

Rosemount 2051CF DP Flowmeters



- Up to 2.00% volumetric flow accuracy at 5:1 turndown
- Available with HART and FOUNDATION fieldbus Protocols
- 2-year stability
- Aluminum and SST housings available
- 4-20mA HART, FOUNDATION fieldbus, Low Power HART
- Conventional bid spec compliance - optional reference accuracy and stability improvements
- Ease-of-Use features, enhanced EDDL screens, optional external zero and span buttons

Rosemount 2051CF Flowmeter Series



Rosemount 2051CF Flowmeters combine the 2051 Pressure transmitter and the latest primary element technology: Annubar Averaging Pitot Tube, Compact Conditioning Orifice Plate and Integral Orifice Plate.

| Configuration | Transmitter Output Code |
|---|-------------------------|
| 4-20 mA HART® -2051 -2051 with Selectable HART ⁽¹⁾ | A |
| Low Power -2051 -2051 with Selectable HART ⁽¹⁾ | M |
| FOUNDATION Fieldbus | F |
| Profibus | W |

(1) The enhanced 4-20 mA HART device can be ordered with Transmitter Output option code A plus any of the following new option codes: M4, QT, DZ, CR, CS, CT, HR5, HR7.

Additional Information

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Rosemount 2051CFA Annubar Flowmeter

- Annubar flowmeters reduce permanent pressure loss by creating less blockage in the pipe
- Ideal for large line size installations when cost, size, and weight of the flowmeter are concerns

Table 1. Rosemount 2051CFA Annubar Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Model | Product Description | |
|--|---|-----------------|
| 2051CFA | Annubar Flowmeter | |
| Measurement Type | | |
| Standard | | Standard |
| D | Differential Pressure | ★ |
| Fluid Type | | |
| Standard | | Standard |
| L | Liquid | ★ |
| G | Gas | ★ |
| S | Steam | ★ |
| Line Size | | |
| Standard | | Standard |
| 020 | 2-in. (50 mm) | ★ |
| 025 | 2 ¹ / ₂ -in. (63.5 mm) | ★ |
| 030 | 3-in. (80 mm) | ★ |
| 035 | 3 ¹ / ₂ -in. (89 mm) | ★ |
| 040 | 4-in. (100 mm) | ★ |
| 050 | 5-in. (125 mm) | ★ |
| 060 | 6-in. (150 mm) | ★ |
| 070 | 7-in. (175 mm) | ★ |
| 080 | 8-in. (200 mm) | ★ |
| 100 | 10-in. (250 mm) | ★ |
| 120 | 12-in. (300 mm) | ★ |
| Pipe I.D. Range (See "Pipe I.D. Range Code" on page 34) | | |
| Standard | | Standard |
| C | Range C from the Pipe I.D. table | ★ |
| D | Range D from the Pipe I.D. table | ★ |
| Expanded | | |
| A | Range A from the Pipe I.D. table | |
| B | Range B from the Pipe I.D. table | |
| E | Range E from the Pipe I.D. table | |
| Z | Non-standard Pipe I.D. Range or Line Sizes greater than 12 inches | |
| Pipe Material / Mounting Assembly Material | | |
| Standard | | Standard |
| C | Carbon steel (A105) | ★ |
| S | 316 Stainless Steel | ★ |
| 0 ⁽¹⁾ | No Mounting (Customer Supplied) | |
| Expanded | | |
| G | Chrome-Moly Grade F-11 | |
| N | Chrome-Moly Grade F-22 | |
| J | Chrome-Moly Grade F-91 | |

Table 1. Rosemount 2051 CFA Annubar Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| Piping Orientation | | |
|---|--|-----------------|
| Standard | | Standard |
| H | Horizontal Piping | ★ |
| D | Vertical Piping with Downwards Flow | ★ |
| U | Vertical Piping with Upwards Flow | ★ |
| Annubar Type | | |
| Standard | | Standard |
| P | Pak-Lok | ★ |
| F | Flanged with opposite side support | ★ |
| Sensor Material | | |
| Standard | | Standard |
| S | 316 Stainless Steel | ★ |
| Sensor Size | | |
| Standard | | Standard |
| 1 | Sensor size 1 — Line sizes 2-in. (50 mm) to 8-in. (200 mm) | ★ |
| 2 | Sensor size 2 — Line sizes 6-in. (150 mm) to 96-in. (2400 mm) | ★ |
| 3 | Sensor size 3 — Line sizes greater than 12-in. (300 mm) | ★ |
| Mounting Type | | |
| Standard | | Standard |
| T1 | Compression or Threaded Connection | ★ |
| A1 | 150# RF ANSI | ★ |
| A3 | 300# RF ANSI | ★ |
| A6 | 600# RF ANSI | ★ |
| D1 | DN PN16 Flange | ★ |
| D3 | DN PN40 Flange | ★ |
| D6 | DN PN100 Flange | ★ |
| Expanded | | |
| R1 | 150# RTJ Flange | |
| R3 | 300# RTJ Flange | |
| R6 | 600# RTJ Flange | |
| Opposite Side Support or Packing Gland | | |
| Standard | | Standard |
| 0 | No opposite side support or packing gland (Required for Pak-Lok and Flange-Lok models) | ★ |
| | Opposite Side Support – Required for Flanged Models | |
| C | NPT Threaded Opposite Support Assembly – Extended Tip | ★ |
| D | Welded Opposite Support Assembly – Extended Tip | ★ |
| Isolation Valve for Flo-Tap Models | | |
| Standard | | Standard |
| 0 ⁽¹⁾ | Not Applicable or Customer Supplied | ★ |
| Temperature Measurement | | |
| Standard | | Standard |
| T | Integral RTD – not available with Flanged model greater than class 600# | ★ |
| 0 | No Temperature Sensor | ★ |

Table 1. Rosemount 2051CFA Annubar Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Transmitter Connection Platform | | | |
|---|--|--------------------|-----------------|
| Standard | | | Standard |
| 3 | Direct-mount, Integral 3-valve Manifold– not available with Flanged model greater than class 600 | | ★ |
| 5 | Direct -mount, 5-valve Manifold – not available with Flanged model greater than class 600 | | ★ |
| 7 | Remote-mount NPT Connections (1/2-in. FNPT) | | ★ |
| Expanded | | | |
| 8 | Remote-mount SW Connections (1/2-in.) | | |
| Differential Pressure Range | | | |
| Standard | | | Standard |
| 1 | 0 to 25 in H ₂ O (0 to 62,3 mbar) | | ★ |
| 2 | 0 to 250 in H ₂ O (0 to 623 mbar) | | ★ |
| 3 | 0 to 1000 in H ₂ O (0 to 2,5 bar) | | ★ |
| Transmitter Output | | | |
| Standard | | | Standard |
| A ⁽²⁾ | 4–20 mA with digital signal based on HART Protocol | | ★ |
| F | FOUNDATION fieldbus Protocol | | ★ |
| Expanded | | | |
| M ⁽²⁾ | Low-Power, 1-5 Vdc with Digital Signal Based on HART Protocol | | |
| Transmitter Housing Material ⁽³⁾ | | Conduit Entry Size | |
| Standard | | | Standard |
| A | Aluminum | 1/2-14 NPT | ★ |
| B | Aluminum | M20 x 1.5 | ★ |
| J | SST | 1/2-14 NPT | ★ |
| K ⁽⁴⁾ | SST | M20 x 1.5 | ★ |
| Expanded | | | |
| D | Aluminum | G1/2 | |
| M ⁽⁴⁾ | SST | G1/2 | |
| Transmitter Performance Class | | | |
| Standard | | | Standard |
| 1 | 2.3% flow rate accuracy, 5:1 flow turndown, 2-year stability | | ★ |

Options (Include with selected model number)

| Pressure Testing | | | |
|----------------------|--|--|--|
| Expanded | | | |
| P1 ⁽⁵⁾ | Hydrostatic Testing with Certificate | | |
| PX ⁽⁵⁾ | Extended Hydrostatic Testing | | |
| Special Cleaning | | | |
| Expanded | | | |
| P2 | Cleaning for Special Services | | |
| PA | Cleaning per ASTM G93 Level D (Section 11.4) | | |
| Material Testing | | | |
| Expanded | | | |
| V1 | Dye Penetrant Exam | | |
| Material Examination | | | |
| Expanded | | | |
| V2 | Radiographic Examination | | |

Table 1. Rosemount 2051 CFA Annubar Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
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| Special Inspection | | |
|--|---|-----------------|
| Standard | | Standard |
| QC1 | Visual & Dimensional Inspection with Certificate | ★ |
| QC7 | Inspection & Performance Certificate | ★ |
| Surface Finish | | |
| Standard | | Standard |
| RL | Surface finish for Low Pipe Reynolds # in Gas & Steam | ★ |
| RH | Surface finish for High Pipe Reynolds # in Liquid | ★ |
| Material Traceability Certification | | |
| Standard | | Standard |
| Q8 ⁽⁶⁾ | Material Traceability Certification per EN 10474:2004 3.1 | ★ |
| Code Conformance | | |
| Expanded | | |
| J2 | ANSI/ASME B31.1 | |
| J3 | ANSI/ASME B31.3 | |
| Materials Conformance | | |
| Expanded | | |
| J5 ⁽⁷⁾ | NACE MR-0175 / ISO 15156 | |
| Country Certification | | |
| Standard | | Standard |
| J6 | European Pressure Directive (PED) | ★ |
| Expanded | | |
| J1 | Canadian Registration | |
| Instrument Connections for Remote Mount Options | | |
| Standard | | Standard |
| G2 | Needle Valves, Stainless Steel | ★ |
| G6 | OS&Y Gate Valve, Stainless Steel | ★ |
| Expanded | | |
| G1 | Needle Valves, Carbon Steel | |
| G3 | Needle Valves, Alloy C-276 | |
| G5 | OS&Y Gate Valve, Carbon Steel | |
| G7 | OS&Y Gate Valve, Alloy C-276 | |
| Special Shipment | | |
| Standard | | Standard |
| Y1 | Mounting Hardware Shipped Separately | ★ |
| Product Certifications | | |
| Standard | | Standard |
| E1 ⁽⁴⁾ | ATEX Flameproof | ★ |
| E2 | INMETRO Flameproof | ★ |
| E3 ⁽⁴⁾ | China Flameproof | ★ |
| E5 | FM Explosion-proof, Dust Ignition-proof | ★ |
| E6 | CSA Explosion-proof, Dust Ignition-proof, Division 2 | ★ |
| E7 ⁽⁴⁾ | IECEx Flameproof, Dust Ignition-proof | ★ |
| I1 ⁽⁴⁾ | ATEX Intrinsic Safety | ★ |
| I2 ⁽⁴⁾ | INMETRO Intrinsic Safety | ★ |
| I3 ⁽⁴⁾ | China Intrinsic Safety | ★ |
| I5 | FM Intrinsically Safe, Division 2 | ★ |

Table 1. Rosemount 2051 CFA Annubar Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| | | |
|--|---|-----------------|
| I6 | CSA Intrinsically Safe | ★ |
| I7 ⁽⁴⁾ | IECEX Intrinsic Safety | ★ |
| IA ⁽⁸⁾ | ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only | ★ |
| IE ⁽⁸⁾ | FM FISCO Intrinsically Safe | ★ |
| IF ⁽⁸⁾ | CSA FISCO Intrinsically Safe | ★ |
| IG ⁽⁸⁾ | IECEX FISCO Intrinsically Safe | ★ |
| K1 ⁽⁴⁾ | ATEX Flameproof, Intrinsic Safety, Type n, Dust | ★ |
| K5 | FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5 and I5) | ★ |
| K6 | CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E6 and I6) | ★ |
| K7 ⁽⁴⁾ | IECEX Flameproof, Dust Ignition-proof, Intrinsic Safety, Type n (combination of E7, I7, and N7) | ★ |
| KA ⁽⁴⁾ | ATEX and CSA Flameproof, Intrinsically Safe, Division 2 | ★ |
| KB | FM and CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5, E6, I5, and I6) | ★ |
| KC ⁽⁴⁾ | FM and ATEX Explosion-proof, Intrinsically Safe, Division 2 | ★ |
| KD ⁽⁴⁾ | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of E5, I5, E6, I6, E1, and I1) | ★ |
| N1 ⁽⁴⁾ | ATEX Type n | ★ |
| N7 ⁽⁴⁾ | IECEX Type n | ★ |
| ND ⁽⁴⁾ | ATEX Dust | ★ |
| Shipboard Approvals | | |
| Standard | | Standard |
| SBS | American Bureau of Shipping | ★ |
| Sensor Fill Fluid and O-ring Options | | |
| Standard | | Standard |
| L1 | Inert Sensor Fill Fluid | ★ |
| L2 | Graphite-Filled (PTFE) O-ring | ★ |
| LA | Inert Sensor Fill Fluid and Graphite-Filled (PTFE) O-ring | ★ |
| Display and Interface Options | | |
| Standard | | Standard |
| M4 ⁽⁹⁾ | LCD Display with Local Operator Interface | ★ |
| M5 | LCD Display | ★ |
| Transmitter Calibration Certification | | |
| Standard | | Standard |
| Q4 | Calibration Certificate for Transmitter | ★ |
| Quality Certification for Safety | | |
| Standard | | Standard |
| QS ⁽⁹⁾ | Prior-use certificate of FMEDA data | ★ |
| QT ⁽¹⁰⁾ | Safety certified to IEC 61508 with certificate of FMEDA | ★ |
| Transient Protection | | |
| Standard | | Standard |
| T1 ⁽¹¹⁾ | Transient terminal block | ★ |
| Manifold for Remote Mount Option | | |
| Standard | | Standard |
| F2 | 3-Valve Manifold, Stainless Steel | ★ |
| F6 | 5-Valve Manifold, Stainless Steel | ★ |
| Expanded | | |
| F1 | 3-Valve Manifold, Carbon Steel | |
| F5 | 5-Valve Manifold, Carbon Steel | |

Table 1. Rosemount 2051CFA Annubar Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| PlantWeb Control Functionality | | |
|---|--|-----------------|
| Standard | | Standard |
| A01 ⁽⁸⁾ | FOUNDATION fieldbus Advanced Control Function Block Suite | ★ |
| Hardware Adjustments | | |
| Standard | | Standard |
| D4 ⁽¹²⁾ | Zero and Span Hardware Adjustments | ★ |
| DZ ⁽¹²⁾ | Digital Zero Trim | ★ |
| Alarm Limit | | |
| Standard | | Standard |
| C4 ⁽⁹⁾⁽¹³⁾ | NAMUR Alarm and Saturation Levels, High Alarm | ★ |
| CN ⁽⁹⁾⁽¹³⁾ | NAMUR Alarm and Saturation Levels, Low Alarm | ★ |
| CR ⁽¹⁰⁾ | Custom alarm and saturation signal levels, high alarm (requires C1 and Configuration Data Sheet) | ★ |
| CS ⁽¹⁰⁾ | Custom alarm and saturation signal levels, low alarm (requires C1 and Configuration Data Sheet) | ★ |
| CT ⁽¹⁰⁾ | Low alarm (standard Rosemount alarm and saturation levels) | ★ |
| Ground Screw | | |
| Standard | | Standard |
| V5 ⁽¹⁴⁾ | External Ground Screw Assembly | ★ |
| HART Revision Configuration | | |
| Standard | | Standard |
| HR5 ⁽¹⁰⁾⁽¹⁵⁾ | Configured for HART Revision 5 | ★ |
| HR7 ⁽¹⁰⁾⁽¹⁶⁾ | Configured for HART Revision 7 | ★ |
| Typical Model Number: 2051CFA D L 060 D C H P S 2 T1 0 0 0 3 2A A 1A 3 | | |

- (1) Provide the "A" dimension for Flanged (page 38) and Pak-Lok (page 37).
- (2) HART Revision 5 is the default HART output. The Enhanced 3051 can be factory or field configured to HART Revision 7. To order HART Revision 7 factory configured, add option code HR7.
- (3) Material specified is cast as follows: CF-8M is the cast version of 316 SST, CF-3M is the cast version of 316L SST. For housing, material is aluminum with polyurethane paint.
- (4) Not available with Low Power Output Code M.
- (5) Applies to assembled flowmeter only, mounting not tested.
- (6) Instrument Connections for Remote Mount Options and Isolation Valves for Flo-tap Models are not included in the Material Traceability Certification.
- (7) Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.
- (8) Only valid with FOUNDATION fieldbus Output Code F.
- (9) Not available with Output Protocol code F.
- (10) Only available with 4-20 mA HART output (output Code A).
- (11) The T1 option is not needed with FISCO Product Certifications, transient protection is included with the FISCO Product Certification code IA.
- (12) Only available with 4-20 mA HART (output codes A and M).
- (13) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
- (14) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.
- (15) Configures the HART output to HART Revision 5. The device can be field configured to HART Revision 7 if needed.

