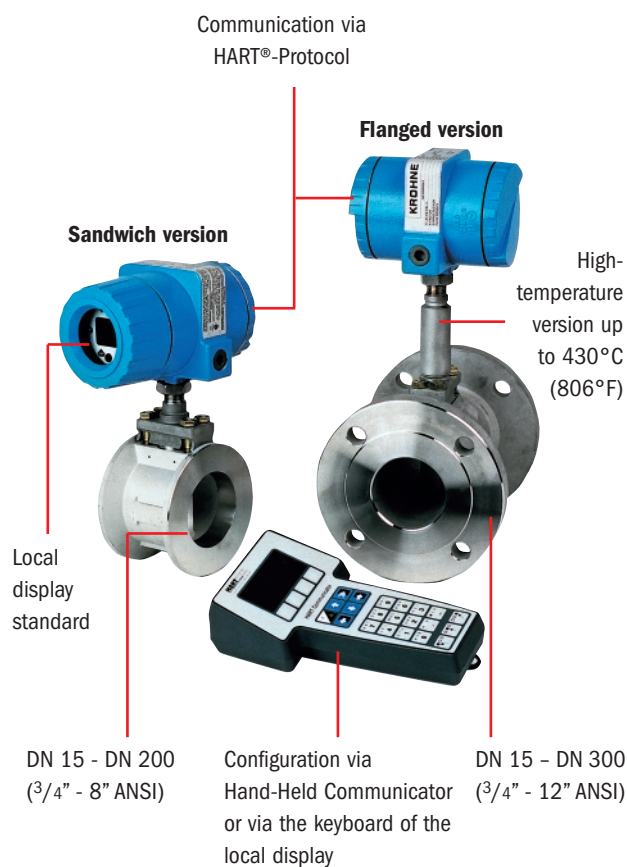
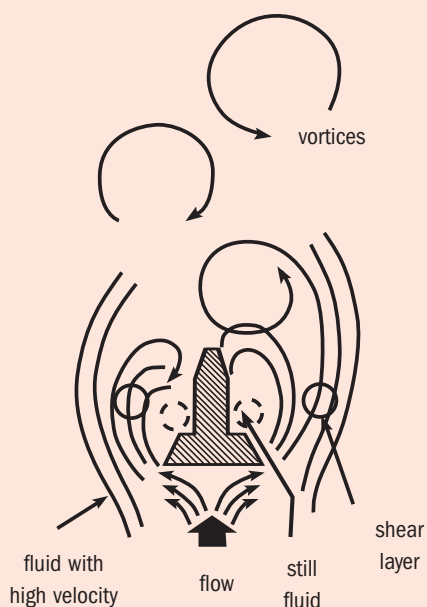
Measurement of volume flow of gases, steam and liquids

- non-contact measurement, no mechanically moving sensor parts
- maintenance-free
- high measuring accuracy and reproducibility
- with safety-shutdown system on analog or frequency output
- compact and "remote" (up to 15 m / 50 ft) versions available

Operating principle

The vortex flowmeter is used for measuring the flow velocity of gases and liquids in pipelines flowing full. The measuring principle is based on the development of a Karman vortex shedding street in the wake of a body built into the pipeline.

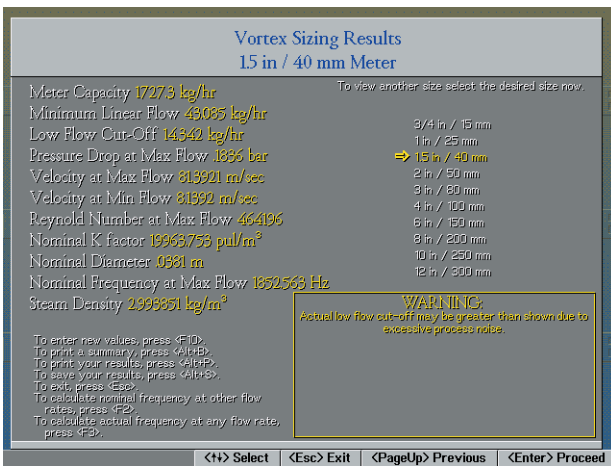
The periodic shedding of eddies occurs first from one side and then from the other side of a bluff body (vortex-shedding body) installed perpendicular to the pipe axis. Vortex shedding generates a so-called "Karman vortex street" with alternating pressure conditions whose frequency is proportional to the flow velocity.



