

VersaFlow Coriolis 200 Sensor for Mass Flow Technical Datasheet

34-VF-03-12
October 2009

Specification

The solution for bulk mass flow measurement

The VersaFlow Coriolis 200 has been developed to meet the demanding transfer requirements of the oil and gas industry. It is well suited to bulk measurement in many applications.

A high level of performance makes the VersaFlow Coriolis 200 suitable for the bulk measurement of petroleum and oil as well as products like syrup, molasses and raw chemicals. Combined with the power of the TWC9000, the VersaFlow Coriolis 200 will provide accurate measurement of mass, volume, density and concentration.

Features

- Innovative twin measuring tube design
- High flow rate capacity
- Easily drained and easy to clean
- Optional heating jacket
- High accuracy for custody transfer
- Optimized flow divider for minimum pressure drop
- Modular electronics concept: electronics and sensor are easy to replace
- Large tube size for bulk measurement

Industries

- Oil & Gas
- Chemical
- Paper & Pulp
- Food & Beverage
- Pharmaceutical
- Fresh water
- Waste water

Applications

- Bulk loading/unloading
- Custody transfer for volume and mass
- High Volume
- Pipeline measurement applications



Figure 1 –
VersaFlow Coriolis 200 sensor for mass flow

1. Comprehensive diagnostic capabilities
2. Available with a range of process connections
3. Outer casing in stainless steel 304L or 316L
4. Common electronics across the range of sensors with redundant storage of calibration and sensor data
5. Modular electronics with all output options.

Features and Options



Features

VersaFlow Coriolis 200 provides the best solution for a variety of applications where bulk measurement is required

- Flow rates up to 2,300,000 kg/h
- Integrated electronics
- Best in class for zero stability



Connection Options

The VersaFlow Coriolis 200 range of meters are available with both hygienic and flange connections.

- Standard flanges with ratings up to 1500 lbs.
- Hygienic connections (S100 only) for bulk measurement in the food/beverage industry



Heating Jacket & Purge Port

VersaFlow Coriolis 200 is available with both heating jacket and purge port options.

- Heating jacket option for use with temperature dependant products.
- Prevents solidification of process product.
- Purge port option for protection in the event of measuring tube failure.
- Allows hazardous chemicals to be drained away safely
- Can also be used for the early detection of measuring tube failure where highly toxic chemicals are being measured.

Versions



Compact

VersaFlow Coriolis 200 compact provides high accuracy with easy installation.

- Pre-programmed TWC9000 for “plug &play” installation.
- available with certified TWC9000 housing for use in hazardous areas.
- Stainless Steel option for TWC9000 housing for use in aggressive environments



Remote

VersaFlow Coriolis 200 remote version for use with either the TWC9000 F, TWC9000 W or TWC9000 R converter.

- Suited to applications where data collection needs to be centralized.
- Allows the TWC9000 converter to be installed in a safe area.
- 300m maximum distance between meter and converter.
- Stainless steel option for junction box housing for use in aggressive environments.



TWC010

VersaFlow Coriolis 200 is also available with the TWC010 MODBUS communications option.

- Stand alone meter - operates without the TWC9000 converter.
- Provides industry standard MODBUS communication.
- Easy integration with MODBUS skids.

Outer Cylinder



Please Note

Honeywell strongly recommends that the burst disk option is ordered where the meter is being used to measure:

- high pressure gases
- gases kept as liquids at high pressure and/or where there is a risk of tube failure because of:
 - the use corrosive and/or erosive process
 - pressure and/or temperature shocking
 - seismic or other shock loading

If in doubt please contact Honeywell Field Solutions.

Please note that meters ordered with flange rating of 100 barg or above, will automatically be supplied with a burst disk in the outer cylinder.