8 (16) Configures the HART output to HART Revision 7. The device can be field configured to HART Revision 5 if needed.



Rosemount 2051CFC Compact Flowmeter

- Compact Conditioning flowmeters reduce straight piping requirements to 2D upstream and 2D downstream from a flow disturbance
- Simple installation of Compact flowmeters between any existing raised-face flanges

Table 2. Rosemount 2051CFC Compact Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Model | Product Description | |
|--|-------------------------------|-----------------|
| 2051CFC | Compact Flowmeter | |
| Measurement Type | | |
| Standard | | Standard |
| D | Differential Pressure | ★ |
| Primary Element Technology | | |
| Standard | | Standard |
| A | Annubar® Averaging Pitot Tube | ★ |
| C | Conditioning Orifice Plate | ★ |
| P | Orifice Plate | ★ |
| Material Type | | |
| Standard | | Standard |
| S | 316 SST | ★ |
| Line Size | | |
| Standard | | Standard |
| 005 ⁽¹⁾ | 1/2-in. (15 mm) | ★ |
| 010 ⁽¹⁾ | 1-in. (25 mm) | ★ |
| 015 ⁽¹⁾ | 1 1/2-in. (40 mm) | ★ |
| 020 | 2-in. (50 mm) | ★ |
| 030 | 3-in. (80 mm) | ★ |
| 040 | 4-in. (100 mm) | ★ |
| 060 | 6-in. (150 mm) | ★ |
| 080 | 8-in. (200 mm) | ★ |
| 100 ⁽²⁾⁽³⁾ | 10-in. (250 mm) | ★ |
| 120 ⁽²⁾⁽³⁾ | 12-in. (300 mm) | ★ |
| Primary Element Type | | |
| Standard | | Standard |
| N000 | Annubar Sensor Size 1 | ★ |
| N040 | 0.40 Beta Ratio | ★ |
| N065 ⁽⁴⁾ | 0.65 Beta Ratio | ★ |
| Temperature Measurement | | |
| Standard | | Standard |
| 0 | No Temperature Sensor | ★ |
| T ⁽⁵⁾ | Integral RTD | ★ |
| Transmitter Connection Platform | | |
| Standard | | Standard |
| 3 | Direct-mount | ★ |
| 7 | Remote-mount, NPT Connections | ★ |

Table 2. Rosemount 2051CFC Compact Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Differential Pressure Range | | | |
|---|--|--------------------|-----------------|
| Standard | | | Standard |
| 1 | 0 to 25 in H ₂ O (0 to 62,3 mbar) | | ★ |
| 2 | 0 to 250 in H ₂ O (0 to 623 mbar) | | ★ |
| 3 | 0 to 1000 in H ₂ O (0 to 2,5 bar) | | ★ |
| Transmitter Output | | | |
| Standard | | | Standard |
| A ⁽⁶⁾ | 4–20 mA with digital signal based on HART Protocol | | ★ |
| F | FOUNDATION fieldbus Protocol | | ★ |
| Expanded | | | |
| M | Low-Power, 1-5Vdc with Digital Signal Based on HART Protocol | | |
| Transmitter Housing Material ⁽⁷⁾ | | Conduit Entry Size | |
| Standard | | | Standard |
| A | Aluminum | 1/2-14 NPT | ★ |
| B | Aluminum | M20 x 1.5 | ★ |
| J | SST | 1/2-14 NPT | ★ |
| K ⁽⁸⁾ | SST | M20 x 1.5 | ★ |
| Expanded | | | |
| D | Aluminum | G1/2 | |
| M ⁽⁸⁾ | SST | G1/2 | |
| Transmitter Performance Class | | | |
| Standard | | | Standard |
| 1 | Up to ±2.00% flow rate accuracy, 5:1 flow turndown, 2-year stability | | ★ |

Options (Include with selected model number)

| Installation Accessories | | | |
|------------------------------|--|--|-----------------|
| Standard | | | Standard |
| AB | ANSI Alignment Ring (150#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes) | | ★ |
| AC | ANSI Alignment Ring (300#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes) | | ★ |
| AD | ANSI Alignment Ring (600#) (Only required for 10-in. (250 mm) and 12-in. (300mm) line sizes) | | ★ |
| DG | DIN Alignment Ring (PN16) | | ★ |
| DH | DIN Alignment Ring (PN40) | | ★ |
| DJ | DIN Alignment Ring (PN100) | | ★ |
| Expanded | | | |
| JB | JIS Alignment Ring (10K) | | |
| JR | JIS Alignment Ring (20K) | | |
| JS | JIS Alignment Ring (40K) | | |
| Remote Adapters | | | |
| Standard | | | Standard |
| FE | Flange Adapters 316 SST (1/2-in NPT) | | ★ |
| High Temperature Application | | | |
| Expanded | | | |
| HT | Graphite Valve Packing (Tmax = 850 °F) | | |
| Flow Calibration | | | |
| Expanded | | | |
| WC ⁽⁹⁾ | Flow Calibration, 3 Pt, Conditioning Orifice Option C (All Pipe Schedules) | | |
| WD ⁽¹⁰⁾⁽¹¹⁾ | Flow Calibration, 10 Pt, Conditioning Option C (All Schedules), Annubar Option A (Schedule 40) | | |

Table 2. Rosemount 2051CFC Compact Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Pressure Testing | | |
|--|--|-----------------|
| Expanded | | |
| P1 | Hydrostatic Testing with Certificate | |
| Special Cleaning | | |
| Expanded | | |
| P2 ⁽¹²⁾ | Cleaning for Special Services | |
| PA | Cleaning per ASTM G93 Level D (Section 11.4) | |
| Special Inspection | | |
| Standard | | Standard |
| QC1 | Visual & Dimensional Inspection with Certificate | ★ |
| QC7 | Inspection and Performance Certificate | ★ |
| Transmitter Calibration Certification | | |
| Standard | | Standard |
| Q4 | Calibration Certificate for Transmitter | ★ |
| Quality Certification for Safety | | |
| Standard | | Standard |
| QS ⁽¹³⁾ | Prior-use certificate of FMEDA data | ★ |
| QT ⁽¹⁴⁾⁽¹⁵⁾ | Safety certified to IEC 61508 with certificate of FMEDA | ★ |
| Material Traceability Certification | | |
| Standard | | Standard |
| Q8 | Material Traceability Certification per EN 10204:2004 3.1 | ★ |
| Code Conformance | | |
| Expanded | | |
| J2 | ANSI/ASME B31.1 | |
| J3 | ANSI/ASME B31.3 | |
| J4 | ANSI/ASME B31.8 | |
| Materials Conformance | | |
| Expanded | | |
| J5 ⁽¹⁶⁾ | NACE MR-0175 / ISO 15156 | |
| Country Certification | | |
| Expanded | | |
| J1 | Canadian Registration | |
| Product Certifications | | |
| Standard | | Standard |
| E1 ⁽⁸⁾ | ATEX Flameproof | ★ |
| E2 | INMETRO Flameproof | ★ |
| E3 ⁽⁸⁾ | China Flameproof | ★ |
| E5 | FM Explosion-proof, Dust Ignition-proof | ★ |
| E6 | CSA Explosion-proof, Dust Ignition-proof, Division 2 | ★ |
| E7 ⁽⁸⁾ | IECEX Flameproof, Dust Ignition-proof | ★ |
| I1 ⁽⁸⁾ | ATEX Intrinsic Safety | ★ |
| I2 ⁽⁸⁾ | INMETRO Intrinsic Safety | ★ |
| I3 ⁽⁸⁾ | China Intrinsic Safety | ★ |
| I5 | FM Intrinsically Safe, Division 2 | ★ |
| I6 | CSA Intrinsically Safe | ★ |
| I7 ⁽⁸⁾ | IECEX Intrinsic Safety | ★ |
| IA ⁽¹⁷⁾ | ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only | ★ |

Table 2. Rosemount 2051CFC Compact Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| | | |
|---|---|-----------------|
| IE ⁽¹⁷⁾ | FM FISCO Intrinsically Safe | ★ |
| IF ⁽¹⁷⁾ | CSA FISCO Intrinsically Safe | ★ |
| IG ⁽¹⁷⁾ | IECEx FISCO Intrinsically Safe | ★ |
| K1 ⁽¹⁷⁾ | ATEX Flameproof, Intrinsic Safety, Type n, Dust | ★ |
| K5 | FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5 and I5) | ★ |
| K6 | CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E6 and I6) | ★ |
| K7 ⁽⁴⁾ | IECEx Flameproof, Dust Ignition-proof, Intrinsic Safety, Type n (combination of E7, I7, and N7) | ★ |
| KA ⁽⁴⁾ | ATEX and CSA Flameproof, Intrinsically Safe, Division 2 | ★ |
| KB | FM and CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5, E6, I5, and I6) | ★ |
| KC ⁽⁴⁾ | FM and ATEX Explosion-proof, Intrinsically Safe, Division 2 | ★ |
| KD ⁽⁴⁾ | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of E5, I5, E6, I6, E1, and I1) | ★ |
| N1 ⁽⁴⁾ | ATEX Type n | ★ |
| N7 ⁽⁴⁾ | IECEx Type n | ★ |
| ND ⁽⁴⁾ | ATEX Dust | ★ |
| Shipboard Approvals | | |
| Standard | | Standard |
| SBS | American Bureau of Shipping | ★ |
| Sensor Fill Fluid and O-ring Options | | |
| Standard | | Standard |
| L1 | Inert Sensor Fill Fluid | ★ |
| L2 | Graphite-Filled (PTFE) O-ring | ★ |
| LA | Inert Sensor Fill Fluid and Graphite-Filled (PTFE) O-ring | ★ |
| Digital Display | | |
| Standard | | Standard |
| M4 ⁽¹⁹⁾ | LCD Display with Local Operator Interface | ★ |
| M5 | LCD Display | ★ |
| Transient Protection | | |
| Standard | | Standard |
| T1 ⁽¹⁸⁾ | Transient terminal block | ★ |
| Manifold for Remote Mount Option | | |
| Standard | | Standard |
| F2 | 3-Valve Manifold, Stainless Steel | ★ |
| F6 | 5-Valve Manifold, Stainless Steel | ★ |
| Alarm Limit | | |
| Standard | | Standard |
| C4 ⁽¹⁹⁾⁽²⁰⁾ | NAMUR Alarm and Saturation Levels, High Alarm | ★ |
| CN ⁽¹⁹⁾⁽²⁰⁾ | NAMUR Alarm and Saturation Levels, Low Alarm | ★ |
| CR ⁽¹⁴⁾⁽¹⁵⁾ | Custom alarm and saturation signal levels, high alarm (requires C1 and Configuration Data Sheet) | ★ |
| CS ⁽¹⁴⁾⁽¹⁵⁾ | Custom alarm and saturation signal levels, low alarm (requires C1 and Configuration Data Sheet) | ★ |
| CT ⁽¹⁴⁾⁽¹⁵⁾ | Low alarm (standard Rosemount alarm and saturation levels) | ★ |
| PlantWeb Control Functionality | | |
| Standard | | Standard |
| A01 ⁽¹⁷⁾ | FOUNDATION fieldbus Advanced Control Function Block Suite | ★ |
| Hardware Adjustments | | |
| Standard | | Standard |
| D4 ⁽²¹⁾ | Zero and Span Hardware Adjustments | ★ |
| DZ ⁽²¹⁾ | Digital Zero Trim | ★ |

Table 2. Rosemount 2051CFC Compact Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Ground Screw | | |
|---|--------------------------------|-----------------|
| Standard | | Standard |
| V5 ⁽²²⁾ | External Ground Screw Assembly | ★ |
| HART Revision Configuration | | |
| Standard | | Standard |
| HR5 ⁽¹⁴⁾⁽¹⁵⁾⁽²³⁾ | Configured for HART Revision 5 | ★ |
| HR7 ⁽¹⁴⁾⁽¹⁵⁾⁽²⁴⁾ | Configured for HART Revision 7 | ★ |
| Typical Model Number: 2051CFC D C S 060 N 065 0 3 2 A A 1 WC E5 M5 | | |

- (1) Available with primary element technology P only
- (2) For the 10-in. (250 mm) and 12-in. (300 mm) line size, the alignment ring must be ordered (Installation Accessories).
- (3) 10-in. (250 mm) and 12-in. (300 mm) line sizes not available with Primary Element Technology A.
- (4) For 2-in. (50 mm) line sizes the Primary Element Type is 0.6 for Primary Element Technology Code C.
- (5) Available with Primary Element Technology A only.
- (6) HART Revision 5 is the default HART output. The Enhanced 3051 can be factory or field configured to HART Revision 7. To order HART Revision 7 factory configured, add option code HR7.
- (7) Material specified is cast as follows: CF-8M is the cast version of 316 SST, CF-3M is the cast version of 316L SST. For housing, material is aluminum with polyurethane paint.
- (8) Not available with Low Power Output Code M.
- (9) Available with primary element technology C only.
- (10) Available with primary element technology C or A only.
- (11) For Annubar Option A, consult factory for pipe schedules other than Sch. 40.
- (12) Available with primary element technology C or P only
- (13) Not available with Output Protocol code F.
- (14) Select Configuration Buttons (option code D4 or DZ) or Local Operator Interface (option code M4) if local configuration buttons are required.
- (15) Only available with 4-20 mA HART output (output Code A).
- (16) Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.
- (17) Only valid with FOUNDATION fieldbus Output Code F.
- (18) The T1 option is not needed with FISCO Product Certifications, transient protection is included with the FISCO Product Certification code IA.
- (19) Not available with FOUNDATION fieldbus (Output Code F).
- (20) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
- (21) Only available with 4-20 mA HART (output codes A and M).
- (22) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.
- (23) Configures the HART output to HART Revision 5. The device can be field configured to HART Revision 7 if needed.
- (24) Configures the HART output to HART Revision 7. The device can be field configured to HART Revision 5 if needed.