Application

- for flow velocities up to 7.7 m/s (25.3 ft/s) for liquids or 80 m/s (260 ft/s) for gases and steam
- hot steam measurement, also for CIP and SIP applications in the food industry
- specially developed for measurement of low flow rates
- measurement of liquid operating media with low conductivity
- measurement of additions in wastewater treatment

Diameter sizing program



Software for speedy device layout is provided free of charge to give you:

- the correct nominal diameter
- the minimum and maximum flow rates,
- the rangeability,
- the pressure loss,
- the Reynolds number, and
- the calibration frequency.

Options

Dual version

- two redundant sensors and electronic unit
- no process interruption
- also for pipe systems carrying two different products

Isolation valve

- no bypass with shut-off valves required for maintenance work
- sensors can be replaced during the process
- available as standard or high-temperature version
- not suitable for use with superheated steam, unless insulated, or for liquids with suspended solids



Technical data

1 Application range	Volume-flow measurement of liquids, gases and steam
2 Function and system design	
Measuring principle	Karman vortex street
3 Input	
Measured variable	
Primary measured variable	Number of shed vortices
Secondary measured variable	Operating and standard volume flow, mass flow
Measuring range	Dependent on diameter, see "Flow rate limits"
4 Output	
Output signal	
Frequency output	100 Hz, referred to the measuring range
Digital output	HART®
Analog output	4 - 20 mA
Signal on alarm	
Frequency output	Off / 125 Hz
Analog output	3.75 / 20.38 mA
Load R_B	= 1450 (Us - 12.5 V) / 29.5; Us= supply voltage (12.5 - 42 V)
min.	250 Ω
max.	1450 Ω
Low flow cut-in	programmable
5 Measuring accuracy	
Reference conditions	Clean water
Process temperature	+20...+30°C (+70...+85°F)
Ambient temperature	+20...+30°C (+70...+85°F)
Pressure	1013 mbar abs.
Humidity	50 - 90%
Max. measuring error	
Re \geq 30 000	\pm 1% for gases \pm 0.5% for liquids
20 000 < Re < 30 000	\pm 1% for gases and liquids
5 000 \leq Re \leq 20 000	\pm 2% for gases and liquids
Hysteresis	
Digital output	no influence
Analog output	\pm 0.05% of calibrated span
Long-term drift	
Digital output	5 ppm
Analog output	\pm 0.01% of reference conditions
Influence of process temperature	5.45 E-3 / K of flow
6 Operating conditions	
6.1 Installation	
Installation note	Different pipeline routing can be adapted by programming
Inlet and outlet runs	
Inlet run	\geq 20 x DN
Outlet run	\geq 5 x DN
Cable length	max. 15 m for remote version
6.2 Environment	
Ambient temperature	-40...+85°C (-40...+185°F)
Storage temperature	-50...+80°C (-58...+176°F)
Protection category	IP66, equivalent to NEMA Type 4X
EMC	acc. to EWG Standards

Technical data

6.3 Process conditions

Process temperature	
Standard	-20...+200°C (-4...+392°F)
Option	+150...+430°C (+302...+806°F), others on request
State of aggregation	liquid, gaseous, vaporous
Density	will be considered in the design layout
Viscosity	< 10 cP
Reynolds number	5 000 - 2 300 000
Pressure/temperature ratings	acc. to EN 1092-1
housing/flange material	material group
ASTM 351 : CF8M/CF8M	2C2
ASTM 240 : 304L/304L	2C3
ASTM 240 : 304L/A105	1C1
Hastelloy C	on request
Option: isolation valve	max. 35 bar (508 psig) at 200°C (392°F)
Flow rate limits	see "Flow rate limits"

7 Mechanical construction see "Dimensions and weights"

Weight dependent on instrument size, see "Dimensions and weights"

Material

Wetted parts	
housing	CF8M (316), 304, Hastelloy C
flange	CF8M (316), A 105
sensor	CF3M (316 SS), Hastelloy C
gasket	PTFE, stainless steel
Non-wetted parts	
electronic housing, cover	aluminium alloy with electrostatic powder coating
cover gaskets	Buna-N O-Ring
Option : isolation valve	
valve housing	stainless steel 316 (LCF-8M)
valve ball	stainless steel 316
valve seat	glass-fibre reinforced PTFE (Ultrafil), graphite

Process connection

Flanged version	EN or ANSI flanges
Sandwich version	DN 15 - DN 300; 3/4" - 12"
	DN 15 - DN 200; 3/4" - 8"

Electrical connection 2 or 4-wire version, see "Electrical connection"

8 Human interface Communication via Hand-Held Communicator or via the keyboard of the local display

Local display LCD with 16 characters

9 Power supply 24 V DC (12.5 - 42 V DC)

Current consumption 22 mA

Flow rate limits

A minimum upper range value of three times the minimum flow rate is recommended. The maximum upper range value equals the maximum flow rate.