Technical data

Operating data

Size	S100	S150	S250
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Flow rates

	Maximum (kg/h)	420,000	900,000	2,300,000
	Maximum (lbs/min)	14,698	33,804	84,510
	Minimum	Dependant on acceptable measuring error.		
Custody Transfer (Mass)	Minimum (kg/h)	11,000	25,000	60,000
	Minimum (lbs/min)	404	919	2205
	Maximum (kg/h)	220,000	500,000	1,200,000
	Maximum (lbs/min)	8084	18,372	44,092
Custody Transfer (Volume-Operating Density 1000kg/m³)	Minimum (m ³ /h)	11	25	60
	Minimum (bbl/day)	1660	3774	9057
	Maximum (m ³ /h)	220	500	1200
	Maximum (bbl/day)	33,210	75,478	181,150

Measuring System	
Measuring principle	Coriolis mass flow
Application range	Mass flow and density measurement of fluids, gases and solids
Measured values	Mass, density, temperature
Calculated values	Volume, referred density, concentration, velocity
Design	
Basic	System consists of a measuring sensor and a converter to process the output signal
Features	Fully welded maintenance free sensor with dual-straight measuring tube
Variants	
Compact version	Integral converter
Remote version	Available with field, wall or 19" rack mount versions of the converter
Modbus version	Sensor with integral electronics providing Modbus output for connection to a PLC

Accuracy

Mass	
Liquid	±0.1% of actual measured flow rate + zero stability
Gas	±0.5% of actual measured flow rate + zero stability
Repeatability	Better than 0.05% plus zero stability (includes the combined effects of repeatability, linearity and hysteresis)
Zero stability	
S100	< 7 kg/h
S150	< 18 kg/h
S250	< 50 kg/h

Reference conditions	
Product	Water
Temperature	+20°C / +68°F
Operating pressure	1 barg / 14.5 psig
Effect on sensor zero point caused by a shift in process temperature	
Stainless Steel	0.0004% per 1°C / 0.000022% per 1°F
Effect on sensor zero point caused by a shift in process pressure	
Stainless Steel	0.0002% of the max flow rate per 1 barrel. / 0.0000014% of the max flow rate per 1 psig
Density	
Measuring range	400...3000 kg/m ³ / 25...187 lbs/ft ³
Accuracy	±2 kg/m ³ / ±0.13 lbs/ft ³ (stainless steel DN15: ±5 kg/m ³ / ±0.33 lbs/ft ³)
On site calibration	±0.5 kg/m ³ / ±0.033 lbs/ft ³
Temperature	
Accuracy	±1°C / ±1.8°F

Ambient temperature	
Compact version with Aluminium converter	-40...+60°C / -40...+140°F
	Extended temperature range: 65°C / 149°F for some I/O options. For more information contact manufacturer.
Compact version with Stainless Steel converter	-40...+55°C / -40...+130°F
Remote versions	-40...+65°C / -40...+149°F
Process temperature	
Flanged connection	-45...+130°C / -49...+266°F
Hygienic connection (S100 only)	-20...+130°C / -4...+266°F
Nominal pressure at 20°C / 68°F	
Measuring tube	
FM	-1...140 barg / -14.5...2030 psig
CRN / ASME B31.3	-1...100 barg / -14.5...1450 psig
Outer cylinder	
Non CRN approved	Typical burst pressure > 100 barg / 1450 psig at 20°C / 68°F
Effect on sensor zero point caused by a shift in process temperature	
Stainless Steel	0.0004% per 1°C / 0.000022% per 1°F
Effect on sensor zero point caused by a shift in process pressure	
Stainless Steel	0.0002% of the max flow rate per 1 barrel. / 0.0000014% of the max flow rate per 1 psig

Fluid properties	
Permissible physical condition	Liquids, gases, slurries
Permissible gas content (volume)	Contact manufacturer for information.
Permissible solid content (volume)	Contact manufacturer for information.
Protection category (acc. to EN 60529)	IP 67, NEMA 4X
Installation conditions	
Inlet runs	None required
Outlet runs	None required

Materials

Measuring tube	Stainless Steel 318L (1.4462)
Spigot	Stainless Steel 318L (1.4462)
Flanges	Stainless Steel AISI 316 / 316L (1.4401 / 1.4404) dual certified
	Optional Stainless Steel 318L (1.4462) (NACE approved)
Outer cylinder	Stainless Steel AISI 304 / 304L (1.4301 / 1.4307) dual certified
	Optional Stainless Steel AISI 316 / 316L (1.4401 / 1.4404) dual certified
Heating jacket version	
Heating jacket	Stainless Steel 316L (1.4404)
	Note: the outer cylinder is in contact with the heating medium
All versions	
Sensor electronics housing	Stainless Steel 316L (1.4409)
Junction box (remote version)	Die cast Aluminium (polyurethane coating)
	Optional Stainless Steel 316 (1.4401)