Rosemount 2051CFP Integral Orifice Flowmeter

- Precision honed pipe section for increased accuracy in small line sizes
- Self-centering plate design prevents alignment errors that magnify measurement inaccuracies in small line sizes

Table 3. Rosemount 2051CFP Integral Orifice Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Model | Product Description | |
|-------------------------------|---|-----------------|
| 2051CFP | Integral Orifice Flowmeter | |
| Measurement Type | | |
| Standard | | Standard |
| D | Differential Pressure | ★ |
| Material Type | | |
| Standard | | Standard |
| S | 316 SST | ★ |
| Line Size | | |
| Standard | | Standard |
| 005 | 1/2-in. (15 mm) | ★ |
| 010 | 1-in. (25 mm) | ★ |
| 015 | 1 1/2-in. (40 mm) | ★ |
| Process Connection | | |
| Standard | | Standard |
| T1 | NPT Female Body (Not Available with Remote Thermowell and RTD) | ★ |
| S1 ⁽¹⁾ | Socket Weld Body (Not Available with Remote Thermowell and RTD) | ★ |
| P1 | Pipe Ends: NPT Threaded | ★ |
| P2 | Pipe ends: Beveled | ★ |
| D1 | Pipe Ends: Flanged, DIN PN16, slip-on | ★ |
| D2 | Pipe Ends: Flanged, DIN PN40, slip-on | ★ |
| D3 | Pipe Ends: Flanged, DIN PN100, slip-on | ★ |
| W1 | Pipe Ends: Flanged, RF, ANSI Class 150, weld-neck | ★ |
| W3 | Pipe Ends: Flanged, RF, ANSI Class 300, weld-neck | ★ |
| W6 | Pipe Ends: Flanged, RF, ANSI Class 600, weld-neck | ★ |
| A1 | Pipe Ends: Flanged, RF, ANSI Class 150, slip-on | ★ |
| A3 | Pipe Ends: Flanged, RF, ANSI Class 300, slip-on | ★ |
| A6 | Pipe Ends: Flanged, RF, ANSI Class 600, slip-on | ★ |
| Expanded | | |
| R1 | Pipe Ends: Flanged, RTJ, ANSI Class 150, slip-on | |
| R3 | Pipe Ends: Flanged, RTJ, ANSI Class 300, slip-on | |
| R6 | Pipe Ends: Flanged, RTJ, ANSI Class 600, slip-on | |
| Orifice Plate Material | | |
| Standard | | Standard |
| S | 316 SST | ★ |
| Bore Size Option | | |
| Standard | | Standard |
| 0066 | 0.066-in. (1.68 mm) for 1/2-in. Pipe | ★ |
| 0109 | 0.109-in. (2.77 mm) for 1/2-in. Pipe | ★ |
| 0160 | 0.160-in. (4.06 mm) for 1/2-in. Pipe | ★ |

Table 3. Rosemount 2051 CFP Integral Orifice Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

| | | | | |
|---|--|--|-------------------------------|---|
| 0196 | 0.196-in. (4.98 mm) for 1/2-in. Pipe | | ★ | |
| 0260 | 0.260-in. (6.60 mm) for 1/2-in. Pipe | | ★ | |
| 0340 | 0.340-in. (8.64 mm) for 1/2-in. Pipe | | ★ | |
| 0150 | 0.150-in. (3.81 mm) for 1-in. Pipe | | ★ | |
| 0250 | 0.250-in. (6.35 mm) for 1-in. Pipe | | ★ | |
| 0345 | 0.345-in. (8.76 mm) for 1-in. Pipe | | ★ | |
| 0500 | 0.500-in. (12.70 mm) for 1-in. Pipe | | ★ | |
| 0630 | 0.630-in. (16.00 mm) for 1-in. Pipe | | ★ | |
| 0800 | 0.800-in. (20.32 mm) for 1-in. Pipe | | ★ | |
| 0295 | 0.295-in. (7.49 mm) for 1 1/2-in. Pipe | | ★ | |
| 0376 | 0.376-in. (9.55 mm) for 1 1/2-in. Pipe | | ★ | |
| 0512 | 0.512-in. (13.00 mm) for 1 1/2-in. Pipe | | ★ | |
| 0748 | 0.748-in. (19.00 mm) for 1 1/2-in. Pipe | | ★ | |
| 1022 | 1.022-in. (25.96 mm) for 1 1/2-in. Pipe | | ★ | |
| 1184 | 1.184-in. (30.07 mm) for 1 1/2-in. Pipe | | ★ | |
| Expanded | | | | |
| 0010 | 0.010-in. (0.25 mm) for 1/2-in. Pipe | | | |
| 0014 | 0.014-in. (0.36 mm) for 1/2-in. Pipe | | | |
| 0020 | 0.020-in. (0.51 mm) for 1/2-in. Pipe | | | |
| 0034 | 0.034-in. (0.86 mm) for 1/2-in. Pipe | | | |
| Transmitter Connection Platform | | | | |
| Standard | | | Standard | |
| D3 | Direct-mount, 3-Valve Manifold, SST | | ★ | |
| D5 | Direct-mount, 5-Valve Manifold, SST | | ★ | |
| R3 | Remote-mount, 3-Valve Manifold, SST | | ★ | |
| R5 | Remote-mount, 5-Valve Manifold, SST | | ★ | |
| Differential Pressure Ranges | | | | |
| Standard | | | Standard | |
| 1 | 0 to 25 in H ₂ O (0 to 62,3 mbar) | | ★ | |
| 2 | 0 to 250 in H ₂ O (0 to 623 mbar) | | ★ | |
| 3 | 0 to 1000 in H ₂ O (0 to 2,5 bar) | | ★ | |
| Transmitter Output | | | | |
| Standard | | | Standard | |
| A ⁽²⁾ | 4–20 mA with digital signal based on HART protocol | | ★ | |
| F | FOUNDATION fieldbus protocol | | ★ | |
| Expanded | | | | |
| M | Low-Power, 1-5Vdc with Digital Signal Based on HART Protocol | | | |
| Transmitter Housing Material⁽³⁾ | | | Conduit Entry Size | |
| Standard | | | Standard | |
| A | Aluminum | | 1/2-14 NPT | ★ |
| B | Aluminum | | M20 x 1.5 | ★ |
| J | SST | | 1/2-14 NPT | ★ |
| K ⁽⁴⁾ | SST | | M20 x 1.5 | ★ |
| Expanded | | | | |
| D | Aluminum | | G ¹ / ₂ | |
| M ⁽⁴⁾ | SST | | G ¹ / ₂ | |
| Transmitter Performance Class | | | | |
| Standard | | | Standard | |
| 1 | up to ±2.25% flow rate accuracy, 5:1 flow turndown, 2-year stability | | ★ | |

Table 3. Rosemount 2051 CFP Integral Orifice Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Options (Include with selected model number)

| | | |
|--|---|-----------------|
| Temperature Sensor | | |
| Expanded | | |
| RT ⁽⁵⁾ | Thermowell and RTD | |
| Optional Connection | | |
| Standard | | Standard |
| G1 | DIN 19213 Transmitter Connection | ★ |
| Pressure Testing | | |
| Expanded | | |
| P1 ^{(6) (7)} | Hydrostatic Testing with Certificate | |
| Special Cleaning | | |
| Expanded | | |
| P2 | Cleaning for Special Services | |
| PA | Cleaning per ASTM G93 Level D (Section 11.4) | |
| Material Testing | | |
| Expanded | | |
| V1 | Dye Penetrant Exam | |
| Material Examination | | |
| Expanded | | |
| V2 | Radiographic Examination | |
| Flow Calibration | | |
| Expanded | | |
| WD ⁽⁸⁾ | Discharge Coefficient Verification | |
| Special Inspection | | |
| Standard | | Standard |
| QC1 | Visual & Dimensional Inspection with Certificate | ★ |
| QC7 | Inspection and Performance Certificate | ★ |
| Material Traceability Certification | | |
| Standard | | Standard |
| Q8 | Material Traceability Certification per EN 10204:2004 3.1 | ★ |
| Code Conformance | | |
| Expanded | | |
| J2 ⁽⁹⁾ | ANSI/ASME B31.1 | |
| J3 ⁽⁹⁾ | ANSI/ASME B31.3 | |
| J4 ⁽⁹⁾ | ANSI/ASME B31.8 | |
| Materials Conformance | | |
| Expanded | | |
| J5 ⁽¹⁰⁾ | NACE MR-0175 / ISO 15156 | |
| Country Certification | | |
| Standard | | Standard |
| J6 | European Pressure Directive (PED) | ★ |
| Expanded | | |
| J1 | Canadian Registration | |

Table 3. Rosemount 2051CFP Integral Orifice Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Transmitter Calibration Certification | | |
|--|---|-----------------|
| Standard | | Standard |
| Q4 | Calibration Certificate for Transmitter | ★ |
| Quality Certification for Safety | | |
| Standard | | Standard |
| QS ⁽¹¹⁾ | Prior-use Certificate of FMEDA data | ★ |
| QT ⁽¹²⁾⁽¹³⁾ | Safety certified to IEC 61508 with certificate of FMEDA | ★ |
| Product Certifications | | |
| Standard | | Standard |
| E1 ⁽⁴⁾ | ATEX Flameproof | ★ |
| E2 | INMETRO Flameproof | ★ |
| E3 ⁽⁴⁾ | China Flameproof | ★ |
| E5 | FM Explosion-proof, Dust Ignition-proof | ★ |
| E6 | CSA Explosion-proof, Dust Ignition-proof, Division 2 | ★ |
| E7 ⁽⁴⁾ | IECEX Flameproof, Dust Ignition-proof | ★ |
| I1 ⁽⁴⁾ | ATEX Intrinsic Safety | ★ |
| I2 ⁽⁴⁾ | INMETRO Intrinsic Safety | ★ |
| I3 ⁽⁴⁾ | China Intrinsic Safety | ★ |
| I5 | FM Intrinsically Safe, Division 2 | ★ |
| I6 | CSA Intrinsically Safe | ★ |
| I7 ⁽⁴⁾ | IECEX Intrinsic Safety | ★ |
| IA ⁽¹⁴⁾ | ATEX FISCO Intrinsic Safety; for FOUNDATION fieldbus protocol only | ★ |
| IE ⁽¹⁴⁾ | FM FISCO Intrinsically Safe | ★ |
| IF ⁽¹⁴⁾ | CSA FISCO Intrinsically Safe | ★ |
| IG ⁽¹⁴⁾ | IECEX FISCO Intrinsically Safe | ★ |
| K1 ⁽¹⁴⁾ | ATEX Flameproof, Intrinsic Safety, Type n, Dust | ★ |
| K5 | FM Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5 and I5) | ★ |
| K6 | CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E6 and I6) | ★ |
| K7 ⁽⁴⁾ | IECEX Flameproof, Dust Ignition-proof, Intrinsic Safety, Type n (combination of E7, I7, and N7) | ★ |
| KA ⁽⁴⁾ | ATEX and CSA Flameproof, Intrinsically Safe, Division 2 | ★ |
| KB | FM and CSA Explosion-proof, Dust Ignition-proof, Intrinsically Safe, Division 2 (combination of E5, E6, I5, and I6) | ★ |
| KC ⁽⁴⁾ | FM and ATEX Explosion-proof, Intrinsically Safe, Division 2 | ★ |
| KD ⁽⁴⁾ | FM, CSA, and ATEX Explosion-proof, Intrinsically Safe (combination of E5, I5, E6, I6, E1, and I1) | ★ |
| N1 ⁽⁴⁾ | ATEX Type n | ★ |
| N7 ⁽⁴⁾ | IECEX Type n | ★ |
| ND ⁽⁴⁾ | ATEX Dust | ★ |
| Shipboard Approvals | | |
| Standard | | Standard |
| SBS | American Bureau of Shipping | ★ |
| Sensor Fill Fluid and O-ring Options | | |
| Standard | | Standard |
| L1 | Inert Sensor Fill Fluid | ★ |
| L2 | Graphite-Filled (PTFE) O-ring | ★ |
| LA | Inert Sensor Fill Fluid and Graphite-Filled (PTFE) O-ring | ★ |
| Digital Display | | |
| Standard | | Standard |
| M4 ⁽¹⁶⁾ | LCD Display with Local Operator Interface | ★ |
| M5 | LCD Display | ★ |

Table 3. Rosemount 2051CFP Integral Orifice Flowmeter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

| Transient Protection | | |
|---|--|-----------------|
| Standard | | Standard |
| T1 ⁽¹⁵⁾ | Transient terminal block | ★ |
| Alarm Limit | | |
| Standard | | Standard |
| C4 ⁽¹⁶⁾⁽¹⁷⁾ | NAMUR Alarm and Saturation Levels, High Alarm | ★ |
| CN ⁽¹⁶⁾⁽¹⁷⁾ | NAMUR Alarm and Saturation Levels, Low Alarm | ★ |
| CR ⁽¹²⁾⁽¹³⁾ | Custom alarm and saturation signal levels, high alarm (requires C1 and Configuration Data Sheet) | ★ |
| CS ⁽¹²⁾⁽¹³⁾ | Custom alarm and saturation signal levels, low alarm (requires C1 and Configuration Data Sheet) | ★ |
| CT ⁽¹²⁾⁽¹³⁾ | Low alarm (standard Rosemount alarm and saturation levels) | ★ |
| PlantWeb Control Functionality | | |
| Standard | | Standard |
| A01 ⁽¹⁴⁾ | FOUNDATION fieldbus Advanced Control Function Block Suite | ★ |
| Hardware Adjustments | | |
| Standard | | Standard |
| D4 ⁽¹⁸⁾ | Zero and Span Hardware Adjustments | ★ |
| DZ ⁽¹⁸⁾ | Digital Zero Trim | ★ |
| Ground Screw | | |
| Standard | | Standard |
| V5 ⁽¹⁹⁾ | External Ground Screw Assembly | ★ |
| Hardware Adjustments | | |
| Standard | | Standard |
| HR5 ⁽¹²⁾⁽¹³⁾ (20) | Configured for HART Revision 5 | ★ |
| HR7 ⁽¹²⁾⁽¹³⁾ (21) | Configured for HART Revision 7 | ★ |
| Typical Model Number: 2051CFP D S 010 W1 S 0500 D3 2 A A 1 E5 M5 | | |

- (1) To improve pipe perpendicularity for gasket sealing, socket diameter is smaller than standard pipe O.D.
- (2) HART Revision 5 is the default HART output. The Enhanced 3051 can be factory or field configured to HART Revision 7. To order HART Revision 7 factory configured, add option code HR7.
- (3) Material specified is cast as follows: CF-8M is the cast version of 316 SST, CF-3M is the cast version of 316L SST. For housing, material is aluminum with polyurethane paint.
- (4) Not available with Low Power Output Code M.
- (5) Thermowell Material is the same as the body material.
- (6) Does not apply to Process Connection codes T1 and S1.
- (7) Option P1 may not be ordered in combination with P2 or PA.
- (8) Not available for bore sizes 0010, 0014, 0020, 0034, 0066, or 0109.
- (9) Not available with DIN Process Connection codes D1, D2, or D3.
- (10) Materials of Construction comply with metallurgical requirements within NACE MR0175/ISO for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.