For example for air: for DN 25 with analog output at 0 kPa, the recommended minimum upper range value would be $3 \times 4.6 = 13.8 \text{ m}^3/\text{h}$, and the maximum upper range value would be $145 \text{ m}^3/\text{h}$.

Min. / max. flow rate limits for water (approximate values)

The values are given at selected base conditions of 0°C and 101.325 kPa, absolute, with the low flow cut-in set at its minimum value.

Flange		Flow in l/s			Flow in US gpm		
DN	ANSI	Min.	Min. recom.	Max.	Min.	Min. recom.	Max.
15	3/4"	0.07	0.14	2.1	1.2	3.6	34
25	1"	0.10	0.30	3.6	1.5	4.5	57
40	1 1/2"	0.15	0.45	8.8	2.4	7.2	140
50	2"	0.19	0.57	14.7	3.1	9.3	233
80	3"	0.37	1.11	32.2	5.1	17.7	511
100 ³⁾	4"	0.72	2.16	56.7	9.0	33.9	899
150	6"	1.88	5.64	130	20.6	89.7	2060
200	8"	3.64	10.9	228	35.1	17.0	3610
250	10"	6.51	19.5	372	58.9	309	5900
300	12"	9.99	30.0	540	85.6	47.0	8560

Min. / max. flow rate limits for air (approximate values)

The values are given at selected base conditions of 0°C and 101.325 kPa, absolute, with the low flow cut-in set at its minimum value.

in m³/h ...

Pressure in kPa	DN 15	DN 25	DN 40	DN 50	DN 80	DN 100	DN 150	DN 200	DN 250	DN 300
0	3.6 - 58.5	4.6 - 145	8.8 - 572	14.7 - 1250	32.2 - 2750	56.8 - 4840	130 - 11100	228 - 19400	372 - 31700	540 - 46100
250	4.0 - 203	6.7 - 503	16.4 - 1640	27.4 - 2740	60.1 - 6010	106 - 10600	242 - 24200	425 - 42500	693 - 69300	1010 - 101000
500	5.2 - 348	8.7 - 863	21.5 - 2150	35.8 - 3580	78.7 - 7870	138 - 13800	317 - 31700	556 - 55600	908 - 90800	1320 - 132000
1000	7.1 - 639	11.9 - 1190	29.1 - 2910	48.5 - 4850	107 - 10700	188 - 18800	429 - 42900	753 - 75300	1230 - 123000	1790 - 179000
2000	9.8 - 981	16.4 - 164	40.3 - 4030	67.2 - 6720	148 - 14800	260 - 26000	594 - 59400	1040 - 104000	1700 - 170000	2510 - 247000

in ft³/h ...

Pressure in psig	ANSI 3/4"	ANSI 1"	ANSI 1 1/2"	ANSI 2"	ANSI 3"	ANSI 4"	ANSI 6"	ANSI 8"	ANSI 10"	ANSI 12"
0	140 - 2060	181 - 5120	320 - 20200	533 - 44200	1170 - 97000	2060 - 171000	4720 - 391000	8270 - 686000	13500 - 1120000	19800 - 1630000
50	163 - 9100	273 - 22600	671 - 67100	1120 - 112000	2480 - 248000	4330 - 433000	9900 - 990000	17400 - 1740000	28400 - 2840000	41120 - 4120000
100	218 - 16200	364 - 36400	895 - 89500	1490 - 149000	3270 - 327000	5770 - 577000	13200 - 1320000	23100 - 2310000	37800 - 3780000	54900 - 5490000
200	298 - 29800	499 - 49900	1230 - 123000	2040 - 204000	4490 - 449000	7900 - 790000	18100 - 1810000	31700 - 3170000	51800 - 5180000	75200 - 7520000
300	361 - 36100	604 - 60400	1490 - 149000	2480 - 248000	5440 - 544000	9570 - 957000	21900 - 2190000	38400 - 3840000	62700 - 6270000	92000 - 9110000

Min. / max. flow rate limits for dry saturated steam (approximate values)

Values listed are for dry saturated steam (steam quality = 100%) with the low flow cut-in set at its minimum value.

in kg/h ...

