

VersaFlow Coriolis 200 Sensor for Mass Flow Specifications

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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



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.

Applications

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

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 |
|------|------|------|------|
|------|------|------|------|

Flow Rates

| | | | | |
|-------------------------------------------------------------------------|-----------------------------|---------|---------|-----------|
| | Maximum (kg/h) | 420,000 | 900,000 | 2,300,000 |
| | Maximum (lbs/min) | 14,698 | 33,804 | 84,510 |
| 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 | Duplex UNS S31803 | Super Duplex UNS S32750 |
| FM | -1...140 barg / -14.5...2030 psig | -1...140 barg / -14.5...2030 psig |
| CRN / ASME B31.3 | -1...100 barg / -14.5...1450 psig | -1...130 barg / -14.5...1885 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 UNS S31803 (1.4462) |
| | Optional UNS S32750 (1.4410) |
| Spigot | Stainless Steel UNS J92205 (1.4470) |
| | Optional UNS J93404 (1.4469) |
| Flanges | Stainless Steel AISI 316 / 316L (1.4401 / 1.4404) dual certified |
| | Optional Stainless Steel UNS S31803 (1.4462) (NACE approved) |
| | Optional UNS S32750 (1.4410) (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 |
| | Optional Stainless Steel UNS S31803 (1.4462) ⁽¹⁾ |
| 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). Optional Stainless Steel (1.4469) |
| Junction box (remote version) | Die cast Aluminium (polyurethane coating) |

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" |

⁽¹⁾ Where this option is ordered, the electronics stem material is UNS J92205 (1.4470)

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 |
| | 2004/108/EC (EMC) |
| | 2006/95/EC (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

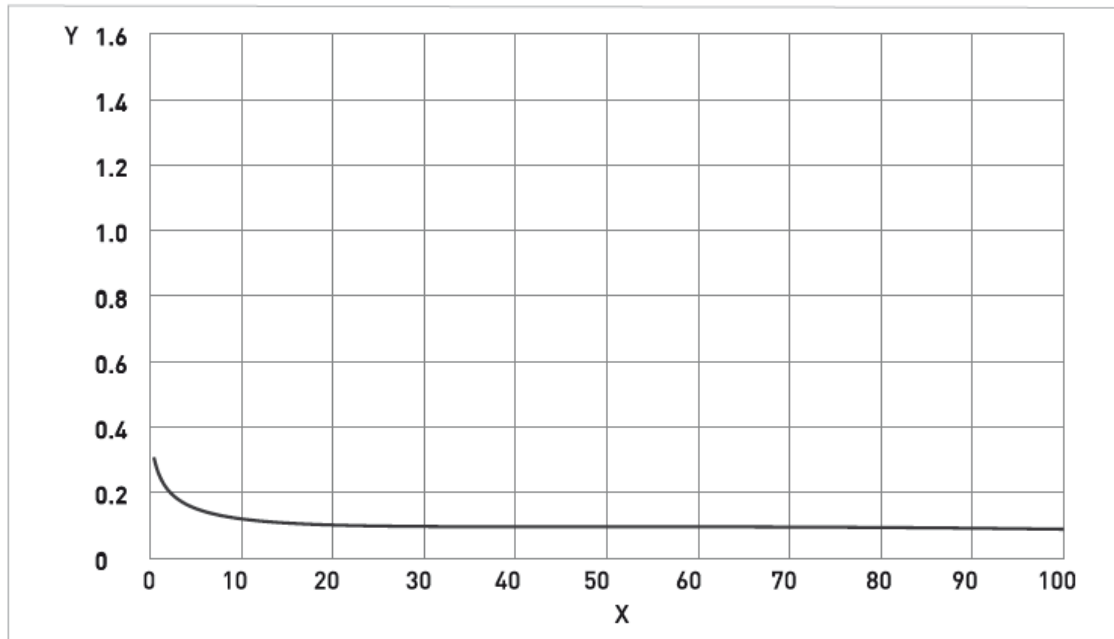
| | Ambient temp. Tamb °C | Max. medium temp. Tm °C | Temp. class | Max. surface temp. °C |
|------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------|-------------|--------------------------|
| 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

