

Foxboro® 84 Series Intelligent Vortex Flowmeter



84 Series Description

The Foxboro Model 84 Series Intelligent Vortex flowmeters are the highest performing vortex flowmeters on the market. These instruments are designed for flexibility and reliability in harsh process environments. Available in flanged (84F), wafer (84W), and sanitary (84S) configurations, there is a meter for nearly every application. The 84S meets 3A sanitary requirements per specification 28-03.

No other vortex flowmeter measures up to the Model 84 for accuracy in liquid, gas, and steam for process temperatures up to 800°F (430°C). The Model 84 incorporates patented DirectSense™ technology and Flexible Tuning for unmatched performance.

DirectSense™ technology eliminates unreliable, mechanical sensor linkages used in other vortex meters. The result is a simpler, more reliable design that is more sensitive to flow and less sensitive to noise. Combined with Flexible Tuning, the Model 84 has the widest flow range capability of any vortex meter.

Features / Benefits

- Liquid, gas and steam service
- Flanged and wafer designs — 3/4 inch to 12 inches fits nearly any application
- Best accuracy delivers tighter process control and better material balance
 - 0.5% of reading in liquids
 - 1.0% of reading in gas and steam
 - Best accuracy under operating conditions
- Widest flow range available for greater flexibility
- Patented Flexible Tuning improves accuracy under operating conditions
 - Real time Reynolds number correction
 - Correction for piping effects
 - Adaptive filtering for noise rejection at varying flow rates
 - Automatic low flow cut-in
 - Tunable for specific operating conditions
 - K-factor corrected for temperature
- HART® communication protocol for measurement integration
- DirectSense™ technology: performance and reliability backed with a lifetime sensor warranty

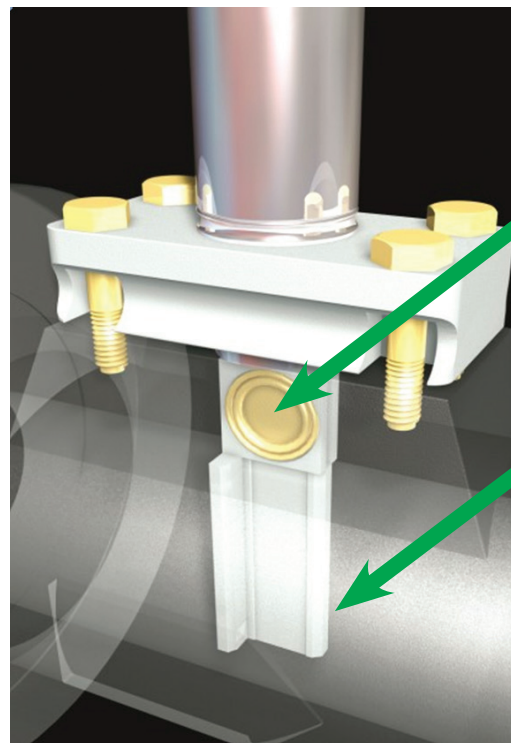
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Best accuracy under operating conditions

Model 84 flowmeters utilize Flexible Tuning to automatically compensate for operating influences and maintain accuracy under conditions outside the calibration lab:

- Process piping — installation parameters such as pipe bore, location of valves, proximity to elbows, etc.
- Process temperature — correction for K-Factor shift due to change in the process temperature.
- Operation at low flow rates — an algorithm, utilizing values for the flowing density and viscosity, is embedded in the flowmeter to correct for nonlinearity in K-Factor at low flow rates ($RD < 20,000$).
- Low Flow Cut-In (LFCI) — eight user defined selections of LFCI. The Model 84 also includes an automatic low flow cut-in feature that can be configured to automatically select LFCI.
- Signal Conditioning — a digital smoothing algorithm can be enabled to condition the raw vortex signal. This results in improved performance, particularly at low flow.
- Low and high frequency filters — these filters are set automatically based on the flowmeter configuration.
- Adaptive filtering — the flowmeter provides an adaptive mode which automatically adjusts the high and low frequency filters.