Pressure in kPa	Temp. in °C	DN 15	DN 25	DN 40	DN 50	DN 80	DN 100	DN 150	DN 200	DN 250	DN 300
0	100.0	3.3 - 34.9	4.2 - 86.7	7.7 - 342	12.8 - 748	28.3 - 1640	49.9 - 2690	114 - 6620	200 - 11600	327 - 19000	475 - 27500
250	139.0	3.6 - 112	5.6 - 278	13.9 - 1100	23.1 - 2310	50.7 - 5070	89.3 - 8930	204 - 20400	359 - 35900	588 - 58600	850 - 85000
500	158.9	4.3 - 186	7.3 - 461	17.8 - 1780	29.8 - 2980	65.3 - 6530	115 - 11500	263 - 26300	462 - 46200	754 - 75400	1100 - 110000
1000	184.1	5.6 - 330	9.7 - 818	23.8 - 2380	39.7 - 3970	87.1 - 8710	153 - 15300	351 - 35100	616 - 61600	1010 - 101000	1460 - 146000
5000	265.1*	24.8 - 1240	41.5 - 2070	102 - 5100	171 - 8500	492 - 18700	820 - 32800	2160 - 75200	4170 - 132000	7480 - 215000	11400 - 313000
10000	311.7*	36.5 - 1830	61.1 - 3050	156 - 7500	266 - 12500	717 - 27500	1370 - 48300	3610 - 111000	6990 - 194000	12500 - 317000	19200 - 460000

in lb/h ...

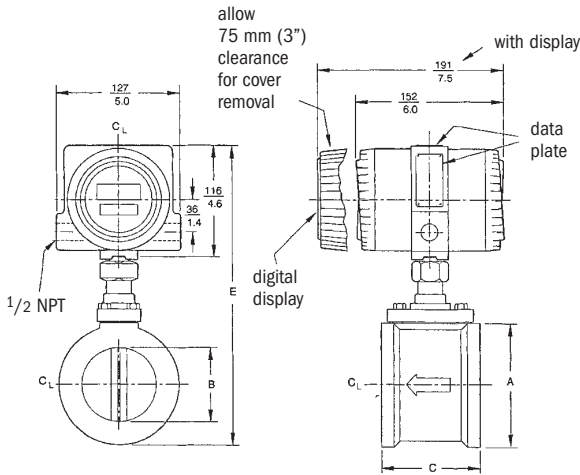
Pressure in psig	Temp. in °F	ANSI 3/4"	ANSI 1"	ANSI 1 1/2"	ANSI 2"	ANSI 3"	ANSI 4"	ANSI 6"	ANSI 8"	ANSI 10"	ANSI 12"
0	212.0	7.2 - 77.0	9.3 - 191	17.1 - 754	28.5 - 1650	62.5 - 3620	110 - 6370	252 - 14600	442 - 25600	721 - 41800	1050 - 80700
50	297.6	8.3 - 300	13.9 - 766	34.2 - 3020	57 - 5700	125 - 12500	220 - 22000	504 - 50400	884 - 88400	1440 - 144000	2100 - 210000
100	337.8	10.9 - 531	18.2 - 1320	44.8 - 4480	74.7 - 7470	164 - 16400	289 - 28900	660 - 66000	1160 - 116000	1890 - 189000	2750 - 275000
500	470.0*	45.3 - 2270	75.8 - 3790	188 - 9310	310 - 15500	735 - 34100	1410 - 60000	3700 - 137000	7160 - 241000	12800 - 393000	19600 - 571000
1000	546.3*	64.9 - 3250	109 - 5430	267 - 13300	473 - 22200	1190 - 48800	2270 - 86000	5980 - 197000	11600 - 345000	20700 - 564000	31700 - 819000
1500	597.5*	82.2 - 4110	137 - 6870	354 - 16900	648 - 28200	1630 - 61800	3110 - 109000	8190 - 249000	15800 - 437000	28300 - 713000	43400 - 1040000