- (11) Not available with Output Protocol code F.
- (12) Select Configuration Buttons (option code D4 or DZ) or Local Operator Interface (option code M4) if local configuration buttons are required.
- (13) Only available with 4-20 mA HART output (output Code A).
- (14) Only valid with FOUNDATION fieldbus Output Code F.
- (15) The T1 option is not needed with FISCO Product Certifications, transient protection is included with the FISCO Product Certification code IA.
- (16) Not available with FOUNDATION fieldbus (Output Code F).
- (17) NAMUR-Compliant operation is pre-set at the factory and cannot be changed to standard operation in the field.
- (18) Only available with 4-20 mA HART (output codes A and M).
- (19) The V5 option is not needed with the T1 option; external ground screw assembly is included with the T1 option.
- (20) Configures the HART output to HART Revision 5. The device can be field configured to HART Revision 7 if needed.
- (21) Configures the HART output to HART Revision 7. The device can be field configured to HART Revision 5 if needed.

2051CF specifications

Rosemount 2051CF performance specifications

Performance assumptions include: measured pipe I.D, transmitter is trimmed for optimum flow accuracy, and performance is dependent on application parameters.

Table 4. Flow Performance - Flow Reference Accuracy⁽¹⁾

| 2051CFA Annubar Flowmeter | | |
|---|---------------------|--|
| Ranges 2-3 | | ±2.30% of Flow Rate at 5:1 flow turndown |
| 2051SFC_A Compact Annubar Flowmeter - Annubar Option A | | |
| Ranges 2-3 | Uncalibrated | ±2.60% of Flow Rate at 5:1 flow turndown |
| | Calibrated | ±2.30% of Flow Rate at 5:1 flow turndown |
| 2051CFC Compact Orifice Flowmeter – Conditioning Option C | | |
| Ranges 2-3 | $\beta = 0.4$ | ±2.25% of Flow Rate at 5:1 flow turndown |
| | $\beta = 0.65$ | ±2.45% of Flow Rate at 5:1 flow turndown |
| 2051CFC Compact Orifice Flowmeter – Orifice Option P⁽²⁾ | | |
| Ranges 2-3 | $\beta = 0.4$ | ±2.50% of Flow Rate at 5:1 flow turndown |
| | $\beta = 0.65$ | ±2.50% of Flow Rate at 5:1 flow turndown |
| 2051CFP Integral Orifice Flowmeter | | |
| Ranges 2-3 | $\beta < 0.1$ | ±3.10% of Flow Rate at 5:1 flow turndown |
| | $0.1 < \beta < 0.2$ | ±2.75% of Flow Rate at 5:1 flow turndown |
| | $0.2 < \beta < 0.6$ | ±2.25% of Flow Rate at 5:1 flow turndown |
| | $0.6 < \beta < 0.8$ | ±3.00% of Flow Rate at 5:1 flow turndown |

(1) Range 1 flowmeters may experience an additional uncertainty up to 0.9%. Consult your Emerson Process Management Representative for exact specifications.

(2) For smaller line sizes, see Rosemount Compact Orifice

Rosemount 2051CF functional specifications

Range and Sensor Limits

| Range | 2051CF Minimum Span | Range and Sensor Limits |
|-------|--------------------------------------|---|
| 1 | 0.5 inH ₂ O (1,24 mbar) | 0 to 25 inH ₂ O (62,16 mbar) |
| 2 | 2.5 inH ₂ O (4,14 mbar) | 0 to 250 inH ₂ O (0,62 bar) |
| 3 | 6.67 inH ₂ O (16,58 mbar) | 0 to 1000 inH ₂ O (2,49 bar) |

Service

Liquid, gas, and steam applications

Protocols

4–20 mA HART (Output Code A)

Output

Two-wire 4–20 mA, user-selectable for linear or square root output. Digital process variable superimposed on 4–20 mA signal, available to any host that conforms to the HART protocol.

Power Supply

External power supply required. Standard transmitter operates on 10.5 to 42.4 Vdc with no load.

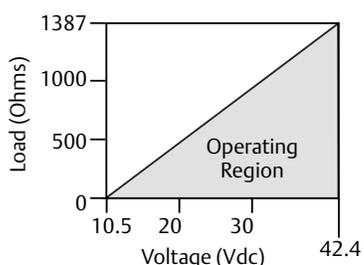
Turn-On Time

Performance within specifications less than 2.0 seconds after power is applied to the transmitter.

Load Limitations

Maximum loop resistance is determined by the voltage level of the external power supply, as described by:

$$\text{Maximum Loop Resistance} = 43.5 * (\text{Power Supply Voltage} - 10.5)$$



The Field Communicator requires a minimum loop resistance of 250Ω for communication.

FOUNDATION fieldbus (Output Code F)

Power Supply

External power supply required; transmitters operate on 9.0 to 32.0 Vdc transmitter terminal voltage.

Current Draw

17.5 mA for all configurations (including LCD display option)

Turn-On Time

Performance within specifications less than 20.0 seconds after power is applied to the transmitter.

FOUNDATION fieldbus Function Block Execution Times

| Block | Execution Time |
|-------------------|-----------------|
| Resource | - |
| Transducer | - |
| LCD Block | - |
| Analog Input 1, 2 | 30 milliseconds |
| PID | 45 milliseconds |

FOUNDATION fieldbus Parameters

| | |
|--|-----------|
| Schedule Entries | 7 (max.) |
| Links | 20 (max.) |
| Virtual Communications Relationships (VCR) | 12 (max.) |

Standard Function Blocks

Resource Block

- Contains hardware, electronics, and diagnostic information.

Transducer Block

- Contains actual sensor measurement data including the sensor diagnostics and the ability to trim the pressure sensor or recall factory defaults.

LCD Block

- Configures the local display.

2 Analog Input Blocks

- Processes the measurements for input into other function blocks. The output value is in engineering units or custom and contains a status indicating measurement quality.

PID Block

- Contains all logic to perform PID control in the field including cascade and feedforward.

Backup Link Active Scheduler (LAS)

The transmitter can function as a Link Active Scheduler if the current link master device fails or is removed from the segment.

1-5 Vdc HART Low Power (Output Code M)

Output

Three wire 1–5 Vdc output, user-selectable for linear or square root output. Digital process variable superimposed on voltage signal, available to any host conforming to the HART protocol.

Power Supply

External power supply required. Standard transmitter operates on 9 to 28 Vdc with no load.

Power Consumption

3.0 mA, 27–84 mW

Output Load

100 kΩ or greater

Turn-On Time

Performance within specifications less than 2.0 seconds after power is applied to the transmitter.

Overpressure Limits

Transmitters withstand the following limits without damage:

2051CF Flowmeters

- Ranges 2–5: 3626 psig (250 bar)
4500 psig (310,3 bar) for option code P9
- Range 1: 2000 psig (137,9 bar)

Static Pressure Limit

- Operates within specifications between static line pressures of -14.2 psig (0.034 bar) and 3626 psig (250 bar)
- Range 1: 0.5 psia to 2000 psig (34 mbar and 137,9 bar)

Burst Pressure Limits**2051CF**

- 10000 psig (689,5 bar)

Temperature Limits**For 2051CFA Temperature Limits-Process Temperature Limits**

Direct Mount Transmitter

- 500 °F (260 °C)
- 750 °F (398 °C) when used with a direct mount, high temperature 5-valve manifold (Transmitter Connection Platform code 6). Maximum temperature limit for steam processes is 650 °F (343 °C).
- 400 °F (204 °C) when top mounted in steam service

Remote Mount Transmitter

- 1250 °F (677 °C) – Alloy C-276 Sensor Material (For superheated steam applications above 1000 °F (538 °C), it is recommended that the Rosemount 585 with Alloy 800H sensor material is used.)
- 850 °F (454 °C) – Stainless Steel Sensor Material

Pressure and Temperature Limits⁽¹⁾

Direct Mount Transmitter

- Up to 600# ANSI (1440 psig at 100 °F (99 bar at 38 °C))
- Integral temperature measurement is not available with Flanged mounting type greater than class 600 Remote Mount Transmitter
- Up to 2500# ANSI (6000 psig at 100 °F (416 bar at 38 °C)).

(1) Static pressure selection may effect pressure limitations.

For 2051CFC Temperature Limits-Process Temperature Limits

Direct Mount Transmitter

- -40 to 450 °F (-40 to 232 °C)
- Up to 400 °F (204 °C) when top mounted in steam service Remote Mount Transmitter
- -148 to 850 °F (-100 to 454 °C) – Stainless Steel

For 2051CFP Temperature Limits-Process Temperature Limits

Standard (direct/remote mount):

- -40 to 450 °F (-40 to 232 °C)
- Extended (remote mount only with option code G):
- -148 to 850 °F (-100 to 454 °C)

Transmitter Temperature Limits:**Ambient⁽¹⁾**

-40 to 185 °F (-40 to 85 °C)

With LCD display⁽²⁾: -40 to 175 °F (-40 to 80 °C)

Storage⁽¹⁾

-50 to 230 °F (-46 to 110 °C)

With LCD display: -40 to 185 °F (-40 to 85 °C)

(1) Limits for silicone fill fluid only.

(2) LCD display may not be readable and LCD updates will be slower at temperatures below -4 °F (-20 °C).

Process Temperature Limits

At atmospheric pressures and above.

Table 5. 2051 Process Temperature Limits

| 2051C | |
|-------------------------------------|-------------------------------|
| Silicone Fill Sensor ⁽¹⁾ | -40 to 250 °F (-40 to 121 °C) |
| Inert Fill Sensor ⁽¹⁾ | -40 to 185 °F (-40 to 85 °C) |

(1) Process temperatures above 185 °F (85 °C) require derating the ambient limits by a 1.5:1 ratio.

Humidity Limits

0–100% relative humidity

Volumetric Displacement

Less than 0.005 in³ (0,08 cm³)

Damping

Analog output response to a step input change is user-selectable from 0 to 25.6 seconds for one time constant. This software damping is in addition to sensor module response time.

Output Code F

If self-diagnostics detect a gross transmitter failure, that information gets passed as a status along with the process variable.

Long Term Stability

| Models | Standard | Performance Option, P8 |
|--------------------------------------|---|---|
| 2051CF Range 1 (CF) Ranges 2-5 | ±0.2% of URL for 1 year, Reference Stability ±0.1% of URL for 2 years, Operating Stability | ±0.125% of URL for 5 years, Operating Stability |

Dynamic Performance

| | 4-20 mA HART ⁽¹⁾ 1-5 Vdc HART Low Power | FOUNDATION fieldbus ⁽³⁾ | Typical HART Transmitter Response Time |
|--|---|------------------------------------|---|
| Total Response Time (T_d + T_c)⁽²⁾: | | | <p>Transmitter Output vs. Time</p> <p>Pressure Released</p> <p>100%</p> <p>36.8%</p> <p>0%</p> <p>Time</p> <p>T_d = Dead Time T_c = Time Constant Response Time = T_d + T_c</p> <p>63.2% of Total Step Change</p> |
| 2051CF, Range 3-5: | 115 milliseconds | 152 milliseconds | |
| Range 1: | 270 milliseconds | 307 milliseconds | |
| Range 2: | 130 milliseconds | 152 milliseconds | |
| Dead Time (T _d) | 60 milliseconds (nominal) | 97 milliseconds | |
| Update Rate | 22 times per second | 22 times per second | |
| <p>(1) Dead time and update rate apply to all models and ranges; analog output only</p> <p>(2) Nominal total response time at 75 °F (24 °C) reference conditions.</p> <p>(3) Transmitter fieldbus output only, segment macro-cycle not included.</p> | | | |

Vibration Effect for 2051CFA, 2051CFC, and 2051CFP

Less than ±0.1% of URL when tested per the requirements of IEC60770-1 field with general application or pipeline with low vibration level (10-1000 Hz test frequency range, 0.15mm displacement peak amplitude, 20 m/s² acceleration

Failure Mode Alarm

If self-diagnostics detect a sensor or microprocessor failure, the analog signal is driven either high or low to alert the user. High or low failure mode is user-selectable with a jumper on the transmitter. The values to which the transmitter drives its output in failure mode depend on whether it is factory-configured to *standard* or *NAMUR-compliant* operation. The values for each are as follows:

| Standard Operation | | | |
|--------------------|----------------|--------------|-------------|
| Output Code | Linear Output | Fail High | Fail Low |
| A | 3.9 ≤ I ≤ 20.8 | I ≥ 21.75 mA | I ≤ 3.75 mA |
| M | 0.97 ≤ V ≤ 5.2 | V ≥ 5.4 V | V ≤ 0.95 V |

| NAMUR-Compliant Operation | | | |
|---------------------------|----------------|-------------|------------|
| Output Code | Linear Output | Fail High | Fail Low |
| A | 3.8 ≤ I ≤ 20.5 | I ≥ 22.5 mA | I ≤ 3.6 mA |

amplitude).⁽¹⁾

(1) Stainless steel temperature housing is not recommended with primary element technology A in applications with mechanical vibration.

Rosemount 2051CF physical specifications

Electrical Connections

$1/2$ -14 NPT, $G1/2$, and $M20 \times 1.5$ conduit.

2051CF Process-Wetted Parts

For 2051CFA Wetted Parts-Annubar Sensor Material

- 316 Stainless Steel
- Alloy C-276

For 2051CFC Wetted Parts-Material of Construction

Body/Plate

- 316/316L SST
 - 50 micro-inch Ra surface finish
- Manifold Head/Valves

- 316 SST
- Flange Studs and Nuts

- Customer supplied
 - Available as a spare part
- Transmitter Connection Studs and Nuts

- Studs– A193 Grade B8M.

- Nuts– A194 Grade 8M.
- Gasket and O-rings

- Gaskets are customer supplied.
- Durlon 8500 fiber gaskets are recommended. Consult an Emerson Process Management representative for use with other gaskets.
- Available as a spare part

Note

Gaskets and O-rings should be replaced when the 405 is disassembled.

For 2051CFP Wetted Parts-Material of Construction

Orifice Plate

- 316/316L SST
- Alloy C-276
- Alloy 400

Body

- 316 SST (CF8M), material per ASTM A351
- Pipe Material (If Applicable)

- A312 Gr 316/316L, B622 UNS N10276, Alloy C-276
- Flange

- A182 Gr 316/316L, SB-564 UNS N10276, Alloy C-276

- Flange pressure limits are per ANSI B16.5

- Flange face finish per ANSI B16.5, 125 to 250 RMS
- Body Bolts/Studs

- ASTM A193 Gr B8M studs

- ASTM A193 Gr B8M Class 2 body studs provided for high temperature option code G

Transmitter Connection Studs

- ASTM A193 Gr B8M studs

Gaskets/O-rings

- Glass filled PTFE
- Inconel® X-750 provided for high temperature option code G
- Gaskets and O-rings must be replaced each time the 3051SFP is disassembled for installation or maintenance.