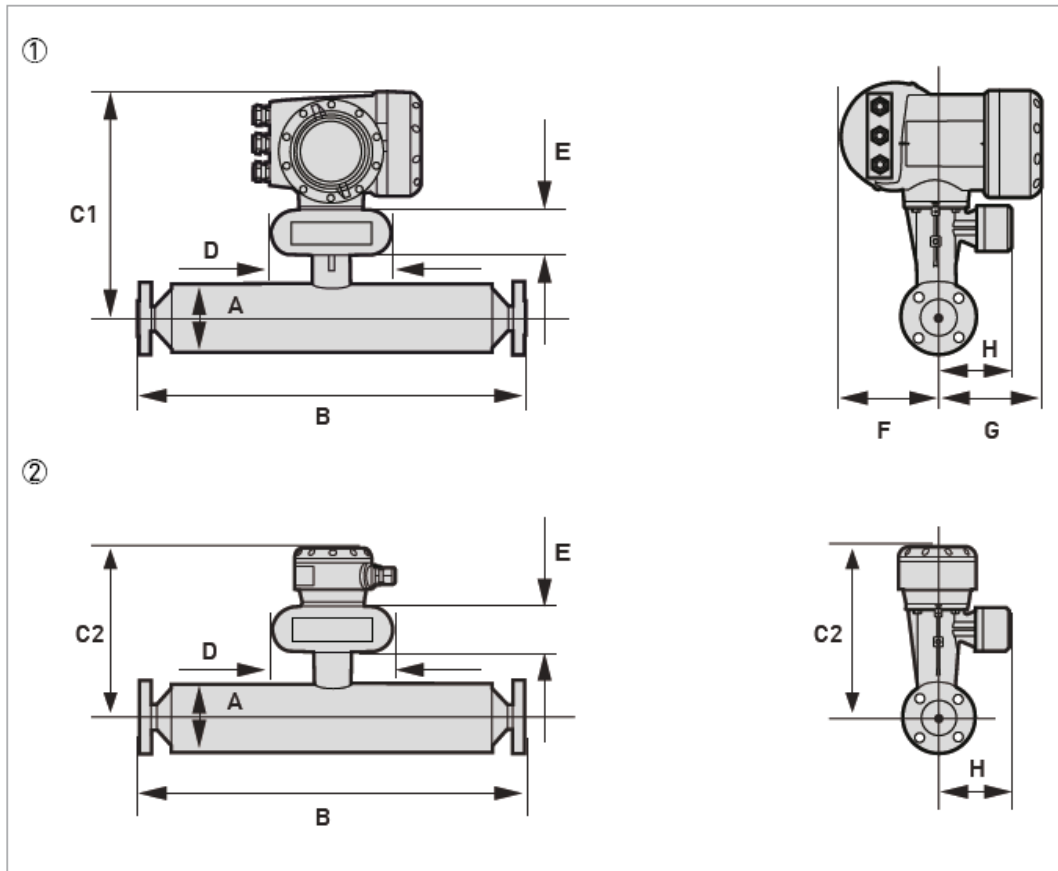
Weights

| 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) | | |

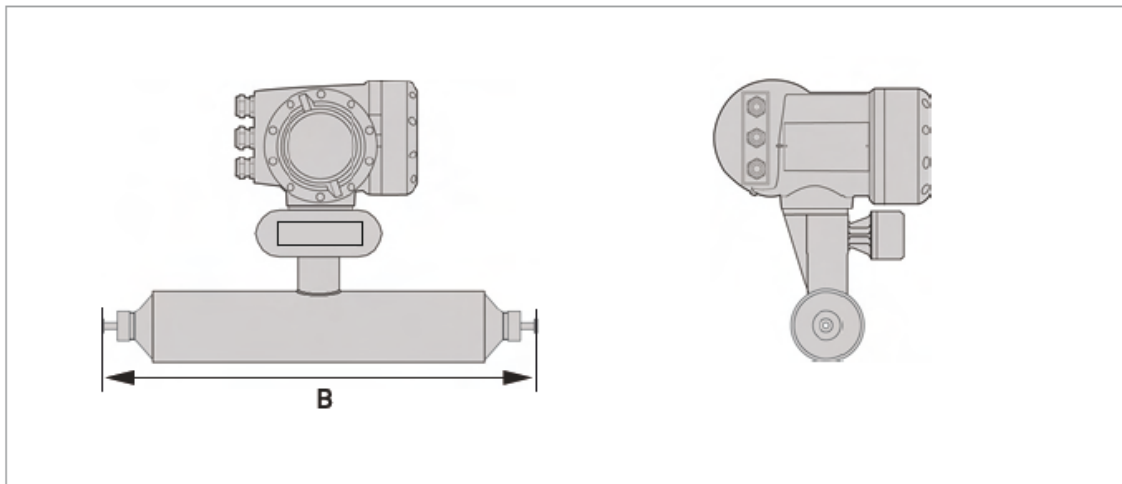
Flanged Connections

| | 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

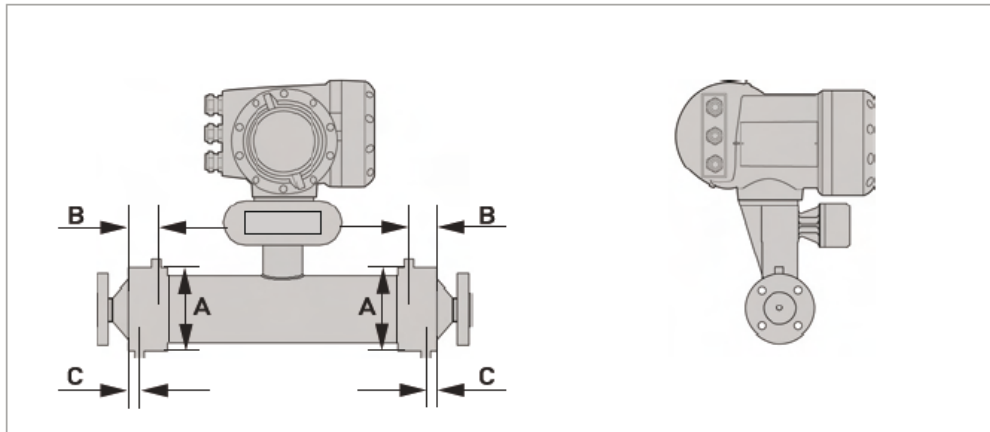
| | Dimension B mm (inches) | | |
|----------------------------|-------------------------|------|------|
| | S100 | S150 | S250 |
| Tri-clover | | | |
| 4" | 1223 (48) | | |
| Tri-clamp DIN 32676 | | | |
| DN100 | 1236 (48.7) | | |
| Tri-clamp ISO 2852 | | | |