*) High-temperature version recommended

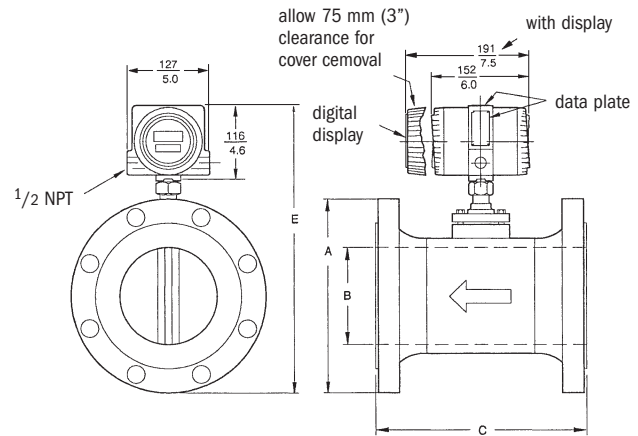
Dimensions and weights

Compact version

Sandwich version

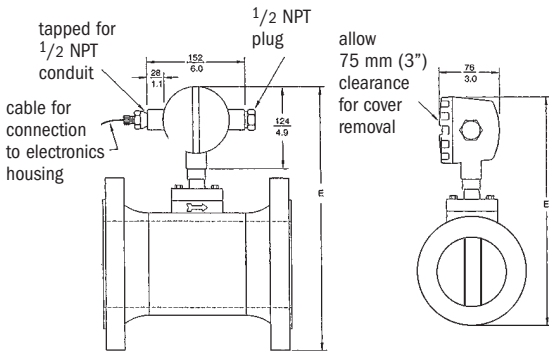


Flanged version

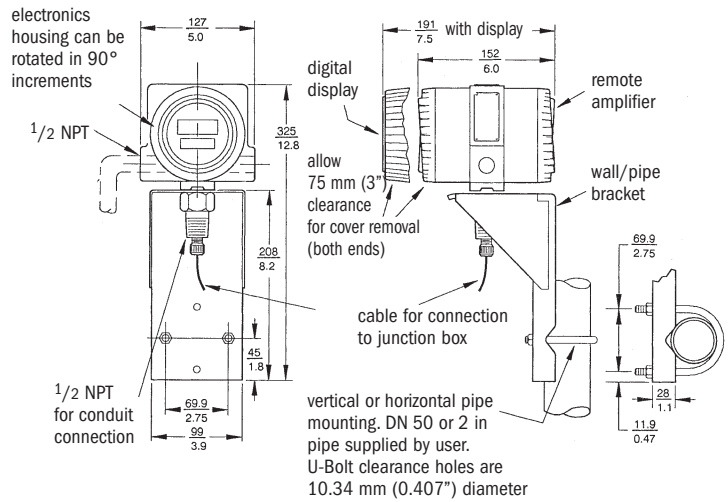


Separate version

here as flanged version



Converter mounted to wall/pipe bracket



Dimensions in mm (inches)

For the version with isolation valve, always take: dimension E + 69 mm (2.7"), weight + 1kg (2.2 lb) at PN 40

Sandwich version

Pressure rating PN 16 / 40 / 63 / 100 and Class 150 / 300 / 600

DN	ANSI	Dimensions in mm (inches)					Weight in kg (lb) ⁴⁾	
		A	B	C	E compact ¹⁾	E remote ²⁾	compact	remote
15	3/4"	57 (2.24)	18.8 (0.74)	79.5 (3.13)	236 (9.29)	211 (8.31)	3.3 (7.28)	2.5 (5.51)
25	1"	67 (2.64)	24 (0.94)	79.5 (3.13)	246 (9.69)	221 (8.70)	3.8 (8.38)	2.9 (6.39)
40	1 1/2"	86 (3.39)	40 (1.57)	79.5 (3.13)	265 (10.43)	240 (9.45)	4.2 (9.26)	3.4 (7.50)
50	2"	104.6 (4.12)	49.2 (1.94)	79.5 (3.13)	283 (11.14)	250 (9.84)	5.6 (12.35)	4.7 (10.36)
80	3"	136.7 (5.38)	72.9 (2.87)	95.3 (3.75)	318 (12.52)	285 (11.22)	7.9 (17.42)	7 (15.43)
100 ³⁾	4"	174.5 (6.87)	96.7 (3.81)	121 (4.76)	355 (13.98)	314 (12.36)	11.5 (25.35)	10.7 (23.59)
150	6"	222 (8.74)	146 (5.75)	178 (7.01)	399 (15.71)	375 (14.76)	16.9 (37.26)	16.2 (35.71)
200	8"	279 (10.98)	194 (7.64)	229 (9.02)	452 (17.80)	427 (16.81)	27.8 (61.29)	27 (59.52)

¹⁾ High-temperature version ≤ 66 mm (2.6") longer

²⁾ High-temperature version ≤ 91 mm (3.58") longer

³⁾ PN 16/40 dimension E compact = 305 mm (12")

