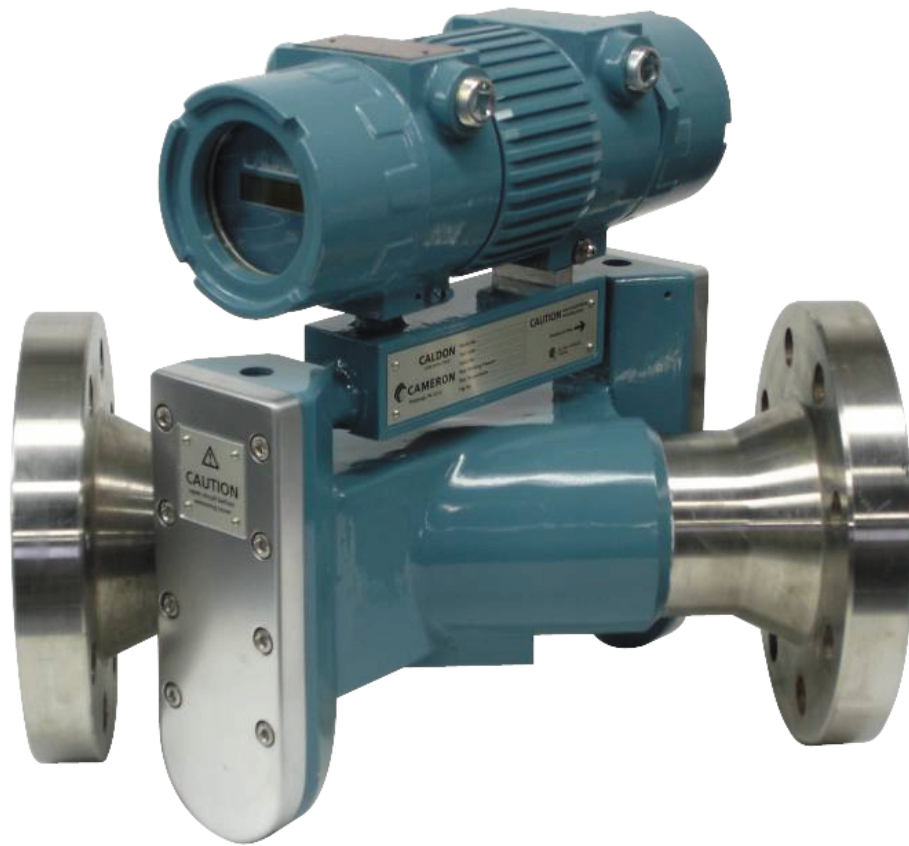


CALDON®

# LEFM® 240Ci / 240C Ultrasonic Flow Meters



When accuracy and reliability are critical the Caldon® family of LEFM® Ultrasonic Meters provides the petroleum industry with a durable, stable and low cost-of-ownership measurement option. The three LEFM models - the LEFM 220C, LEFM 240C and LEFM 280C - cover a broad range of measurement demands and allow users to choose just the right amount of metering "horsepower" whether it is for custody transfer, check or allocation metering, or leak detection/line balance applications.

The LEFM 240C ultrasonic meter is a compact, high performance unit designed specifically for custody transfer or fiscal metering applications. The four-chordal path design ensures linearity over a wide flow range and the ability to handle a wide range of petroleum fluids including crude oils, refined products and blends. Its versatility allows application in single or multiple product pipelines, as well as ship loading/off loading and off-shore applications.

Custody transfer performance

Stable performance over:

- wide viscosity ranges
- large flow ranges

Ideally suited for refined products and crude oil

Provable

Enhanced flow stream and performance diagnostics

## Meter Construction

The Caldon LEFM 240C meter body is designed and manufactured in accordance with ASME B31.3 Process Piping Code or the Pressure Equipment Directive (PED) 97/23/EC and is suitable for handling pressurized liquid hydrocarbons. It has eight (8) piezoelectric transducer modules (typically 0.5MHz, 1.0MHz or 1.6MHz) forming four (4) chordal paths. These are mounted in pressure containing housings and can be replaced while the meter body is under operating conditions.

## Electrical Approvals

The meter meets the requirements of NFPA 70 for use in Class 1, Division 1, Groups C and D hazardous locations and is classified by UL/cUL. It meets the requirements for NEMA 4X and NEMA 7. It is certified by ATEX (CENELEC IIB) for use in EExd IIB flameproof applications and has an ingress protection rating of IP66.

## Remote Mounted Wall Transmitter and Compact Transmitter<sup>1</sup>



<sup>1</sup> Approval pending for compact transmitter.