Process Isolating Diaphragms

316L SST, Alloy C-276, or Tantalum

Non-Wetted Parts for 2051CF

Electronics Housing

Low-copper aluminum or CF-8M (Cast version of 316 SST).
Enclosure Type 4X, IP 65, IP 66, IP68

Coplanar Sensor Module Housing

CF-3M (Cast version of 316L SST)

Bolts

ASTM A449, Type 1 (zinc-cobalt plated carbon steel)
ASTM F593G, Condition CW1 (Austenitic 316 SST)
ASTM A193, Grade B7M (zinc plated alloy steel)

Sensor Module Fill Fluid

Silicone oil (D.C. 200) or Fluorocarbon oil (Halocarbon or Fluorinert® FC-43 for 2051T)

Paint

Polyurethane

Cover O-rings

Nitrile Butadiene (NBR)

Rosemount 2051CF product certifications

Approved manufacturing locations

Rosemount Inc. — Chanhassen, Minnesota USA
 Emerson Process Management GmbH & Co. — Wessling, Germany
 Emerson Process Management Asia Pacific Private Limited — Singapore
 Beijing Rosemount Far East Instrument Co., LTD — Beijing, China
 Emerson Process Management LTDA — Sorocaba, Brazil
 Emerson Process Management (India) Pvt. Ltd — Daman, India

European directive information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting an Emerson Process Management representative.

Ordinary Location Certification for Factory Mutual

As standard, the transmitter has been examined and tested to determine that the design meets basic electrical, mechanical, and fire protection requirements by FM, a nationally recognized testing laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

2051CF HART Protocol

Hazardous Locations Certifications

North American Certifications

FM Approvals

- E5** Explosion-Proof and Dust-Ignition-Proof
 Certificate No: 3032938
 Applicable Standards: FM Class 3600 – 1998, FM Class 3615 – 2006, FM Class 3810 – 2005, ANSI/NEMA 250 – 1991, ANSI/IEC 60529 – 2004
 Markings: Explosion-Proof for Class I, Division 1, Groups B, C, and D
 Dust-Ignition-Proof for Class II, Division 1, Groups E, F, G; and Class III, Division 1.
 T5 ($T_a = -50\text{ °C}$ to $+85\text{ °C}$), Factory Sealed, Enclosure Type 4X
- I5** Intrinsically-Safe and Non-incendive
 Certificate No: 3033457
 Applicable Standards: FM Class 3600 – 1998, FM Class 3610 – 2007, FM Class 3611 – 2004, FM Class 3810 – 2005
 Markings: Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1; Class I, Zone 0, AEx ia IIC;
 Nonincendive for use in Class I, Division 2, Groups A, B, C and D; in accordance with Control Drawing 02051-1009 T4 (-50 °C to $+70\text{ °C}$) Enclosure Type 4X
 For input parameters see control drawing 02051-1009.

Special Conditions for Safe Use:

1. The Model 2051 transmitter housing contains aluminum and is considered a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.
2. The Model 2051 transmitter with the transient terminal block (Option code T1) will not pass the 500Vrms dielectric strength test and this must be taken into account during installation.

Canadian Standards Association (CSA)

All CSA hazardous approved transmitters are certified per ANSI/ISA 12.27.01-2003.

- E6** Explosion-Proof, Dust Ignition Proof
 Certificate No: 2041384
 Applicable Standards: CSA Std. C22.2 No. 142 - M1987, CSA Std. C22.2 No. 30 - M1986, CSA Std. C22.2 No. 213 - M1987, CAN/CSA-E60079-0:07, CAN/CSA-E60079-1:07
 Markings: Explosion-Proof for Class I, Division 1, Groups B, C, and D. Dust-Ignition Proof for Class II and Class III, Division 1, Groups E, F, and G. Suitable for Class I, Division 2, Groups A, B, C, and D for indoor and outdoor hazardous locations. Class I Zone 1 Ex d IIC T5. Enclosure type 4X, factory sealed. Single Seal.
- I6** Intrinsically Safe
 Certificate no.: 2041384
 Applicable Standards: CSA Std. C22.2 No. 142 - M1987, CSA Std. C22.2 No. 213 - M1987, CSA Std. C22.2 No. 157 - 92, CSA Std. C22.2 No. 213 - M1987, ANSI/ISA 12.27.01 - 2003, CAN/CSA-E60079-0:07, CAN/CSA-E60079-11:02
 Markings: Intrinsically safe for Class I, Division 1, Groups A, B, C, and D when connected in accordance with Rosemount drawings 02051-1008. Temperature code T3C. Class I Zone 1 Ex ia IIC T3C. Single Seal. Enclosure Type 4X.

European Certifications

- I1** ATEX Intrinsic Safety
 Certificate No: Baseefa08ATEX0129X
 Applicable Standards: EN60079-0:2012, EN60079-11:2012
 Markings: Ⓢ II 1 G Ex ia IIC T4 Ga ($-60\text{ °C} \leq T_a \leq +70\text{ °C}$)
 IP66 IP68
 cE 1180

Table 6. Input Parameters

| |
|----------------------------------|
| $U_i = 30\text{ V}$ |
| $I_i = 200\text{ mA}$ |
| $P_i = 1.0\text{ W}$ |
| $C_i = 0.012\text{ }\mu\text{F}$ |

Table 7. RTD Assembly (2051CFx Option T or R)

| |
|------------------------|
| $U_i = 5 \text{ Vdc}$ |
| $I_i = 500 \text{ mA}$ |
| $P_i = 0.63 \text{ W}$ |

Special Conditions for Safe Use (X):

When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding the 500 V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.

N1 ATEX Type n
 Certification No. Baseefa08ATEX0130X
 Applicable Standards: EN60079-0:2012, EN60079-15:2010

Markings:  II 3 G
 Ex nA IIC T4 Gc ($-40 \text{ }^\circ\text{C} \leq T_a \leq +70 \text{ }^\circ\text{C}$)
 $U_i = 42.4 \text{ Vdc max}$
 IP66
CE

Special Conditions for Safe Use (X):

When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding a 500 V r.m.s. test to case. This must be taken into account on any installation in which it is used, for example by assuring that the supply to the apparatus is galvanically isolated.

E1 ATEX Flame-Proof
 Certification No. KEMA 08ATEX0090X
 Applicable Standards: EN60079-0:2009, IEC60079-0:2011, EN60079-1:2007, EN60079-26:2007
 Markings:  II 1/2 G
 Ex d IIC T6 Ga/Gb ($-50 \text{ }^\circ\text{C} \leq T_a \leq 65 \text{ }^\circ\text{C}$)
 Ex d IIC T5 Ga/Gb ($-50 \text{ }^\circ\text{C} \leq T_a \leq 80 \text{ }^\circ\text{C}$)
 IP66
CE 1180
 $U_i = 42.4 \text{ Vdc}$

Special Conditions for Safe Use (X):

1. Appropriate ex d blanking plugs, cable glands, and wiring needs to be suitable for a temperature of 90 °C.
2. This device contains a thin wall diaphragm. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer’s instructions for maintenance shall be followed in detail to assure safety during its expected lifetime.
3. In case of repair, Contact Emerson Process Management for information on the dimensions of flameproof joints.

ND ATEX Dust
 Certification No. Baseefa08ATEX0182X
 Applicable Standards: EN60079-0:2012, EN60079-31:2009

Markings:  II 1 D Ex t IIC T50 °C T₅₀₀ 60 °C Da
 IP66 IP68
 $U_i = 42.4 \text{ Vdc}$
CE 1180

Special Conditions for Safe Use (X):

If the equipment is fitted with an optional 90 V transient suppressor, it is incapable of isolation from earth test and this must be taken into account during installation.

IECEx Certifications

I7 IECEx Intrinsic Safety
 Certification No. IECExBAS08.0045X
 Applicable Standards: IEC60079-0:2011, IEC60079-11:2011
 Ex ia IIC T4 Ga ($-60 \text{ }^\circ\text{C} \leq T_a \leq +70 \text{ }^\circ\text{C}$)

Table 8. Input Parameters

| |
|------------------------------------|
| $U_i = 30 \text{ V}$ |
| $I_i = 200 \text{ mA}$ |
| $P_i = 1.0 \text{ W}$ |
| $C_i = 0.012 \text{ } \mu\text{F}$ |

Table 9. RTD Assembly (2051CFx Option T or R)

| |
|------------------------|
| $U_i = 5 \text{ Vdc}$ |
| $I_i = 500 \text{ mA}$ |
| $P_i = 0.63 \text{ W}$ |

Special Conditions for Safe Use (X):

When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding the 500V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.

E7 IECEx Flame-Proof
 Certification No. IECEx KEM 08.0024X
 Applicable Standards: IEC60079-0:2011, IEC60079-1:2007-04, IEC60079-26:2006

Ex d IIC T6 Ga/Gb ($-50 \text{ }^\circ\text{C} \leq T_a \leq 65 \text{ }^\circ\text{C}$)
 Ex d IIC T5 Ga/Gb ($-50 \text{ }^\circ\text{C} \leq T_a \leq 80 \text{ }^\circ\text{C}$)
 $U_i = 42.4 \text{ Vdc}$

Special Conditions for Safe Use (X):

1. Appropriate ex d blanking plugs, cable glands, and wiring needs to be suitable for a temperature of 90 °C.
2. This device contains a thin wall diaphragm. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer’s instructions for maintenance shall be followed in detail to assure safety during its expected lifetime.

3. In case of repair, Contact Emerson Process Management for information on the dimensions of flameproof joints.

- N7** IECEx Type 'n'
 Certification No. IECExBAS08.0046X
 Applicable Standards: IEC60079-0: 2011, IEC60079-15: 2010
 Ex nA IIC T4 Gc (-40 °C ≤ T_a ≤ +70 °C)
 U_i = 42.4 Vdc max

Special Conditions for Safe Use (X):

When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding a 500 V r.m.s. test to case. This must be taken into account on any installation in which it is used, for example by assuring that the supply to the apparatus is galvanically isolated.

Inmetro Certifications

- E2** Flame-Proof
 Certificate No: CEPEL 09.1767X
 Ex d IIC T* Ga/Gb IP66
 T6 = -50 °C ≤ Tamb ≤ 65 °C
 T5 = -50 °C ≤ Tamb ≤ 80 °C
- I2** Intrinsic Safety
 Certificate No: CEPEL 09.1768X
 Ex ia IIC T4 Ga (-60 °C ≤ T_{amb} ≤ +70 °C)
 IP66

China (NEPSI) Certifications

- E3** Flameproof
 NEPSI Certificate No.: GYJ101321X
 Applicable Standards: GB3836.1-2000, GB3836.2-2000
 Markings: Ex d II C T5/T6,
 T5: -50 °C □Ta □+80 °C
 T6: -50 °C □Ta □+65 °C

Specific Conditions for Safe Use (X):

1. Symbol "X" is used to denote specific conditions of use:
 - a. The Ex d blanking elements, cable glands and wiring shall be suitable for a temperature of 90°C.
 - b. This device contains a thin wall diaphragm. Installation, maintenance and use shall take into account the environmental conditions to which the diaphragm will be subjected.
2. The relation between T code and ambient temperature range is:

| Transmitter Model | T Code | Temperature Range |
|-----------------------------------|--------|--------------------|
| Using 644 temperature transmitter | T4 | -40 °C □Ta □+65 °C |
| No 644 temperature transmitter | T5 | -50 °C □Ta □+80 °C |
| | T6 | -50 °C □Ta □+65 °C |

3. The earth connection facility in the enclosure should be connected reliably.
4. During installation, use and maintenance of the product, observe the warning "Don't open the cover when the circuit is alive".
5. During installation, there should be no present mixture harmful to the flameproof housing.
6. Cable entry and conduit, certified by NEPSI with type of protection Ex d IIC and appropriate thread form, should be applied when installed in hazardous locations. Blanking elements should be used on the redundant cable entries.
7. End users are not permitted to change any internal components, but to settle the problem in conjunction with the manufacturer to avoid damage to the product.
8. Maintenance should be done in non-hazardous locations.
9. During installation, use and maintenance of this product, observe the following standards:
 - GB3836.13-1997 "Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres"
 - GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)"
 - GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)"
 - GB50257-1996 "Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering".
- I3** Intrinsic Safety
 NEPSI Certificate No.: GYJ101320X
 Applicable Standards: GB3836.1-2000, GB3836.4-2000
 Markings: Ex ia IIC T4
 T4: -60°C □Ta □+70°C

Specific Conditions for Safe Use (X):

1. Symbol "X" is used to denote specific conditions of use:

a. If the apparatus is fitted with an optional 90V transient suppressor, it is not capable of withstanding the 500V insulation test for 1 minute. This must be taken into account when installing the apparatus.

2. The relation between T code and ambient temperature range is:

| Transmitter Model | | T Code | Temperature Range |
|-----------------------------------|------------------|--------|--------------------|
| Using 644 temperature transmitter | | T4 | -40 °C □Ta □+60 °C |
| No 644 temperature transmitter | No FISCO Version | T4 | -60 °C □Ta □+70 °C |
| | FISCO Version | T4 | -60 °C □Ta □+60 °C |

3. Intrinsically safe parameters:

| Transmitter Model | Maximum input voltage: U_i (V) | Maximum input current: I_i (mA) | Maximum input power: P_i (W) | Maximum internal parameters: | |
|---------------------|----------------------------------|-----------------------------------|--------------------------------|------------------------------|------------|
| | | | | C_i (nF) | L_i (μH) |
| 4-20mA HART | 30 | 200 | 1 | 12 | 0 |
| FOUNDATION Fieldbus | 30 | 300 | 1.3 | 0 | 0 |
| FISCO | 17.5 | 380 | 5.32 | 0 | 0 |

Note

FISCO parameters apply to both Group IIC and IIB.

When 644 temperature transmitter is used, the 644 temperature transmitter should be used with Ex-certified associated apparatus to establish an explosion protection system that can be used in explosive gas atmospheres. Wiring and terminals should comply with the instruction manual of both 644 temperature transmitter and associated apparatus. The cables between 644 temperature transmitter and associated apparatus should be shielded cables (the cables must have an insulated shield). The shield has to be grounded reliably in a non-hazardous area.

4. 2051CF series Flowmeter comply with the requirements for FISCO field devices specified in IEC60079-27:2008. For the connection of an intrinsically safe circuit in accordance to the FISCO model, FISCO parameters of 2051CF series Flowmeter are listed in the table above.

5. The product should be used with Ex-certified associated apparatus to establish an explosion protection system that can be used in explosive gas atmospheres. Wiring and terminals should comply with the instruction manual of the product and associated apparatus.

6. The cables between this product and associated apparatus should be shielded cables (the cables must have insulated shields). The shield has to be grounded reliably in a non-hazardous area.

7. End users are not permitted to change any internal components, but to settle the problem in conjunction with the manufacturer to avoid damage to the product.

8. During installation, use and maintenance of this product, observe the following standards:

GB3836.13-1997 “Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”

GB3836.15-2000 “Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)”

GB3836.16-2006 “Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)”

GB50257-1996 “Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering”.

Combinations of Certifications

Stainless steel certification tag is provided when optional approval is specified. Once a device labeled with multiple approval types is installed, it should not be reinstalled using any other approval types. Permanently mark the approval label to distinguish it from unused approval types.