⁴⁾ for PN 40

Flanged version

... with metric flanges

DN	PN	Dimensions in mm (Inches)					Weight in kg (lb) ⁴⁾	
		A	B	C	E compact ¹⁾	E remote ²⁾	compact	remote
15	40 / 100	95 (3.74)	18.8 (0.74)	152 (5.98)	269 (10.59)	254 (10)	5.3 (11.68)	4.5 (9.92)
25	40	115 (4.53)	24.3 (0.96)	166 (6.54)	287 (11.30)	262 (10.31)	6.3 (13.89)	5.4 (11.90)
	100	140 (5.51)		178 (7.01)	300 (11.81)	275 (10.83)		
40	40	150 (5.91)	38.1 (1.50)	179 (7.05)	312 (12.28)	287 (11.30)	7.8 (17.20)	6.8 (14.99)
	100	170 (6.69)		196 (7.72)	322 (12.68)	297 (11.69)		
50	40	165 (6.5)	49.2 (1.94)	195 (7.68)	322 (12.68)	298 (11.73)	9.5 (20.94)	8.6 (18.96)
	63	180 (7.09)		205 (8.07)	337 (13.27)	306 (12.05)		
	100	195 (7.68)		205 (8.07)	338 (13.31)	314 (12.36)		
80	40	200 (7.87)	72.9 (2.87)	220 (8.66)	350 (13.78)	325 (12.8)	15.4 (33.95)	13 (28.7)
	63	215 (8.46)		230 (9.06)	358 (14.09)	333 (13.11)		
	100	230 (9.06)		340 (13.39)	366 (14.41)	341 (13.43)		
100	40	235 (9.25)	96.7 (3.81)	240 (9.45)	382 (15.04)	350 (13.78)	20.8 (45.86)	20 (44.1)
	63	250 (9.84)		250 (9.84)	390 (15.35)	358 (14.09)		
	100	265 (10.43)		260 (10.24)	398 (15.67)	366 (14.41)		
150	16	279 (10.99)	147 (5.79)	305 (12.01)	428 (16.85)	423 (16.65)	33.1 (72.97)	32.3 (71.2)
	40	305 (12)		320 (12.60)	441 (17.36)	416 (16.38)		
	63/100	356 (14)		360 (14.17)	464 (18.27)	439 (17.28)		
200	16	340 (13.4)	194 (7.64)	381 (15.00)	483 (19.02)	460 (18.11)	57 (125.66)	55.3 (121.9)
	40	378 (14.9)		396 (15.59)	503 (19.80)	476 (18.74)		
	63/100	419 (16.5)		443 (17.44)	523 (20.59)	500 (19.69)		
250	40	445 (17.5)	248 (9.76)	411 (16.18)	568 (22.36)	544 (21.42)	86.2 (190)	84.8 (187)
	63/100	508 (20)		481 (18.94)	600 (23.62)	574 (22.6)		
300	40	521 (20.5)	299 (11.77)	459 (18.07)	631 (24.84)	605 (23.82)	120 (264.6)	119 (262.4)
	63	559 (22)		513 (20.20)	650 (25.59)	625 (24.61)		

1) High-temperature version ≤ 65 mm (2.6") longer
 2) High-temperature version ≤ 90 mm (3.5") longer