## Meter Body



## Standard Materials of Construction

| Meter Body                             | Stainless Steel                    | Carbon Steel                         |
|--|------------------------------------|--------------------------------------|
| Flanges                                | 316 Forged Stainless Steel         | Forged Carbon Steel – ASTM A105      |
| Body                                   | Cast Stainless Steel – CF8M (316)  | Cast Carbon Steel – ASTM A216 Gr WCB |
| Manifold                               | 304 Stainless Steel                | 304 Stainless Steel                  |
| Manifold Covers                        | 316 Stainless Steel                | 316 Stainless Steel                  |
| Transducer Housings                    | 316 Stainless Steel                | 316 Stainless Steel                  |
| Junction Boxes (optional)              | Epoxy Painted Copper-Free Aluminum | Epoxy Painted Copper-Free Aluminum   |
| <b>Compact Transmitter Enclosure</b>   |                                    |                                      |
| EX – NEMA 7/4X                         | Copper-Free Aluminum               | Copper-Free Aluminum                 |
| <b>Remote Wall Mounted Transmitter</b> |                                    |                                      |
| GP – NEMA 4X                           | 304 Stainless Steel                | 304 Stainless Steel                  |
| EX – NEMA 7                            | Copper-Free Aluminum               | Copper-Free Aluminum                 |

## Sizes, Maximum Flow Rates and K Factors

| Size | DN    | Nominal Maximum Flow BPH | K Factor P/Bbl | Nominal Maximum Flow m <sup>3</sup> /h | K Factor P/m <sup>3</sup> |
|------|-------|--------------------------|----------------|--|---------------------------|
| 4    | 100   | 2,050                    | 2,000          | 325                                    | 12,600                    |
| 6    | 150   | 4,650                    | 1,000          | 740                                    | 6,300                     |
| 8    | 200   | 8,150                    | 500            | 1,290                                  | 3,150                     |
| 10   | 250   | 12,800                   | 350            | 2,030                                  | 2,200                     |
| 12   | 300   | 19,300                   | 250            | 3,070                                  | 1,570                     |
| 14   | 350   | 23,600                   | 200            | 3,750                                  | 1,000                     |
| 16   | 400   | 28,700                   | 150            | 4,560                                  | 940                       |
| 18   | 450   | 41,000                   | 100            | 6,500                                  | 630                       |
| 20   | 500   | 50,000                   | 85             | 7,900                                  | 530                       |
| 24   | 600   | 72,000                   | 60             | 11,500                                 | 380                       |
| 26   | 650   | 87,000                   | 45             | 13,900                                 | 280                       |
| 28   | 700   | 100,000                  | 40             | 16,200                                 | 240                       |
| 30   | 750   | 115,000                  | 35             | 18,700                                 | 220                       |
| 32   | 800   | 130,000                  | 30             | 21,300                                 | 185                       |
| 34   | 850   | 150,000                  | 25             | 24,200                                 | 165                       |
| 36   | 900   | 165,000                  | 25             | 27,200                                 | 145                       |
| 40   | 1,000 | 205,000                  | 20             | 32,600                                 | 125                       |

K Factor is based on ~ 1.1 KHz at maximum nominal rate. Other K factors can be programmed but must be between 4 Hz and 10 KHz at all operating flow rates.

## Standard End Connections & Maximum Working Pressure

Maximum Working Pressure -20° F to 100° F (-29° C to 38° C)

| ANSI B16.5 Raised Face | Stainless Steel |               | Carbon Steel |               |
|------------------------|-----------------|---------------|--------------|---------------|
| Class 150              | 275 psi         | (18.96 Bars)  | 285 psi      | (19.65 Bars)  |
| Class 300              | 720 psi         | (49.64 Bars)  | 740 psi      | (51.02 Bars)  |
| Class 600              | 1,440 psi       | (99.29 Bars)  | 1,480 psi    | (102.05 Bars) |
| Class 900              | 2,160 psi       | (148.93 Bars) | 2,220 psi    | (153.07 Bars) |
| Class 1500             | 3,600 psi       | (248.22 Bars) | 3,705 psi    | (255.46 Bars) |