| 4" | 1223 (48) | | |
| DIN 11864-2 Form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



Hygienic Connections: Adapter Versions (male thread)

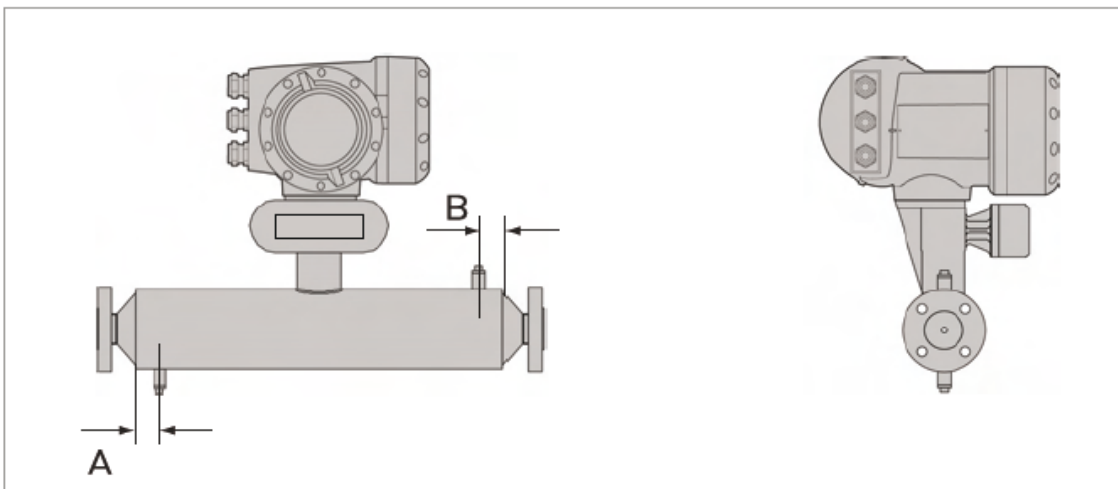
| | Dimension B mm (inches) | | |
|------------------------------|-------------------------|------|------|
| | S100 | S150 | S250 |
| Male thread DIN 11851 | | | |
| DN100 | 1288 (50.1) | | |
| Male thread SMS | | | |
| 4" | 1236 (48.7) | | |
| Male thread IDF/ISS | | | |
| 4" | 1223 (48) | | |
| Male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