3) For the high-temperature version add 66 mm (2.6")
 4) At PN 40

... with ANSI flanges

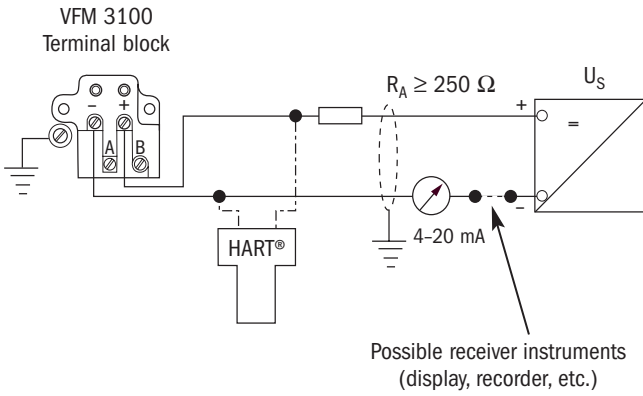
ANSI	Class	Dimensions in mm (Inches)					Weight in kg (lb) ³⁾	
		A	B	C	E compact ¹⁾	E remote ²⁾	compact	remote
3/4"	150	99 (3.9)	18.8 (0.74)	152 (5.98)	274 (10.79)	249 (9.8)	5.3 (11.68)	4.5 (9.92)
	300	117 (4.61)		152 (5.98)	284 (11.18)	259 (10.2)		
	600	117 (4.61)		165 (6.5)	284 (11.18)	259 (10.2)		
1"	150	108 (4.25)	24.3 (0.96)	165 (6.5)	282 (11.1)	257 (10.12)	6.3 (13.89)	5.4 (11.90)
	300	124 (4.88)		165 (6.5)	290 (11.42)	264 (10.39)		
	600	124 (4.88)		178 (7.01)	290 (11.42)	264 (10.39)		
1 1/2 "	150	127 (5)	38.1 (1.5)	184 (7.24)	297 (11.69)	272 (10.71)	7.8 (17.20)	6.8 (14.99)
	300	155 (6.1)		184 (7.24)	312 (12.28)	287 (11.3)		
	600	155 (6.1)		200 (7.87)	312 (12.28)	287 (11.3)		
2"	150	152 (5.98)	49.3 (1.94)	197 (7.76)	305 (12.01)	279 (10.98)	9.5 (20.94)	8.6 (18.96)
	300	165 (6.5)		197 (7.76)	312 (12.28)	287 (11.3)		
	600	165 (6.5)		216 (8.5)	312 (12.28)	287 (11.3)		
3"	150	191 (7.52)	72.9 (2.87)	222 (8.74)	340 (13.39)	315 (12.4)	15.4 (33.95)	13 (28.66)
	300	211 (8.31)		222 (8.74)	351 (13.82)	351 (13.82)		
	600	211 (8.31)		241 (9.49)	351 (13.82)	351 (13.82)		
4"	150	229 (9.02)	96.8 (3.81)	241 (9.49)	373 (14.69)	348 (13.7)	20.8 (45.86)	20 (44.09)
	300	254 (10)		241 (9.49)	386 (15.2)	361 (14.21)		
	600	274 (10.79)		267 (10.51)	396 (15.59)	371 (14.61)		
6"	150	279 (10.98)	147 (5.79)	305 (12.01)	513 (20.2)	488 (19.21)	33.1 (72.97)	32.3 (71.21)
	300	318 (12.52)		324 (12.76)	533 (20.98)	508 (20)		
	600	356 (14.02)		375 (14.76)	554 (21.81)	528 (20.79)		
8"	150	343 (13.5)	194 (7.64)	381 (15)	572 (22.52)	546 (21.5)	57 (125.66)	55.3 (121.92)
	300	381 (15)		400 (15.75)	592 (23.31)	566 (22.28)		
	600	419 (16.5)		457 (17.99)	612 (24.09)	587 (23.11)		
10"	150	406 (15.98)	250 (9.84)	381 (15)	605 (23.82)	508 (20)	86.2 (190.04)	84.8 (186.95)
	300	445 (17.52)		411 (16.18)	622 (24.49)	526 (20.71)		
12"	150	483 (19.02)	301 (11.85)	437 (17.2)	643 (25.31)	569 (22.4)	120 (264.55)	119 (262.35)
	300	521 (20.51)		462 (18.19)	663 (26.1)	592 (23.31)		

1) High-temperature version ≤ 69 mm (2.7") longer
 2) High-temperature version ≤ 92 mm (3.6") longer