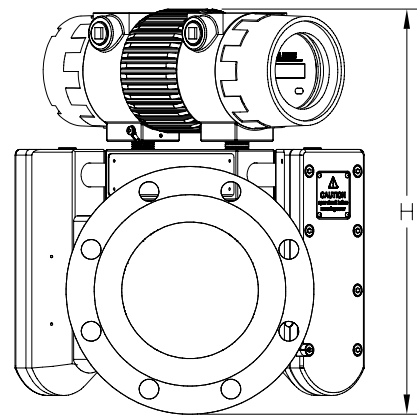
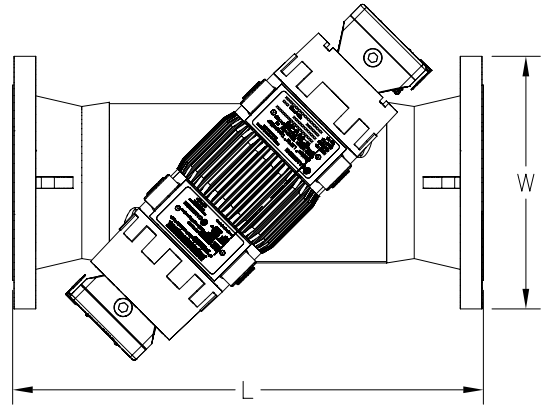
## General Specifications

|                            | LEFM 240Ci Electronics  | LEFM 240C Wall Mounted Electronics  | Meter Body  |
|----------------------------|---|---|---|
| Voltage                    | 18-30 VDC   | 120 VAC, 240 VAC ± 10%<br>18-30 VDC   |   |
| Power                      | 10 W  | 80 W  |   |
| Relative Humidity          | 0-100%  | 0-100%  | 0-100%  |
| Operating Temperature      | -40° F to 140° F<br>(-40° C to 60° C)   | -30° F to 140° F<br>(-35° C to 60° C)   | -40° F to 200° F<br>(-40° C to 93° C)<br><br><b>Extended Range:</b><br>-328° F to 464° F<br>(-200° C to 240° C) |
| Local Display              | Yes   | No  |   |
| Remote Mounting from Meter | 328 feet (100 meters)   | 328 feet (100 meters)   |   |
| Analog Input(s)            | One, 4-20 mA<br>Configured for temperature, pressure<br>or density.   | Up to three, 4-20 mA<br>Configured for temperature, pressure<br>or density.   |   |
| Analog Output(s)           | One, 4-20 mA<br>Any process variable measured by the<br>meter is available as an analog output.   | Up to four, 4-20 mA<br>Any process variable measured by the<br>meter is available as an analog output.  |   |
| <b>Digital Outputs</b>     |   |   |   |
| Flow                       | Two pulse output channels<br>selectable as either 0-5 V or<br>0-12 V; A and B continuous<br>50/50 duty cycle.<br>Programmable K Factor. | Three pulse output channels<br>0-5 V; 2 A channels, and<br>1 B continuous 50/50 duty cycle.<br>Programmable K Factor.<br>A channels are identical;<br>B channel is 90° out of phase<br>with A for flow direction. |   |
| Flow Direction             | B channel can be programmed<br>as 90° out of phase with A or<br>as a direction-indicating voltage<br>level (high = forward flow)        | 0-5 V (5 = forward flow)  |   |
| Alarm Status               | 0-5 V or 0-12 V selectable<br>(0 = alarm)   | 0-5 V (0 = alarm)   |   |
| Serial Communication       | ModBus RTU: RS-485<br>(2) – Up to 3,900 feet (1,200 meters)   | ModBus RTU: RS-485<br>(2) – Up to 3,900 feet (1,200 meters)   |   |