- K1** E1, I1, N1, and ND combination
- K5** E5 and I5 combination
- K6** I6 and E6 combination
- K7** E7, I7, and N7 combination
- KA** E1, I1, E6, and I6 combination
- KB** E5, I5, E6, and I6 combination
- KC** E1, I1, E5, and I5 combination
- KD** E1, I1, E5, I5, E6, and I6 combination

2051CF Fieldbus Protocol

Hazardous Locations Certifications

North American Certifications

FM Approvals

E5 Explosion-Proof and Dust-Ignition-Proof
 Certificate No: 3032938
 Applicable Standards: FM Class 3600 – 1998, FM Class 3615 – 2006, FM Class 3810 – 2005, ANSI/NEMA 250 – 1991, ANSI/IEC 60529 – 2004
 Markings: Explosion-Proof for Class I, Division 1, Groups B, C, and D
 Dust-Ignition-Proof for Class II, Division 1, Groups E, F, G; and Class III, Division 1.
 T5 ($T_a = -50^\circ\text{C}$ to $+85^\circ\text{C}$), Factory Sealed, Enclosure Type 4X

IE/IS Intrinsically Safe and Non-incendive
 Certificate No.: 3033457
 Applicable Standards: FM Class 3600-1998, FM Class 3610-2007, FM Class 3611-2004, FM Class 3810-2005
 Markings: Intrinsically Safe for use in Class I, Division 1, Groups A, B, C and D; Class II, Division 1, Groups E, F and G; Class III, Division 1; Class I, Zone 0, AEx ia IIC; Nonincendive for use in Class I, Division 2, Groups A, B, C and D; in accordance with Control Drawing 02051-1009.

For FOUNDATION fieldbus and PROFIBUS PA, Temperature Code: T4 ($T_a = -50^\circ\text{C}$ to $+70^\circ\text{C}$)

For FISCO,
 Temperature Code: T4 ($T_a = -50^\circ\text{C}$ to $+60^\circ\text{C}$)

Enclosure Type 4X
 For input parameters see control drawing 02051-1009.

Canadian Standards Association (CSA)

All CSA hazardous approved transmitters are certified per ANSI/ISA 12.27.01-2003.

E6 Explosion-Proof, Dust Ignition Proof
 Certificate No: 2041384
 Applicable Standards: CSA Std. C22.2 No. 142 - M1987, CSA Std. C22.2 No. 30 - M1986, CSA Std. C22.2 No. 213 - M1987, CAN/CSA-E60079-0:07, CAN/CSA-E60079-1:07
 Markings: Explosion-Proof for Class I, Division 1, Groups B, C, and D. Dust-Ignitions Proof for Class II and Class III, Division 1, Groups E, F, and G. Suitable for Class I, Division 2, Groups A, B, C, and D for indoor and outdoor hazardous locations. Class I Zone 1 Ex d IIC T5. Enclosure type 4X, factory sealed. Single Seal.

I6/IF Intrinsically Safe

Certificate no.: 2041384

Applicable Standards: CSA Std. C22.2 No. 142 - M1987, CSA Std. C22.2 No. 213 - M1987, CSA Std. C22.2 No. 157 - 92, CSA Std. C22.2 No. 213 - M1987, ANSI/ISA 12.27.01 - 2003, CAN/CSA-E60079-0:07, CAN/CSA-E60079-11:02

Markings: Intrinsically safe for Class I, Division 1, Groups A, B, C, and D when connected in accordance with Rosemount drawings 02051-1008. Temperature code T3C. Class I Zone 1 Ex ia IIC T3C. Single Seal. Enclosure Type 4X.

European Certifications

I1 ATEX Intrinsic Safety
 Certificate No: Baseefa08ATEX0129X
 Applicable Standards: EN60079-0:2012, EN60079-11:2012
 Markings:  II 1 G Ex ia IIC T4 Ga ($-60^\circ\text{C} \leq T_a \leq +70^\circ\text{C}$)
 IP66 IP68

Table 10. Input Parameters

| |
|------------------------------|
| $U_i = 30\text{ V}$ |
| $I_i = 300\text{ mA}$ |
| $P_i = 1.3\text{ W}$ |
| $C_i = 0\text{ }\mu\text{F}$ |

Table 11. RTD Assembly (2051CFx Option T or R)

| |
|-----------------------|
| $U_i = 5\text{ Vdc}$ |
| $I_i = 500\text{ mA}$ |
| $P_i = 0.63\text{ W}$ |

Special Conditions for Safe Use (X):

When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding the 500 V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.

IA ATEX FISCO Intrinsic Safety
 Certificate No: Baseefa08ATEX0129X
 Applicable Standards: EN60079-0:2012, EN60079-11:2012
 Markings:  II 1 G Ex ia IIC T4 Ga ($-60^\circ\text{C} \leq T_a \leq +60^\circ\text{C}$)
 IP66 IP68
 1180

Table 12. Input Parameters

| |
|---------------------------------------|
| $U_i = 30\text{ V}$ |
| $I_i = 200\text{ mA}$ |
| $P_i = 1.0\text{ W}$ |
| $C_i = \leq 0.012\text{ }\mu\text{F}$ |

Table 13. RTD Assembly (2051CFx Option T or R)

| |
|------------------------|
| $U_i = 5 \text{ Vdc}$ |
| $I_i = 500 \text{ mA}$ |
| $P_i = 0.63 \text{ W}$ |

Special Conditions for Safe Use (X):

When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding the 500 V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.

- N1** ATEX Type n
 Certification No. Baseefa08ATEX0130X
 Applicable Standards: EN60079-0:2012, EN60079-15:2010
 Markings: Ⓔ II 3 G
 Ex nA IIC T4 Gc ($-40^\circ\text{C} \leq T_a \leq +70^\circ\text{C}$)
 $U_i = 42.4 \text{ Vdc max}$
 IP66 **CE**

Special Conditions for Safe Use (X):

When the optional transient protection terminal block is installed, the apparatus is not capable of withstanding a 500 V r.m.s. test to case. This must be taken into account on any installation in which it is used, for example by assuring that the supply to the apparatus is galvanically isolated.

- E1** ATEX Flame-Proof
 Certification No. KEMA 08ATEX0090X
 Applicable Standards: EN60079-0:2009, IEC60079-0:2011, EN60079-1:2007, EN60079-26:2007
 Markings: Ⓔ II 1/2 G
 Ex d IIC T6 Ga/Gb ($-50^\circ\text{C} \leq T_a \leq 65^\circ\text{C}$)
 Ex d IIC T5 Ga/Gb ($-50^\circ\text{C} \leq T_a \leq 80^\circ\text{C}$)
 IP66
CE 1180
 $U_i = 32 \text{ Vdc}$

Special Conditions for Safe Use (X):

1. Appropriate ex d blanking plugs, cable glands, and wiring needs to be suitable for a temperature of 90 °C.
2. This device contains a thin wall diaphragm. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer’s instructions for maintenance shall be followed in detail to assure safety during its expected lifetime.
3. In case of repair, Contact Emerson Process Management for information on the dimensions of flameproof joints.

- ND** ATEX Dust
 Certification No. Baseefa08ATEX0182X
 Applicable Standards: EN60079-0:2012, EN60079-31:2009
 Markings: Ⓔ II 1 D Ex t IIC T50 °C T₅₀₀ 60 °C Da
 IP66 IP68
 $U_i = 42.4 \text{ Vdc}$
CE 1180

Special Conditions for Safe Use (X):

If the equipment is fitted with an optional 90 V transient suppressor, it is incapable of isolation from earth test and this must be taken into account during installation.

IECEx Certifications

- I7** IECEx Intrinsic Safety
 Certification No. IECExBAS08.0045X
 Applicable Standards: IEC60079-0:2011, IEC60079-11:2011
 Ex ia IIC T4 Ga ($-60^\circ\text{C} \leq T_a \leq +70^\circ\text{C}$)

Table 14. Input Parameters

| |
|------------------------|
| $U_i = 30 \text{ V}$ |
| $I_i = 300 \text{ mA}$ |
| $P_i = 1.3 \text{ W}$ |
| $C_i = 0 \mu\text{F}$ |

Table 15. RTD Assembly (2051CFx Option T or R)

| |
|------------------------|
| $U_i = 5 \text{ Vdc}$ |
| $I_i = 500 \text{ mA}$ |
| $P_i = 0.63 \text{ W}$ |

Special Conditions for Safe Use (X):

The device is not capable of withstanding the 500 V insulation test required by IEC60079-11. This must be taken into account when installing the apparatus.

- IG** IECEx FISCO Intrinsic Safety
 Certification No. IECExBAS08.0045X
 Applicable Standards: IEC60079-0:2011, IEC60079-11:2011
 Ex ia IIC T4 Ga ($-60^\circ\text{C} \leq T_a \leq +60^\circ\text{C}$)
 IP66
CE 1180

Table 16. Input Parameters

| |
|-----------------------------|
| $U_i = 17.5 \text{ V}$ |
| $I_i = 380 \text{ mA}$ |
| $P_i = 5.32 \text{ W}$ |
| $C_i = \leq 5 \mu\text{F}$ |
| $L_i = \leq 10 \mu\text{H}$ |

Table 17. RTD Assembly (2051CFx Option T or R)

| |
|------------------------|
| $U_i = 5 \text{ Vdc}$ |
| $I_i = 500 \text{ mA}$ |
| $P_i = 0.63 \text{ W}$ |

Special Conditions for Safe Use (X):

The device is not capable of withstanding the 500 V insulation test required by IEC 60079-11. This must be taken into account when installing the apparatus.

- E7** IECEx Flame-Proof
 Certification No. IECEx KEM 08.0024X
 Applicable Standards: IEC60079-0:2011, IEC60079-1:2007-04, IEC60079-26:2006
 Ex d IIC T6 Ga/Gb ($-50 \text{ }^\circ\text{C} \leq T_a \leq 65 \text{ }^\circ\text{C}$)
 Ex d IIC T5 Ga/Gb ($-50 \text{ }^\circ\text{C} \leq T_a \leq 80 \text{ }^\circ\text{C}$)
 $U_i = 32 \text{ Vdc}$

Special Conditions for Safe Use (X):

1. Appropriate ex d blanking plugs, cable glands, and wiring needs to be suitable for a temperature of 90 °C.
2. This device contains a thin wall diaphragm. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer’s instructions for maintenance shall be followed in detail to assure safety during its expected lifetime.
3. In case of repair, Contact Emerson Process Management for information on the dimensions of flameproof joints.

- N7** IECEx Type 'n'
 Certification No. IECExBAS08.0046X
 Applicable Standards: IEC60079-0: 2011, IEC60079-15: 2010
 Ex nA IIC T4 Gc ($-40 \text{ }^\circ\text{C} \leq T_a \leq +70 \text{ }^\circ\text{C}$)
 $U_i = 42.4 \text{ Vdc max}$

Special Conditions for Safe Use (X):

The device is not capable of withstanding the 500 V insulation test required by IEC60079-15. This must be taken into account when installing the device.

Inmetro Certifications

- E2** Flameproof
 Certificate No: CEPEL 09.1767X
 Ex d IIC T* Ga/Gb IP66
 $T6 = -50 \text{ }^\circ\text{C} < T_{amb} < 65 \text{ }^\circ\text{C}$
 $T5 = -50 \text{ }^\circ\text{C} < T_{amb} < 80 \text{ }^\circ\text{C}$
- I2** Intrinsic Safety
 Certificate No: CEPEL 09.1768X
 Ex ia IIC T4 Ga ($-60 \text{ }^\circ\text{C} \leq T_{amb} \leq 70 \text{ }^\circ\text{C}$)
 IP66

- IB** FISCO Intrinsic Safety
 Certificate No: CEPEL 09.1768X
 Ex ia IIC T4 Ga ($-60 \text{ }^\circ\text{C} \leq T_{amb} \leq 60 \text{ }^\circ\text{C}$)
 IP66

China (NEPSI) Certifications

- E3** Flameproof
 NEPSI Certificate No.: GYJ101321X
 Applicable Standards: GB3836.1-2000, GB3836.2-2000
 Markings: Ex d IIC T5/T6,
 $T5: -50 \text{ }^\circ\text{C} \square Ta \square +80 \text{ }^\circ\text{C}$
 $T6: -50 \text{ }^\circ\text{C} \square Ta \square +65 \text{ }^\circ\text{C}$

Special Conditions for Safe Use (X):

1. Symbol “X” is used to denote specific conditions of use:
 - a. The Ex d blanking elements, cable glands and wiring shall be suitable for a temperature of 90°C.
 - b. This device contains a thin wall diaphragm. Installation, maintenance and use shall take into account the environmental conditions to which the diaphragm will be subjected.
2. The relation between T code and ambient temperature range is

| Transmitter Model | T Code | Temperature Range |
|-----------------------------------|--------|--|
| Using 644 temperature transmitter | T4 | $-40 \text{ }^\circ\text{C} \square Ta \square +65 \text{ }^\circ\text{C}$ |
| No 644 temperature transmitter | T5 | $-50 \text{ }^\circ\text{C} \square Ta \square +80 \text{ }^\circ\text{C}$ |
| | T6 | $-50 \text{ }^\circ\text{C} \square Ta \square +65 \text{ }^\circ\text{C}$ |

3. The earth connection facility in the enclosure should be connected reliably.
4. During installation, use and maintenance of the product, observe the warning “Don’t open the cover when the circuit is alive”.
5. During installation, there should be no present mixture harmful to the flameproof housing.
6. Cable entry and conduit, certified by NEPSI with type of protection Ex d IIC and appropriate thread form, should be applied when installed in hazardous locations. Blanking elements should be used on the redundant cable entries.
7. End users are not permitted to change any internal components, but to settle the problem in conjunction with the manufacturer to avoid damage to the product.
8. Maintenance should be done in non-hazardous locations.
9. During installation, use and maintenance of this product, observe the following standards:

GB3836.13-1997 “Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”

GB3836.15-2000 “Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)”

GB3836.16-2006 “Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)”

GB50257-1996 “Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering”.

I3 Intrinsic Safety

NEPSI Certificate No.: GYJ101320X

Applicable Standards: GB3836.1-2000, GB3836.4-2000

Markings: Ex ia IIC T4

T4: -60°C □Ta □+70°C

T4: -60°C □Ta □+60°C (FISCO)

Specific Conditions for Safe Use (X):

1. Symbol “X” is used to denote specific conditions of use:
 - a. If the apparatus is fitted with an optional 90V transient suppressor, it is not capable of withstanding the 500V insulation test for 1 minute. This must be taken into account when installing the apparatus.
2. The relation between T code and ambient temperature range is:

| Transmitter Model | | T Code | Temperature Range |
|-----------------------------------|------------------|--------|----------------------|
| Using 644 temperature transmitter | | T4 | -40 °C ≤ Ta ≤ +60 °C |
| No 644 temperature transmitter | No FISCO Version | T4 | -60 °C ≤ Ta ≤ +70 °C |
| | FISCO Version | T4 | -60 °C ≤ Ta ≤ +60 °C |

3. Intrinsically safe parameters:

| Transmitter Model | Maximum input voltage: U _i (V) | Maximum input current: I _i (mA) | Maximum input power: P _i (W) | Maximum internal parameters: | |
|---------------------|---|--|---|------------------------------|---------------------|
| | | | | C _i (nF) | L _i (μH) |
| 4-20mA HART | 30 | 200 | 1 | 12 | 0 |
| FOUNDATION Fieldbus | 30 | 300 | 1.3 | 0 | 0 |
| FISCO | 17.5 | 380 | 5.32 | 0 | 0 |

Note

FISCO parameters apply to both Group IIC and IIB.