Process connections

Flange	
DIN	DN100...300 / PN16...160
ASME	4...12" / ASME 150...1500
JIS	100A / 10...20K
Hygienic (S100 only)	
Tri-clover	4"
Tri-clamp DIN 32676	DN100
Tri-clamp ISO 2852	4"
DIN 11864-2 Form A	DN100
Male thread DIN 11851	DN100
Male thread SMS	4"
Male thread IDF / ISS	4"
Male thread RJT	4"

Electrical connections

Electrical connections	For full details, including: power supply, power consumption etc., see technical data for the relevant converter.
I/O	For full details of I/O options, including data streams and protocols, see technical data for the relevant converter.

Approvals

Mechanical	
Electromagnetic compatibility (EMC) acc. to CE	Namur NE 21/5.95
	89/336/EEC (EMC)
	72/73/EEC (Low Voltage Directive)
Factory Mutual / CSA	Class I, Div 1 groups A, B, C, D
	Class II, Div 1 groups E, F, G
	Class III, Div 1 hazardous areas
	Class I, Div 2 groups A, B, C, D
	Class II, Div 2 groups F, G
	Class III, Div 2 hazardous areas
ANSI / CSA (Dual Seal)	12.27.901-2003
Hygienic	3A 28-03
	ASME BPE
Custody Transfer (pending)	MID 2004/22/EC MI-005
ATEX (acc. 94/9/EC)	
Coriolis 200 with TWC9000C non Ex i Signal outputs	
Ex d connection compartment	II 2 G Ex d [ib] IIC T6...T1
	II 2 D Ex tD A21 IP6x T160°C
Ex e connection compartment	II 2 G Ex de [ib] IIC T6...T1
	II 2 D Ex tD A21 IP6x T160°C
Coriolis 200 with TWC9000C Ex i signal outputs	
Ex d connection compartment	II 2(1) G Ex d [ia/ib] IIC T6...T1
	II 2(1) D Ex tD [iaD] A21 IP6x T160°C
Ex e connection compartment	II 2(1) G Ex de [ia/ib] IIC T6...T1
	II 2(1) D Ex tD [iaD] A21 IP6x T160°C
Coriolis 200 with TWC010	II 2 G Ex ib IIC T6...T1
	II 2 D Ex ibD 21 T165 °C

ATEX (acc. 94/9/EC) temperature limits

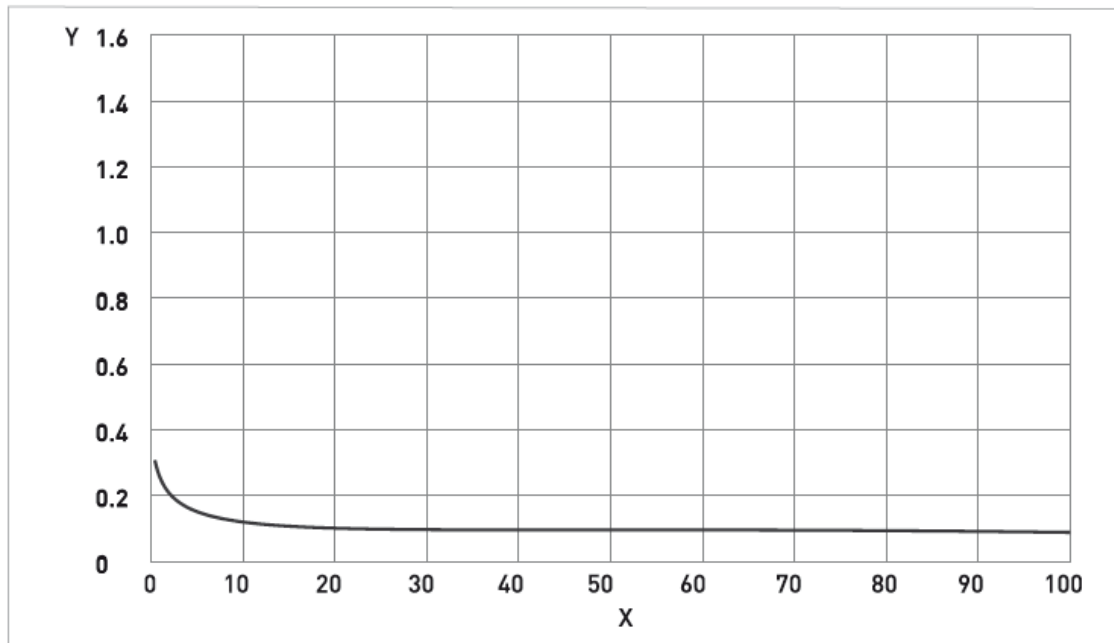
	Ambient temp. T _{amb} °C	Max. medium temp. T _m °C	Temp. class	Max. surface temp. °C	
Coriolis 200 with TWC010 with or without heating jacket / insulation	40	65	T6	T80	
		75	T5	T95	
		110	T4	T130	
		130	T3-T1	T150	
	65	75	T5	T95	
		110	T4	T130	
130		T3-T1	T150		
Coriolis 200 with TWC9000C Aluminium converter housing - with or without heating jacket / insulation	40	50	T6	T80	
		65	T5	T95	
		100	T4	T130	
		130	T3-T1	T160	
	50	65	T5	T95	
		100	T4-T1	T130	
	60	60	T4-T1	T90	
	65 (1)	65	T5	T95	
	Coriolis 200 with TWC9000C Stainless Steel converter housing - with or without heating jacket / insulation	40	50	T6	T80
			65	T5	T95
100			T4	T130	
120			T3-T1	T150	
50		65	T5	T95	
		75	T4-T1	T130	
55		55	T5-T1	T85	