### Dimension & Weights for LFM 240Ci with Compact Electronics

| Pipe Size<br>Inches<br>(DN) | ANSI<br>Class | Length<br>(L) |        | Width<br>(W) |        | Height<br>(H) |        | Unpacked<br>Weight |        |
|-----------------------------|---------------|---------------|--------|--------------|--------|---------------|--------|--------------------|--------|
|                             |               | Inches        | (mm)   | Inches       | (mm)   | Inches        | (mm)   | lbs.               | (kg)   |
| 4<br>(100)                  | 150           | 18.0          | (457)  | 11.0         | (280)  | 16.2          | (411)  | 153                | (70)   |
|                             | 300           | 18.8          | (477)  | 11.0         | (280)  | 16.7          | (424)  | 170                | (77)   |
|                             | 600           | 20.5          | (521)  | 11.0         | (280)  | 17.1          | (434)  | 204                | (93)   |
|                             | 900           | 21.5          | (546)  | 11.5         | (292)  | 17.4          | (442)  | 222                | (101)  |
|                             | 1500          | 22.3          | (565)  | 12.3         | (311)  | 17.8          | (452)  | 266                | (121)  |
| 6<br>(150)                  | 150           | 20.5          | (521)  | 12.8         | (324)  | 18.1          | (460)  | 226                | (103)  |
|                             | 300           | 21.3          | (540)  | 12.8         | (324)  | 18.8          | (478)  | 260                | (118)  |
|                             | 600           | 23.2          | (590)  | 14.0         | (356)  | 19.6          | (498)  | 338                | (154)  |
|                             | 900           | 25.0          | (635)  | 15.0         | (381)  | 20.1          | (511)  | 396                | (180)  |
|                             | 1500          | 27.5          | (699)  | 15.5         | (394)  | 20.3          | (516)  | 506                | (230)  |
| 8<br>(200)                  | 150           | 24.0          | (610)  | 14.8         | (375)  | 20.3          | (516)  | 377                | (171)  |
|                             | 300           | 24.8          | (629)  | 15.0         | (381)  | 21.1          | (536)  | 433                | (196)  |
|                             | 600           | 27.0          | (686)  | 16.5         | (419)  | 21.8          | (554)  | 539                | (244)  |
|                             | 900           | 29.3          | (743)  | 18.5         | (470)  | 22.8          | (579)  | 649                | (294)  |
| 10<br>(250)                 | 150           | 26.0          | (660)  | 17.0         | (432)  | 22.7          | (577)  | 559                | (253)  |
|                             | 300           | 27.2          | (692)  | 17.5         | (445)  | 23.4          | (594)  | 637                | (289)  |
|                             | 600           | 30.5          | (775)  | 20.0         | (508)  | 24.7          | (627)  | 835                | (379)  |
|                             | 900           | 33.0          | (838)  | 21.5         | (546)  | 25.4          | (645)  | 975                | (442)  |
| 12<br>(300)                 | 150           | 29.5          | (749)  | 19.0         | (483)  | 25.2          | (640)  | 773                | (351)  |
|                             | 300           | 30.7          | (781)  | 20.5         | (521)  | 25.9          | (658)  | 893                | (405)  |
|                             | 600           | 33.2          | (844)  | 22.0         | (559)  | 26.7          | (678)  | 1063               | (482)  |
|                             | 900           | 36.8          | (934)  | 24.0         | (610)  | 27.7          | (704)  | 1263               | (573)  |
| 14<br>(350)                 | 150           | 32.0          | (813)  | 21.0         | (533)  | 26.9          | (683)  | 992                | (450)  |
|                             | 300           | 33.2          | (844)  | 23.0         | (584)  | 27.9          | (709)  | 1132               | (513)  |
|                             | 600           | 35.5          | (902)  | 23.8         | (603)  | 28.3          | (719)  | 1332               | (604)  |
|                             | 900           | 39.3          | (997)  | 25.3         | (641)  | 29.1          | (739)  | 1572               | (713)  |
| 16<br>(400)                 | 150           | 33.5          | (851)  | 23.5         | (597)  | 29.2          | (742)  | 1156               | (524)  |
|                             | 300           | 35.0          | (889)  | 25.5         | (648)  | 30.2          | (767)  | 1376               | (624)  |
|                             | 600           | 38.0          | (965)  | 27.0         | (686)  | 30.9          | (785)  | 1656               | (751)  |
|                             | 900           | 41.5          | (1054) | 27.8         | (705)  | 31.3          | (795)  | 1866               | (846)  |
| 18<br>(450)                 | 150           | 37.0          | (940)  | 25.0         | (635)  | 31.0          | (787)  | 1259               | (571)  |
|                             | 300           | 38.5          | (978)  | 28.0         | (711)  | 32.5          | (826)  | 1599               | (725)  |
|                             | 600           | 41.0          | (1041) | 29.3         | (743)  | 33.1          | (841)  | 1909               | (866)  |
|                             | 900           | 44.5          | (1130) | 31.0         | (787)  | 34.0          | (864)  | 2319               | (1052) |
| 20<br>(500)                 | 150           | 39.4          | (1000) | 27.5         | (699)  | 33.2          | (843)  | 1404               | (637)  |
|                             | 300           | 40.8          | (1035) | 30.5         | (775)  | 34.7          | (881)  | 1844               | (836)  |
|                             | 600           | 43.5          | (1105) | 32.0         | (813)  | 35.5          | (902)  | 2224               | (1009) |
|                             | 900           | 48.0          | (1219) | 33.8         | (857)  | 36.3          | (922)  | 2704               | (1226) |
| 24<br>(600)                 | 150           | 44.0          | (1118) | 32.0         | (813)  | 37.5          | (953)  | 1717               | (779)  |
|                             | 300           | 45.2          | (1149) | 36.0         | (914)  | 39.5          | (1003) | 2357               | (1069) |
|                             | 600           | 48.5          | (1232) | 37.0         | (940)  | 40.0          | (1016) | 2857               | (1296) |
|                             | 900           | 55.5          | (1410) | 41.0         | (1041) | 42.0          | (1067) | 4197               | (1904) |
| 26<br>(650)                 | 150           | 43.5          | (1105) | 34.3         | (870)  | 39.6          | (1006) | 1904               | (864)  |
|                             | 300           | 48.5          | (1232) | 38.3         | (972)  | 41.6          | (1057) | 2514               | (1140) |
| 28<br>(700)                 | 150           | 45.9          | (1166) | 36.5         | (927)  | 41.7          | (1059) | 2096               | (951)  |
|                             | 300           | 51.5          | (1308) | 40.8         | (1036) | 43.8          | (1113) | 2871               | (1302) |
| 30<br>(750)                 | 150           | 48.8          | (1239) | 38.8         | (984)  | 43.8          | (1113) | 2288               | (1038) |
|                             | 300           | 54.5          | (1384) | 43.0         | (1092) | 46.0          | (1168) | 3228               | (1464) |
| 32<br>(800)                 | 150           | 51.4          | (1305) | 41.8         | (1060) | 46.3          | (1176) | 2585               | (1172) |
|                             | 300           | 57.5          | (1461) | 45.3         | (1149) | 48.1          | (1222) | 3585               | (1626) |
| 34<br>(850)                 | 150           | 53.8          | (1366) | 43.8         | (1111) | 48.3          | (1227) | 2742               | (1244) |
|                             | 300           | 60.2          | (1530) | 47.5         | (1207) | 50.2          | (1275) | 3952               | (1792) |
| 36<br>(900)                 | 150           | 56.4          | (1432) | 46.0         | (1168) | 50.5          | (1283) | 3028               | (1374) |
|                             | 300           | 63.0          | (1600) | 50.0         | (1270) | 52.5          | (1334) | 4298               | (1950) |