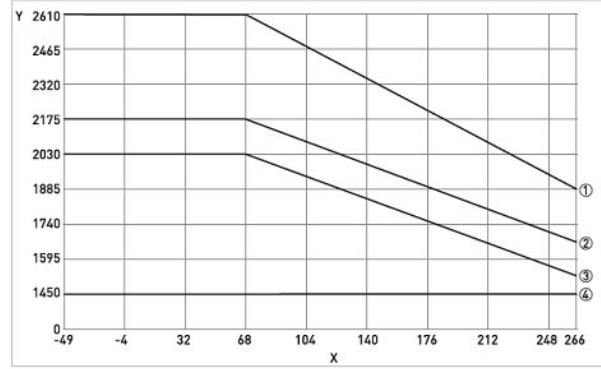
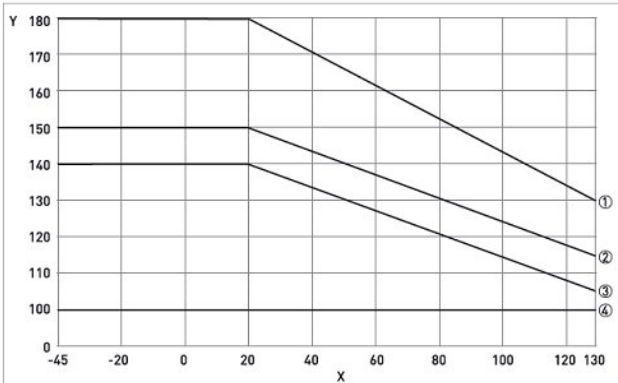
Guidelines for Maximum Operating Pressure

Notes:

- Ensure that the meter is used within its operating limits
- All hygienic process connections have a maximum operating rating of 10 barg at 130°C/ 145°C at 266°F

Pressure / temperature de-rating, all meter sizes in metric (flanged connections as per EN 1092-1:2007)

Pressure / temperature de-rating, all meter sizes, in imperial (flanged connections as per ASME B16.5)



X temperature [°C]
Y pressure [barg]

X temperature [°F]
Y pressure [psig]

1. Measuring tube [UNS S32750] PED certification
2. Measuring tube [UNS S31803] PED certification
3. Measuring tube [UNS S31803/S32750] FM certification
4. Measuring tube [UNS S31803] CRN certification

Linear de-rating of PED certified secondary containment

| Outer cylinder material | -45°C | 20°C | 130°C |
|-------------------------|----------|----------|----------|
| 304 /L or 316 /L | 40 barg | 40 barg | 32 barg |
| UNS S31803 | 150 barg | 150 barg | 100 barg |

| Outer cylinder material | -49°F | 68°F | 266°F |
|-------------------------|-----------|-----------|-----------|
| 304 /L or 316 /L | 580 psig | 580 psig | 464 psig |
| UNS S31803 | 2175 psig | 2175 psig | 1450 psig |

Flanges

- DIN flange ratings are based on EN 1092-1 2007 table G.1 material group 14EO.
- ASME flange ratings are based on ASME B16.5 2003 table 2 material group 2.2
- JIS flange ratings are based on JIS 2220: 2001 table 1 division 1 material group 022a

Notes

- The maximum operating pressure will be either the flange rating or the measuring tube rating. **WHICHEVER IS THE LOWER!**
- The manufacturer recommends that the seals are replaced at regular intervals. This will maintain the hygienic integrity of the connection.

Specifications are subject to change without notice.

For More Information

Learn more about how Honeywell's VersaFlow Coriolis 200 Sensor for Mass Flow is well suited for bulk measurement in many applications, visit our website www.honeywell.com/ps/hfs or contact your Honeywell account manager.

Honeywell Process Solutions

1860 West Rose Garden Lane
Phoenix, Arizona 85027
Tel: 1-800-423-9883 or 1-800-343-0228
www.honeywell.com/ps

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