(1) depending on I/O option. Please call for more information.

Maximum end loadings

		S100	S150	S250
Flanges				
20°C	40 barg	150kN	650kN	550kN
	100 barg	100kN	120kN	60kN
	150 barg			
130°C	32 barg	150kN	280kN	400kN
	80 barg	60kN	50kN	50kN
	115 barg			
Hygienic (all connections)				
130°C	10 barg	5kN	-	-

Measuring accuracy



X flow rate [%]
Y measuring error [%]

Measuring error

The measuring error is obtained from the combined effects of accuracy and zero stability.

Reference conditions

Product	Water
Temperature	+20°C / +68°F
Operating pressure	1 barg / 14.5 psig

Dimensions and Weights

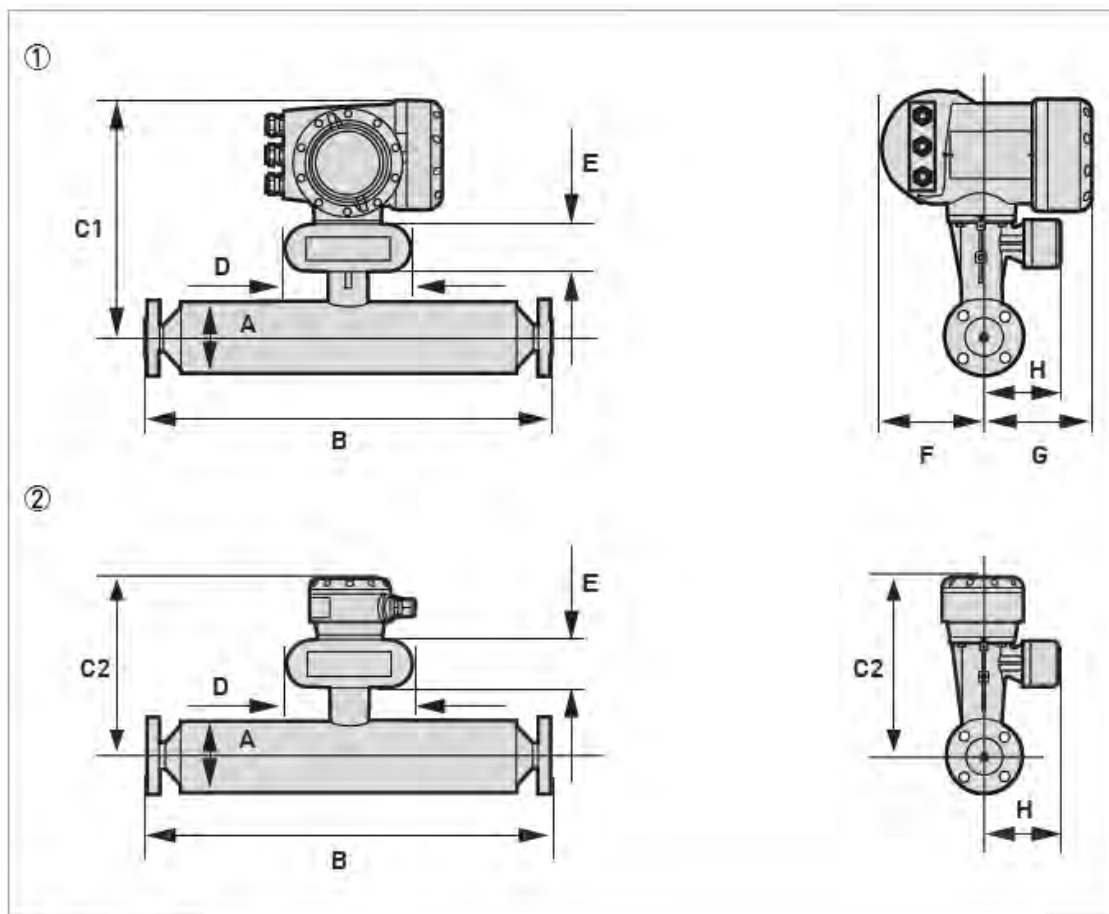
Weights

Weights (Kg)	S100	S150	S250
Compact with aluminum converter	84.8	211.5	444.5
Compact with stainless steel converter	90.1	216.8	449.8
