

## Features

Flokak B.V. Coriolis Mass Flowmeter series FMCM is a mass flowmeter that measures mass flow, density and temperature (volume flow calculated) of liquids, slurries and multi-phase liquids directly without going through calculation process based on other variables.

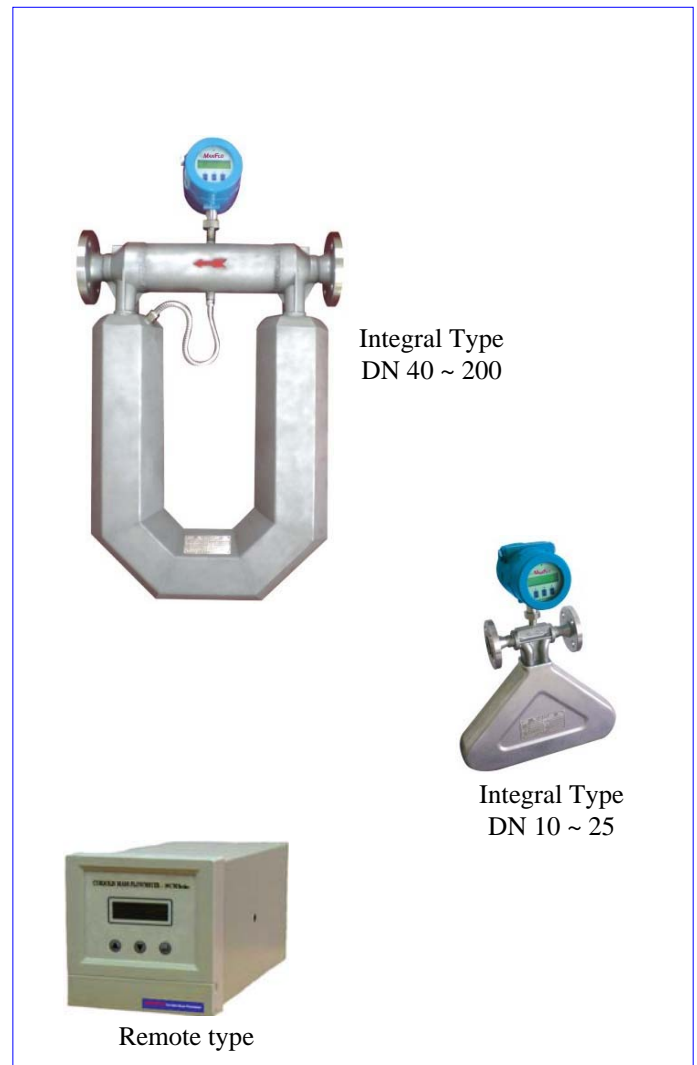
It has no moving parts in the flow. And it doesn't require any special device for installation and it doesn't require flow profile stabilization, meaning it doesn't require straightener or straight pipe sections either upstream or downstream. The wetted parts are made of stainless steel and therefore can be used for corrosive liquids.

- High accuracy and precision of 0.1%, 0.2% and 0.5% of reading
- Wide turndown ratio
- Can measure liquids of all types, slurries and multiphase liquids (solids or air bubbles mixed inside liquid)
- Wetted parts are stainless steel and can be used for corrosive liquids
- Mass flow, volume flow, density and temperature measurement without additional instruments
- Measurement accuracy not affected by whether laminar or turbulent and there's no need for flow profile stabilization by means of flow straightener or straight pipe sections upstream or downstream
- Minimal pressure loss
- No moving parts in the flow, longer life and easy maintenance

## Measuring Principle of Coriolis MFM

The mass flow-sensing element is composed of a pair of bent tubes, vibrators and displacement sensors. The trick here is to detect the Coriolis force applied on the tube by the flowing fluid inside the bent oscillating tube. In order to do that the vibrators vibrate the bent tubes at the natural frequency of the tubes. When there's a flow inside the tubes, the Coriolis force at work distorts the vibration of the tubes. This distortion can be measured using the displacement sensors. The amount of distortion is directly proportional to the mass flow of the liquid inside the tube. By accurately processing the displacement, the accurate mass flow is directly measured.