When 644 temperature transmitter is used, the 644 temperature transmitter should be used with Ex-certified associated apparatus to establish an explosion protection system that can be used in explosive gas atmospheres. Wiring and terminals should comply with the instruction manual of both 644 temperature transmitter and associated apparatus. The cables between 644 temperature transmitter and associated apparatus should be shielded cables (the cables must have an insulated shield). The shield has to be grounded reliably in a non-hazardous area.

4. 2051CF series Flowmeter comply with the requirements for FISCO field devices specified in IEC60079-27:2008. For the connection of an intrinsically safe circuit in accordance to the FISCO model, FISCO parameters of 2051CF series Flowmeter are listed in the table above.

5. The product should be used with Ex-certified associated apparatus to establish an explosion protection system that can be used in explosive gas atmospheres. Wiring and terminals should comply with the instruction manual of the product and associated apparatus.

6. The cables between this product and associated apparatus should be shielded cables (the cables must have insulated shields). The shield has to be grounded reliably in a non-hazardous area.

7. End users are not permitted to change any internal components, but to settle the problem in conjunction with the manufacturer to avoid damage to the product.

8. During installation, use and maintenance of this product, observe the following standards:

GB3836.13-1997 “Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”

GB3836.15-2000 “Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)”

GB3836.16-2006 “Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)”

GB50257-1996 “Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering”.

Combinations of Certifications

Stainless steel certification tag is provided when optional approval is specified. Once a device labeled with multiple approval types is installed, it should not be reinstalled using any other approval types. Permanently mark the approval label to distinguish it from unused approval types.

- K1** E1, I1, N1, and ND combination
- K5** E5 and I5 combination
- K6** I6 and E6 combination
- K7** E7, I7, and N7 combination
- KA** E1, I1, E6, and I6 combination
- KB** E5, I5, E6, and I6 combination
- KC** E1, I1, E5, and I5 combination
- KD** E1, I1, E5, I5, E6, and I6 combination

Pipe I.D. Range Code

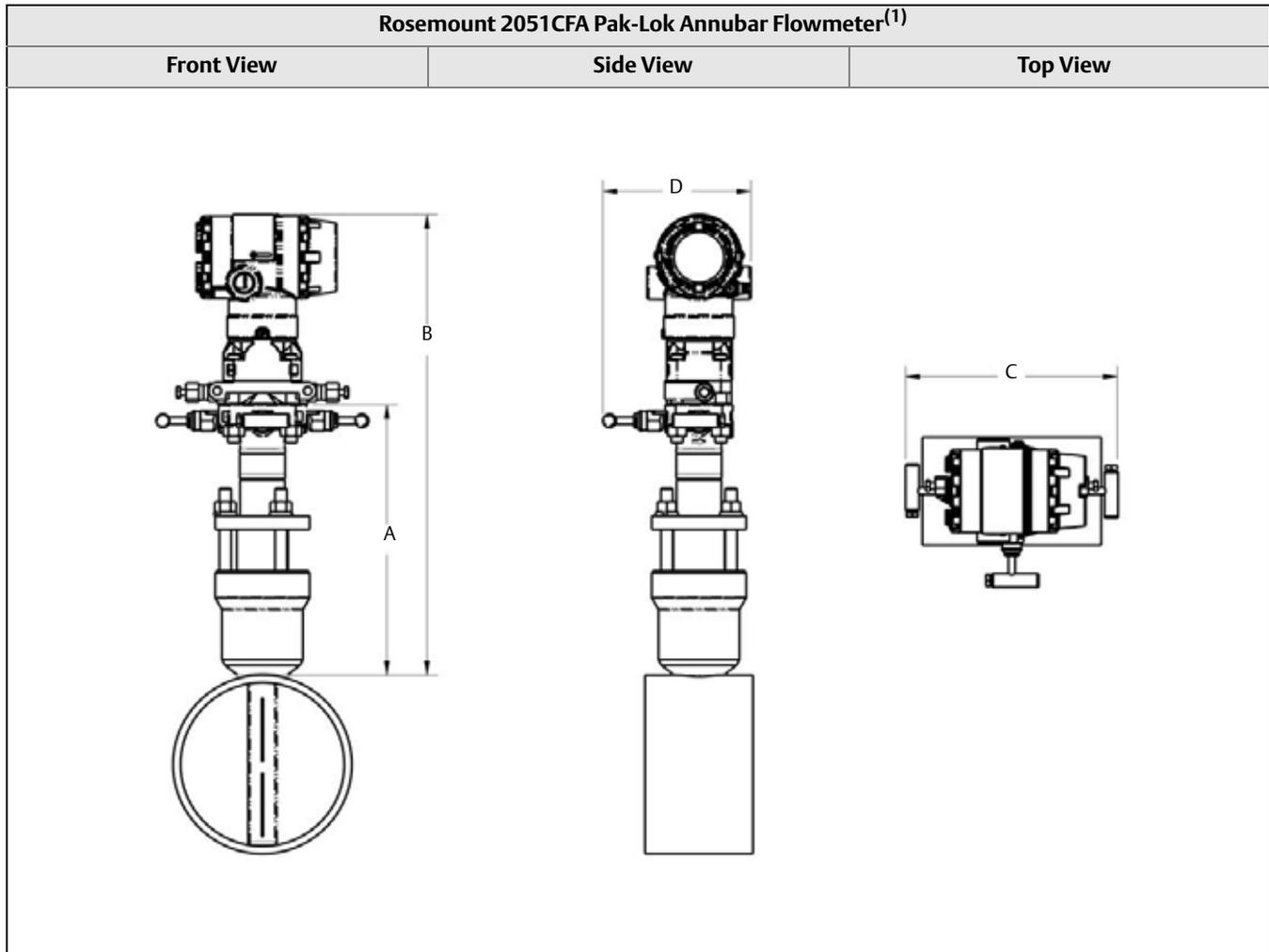
For pipes with an Inner Diameter (I.D.) Range / Pipe Wall Thickness not found in this table or with a line size greater than 12-in. (300 mm), choose option code Z and specify the exact pipe dimensions (I.D. and Pipe Wall Thickness) on the Configuration Data Sheet (See document 00806-0100-4010). The Emerson process Management sizing program will determine this code, based on the application piping.

| | Line Size | | | Inner Diameter (I.D.) Range | Pipe Wall Thickness | | I.D. Range Code |
|------------------------|--------------------------|-----------|--|--|-------------------------------------|----------------|-----------------|
| | Nominal | Max. O.D. | Option Code | | ANSI Pipes | Non-ANSI Pipes | |
| 2-in. (50 mm) | 2.625-in. (66.68 mm) | 020 | 1.784 to 1.841-in. (45.31 to 46.76 mm) | 0.065 to 0.545-in. (1.7 to 13.8 mm) | 0.065 to 0.488-in. (1.7 to 12.4 mm) | A | |
| | | | 1.842 to 1.938-in. (46.79 to 49.23 mm) | | 0.065 to 0.449-in. (1.7 to 11.4 mm) | B | |
| | | | 1.939 to 2.067-in. (49.25 to 52.50 mm) | | 0.065 to 0.417-in. (1.7 to 10.6 mm) | C | |
| | | | 2.068 to 2.206-in. (52.53 to 56.03 mm) | | 0.065 to 0.407-in. (1.7 to 10.3 mm) | D | |
| 2 1/2-in. (63.5 mm) | 3.188-in. (80.98 mm) | 025 | 2.207 to 2.322-in. (56.06 to 58.98 mm) | 0.083 to 0.563-in. (2.1 to 14.3 mm) | 0.083 to 0.448-in. (2.1 to 11.4 mm) | B | |
| | | | 2.323 to 2.469-in. (59.00 to 62.71 mm) | | 0.083 to 0.417-in. (2.1 to 10.6 mm) | C | |
| | | | 2.470 to 2.598-in. (62.74 to 65.99 mm) | | 0.083 to 0.435-in. (2.1 to 11.0 mm) | D | |
| | | | 2.599 to 2.647-in. (66.01 to 67.23 mm) | | 0.083 to 0.515-in. (2.1 to 13.1 mm) | E | |
| 3-in. (80 mm) | 3.75-in. (95.25 mm) | 030 | 2.648 to 2.751-in. (67.26 to 69.88 mm) | 0.083 to 0.563-in. (2.1 to 14.3 mm) | 0.083 to 0.460-in. (2.1 to 11.7 mm) | A | |
| | | | 2.752 to 2.899-in. (69.90 to 73.63 mm) | | 0.083 to 0.416-in. (2.1 to 10.6 mm) | B | |
| | | | 2.900 to 3.068-in. (73.66 to 77.93 mm) | | 0.083 to 0.395-in. (2.1 to 10.0 mm) | C | |
| | | | 3.069 to 3.228-in. (77.95 to 81.99 mm) | | 0.083 to 0.404-in. (2.1 to 10.3 mm) | D | |
| 3 1/2-in. (89 mm) | 4.25-in. (107.95 mm) | 035 | 3.229 to 3.333-in. (82.02 to 84.66 mm) | 0.120 to 0.600-in. (3.0 to 15.2 mm) | 0.120 to 0.496-in. (3.0 to 12.6 mm) | B | |
| | | | 3.334 to 3.548-in. (84.68 to 90.12 mm) | | 0.120 to 0.386-in. (3.0 to 9.8 mm) | C | |
| | | | 3.549 to 3.734-in. (90.14 to 94.84 mm) | | 0.120 to 0.415-in. (3.0 to 10.5 mm) | D | |
| 4-in. (100 mm) | 5.032-in. (127.81 mm) | 040 | 3.735 to 3.825-in. (94.87 to 97.16 mm) | 0.120 to 0.600-in. (3.0 to 15.2 mm) | 0.120 to 0.510-in. (3.0 to 13.0 mm) | B | |
| | | | 3.826 to 4.026-in. (97.18 to 102.26 mm) | | 0.120 to 0.400-in. (3.0 to 10.2 mm) | C | |
| | | | 4.027 to 4.237-in. (102.29 to 107.62 mm) | | 0.120 to 0.390-in. (3.0 to 9.9 mm) | D | |
| | | | 4.238 to 4.437-in. (107.65 to 112.70 mm) | | 0.120 to 0.401-in. (3.0 to 10.2 mm) | E | |
| 5-in. (125 mm) | 6.094-in. (154.79 mm) | 050 | 4.438 to 4.571-in. (112.73 to 116.10 mm) | 0.134 to 0.614-in. (3.4 to 15.6 mm) | 0.134 to 0.481-in. (3.4 to 12.2 mm) | A | |
| | | | 4.572 to 4.812-in. (116.13 to 122.22 mm) | | 0.134 to 0.374-in. (3.4 to 9.5 mm) | B | |
| | | | 4.813 to 5.047-in. (122.25 to 128.19 mm) | | 0.134 to 0.380-in. (3.4 to 9.7 mm) | C | |
| | | | 5.048 to 5.249-in. (128.22 to 133.32 mm) | | 0.134 to 0.413-in. (3.4 to 10.5 mm) | D | |

| | | | | | | | |
|---------------|----------------|-----------------------|-----|--|-------------------------------------|-------------------------------------|---|
| Sensor Size 1 | 6-in. (150 mm) | 6.93-in. (176.02 mm) | 060 | 5.250 to 5.472-in. (133.35 to 138.99 mm) | 0.134 to 0.614-in. (3.4 to 15.6 mm) | 0.134 to 0.3919-in. (3.4 to 9.9 mm) | A |
| | | | | 5.473 to 5.760-in. (139.01 to 146.30 mm) | | 0.134 to 0.327-in. (3.4 to 8.3 mm) | B |
| | | | | 5.761 to 6.065-in. (146.33 to 154.05 mm) | | 0.134 to 0.31-in. (3.4 to 7.9 mm) | C |
| | | | | 6.066 to 6.383-in. (154.08 to 162.13 mm) | | 0.134 to 0.297-in. (3.4 to 7.5 mm) | D |
| Sensor Size 2 | 6-in. (150 mm) | 6.93-in. (176.02 mm) | 060 | 5.250 to 5.472-in. (133.35 to 139.99 mm) | 0.134 to 1.354-in. (3.4 to 34.4 mm) | 0.134 to 1.132-in. (3.4 to 28.7 mm) | A |
| | | | | 5.473 to 5.760-in. (139.01 to 146.30 mm) | | 0.134 to 1.067-in. (3.4 to 27.1 mm) | B |
| | | | | 5.761 to 6.065-in. (146.33 to 154.05 mm) | | 0.134 to 1.05-in. (3.4 to 26.7 mm) | C |
| | | | | 6.066 to 6.383-in. (154.08 to 162.13 mm) | | 0.134 to 1.037-in. (3.4 to 26.3 mm) | D |
| Sensor Size 1 | 7-in. (180 mm) | 7.93-in. (201.42 mm) | 070 | 6.384 to 6.624-in. (162.15 to 168.25 mm) | 0.134 to 0.614-in. (3.4 to 15.6 mm) | 0.134 to 0.374-in. (3.4 to 9.5 mm) | B |
| | | | | 6.625 to 7.023-in. (168.28 to 178.38 mm) | | 0.134 to 0.216-in. (3.4 to 5.5 mm) | C |
| | | | | 7.024 to 7.392-in. (178.41 to 187.76 mm) | | 0.134 to 0.246-in. (3.4 to 6.2 mm) | D |
| Sensor Size 2 | 7-in. (180 mm) | 7.93-in. (201.42 mm) | 070 | 6.384 to 6.624-in. (162.15 to 168.25 mm) | 0.134 to 1.354-in. (3.4 to 34.4 mm) | 0.134 to 1.114-in. (3.4 to 28.3 mm) | B |
| | | | | 6.625 to 7.023-in. (168.28 to 178.38 mm) | | 0.134 to 0.956-in. (3.4 to 24.3 mm) | C |
| | | | | 7.024 to 7.392-in. (178.41 to 187.76 mm) | | 0.134 to 0.986-in. (3.4 to 25.0 mm) | D |
| Sensor Size 1 | 8-in. (200 mm) | 9.688-in. (246.08 mm) | 080 | 7.393 to 7.624-in. (187.78 to 193.65 mm) | 0.250 to 0.73-in. (6.4 to 18.5 mm) | 0.250 to 0.499-in. (6.4 to 12.6 mm) | B |
| | | | | 7.625 to 7.981-in. (193.68 to 202.72 mm) | | 0.250 to 0.374-in. (6.4 to 9.5 mm) | C |
| | | | | 7.982 to 8.400-in. (202.74 to 213.36 mm) | | 0.250 to 0.312-in. (6.4 to 7.9 mm) | D |
| | | | | 8.401 to 8.766-in. (213.39 to 222.66 mm) | | 0.250 to 0.364-in. (6.4 to 9.2 mm) | E |
| Sensor Size 2 | 8-in. (200 mm) | 9.688-in. (246.08 mm) | 080 | 7.393 to 7.624-in. (187.78 to 193.65 mm) | 0.250 to 1.47-in. (6.4 to 37.3 mm) | 0.250 to 1.239-in. (6.4 to 31.4 mm) | B |
| | | | | 7.625 to 7.981-in. (193.68 to 202.72 mm) | | 0.250 to 1.114-in. (6.4 to 28.3 mm) | C |
| | | | | 7.982 to 8.400-in. (202.74 to 213.36 mm) | | 0.250 to 1.052-in. (6.4 to 26.7 mm) | D |
| | | | | 8.401 to 8.766-in. (213.39 to 222.66 mm) | | 0.250 to 1.104-in. (6.4 to 28.0 mm) | E |