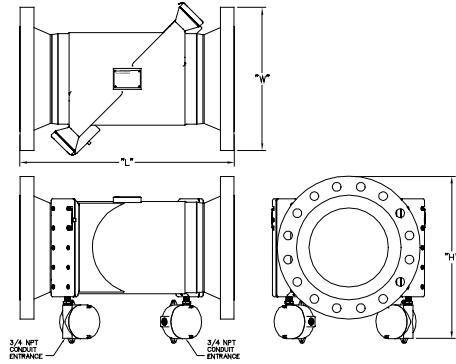
### LFM 240Ci with Compact Electronics



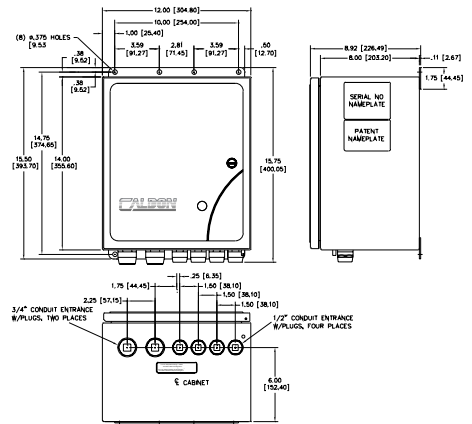
**Dimension & Weights for LFM 240C** Meter Body only