Remote with aluminum junction box	80.8	207.5	440.5
Remote with stainless steel junction box	81.7	208.4	441.4

Weights (lbs)	S100	S150	S250
Compact with aluminum converter	187	466	980
Compact with stainless steel converter	198	478	991
Remote with aluminum junction box	178	457	971
Remote with stainless steel junction box	180	459	973

Dimensions (mm)

Flanged Versions



- ① Compact version
- ② Remote version

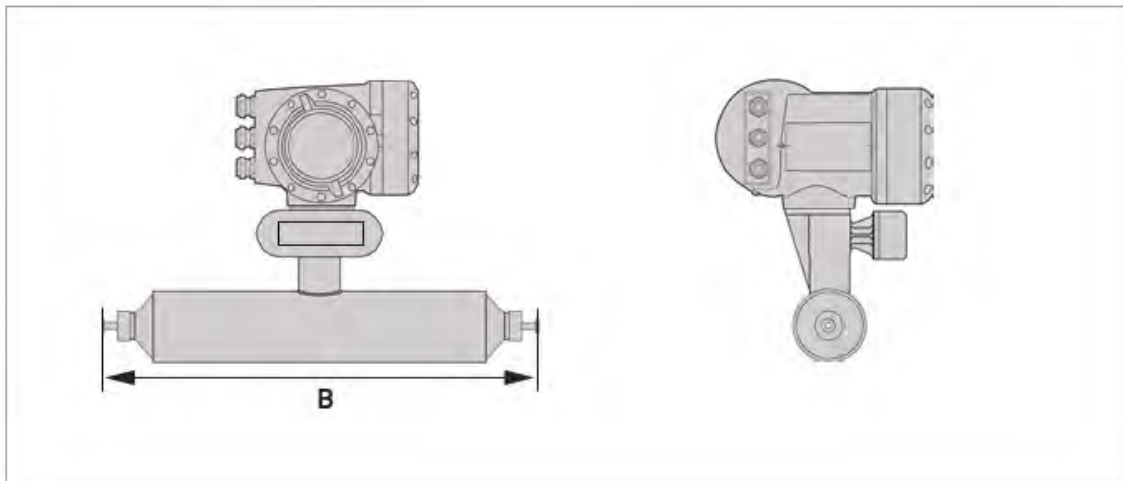
Measuring tube in Stainless Steel

	Dimensions mm (inches)		
	S100	S150	S250
A	219 ±5 (8.6 ±0.2)	323 ±5 (12.7 ±0.2)	406 ±5 (16 ±0.2)
C1 (compact)	370 ±5 (14.6 ±0.2)	422 ±5 (16.6 ±0.2)	463 ±5 (18.2 ±0.2)
C2 (remote)	293 ±5 (11.5 ±0.2)	345 ±5 (13.6 ±0.2)	386 ±5 (15.2 ±0.2)
D	160 (6.3)		
E	60 (2.4)		
F	123.5 (4.9)		
G	137 (5.4)		
H	98.5 (3.9)		