| | | | | | | |
|--------------------|----------------------------|-----|--|--|-------------------------------------|---|
| 10-in. (250 mm) | 11.75-in. (298.45 mm) | 100 | 8.767 to 9.172-in. (222.68 to 232.97 mm) | 0.250 to 1.470-in. (6.4 to 37.3 mm) | 0.250 to 1.065-in. (6.4 to 27.1 mm) | A |
| | | | 9.173 to 9.561-in. (232.99 to 242.85 mm) | | 0.250 to 1.082-in. (6.4 to 27.5 mm) | B |
| | | | 9.562 to 10.020-in. (242.87 to 254.51 mm) | | 0.250 to 1.012-in. (6.4 to 25.7 mm) | C |
| | | | 10.021 to 10.546-in. (254.53 to 267.87 mm) | | 0.250 to 0.945-in. (6.4 to 24.0 mm) | D |
| | | | 10.547 to 10.999-in. (267.89 to 279.37 mm) | | 0.250 to 1.018-in. (6.4 to 25.9 mm) | E |
| 12-in. (300 mm) | 13.0375-in. (331.15 mm) | 120 | 11.000 to 11.373-in. (279.40 to 288.87 mm) | 0.250 to 1.470-in. (6.4 to 37.3 mm) | 0.250 to 1.097-in. (6.4 to 27.9 mm) | B |
| | | | 11.374 to 11.938-in. (288.90 to 303.23 mm) | | 0.250 to 0.906-in. (6.4 to 23.0 mm) | C |
| | | | 11.939 to 12.250-in. (303.25 to 311.15 mm) | | 0.250 to 1.159-in. (6.4 to 29.4 mm) | D |

Dimensional drawings



(1) The Pak-Lok Annubar model is available up to 600# ANSI (1440 psig at 100 °F (99 bar at 38 °C)).

Table 18. 2051CFA Pak-Lok Annubar Dimensional Data

| Sensor Size | A (Max) | B (Max) | C (Max) | D (Max) |
|-------------|---------------|---------------|--------------|--------------|
| 1 | 8.50 (215.9) | 14.55 (369.6) | 9.00 (228.6) | 6.00 (152.4) |
| 2 | 11.00 (279.4) | 16.30 (414.0) | 9.00 (228.6) | 6.00 (152.4) |
| 3 | 12.00 (304.8) | 19.05 (483.9) | 9.00 (228.6) | 6.00 (152.4) |

Dimensions are in inches (millimeters)

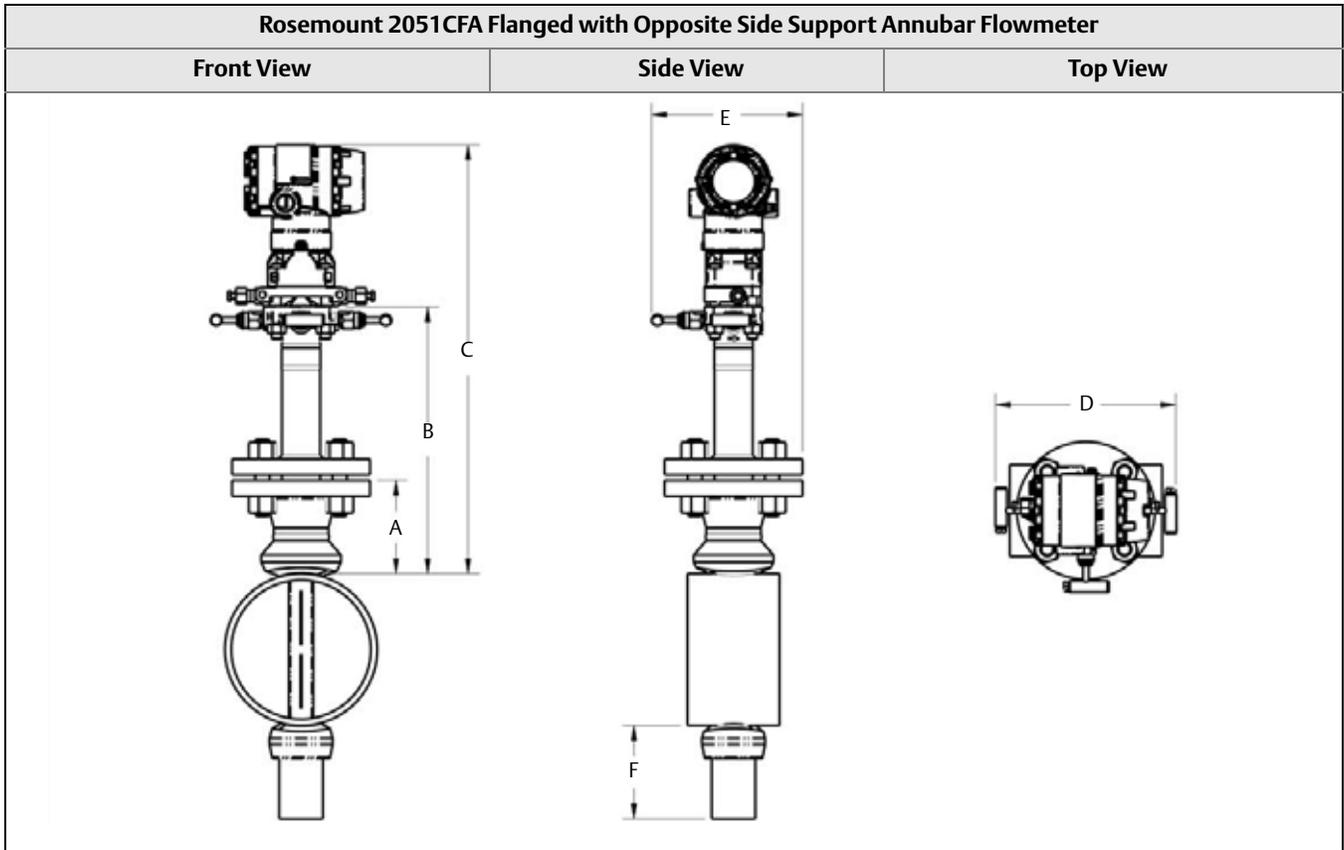


Table 19. 2051CFA Flanged Annubar Dimensional Data

| Sensor Size | Flange Size and Rating | A ± 0.125 (3.2) | B ± 0.25 (6.4) | C ± 0.25 (6.4) | D (Max) | E (Max) | F (Max) |
|-------------|---------------------------------------|-----------------|----------------|----------------|--------------|--------------|--------------|
| 1 | 1 ¹ / ₂ – 150# | 3.88 (98.6) | 11.00 (279.4) | 18.03 (458.0) | 9.00 (228.6) | 6.30 (160.0) | 3.50 (88.9) |
| 1 | 1 ¹ / ₂ – 300# | 4.13 (104.9) | 11.00 (279.4) | 18.03 (458.0) | 9.00 (228.6) | 6.86 (174.2) | 3.50 (88.9) |
| 1 | 1 ¹ / ₂ – 600# | 4.44 (112.8) | 11.00 (279.4) | 18.03 (458.0) | 9.00 (228.6) | 6.86 (174.2) | 3.50 (88.9) |
| 1 | DN40/PN16 | 3.09 (78.5) | 11.00 (279.4) | 18.03 (458.0) | 9.00 (228.6) | 6.30 (160.0) | 3.50 (88.9) |
| 1 | DN40/PN40 | 3.21 (81.5) | 11.00 (279.4) | 18.03 (458.0) | 9.00 (228.6) | 6.86 (174.2) | 3.50 (88.9) |
| 1 | DN40/ PN100 | 3.88 (98.6) | 11.00 (279.4) | 18.03 (458.0) | 9.00 (228.6) | 6.86 (174.2) | 3.50 (88.9) |
| 1 | 1 ¹ / ₂ – 900# | 4.94 (125.5) | 9.31 (236.5) | - | - | - | 3.50 (88.9) |
| 1 | 1 ¹ / ₂ – 1500# | 4.94 (125.5) | 9.31 (236.5) | - | - | - | 3.50 (88.9) |
| 1 | 1 ¹ / ₂ – 2500# | 6.76 (171.7) | 11.63 (295.4) | - | - | - | 4.00 (101.6) |
| 2 | 2 – 150# | 4.13 (104.9) | 12.00 (304.8) | 19.03 (483.4) | 9.00 (228.6) | 6.30 (160.0) | 5.00 (127.0) |
| 2 | 2 – 300# | 4.38 (111.3) | 12.00 (304.8) | 19.03 (483.4) | 9.00 (228.6) | 6.86 (174.2) | 5.00 (127.0) |
| 2 | 2 – 600# | 4.75 (120.7) | 12.00 (304.8) | 19.03 (483.4) | 9.00 (228.6) | 6.86 (174.2) | 5.00 (127.0) |
| 2 | DN50/PN16 | 3.40 (86.4) | 12.00 (304.8) | 19.03 (483.4) | 9.00 (228.6) | 6.30 (160.0) | 5.00 (127.0) |
| 2 | DN50/PN40 | 3.52 (89.4) | 12.00 (304.8) | 19.03 (483.4) | 9.00 (228.6) | 6.86 (174.2) | 5.00 (127.0) |
| 2 | DN50/ PN100 | 4.30 (109.2) | 12.00 (304.8) | 19.03 (483.4) | 9.00 (228.6) | 6.86 (174.2) | 5.00 (127.0) |
| 2 | 2 – 900# | 5.88 (149.4) | 10.50 (266.7) | - | - | - | 5.00 (127.0) |
| 2 | 2 – 1500# | 5.88 (149.4) | 10.50 (266.7) | - | - | - | 5.00 (127.0) |
| 2 | 2 – 2500# | 9.88 (251.0) | 15.63 (397.0) | - | - | - | 4.50 (114.3) |
| 3 | 3 – 150# | 4.63 (117.6) | 13.50 (342.9) | 20.53 (521.5) | 9.00 (228.6) | 6.30 (160.0) | 4.00 (101.6) |
| 3 | 3 – 300# | 5.00 (127.0) | 13.50 (342.9) | 20.53 (521.5) | 9.00 (228.6) | 6.86 (174.2) | 4.00 (101.6) |
| 3 | 3 – 600# | 5.38 (136.7) | 13.50 (342.9) | 20.53 (521.5) | 9.00 (228.6) | 6.86 (174.2) | 4.00 (101.6) |
| 3 | DN80/PN16 | 3.85 (97.8) | 13.50 (342.9) | 20.53 (521.5) | 9.00 (228.6) | 6.30 (160.0) | 4.00 (101.6) |
| 3 | DN80/PN40 | 4.16 (105.7) | 13.50 (342.9) | 20.53 (521.5) | 9.00 (228.6) | 6.86 (174.2) | 4.00 (101.6) |
| 3 | DN80/ PN100 | 4.95 (125.7) | 13.50 (342.9) | 20.53 (521.5) | 9.00 (228.6) | 6.86 (174.2) | 4.00 (101.6) |
| 3 | 3 – 900# | 8.19 (208.0) | 13.06 (331.7) | - | - | - | 7.00 (177.8) |
| 3 | 3 – 1500# | 8.56 (217.4) | 13.81 (350.8) | - | - | - | 7.00 (177.8) |
| 3 | 3 – 2500# | 11.19 (284.2) | 17.31 (439.7) | - | - | - | 7.00 (177.8) |

Dimensions are in inches (millimeters)

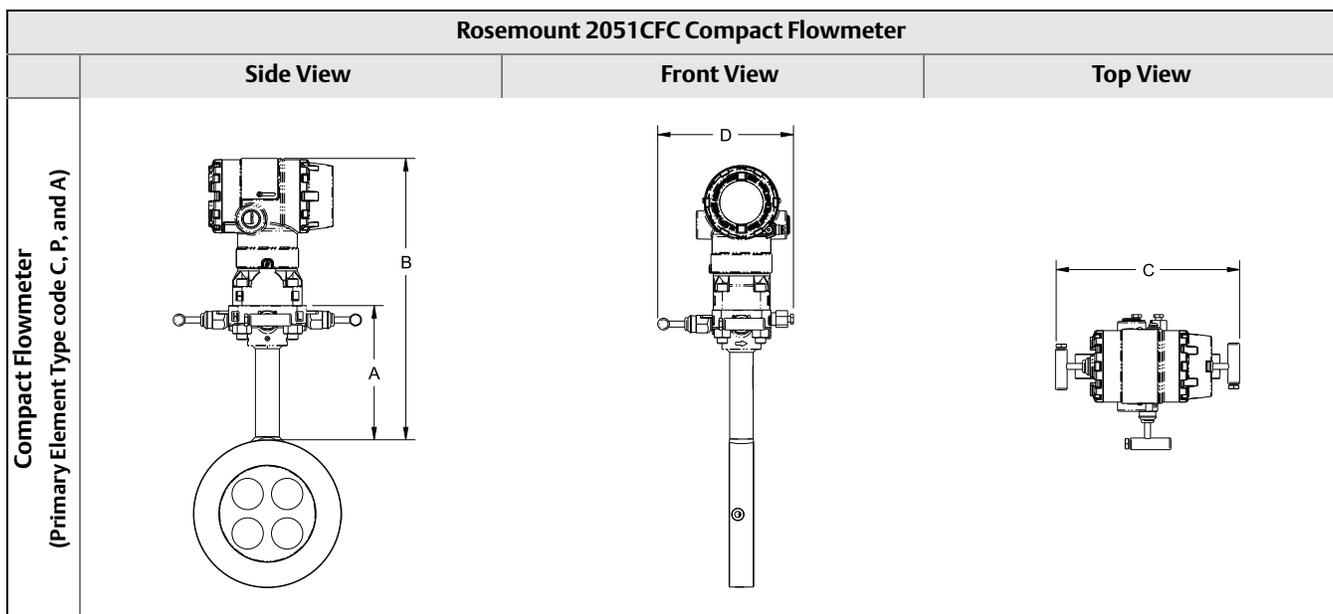


Table 20. 2051CFC Compact Dimensional Data⁽¹⁾

| Primary Element Type | A | B | Transmitter Height | C | D |
|----------------------|------------|------------------------|--------------------|--|--|
| Type A | 5.62 (143) | Transmitter Height + A | 7.03 (179) | 7.75 (197) - closed 8.25 (210) - open | 6.00 (152) - closed 6.25 (159) - open |
| Type P and C | 5.62 (143) | Transmitter Height + A | 6.20 (157) | 7.75 (197) - closed 8.25 (210) - open | 6.00 (152) - closed 6.25 (159) - open |

(1) Measurement in inches (millimeters).

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