| Pipe Size<br>Inches<br>(DN) | ANSI<br>Class | Length<br>(L) |        | Width<br>(W) |        | Height<br>(H) |        | Unpacked<br>Weight |        |
|-----------------------------|---------------|---------------|--------|--------------|--------|---------------|--------|--------------------|--------|
|                             |               | Inches        | (mm)   | Inches       | (mm)   | Inches        | (mm)   | lbs.               | (kg)   |
| 4<br>(100)                  | 150           | 18.0          | (457)  | 11.0         | (280)  | 17.9          | (454)  | 153                | (70)   |
|                             | 300           | 18.8          | (477)  | 11.0         | (280)  | 18.4          | (467)  | 170                | (77)   |
|                             | 600           | 20.5          | (521)  | 11.0         | (280)  | 18.8          | (476)  | 204                | (93)   |
|                             | 900           | 21.5          | (546)  | 11.5         | (292)  | 19.1          | (486)  | 222                | (101)  |
|                             | 1500          | 22.3          | (565)  | 12.3         | (311)  | 19.5          | (496)  | 266                | (121)  |
| 6<br>(150)                  | 150           | 20.5          | (521)  | 12.8         | (324)  | 19.8          | (502)  | 226                | (103)  |
|                             | 300           | 21.3          | (540)  | 12.8         | (324)  | 20.5          | (521)  | 260                | (118)  |
|                             | 600           | 23.2          | (590)  | 14.0         | (356)  | 21.3          | (540)  | 338                | (154)  |
|                             | 900           | 25.0          | (635)  | 15.0         | (381)  | 21.8          | (553)  | 396                | (180)  |
|                             | 1500          | 27.5          | (699)  | 15.5         | (394)  | 22.0          | (559)  | 506                | (230)  |
| 8<br>(200)                  | 150           | 24.0          | (610)  | 14.8         | (375)  | 22.0          | (559)  | 377                | (171)  |
|                             | 300           | 24.8          | (629)  | 15.0         | (381)  | 22.8          | (578)  | 433                | (196)  |
|                             | 600           | 27.0          | (686)  | 16.5         | (419)  | 23.5          | (597)  | 539                | (244)  |
|                             | 900           | 29.3          | (743)  | 18.5         | (470)  | 24.5          | (623)  | 649                | (294)  |
| 10<br>(250)                 | 150           | 26.0          | (660)  | 17.0         | (432)  | 24.4          | (619)  | 559                | (253)  |
|                             | 300           | 27.2          | (692)  | 17.5         | (445)  | 25.1          | (638)  | 637                | (289)  |
|                             | 600           | 30.5          | (775)  | 20.0         | (508)  | 26.4          | (670)  | 835                | (379)  |
|                             | 900           | 33.0          | (838)  | 21.5         | (546)  | 27.1          | (689)  | 975                | (442)  |
| 12<br>(300)                 | 150           | 29.5          | (749)  | 19.0         | (483)  | 26.9          | (683)  | 773                | (351)  |
|                             | 300           | 30.7          | (781)  | 20.5         | (521)  | 27.6          | (702)  | 893                | (405)  |
|                             | 600           | 33.2          | (844)  | 22.0         | (559)  | 28.4          | (721)  | 1063               | (482)  |
|                             | 900           | 36.8          | (934)  | 24.0         | (610)  | 29.4          | (746)  | 1263               | (573)  |
| 14<br>(350)                 | 150           | 32.0          | (813)  | 21.0         | (533)  | 28.6          | (727)  | 992                | (450)  |
|                             | 300           | 33.2          | (844)  | 23.0         | (584)  | 29.6          | (753)  | 1132               | (513)  |
|                             | 600           | 35.5          | (902)  | 23.8         | (603)  | 30.0          | (762)  | 1332               | (604)  |
|                             | 900           | 39.3          | (997)  | 25.3         | (641)  | 30.8          | (781)  | 1572               | (713)  |
| 16<br>(400)                 | 150           | 33.5          | (851)  | 23.5         | (597)  | 30.9          | (784)  | 1156               | (524)  |
|                             | 300           | 35.0          | (889)  | 25.5         | (648)  | 31.9          | (810)  | 1376               | (624)  |
|                             | 600           | 38.0          | (965)  | 27.0         | (686)  | 32.6          | (829)  | 1656               | (751)  |
|                             | 900           | 41.5          | (1054) | 27.8         | (705)  | 33.0          | (838)  | 1866               | (846)  |
| 18<br>(450)                 | 150           | 37.0          | (940)  | 25.0         | (635)  | 32.7          | (830)  | 1259               | (571)  |
|                             | 300           | 38.5          | (978)  | 28.0         | (711)  | 34.2          | (868)  | 1599               | (725)  |
|                             | 600           | 41.0          | (1041) | 29.3         | (743)  | 34.8          | (884)  | 1909               | (866)  |
|                             | 900           | 44.5          | (1130) | 31.0         | (787)  | 35.7          | (906)  | 2319               | (1052) |
| 20<br>(500)                 | 150           | 39.4          | (1000) | 27.5         | (699)  | 34.9          | (887)  | 1404               | (637)  |
|                             | 300           | 40.8          | (1035) | 30.5         | (775)  | 36.4          | (925)  | 1844               | (836)  |
|                             | 600           | 43.5          | (1105) | 32.0         | (813)  | 37.2          | (944)  | 2224               | (1009) |
|                             | 900           | 48.0          | (1219) | 33.8         | (857)  | 38.0          | (966)  | 2704               | (1226) |
| 24<br>(600)                 | 150           | 44.0          | (1118) | 32.0         | (813)  | 39.2          | (995)  | 1717               | (779)  |
|                             | 300           | 45.2          | (1149) | 36.0         | (914)  | 41.2          | (1046) | 2357               | (1069) |
|                             | 600           | 48.5          | (1232) | 37.0         | (940)  | 41.7          | (1058) | 2857               | (1296) |
|                             | 900           | 55.5          | (1410) | 41.0         | (1041) | 43.7          | (1109) | 4197               | (1904) |
| 26<br>(650)                 | 150           | 43.5          | (1105) | 34.3         | (870)  | 41.3          | (1049) | 1904               | (864)  |
|                             | 300           | 48.5          | (1232) | 38.3         | (972)  | 43.3          | (1100) | 2514               | (1140) |
| 28<br>(700)                 | 150           | 45.9          | (1165) | 36.5         | (927)  | 43.4          | (1103) | 2091               | (948)  |
|                             | 300           | 51.5          | (1308) | 40.8         | (1035) | 45.5          | (1157) | 2891               | (1311) |
| 30<br>(750)                 | 150           | 48.8          | (1239) | 38.8         | (984)  | 45.5          | (1157) | 2288               | (1038) |
|                             | 300           | 54.5          | (1384) | 43.0         | (1092) | 47.7          | (1211) | 3228               | (1464) |
| 32<br>(800)                 | 150           | 51.4          | (1305) | 41.8         | (1060) | 48.0          | (1220) | 2585               | (1172) |
|                             | 300           | 57.5          | (1461) | 45.3         | (1149) | 49.8          | (1265) | 3585               | (1626) |
| 34<br>(850)                 | 150           | 53.8          | (1366) | 43.8         | (1111) | 50.0          | (1271) | 2742               | (1244) |
|                             | 300           | 60.2          | (1530) | 47.5         | (1207) | 51.9          | (1319) | 3952               | (1792) |
| 36<br>(900)                 | 150           | 56.4          | (1432) | 46.0         | (1168) | 52.2          | (1325) | 3028               | (1374) |
|                             | 300           | 63.0          | (1600) | 50.0         | (1270) | 54.2          | (1376) | 4298               | (1950) |