Liquids, slurries and multiphase (liquid mixed with air bubbles or solids) can be measured. It boasts strong immunity to noise, high accuracy, wide turndown ratio, stability and reliability.



## Technical Specifications

### Flow Ranges

DN (mm)	Max. Flow Range (Kg/h)	Norm. Flow Range for 0.1% Accuracy (Kg/h)	Norm. Flow Range for 0.2 & 0.5% Accuracy (Kg/h)	Zero Stability (Kg/h)
DN 10	20 ~ 1000	150 ~ 1000	80 ~ 1000	0.200
DN 15	40 ~ 2000	300 ~ 2000	150 ~ 2000	0.400
DN 20	80 ~ 4000	600 ~ 4000	400 ~ 4000	0.800
DN 25	120 ~ 6000	1000 ~ 6000	600 ~ 6000	1.200
DN 40	600 ~ 30000	5000 ~ 30000	3000 ~ 30000	6.000
DN 50	1000 ~ 50000	8000 ~ 50000	5000 ~ 50000	10.00
DN 80	2400 ~ 120000	20 ~ 120000	12000 ~ 120000	24.00
DN 100	4000 ~ 200000	30000 ~ 200000	20000 ~ 200000	40.00
DN 150	10000 ~ 660000	80000 ~ 500000	50000 ~ 500000	100.0
DN 200	20000 ~ 1200000	150000 ~ 1000000	800000 ~ 1000000	200.0

### Flow Measurement Accuracies and Repeatabilities

	0.1%	0.2%	0.5%
Accuracy	$\pm 0.1 \pm \left( \frac{\text{Zero Stability}}{\text{Instant Flow Rate}} \times 100\% \right)$	$\pm 0.2 \pm \left( \frac{\text{Zero Stability}}{\text{Instant Flow Rate}} \times 100\% \right)$	$\pm 0.2 \pm \left( \frac{\text{Zero Stability}}{\text{Instant Flow Rate}} \times 100\% \right)$
Repeatability	$\pm 0.05\%$	$\pm 0.1\%$	$\pm 0.25\%$

The accuracy is calculated based on the water flow measurement under 20 ~ 25 °C and 0.1 ~ 0.2 Mpa condition.

### Other Elements Measured

Volume Flow: Calculated based on mass flow, density and temperature measured

Density: 0.2 g/cm<sup>3</sup> ~ 2.0 g/cm<sup>3</sup> -----  $\pm 0.005$  g/cm<sup>3</sup>

Temperature: -50 °C ~ +125 °C (Integral Type) -----  $\pm 1.0$  °C

-50 °C ~ +200 °C (Remote Type) -----  $\pm 1.0$  °C

-50 °C ~ +350 °C (Remote High-Temperature Type) -----  $\pm 1.0$  °C

### Operating Conditions

Ambient Vibration:

Frequency: 10 ~ 2000 Hz

Acceleration Amplitude: 2g

Circulation Time: 50 times

Ambient Temperature: -20 °C ~ +55 °C (operating), -20 °C ~ +70 °C (storage)

Ambient Humidity:  $\leq 90\%$  RH (operating),  $\leq 95\%$  RH (storage)

Fluid Pressure: See the pressure ratings for each sizes in the catalog.

Ambient Pressure: 86kPa ~ 106kPa

## Outputs

4-20mA Current Output:

Resolution: 0.000244mA

Basic Error: 0.2% F.S

Temperature Impact:  $\pm 0.005\%$  F.S/ $^{\circ}\text{C}$

\*\* The external resistor should be 250 ~ 600 $\Omega$ .

Frequency Output:

Frequency Range: 0 ~ 10 kHz

Resolution: 0.152 Hz

Basic Error:  $\pm 0.075\%$

Temperature Impact:  $\pm 0.001\%$  F.S/ $^{\circ}\text{C}$

\*\* The maximum output capacity is 12 kHz.