Flanged Connections

	Dimension B mm (inches)		
	S100	S150	S250
PN40			
DN100	1310 (51.6)		
DN150	1330 (52.6)	1621 (64)	
DN200		1647 (65.5)	
DN250			2030 (80.7)
DN300			2050 (82.3)
PN63			
DN100	1336 (53.2)		
DN150	1370 (55.5)	1661 (67)	
DN200		1691 (65)	
DN250			2070 (84.8)
DN300			2100 (81.5)
PN100			
DN100	1360 (53.9)		
DN150	1410 (55.5)	1701 (66.6)	
DN200		1731 (68.3)	
DN250			1977 (83.5)
DN300			2160 (85.9)
ASME 150			
4"	1334 (52.5)		
6"	1358 (53.4)	1649 (65)	
8"		1675 (66)	
10"			2024 (80.4)
12"			2050 (81.5)
ASME 300			
4"	1352 (53.2)		
6"	1378 (54.2)	1669 (65.8)	
8"		1695 (66.8)	
10"			2056 (81.7)
12"			2082 (82.7)
ASME 600			
4"	1398 (54.9)		
6"	1428 (56.1)	1719 (67.8)	
8"		1428 (69)	
10"			2138 (85)
12"			2146 (85.2)
ASME 900			
4"	1422 (55.2)		
6"	1474 (57.9)	1765 (69.5)	
8"		1474 (71.2)	
10"			2202 (87.5)
12"			2234 (88.7)
JIS 10K			
100A	1332 (52.5)		
JIS 20K			
100A	1332 (52.5)		

Hygienic versions



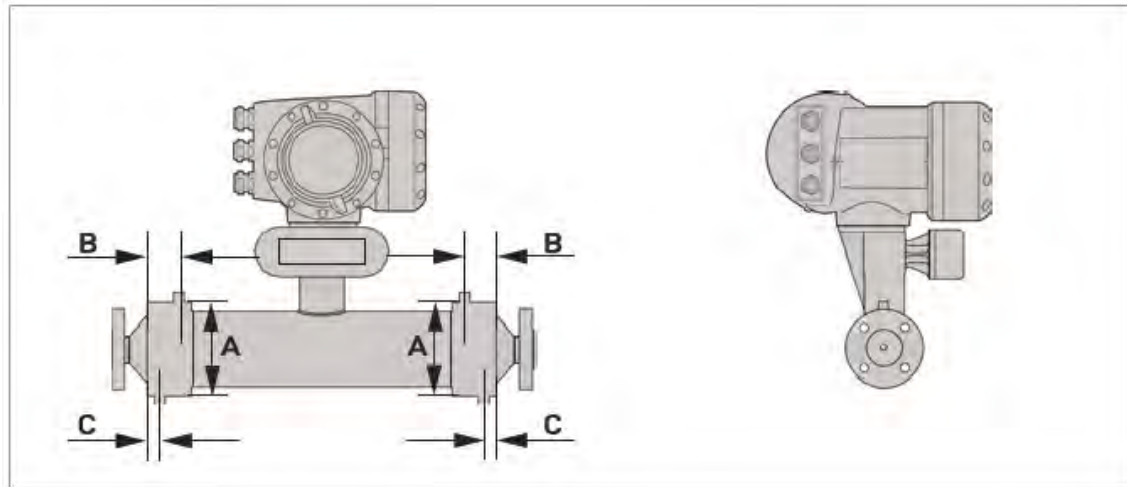
Hygienic connections: all welded versions

	Dimension B mm (inches)		
	S100	S150	S250
Tri-clover			
4"	1223 (48)		
Tri-clamp DIN 32676			
DN100	1236 (48.7)		
Tri-clamp ISO 2852			
4"	1223 (48)		
DIN 11864-2 Form A			
DN100	1296 (51)		

Hygienic connections: adapter versions (male thread)