**Meter Body**

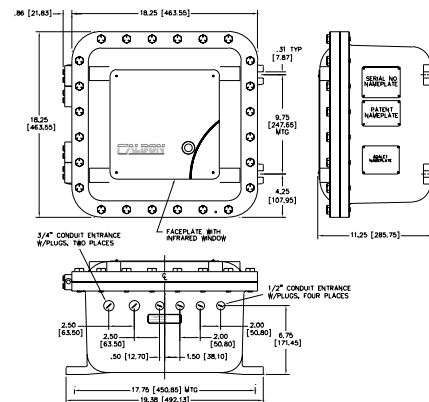


**Wall Mounted EX Transmitter**



**EX - Explosion Proof** - Unpacked Weight: 120 lbs. (54.5 kg)  
Use 1/2 inch bolts/hardware (or equal) on all mounting points for the Explosion Proof (NEMA 7) transmitter. Cover bolts are metric (19 mm). Available with high quality offshore paint specification.

**Wall Mounted GP Transmitter**



**GP - NEMA 4X** - Unpacked Weight: 30 lbs. (13.6 kg)  
Use 1/4 inch bolts/hardware (or equal) on at least the 2 top and 2 bottom mounting points for the NEMA 4X transmitter.

## General Performance

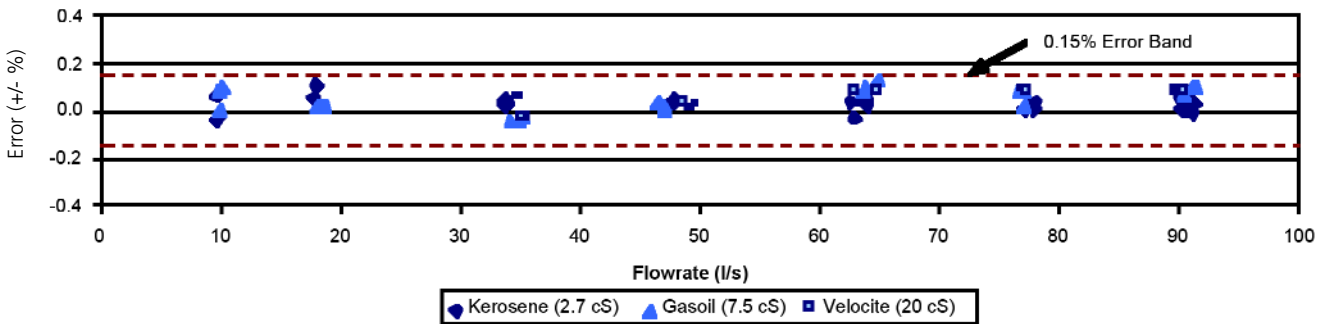
|  |   |
|--|---|
| Linearity  | ± 0.15% over Nominal Flow Range with recommended flow conditioning  |
| Repeatability  | ± 0.027% (API MPMS, Chapter 5.8, Table B-1)   |
| Nominal Flow Range <sup>1</sup>  | 10:1 or greater for sizes 4 in. to 8 in. (DN100 – DN200) from max. flow;<br>15:1 or greater for sizes 10 in. and larger (DN250 and larger) from max. flow   |
| Long Term Stability  | Linearity is unaffected by usage  |
| Reynolds Number  | Performance may degrade when Reynolds Numbers fall below 10,000   |
| Water in Oil <sup>2</sup>  | For water volumes up to 10% and velocities above 6.5 fps (2.0 mps), the meter will measure the total volume with no change in performance. Below 6.5 fps (2.0 mps) the performance depends on the separation of the water |
| Viscosity  | Contact Cameron for applications with viscosity above 500 cSt for applicability   |
| Custody Transfer Performance Approval<br>(Pending for LEFM 240Ci with compact electronics) | OIML R 117 Edition 1995 (E)<br>Accuracy Class 0.3<br>NMI Test Certificates TC3499R0, TC3499R1, CPC-051402-2, CPC-051402-3   |