3) For PN 40, Class 150

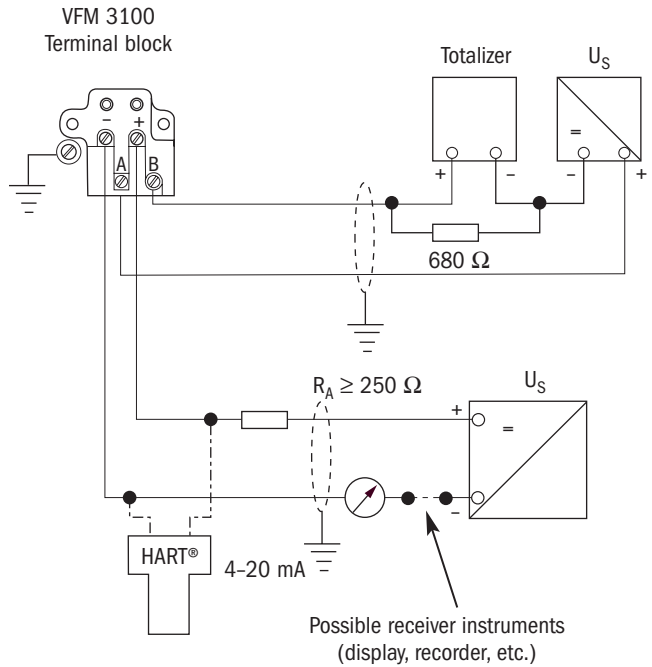
Electrical connection

2-wire connection



U_S = supply voltage 24 V DC
 R_A = minimal load

4-wire connection



Approvals

CSA, intrinsically safe	Class I, Div. 1, Gr. A,B,C,D Class II, Div. 1, Gr. E,F,G Class III, Div. 1	Temperature Class T3C at 85°C and T4A at 40°C maximum ambient. Limited to Gas Groups C and D, when connected 33V, 185 Ω Zener barrier.
CSA, explosion-proof	Class I, Div. 1, Gr. C,D T5	
CSA, dust-ignition-proof	Class II,III, Div. 1, Gr. E,F,G T5 Class III, Div. 1,	
FM, suitable	Class I, II, III Div. 1, Gr. A,B,C,D,E,F,G	Temperature Class T3C at 85°C and T4A at 40°C maximum ambient.
FM, intrinsically safe	Class I, II, III Div. 2, Gr. A,B,C,D,E,F,G	Temperature Class T3C at 85°C and T4A at 40°C maximum ambient.
FM, explosion-proof	Class I, Div. 1, Gr. C,D T5	
FM, dust-ignition-proof	Class II,III, Div. 1, Gr. E,F,G T5	
FM, intrinsically safe	Class I, II, III Div. 2, Gr. A,B,C,D,E,F,G T5	
CENELEC, suitable	EEx ib IIC T4-T6, Zone 1	Temperature Class T4 at 0.8 W Temperature Class T5 at 0.5 W Temperature Class T6 at 0.3 W

ATEX pending

Ordering code

Flow meter	
V211 0	VFM 3100 F flange version
V212 0	VFM 3100 W sandwich version
Version	
T	HART®
Size	
1	DN 15 / 3/4" 6 DN 100 / 4"
2	DN 25 / 1" 7 DN 150 / 6"
3	DN 40 / 1 1/2" 8 DN 200 / 8"
4	DN 50 / 2" A DN 250 / 10" (only flange version)
5	DN 80 / 3" B DN 300 / 12" (only flange version)
Materials, housing / flange	
H	Hastelloy C (DN 15 - DN 100 / 3/4" - 4") (only sandwich version)
K	304 / A105 (DN 150 - DN 300 / 6" - 12") (only flange version)
S	CF8M (316) / CF8M (316) (DN 15 - DN 100 / 3/4" - 4")
T	304 / 304 (DN 150 - DN 300 / 6" - 12") (only flange version)
Pressure class	
1	ANSI 150 lb 5 PN 40
2	ANSI 300 lb 6 PN 63
3	ANSI 600 lb 7 PN 100
4	PN 16 (only DN 150 / DN 200)
Single measurement / isolation valve	
K	single measurement with isolation valve
S	single measurement without isolation valve
D	dual measurement without isolation valve
L	dual measurement with isolation valve
Sensor temperature range / material	
C	+150 ... +430°C (+302...+806°F) unfilled, Hastelloy
D	-20 ... +90°C (-4...+194°F) fluorolube filling, Hastelloy (for chlorine measurement)
F	-20 ... +90°C (-4...+194°F) fluorolube filling, stainless steel (for oxygen measurement)
R	-20 ... +200°C (-4...+392°F) silicone oil filling, Hastelloy
S	-20 ... +200°C (-4...+392°F) silicone oil filling, stainless steel
T	+150 ... + 430°C (+302...+806°F) unfilled, stainless steel CF3M
Converter	
R	remote
T	compact
Display	
1	with
N	without
Approval	
1	FM, d
C	CSA, ia
E	CENELEC, ib
F	FM, ia
G	CSA, d
Z	without
Cable length	
B	6 m / 20 ft
D	9 m / 30 ft
E	12 m / 40 ft
G	15 m / 50 ft
T	compact
Cable connection	
0	standard, without (1/2" NPT female)
P	Hawke cable gland
R	PG 11 gland (flared)
S	PG 13,5 gland, plastics (flared)
Plating	
0	without
1	gold (for hydrogen measurement*)
Cleaning	
0	without
H	with (not for isolation valve, not for dual measurement)
Certificates	
1	calibration (standard)
L	certificate of compliance (ISO 9001)
M	material test report acc. to EN 10204 - 3.1.B
N	calibration and pressure test certificate
P	materials acc. to NACE MR-01
Welding	
0	without (always for sandwich version)
F	certificate acc. to ASME Boiler Code
V	x-ray test of flange welds
X	welding and x-ray test acc. to ASME Boiler Code

Additional ordering datas: fluid, operating pressure, temperature and min. and max. flow
 * Please contact KROHNE