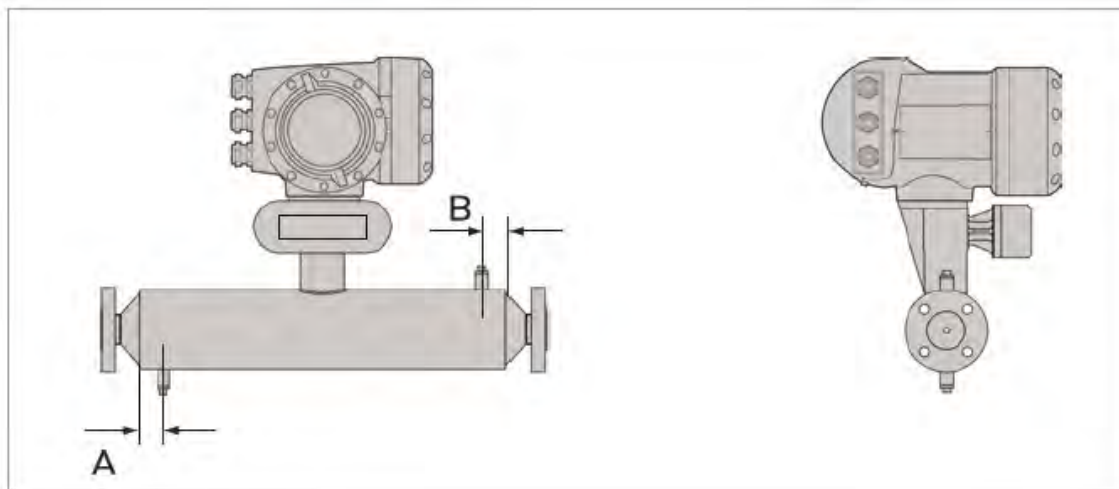
	Dimension B mm (inches)		
	S100	S150	S250
Male thread DIN 11851			
DN100	1288 (50.1)		
Male thread SMS			
4"	1236 (48.7)		
Male thread IDF/ISS			
4"	1223 (48)		
Male thread RJT			
4"	1234 (48.6)		

Heating Jacket Version



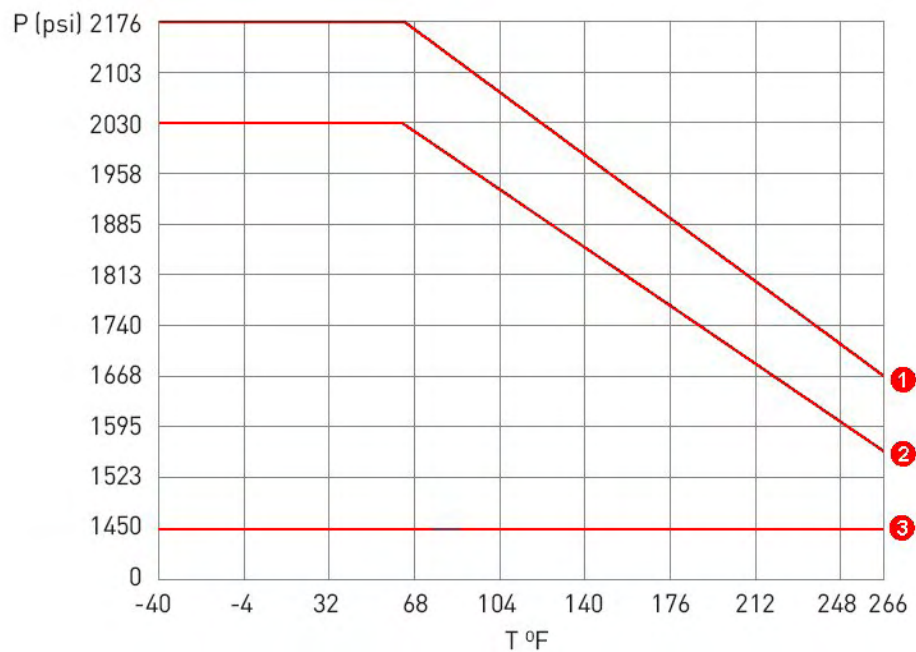
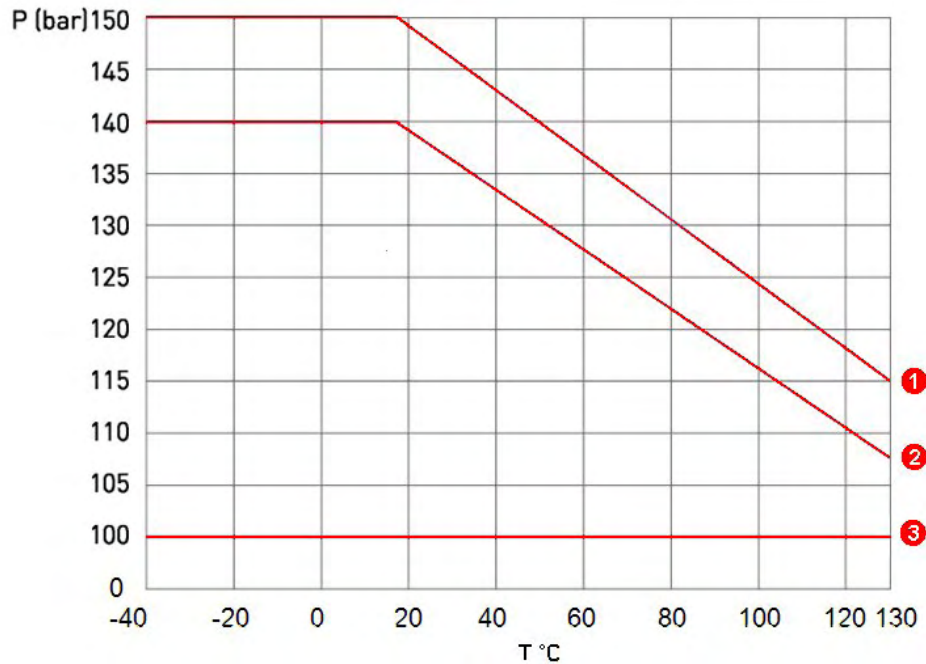
	Dimensions mm (inches)		
	S100	S150	S250
Heating connection size	25 mm (ERMETO) 1" (NPTF)		
A	254 ±2.5 (10 ±0.1)	355 ±2.5 (14 ±0.1)	444 ±2.5 (17.5 ±0.06)
B	178 ±2.0 (7 ±0.08)	228 ±2.0 (9 ±0.08)	208 ±2.0 (8.2 ±0.08)
C	28 ±2.0 (1.1 ±0.08)	28 ±2.0 (1.1 ±0.08)	6.5 ±2.0 (0.25 ±0.08)