DirectSense™ technology with large sensing surface: accurate and reliable.

Rugged, nonvibrating shedder bar

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Specifications

| | |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sizes | 84F Flanged body: 3/4 to 12 in. (15 to 300 mm) 84W Wafer body: 3/4 to 8 in. (15 to 200 mm) 84S Sanitary body: 2 in. and 3 in. (50 mm and 80 mm) |
| Accuracy | Liquids: $\pm 0.5\%$ of rate over calibrated Reynolds number range. $\pm 1.0\%$ of rate outside calibrated Reynolds number range Gases: $\pm 1.0\%$ of rate for Reynolds numbers = 20,000 Liquids and gases: $\pm 2.0\%$ of rate for Reynolds number 5,000 to 20,000 (using corrections for density and viscosity in software) |
| Materials of construction | |
| 84F meter body | 3/4 to 4 in.: 316 ss cast body, flange, and shedder 6 to 12 in.: 304 ss body, shedder, and flanges or 304 ss body and shedder and carbon steel flanges, versions available in Hastelloy C. |
| 84W meter body | 3/4 to 8 in.: 316 ss cast body and shedder 3/4 to 4 in.: Hastelloy C cast body and shedder |
| Sensor | Stainless steel (CF3M) or Hastelloy (CW2M) Options: Fluorolube, silicon, or unfilled options |

83S Sanitary — Table 1. Water flow rates and upper range value limits at 20°C and 101.3 kPa absolute (68°F and 14.7 psia)

| Normal Line Size | | Minimum and Maximum Operating Flow Rates* | |
|------------------|----|-------------------------------------------|---------------|
| mm | in | L/s | U.S. gpm |
| 50 | 2 | 0.346 and 17.3 | 5.50 and 275 |
| 80 | 3 | 0.816 and 40.8 | 12.96 and 648 |

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83F Flanged — Table 2. Water flow rates and upper range value limits at 20°C and 101.3 kPa absolute (68°F and 14.7 psia)

| Normal Line Size | | Minimum and Maximum Operating Flow Rates* | |
|------------------|-------|-------------------------------------------|---------------|
| mm | in | L/s | U.S. gpm |
| 15 | 3/4 | 0.07 and 2.1 | 1.2 and 34 |
| 25 | 1 | 0.10 and 3.6 | 1.5 and 57 |
| 40 | 1 1/2 | 0.15 and 8.8 | 2.4 and 140 |
| 50 | 2 | 0.19 and 14.7 | 3.1 and 233 |
| 80 | 3 | 0.37 and 32.2 | 5.1 and 511 |
| 100 | 4 | 0.72 and 56.7 | 9.0 and 899 |
| 150 | 6 | 1.88 and 130 | 20.6 and 899 |
| 200 | 8 | 3.64 and 228 | 36.1 and 3610 |
| 250 | 10 | 6.51 and 372 | 58.9 and 5900 |
| 300 | 12 | 9.99 and 540 | 85.6 and 8560 |

83W Water — Table 3. Water flow rates and upper range value limits at 20°C and 101.3 kPa absolute (68°F and 14.7 psia)

| Normal Line Size | | Minimum and Maximum Operating Flow Rates* | |
|------------------|-------|-------------------------------------------|---------------|
| mm | in | L/s | U.S. gpm |
| 15 | 3/4 | 0.07 and 2.1 | 1.2 and 34 |
| 25 | 1 | 0.10 and 3.6 | 1.5 and 57 |
| 40 | 1 1/2 | 0.15 and 8.8 | 2.4 and 140 |
| 50 | 2 | 0.19 and 14.7 | 3.1 and 233 |
| 80 | 3 | 0.37 and 32.2 | 5.1 and 511 |
| 100 | 4 | 0.72 and 56.7 | 9.0 and 899 |
| 150 | 6 | 1.88 and 130 | 20.6 and 899 |
| 200 | 8 | 3.64 and 228 | 36.1 and 3610 |

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