<sup>1</sup> Nominal Flow Range will increase for values of linearity >0.15%.

<sup>2</sup> Call Cameron for special applications outside these ranges.

## Typical Performance Curve

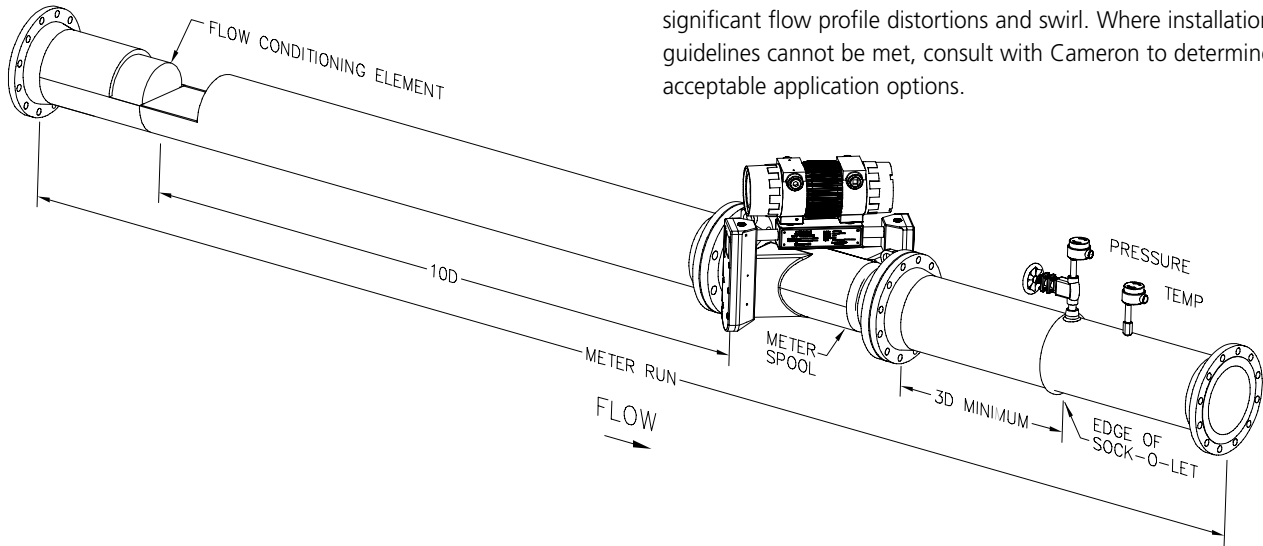
Error vs. Flow Rate (6" LEFM 240C)



## Installation

To obtain the best possible performance for an LEFM 240C, there are some basic minimum installation requirements. The meter should have upstream straight pipe of the same schedule as the meter. Process temperature and pressure should be measured downstream of the meter. It is generally recommended that the LEFM 240C meter be installed

downstream of a flow conditioning element followed by 10 diameters of straight pipe. If there are no varying upstream conditions (manifolds, strainers, etc.) or swirl producing elements (out-of-plane elbows) then 20 diameters of straight pipe may be considered. There should be at least 3 diameters of straight pipe of the same nominal diameter as the meter downstream. These conditions minimize the possibility of significant flow profile distortions and swirl. Where installation guidelines cannot be met, consult with Cameron to determine acceptable application options.



U.S. Patents: 5546813, 5597962, 5639972, 5705753;  
Korea Patent: 208678; Canada Patent: 2107.750;

Taiwan Patents: NI-080038, UM-119114.  
U.S. and foreign patents pending.

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