Coriolis Mass Flowmeter
FCM2000

For the flow and density measurement of liquids

- Wide measurement range
- Digital Signal Processor (DSP) for high precision
- Flexible EEx concept
- Measurement of mass, density and temperature

FieldIT

ABB
ABB Mass Flowmeters operate according to the Coriolis principle. FCM2000 with the classical parallel meter tubes features:

- Space saving sturdy design
- Wide meter size range
- Price advantages for the customer
- Digital Signal Processing (DSP)
- Insensitive to pipeline stresses and vibrations
- Self draining in both horizontal and vertical orientations
- Straight forward installations
- Two configurable current output for mass flowrate, volume flowrate, density or a pulse output

The modular concept
The basic concept is to effectively combine the flowmeter primary and the converter. The wide measuring ranges and the large variety of process connection types and meter tube materials coupled with the customized software, “Standard Flowrate”, ”High Accuracy Density Measurements” assure an optimum adaptation to existing process requirements.

Measurement principle
When a mass flows through a vibrating tube Coriolis forces are generated which bend or twist the tube. The extremely small tube displacements are detected by optimally positioned sensors and evaluated electronically. Since the measured phase shift of the sensor signals is proportional to the mass flowrate the Coriolis Mass Flowmeter measures the mass flowrate directly. The measurement principle is independent of the density, temperature, viscosity, pressure or conductivity. The meter tubes always vibrate at their natural frequency which is a function not only of the meter tube geometry and the meter tube material properties but also the mass of the fluid in the vibrating meter tubes. This frequency provides exact information about the density of the fluid being measured.

In summary, the Coriolis Mass Flowmeter can be used to simultaneously measure the mass flowrate, density and temperature.

FCM2000: price effective, all-purpose and future oriented
The result of the FCM2000 development is a totally uncomplicated metering instrument which readily fulfills the high requirements of a Coriolis Mass Flowmeter. The new, manufacturing optimized design makes it possible to produce the mass flowmeter at an attractive price.

The ATEX and FM Class I, Div.1 and Div.2 certificates allow for universal use in all kinds of chemical plants. The devices of the EHEDG series are certified for use in the food and beverages industries.
Measurements of chemicals are crucial in various industrial processes. Precision with Digital Signal Processor (DSP) is optimally applied in production processes. The flowmeter primary features two single piece, formed meter tubes for parallel flow. The inlet and outlet are mounted on a bend and twist resistant structure which is very effective in eliminating the effects of external forces and moments. Both ends of the meter tubes are welded at their in- and outlet ends to flow splitters. This eliminates any direct coupling to the process connections. This construction is the solution for minimizing the effects of external vibrations. The elimination of weld seams at all the high stress locations and the hard soldered meter tube, driver and sensor brackets assure long life. The construction of the primary is EHEDG certified and can be installed in hygienic applications.

Compact FCM2000

The compact meter with the new DSP-Converter mounted on the flowmeter primary reduces the installation and cabling costs. The flowrate information is displayed directly at the metering site and the installation can be made in a space saving manner. The Reynolds number is increased, which reduces the installation and cabling costs. The flowrate information is displayed directly at the metering site and the installation can be made in a space saving manner. The compact meter with the new DSP-Converter mounted on the flowmeter primary reduces the installation and cabling costs. The flowrate information is displayed directly at the metering site and the installation can be made in a space saving manner.

User friendly and easy configuration using clear text displays

This feature assures expeditious startup and minimizes the costs. All data entered into the converter are stored in a plug-in memory module. Should a failure occur, a quick exchange is possible. This reduces system downtime. Up to four different values can be display in the multiplex mode – almost simultaneously (e.g. the instantaneous flowrate in kg/h, the density and temperature values). Whether mechanical counter or SPC – using one of the user selectable pulse output format (passive optocoupler or active 24 V dc pulse) the appropriate signal is always available for measurement value processing.

Specifications

- **Accuracy, Flowrate:**
  - ± 0.4% of rate
  - ± 0.02% of Qnom
  - ± 0.25% of rate
  - ± 0.02% of Qnom
  - ± 0.15% of rate
  - ± 0.01% of Qnom

- **Measurement Range, Flowrate**

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**Measurement Range, Density**

- 0.5 kg/l to 3.5 kg/l

- **Accuracy, Density**
  - Standard calibration ± 0.005 kg/l
  - High accuracy density calibration ± 0.001 kg/l
  - Reproducibility ± 0.0001 kg/l

- **Process Connections**
  - Flanges: DIN/ANSI
  - Tri-Clamp DIN 32676 (to 4”/DN 100)
  - Food Ind. Fitting DIN 11851 (to 4”/DN 80)
  - Male threaded, ISO 288/1 G1/4”/NPT1/4”

- **Pressure Rating**
  - DIN PN 16, PN 40, PN 100 (upto DN 80)
  - ANSI CL 150, CL 300, CL 600 (upto DN 80)

- **Materials**
  - Fluid wetted parts
    - Stainless steel 1.4571/316L
    - Hastelloy C4 2.4610
    - Stainless steel 1.4571/316Ti

- **Temperatures**
  - Fluid: -4 to +140 °C
  - Ambient: -25 to + 60 °C
  - Ex-Design fluid: -13 to +140 °F
  - Ex-Design amb. -20 to + 60 °F

- **Ex-Approval**
  - ATEX, FM
  - FM Class I, Div. 1
  - FM Class I, Div. 2
  - Signal Outputs as Ex “e” or Ex “ib” (Option)

- **Signal Outputs**
  - External totalizer reset
  - External zero return
  - Min./max. contact
  - Forward and reverse direction signal

- **Signal Outputs Ex “e”**
  - Current Output 1/active 0/4…20 mA selectable
  - User configured in the software
  - Current Output 2/passive 4…20 mA selectable
  - User configured in the software
  - Scale Pulse Output
  - Scaled pulse output max. 5 kHz.
  - Galvanically isolated from the current output
  - Contact In-/Outputs for:
    - Automatic system monitoring
    - Forward and reverse direction signal
    - Min./max. contact
    - External zero return
  - External totalizer reset

- **Communication**
  - HART®-Protocol

- **Supply Power**
  - High voltage 85 to 253V ac
  - Low voltage 20,4 to 26,4V ac/31,2V dc