Serial Interface: RS-485 (MODBUS)

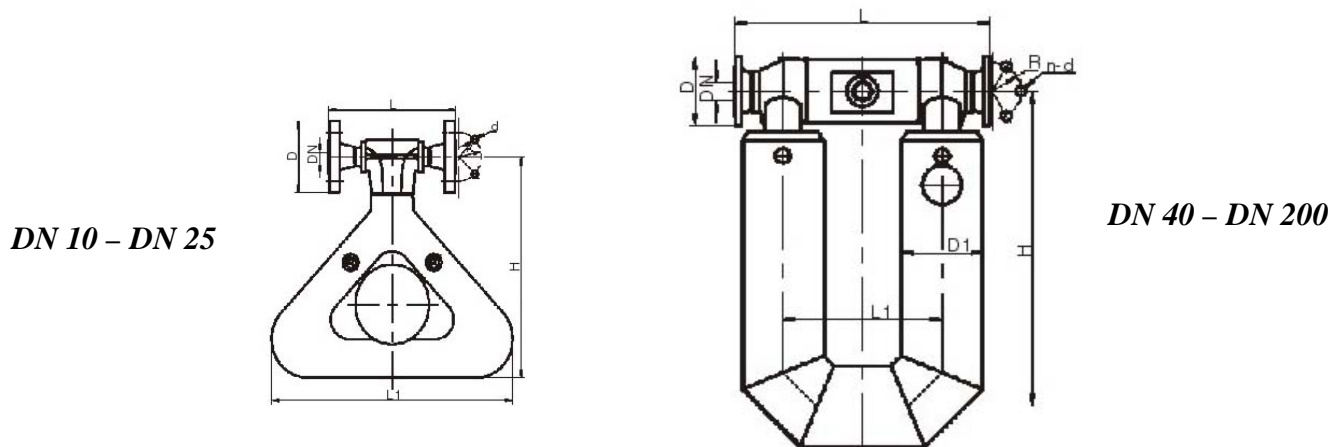
## Power Supply

Integral Type: 24VDC  $\pm 2.4\text{V}$

Remote Type: AC220V  $\pm 22\text{V}$ , 50Hz

Enclosure: IP65

### Sensor Dimensions



Size	D	R	n-d ( $\phi$ )	L1	H	L
10	90	30	4-14	350	290	8/150
15	95	32.5	4-14	350	290	180
20	95	32.5	4-14	350	290	180
25	115	42.5	4-14	530	340	200
40	150	22	4-18	340	580	450
50	165	62.5	4-18	364	650	570
80	200	80	8-18	520	880	850
100	235	95	8-22	580	1150	950
150	300	125	8-26	686	1416	1100
200	375	160	12-30			

**Model Selection Code**

FMCM-DN## - # - ## - ## - # - ## - ## - ##### - # - #

<b>Nominal Size</b>		<b>DN##</b>
<b>Converter Type</b>	Integral	<b>I</b>
	Remote	<b>R</b>
<b>Sensor</b>	Normal	<b>SN</b>
	Ex-proof	<b>SX</b>
<b>Transmitter</b>	Normal	<b>CN</b>
	Ex-Proof	<b>CX</b>
<b>Medium</b>	Gas	<b>G</b>
	Liquid	<b>L</b>
<b>Power Supply</b>	220VAC	<b>P1</b>
	24VDC	<b>P2</b>
<b>Output Interface</b>	RS-485	<b>RS</b>
	None	<b>NO</b>
<b>Nominal Pressure</b>	1.6 MPa	<b>PN16</b>
	2.5 MPa	<b>PN25</b>
	4.0 MPa	<b>PN40</b>
	6.4 MPa	<b>PN64</b>
<b>Signal Output</b>	4-20mA	<b>I</b>
	Pulse	<b>F</b>
<b>Accuracy</b>	0.1%	<b>A</b>
	0.2%	<b>B</b>
	0.5%	<b>C</b>