Purge Port Option



	Dimensions mm (inches)		
	S100	S150	S250
A	70 ±1.0 (2.75 ±0.04)	100 ±1.0 (4.0 ±0.04)	
B	70 ±1.0 (2.75 ±0.04)	100 ±1.0 (4.0 ±0.04)	

Guidelines for maximum operating pressure



- 1. Measuring Tube PED certification
- 2. Measuring Tube FM certification
- 3. Measuring Tube CRN & CSA certification

Flanges

DIN flange ratings based on EN 1092-1 2007 table G.4.1 material group 14E0

ASME flange ratings based on ASME B16.5 2003 table 2 material group 2.2

JIS flange ratings based on JIS 2220: 2001 table 1 division 1 material group 022a

Note:

The maximum operating pressure will be either the flange rating or measuring tube rating
WHICHEVER IS THE LOWER

Ordering Information

Contact your nearest Honeywell sales office, or

In the U.S.:

Honeywell Process Solutions
Honeywell International Inc
2500 West Union Hills Drive
Phoenix, AZ 85027 1-800-343-0228

In Europe and Africa:

Honeywell S. A.
Avenue du Bourget 1
1140 Brussels, Belgium

In Asia:

Honeywell Asia Pacific Inc.
Honeywell Building,
17 Changi Business Park Central 1
Singapore 486073
Republic of Singapore

In Canada:

The Honeywell Centre
155 Gordon Baker Rd.
North York, Ontario M2H 3N7
1-800-461-0013

In Eastern Europe:

Honeywell Praha,
s.r.o. Budejovicka 1
140 21 Prague 4,
Czech Republic

In the Pacific:

Honeywell Pty Ltd.
5 Thomas Holt Drive
North Ryde NSW Australia 2113
(61 2) 9353 7000

In Latin America:

Honeywell Inc.
480 Sawgrass Corporate Parkway,
Suite 200 Sunrise, FL 33325
(954) 845-2600

In the Middle East:

Honeywell Middle East Ltd.
Khalifa Street,
Sheikh Faisal Building
Abu Dhabi, U. A. E.

In Japan:

Honeywell K.K.
14-6 Shibaura 1-chrome
Minato-ku, Tokyo, Japan 105-0023

Or, visit Honeywell on the World Wide Web at: <http://www.honeywell.com/ps>
Specifications are subject to change without notice.