



ADDMAS CORIOLIS MASS FLOW METER

1. General

ADDMAS Series Coriolis Mass Flow meter (here after we call CMF) is designed according to the coriolis principle. It can be widely used for the process detecting and custody transfer unit in many industries such as petroleum, Petrochemical industries, Pharmacy, paper making, food and energy and so on. As a fairly advanced kind of flow measurement instrument, it has been paid attention by the circle of measurement and accepted by many customers .



ADDMAS CMF : 300 MM Flow meter



ADDMAS CMF : Micro series



ADDMAS CMF : 150 MM Flow meter



ADDMAS CMF : 25 MM Flow meter

2. Principle

Addmas CMF is designed according to the principle of coriolis force. Under the alternating current effect, the magnet and coil installed on the tube will make two parallel measuring tube vibrate according to some fixed frequency. Once there is flow passing through pipes, coriolis force will give rise to deflection (phase shift) on the vibration of two pipes and the deflection of vibration is directly proportional to the mass flow of fluid. This way mass flow rate can be calculated.

The vibration frequency of measuring tube is determined by the total mass of measuring tube and inner fluid. When the fluid density changes, the vibration frequency of measuring tube will also change, as a result, the fluid density can be calculated.

The Temperature Transducer installed in the pipe line can pick up the fluid temperature on time under the co ordination of measuring circuit.

3. Feature

3.1 Digital Transmitter Feature

Comparing with traditional analog circuit and analog transmitter, digital circuit and digital transmitter has the following obvious advantages:-

- 3.1.1 The DSP chip is the core of digital transmitter of ADDMAS CMF, we know the technique of digital signal processing can greatly increase the accuracy of flow meter and broden turn down ration.
- 3.1.2 The sampling rate of digital transmitter is much higher than the traditional products, so it can provide shorter response time for the flow, quicker reaction to the change, higher efficiency and better accuracy for the small amount tank loading / unloading system.
- 3.1.3 Digital signal processing techniques can filter and shape the flow signal better. Well – designed digital filter can remove industrial frequency electromagnetic field and noise effect on mass flow meter which gives enhanced stability, reliability of mass flow meter

3.2 Mass Flow meter Feature

Comparing with the traditional flow measurement method ADDMAS CFM has following obvious merits

- 3.2.1 Enable to measure directly mass flow rate of fluid in the pipeline without changing any parameters, which avoids the some measurement error of intermediate links. Its mass flow rate can be high accuracy and good repeatability within bigger range of turn down ratio.
- 3.2.2 Fluid measured can be more extensive, such as the steady uniform flow of common viscosity fluid, the viscosity fluid, non Newtonian fluid, slurry containg some solid components and the liquid containing some trace of gas.
- 3.2.3 Due to the small vibration, measuring tube of ADDMAs CMF can be regards as non moving parts, which will reduce the maintenance of flow meter , enhance the stability for life time.
- 3.2.4 Besides the mass flow measurement , the density and temperature and even consistency can also be maintained.

4.0 Main Technical specifications

4.1 Specification of sensor and flow Range of Liquid

Table – 1

DN (MM)	8 TO 300
Structure	Integrated Type (-50 to 125 Deg.C) Separate Type (-50 to 200 Deg.C)
Sensor	U series, Micro Bend Series
Transmitter	Digital Type
Explosion proof	Weather proof, Explosion proof
Power Supply	24 VDC
Output Interface	RS 485, Modbus
Nominal Pressure (Bar)	16 , 25, 40, 64

Signal Output	Pulse output (4 to 20) mA	
Accuracy	0.25%	0.5%

U-Series sensor with general transmitter

Table2

DN (mm)	Max.Flow Range (t/h)	Normal Flow Range for Accuracy 0.1% (t/h)	Normal Flow Range for Accuracy 0.2%&0.5% (t/h)	Stability of Zero Point (t/h)
DN08	0.016 ~ 0.80	0.16 ~ 0.80	0.08 ~ 0.80	0.0001
DN10	0.02 ~ 1.00	0.20 ~ 1.00	0.10 ~ 1.00	0.0001
DN15	0.04 ~ 2.00	0.40 ~ 2.00	0.20 ~ 2.00	0.0002
DN25	0.12 ~ 6.00	1.20 ~ 6.00	0.60 ~ 6.00	0.0006
DN40	0.6 ~ 30.0	6.0 ~ 30.0	3.0 ~ 30.0	0.0030
DN50	1.0 ~ 50.0	10.0 ~ 50.0	5.0 ~ 50.0	0.0050
DN80	2.4 ~ 120	24.0 ~ 120	12 ~ 120	0.0120
DN100	4.0 ~ 200	40.0 ~ 200	20 ~ 200	0.0200
DN150	10.0 ~ 500	100 ~ 500	50 ~ 500	0.0500
DN200	20.0 ~ 1000	200 ~ 1000	100 ~ 1000	0.1000
DN250	30.0 ~ 1500	300 ~ 1500	150 ~ 1500	0.1500
DN300	50.0 ~ 2500	500 ~ 2500	250 ~ 2500	0.2500

U-Series sensor with digital transmitter

Table 3

DN (mm)	Max.Flow Range (t/h)	Normal Flow Range for Accuracy 0.1% (t/h)	Normal Flow Range for Accuracy 0.2%&0.5% (t/h)	Stability of Zero Point (t/h)
DN08	0.016 ~ 0.80	0.06 ~ 0.80	0.04 ~ 0.80	0.0001
DN10	0.02 ~ 1.00	0.70 ~ 1.00	0.05 ~ 1.00	0.0001
DN15	0.04 ~ 2.00	0.15 ~ 2.00	0.10 ~ 2.00	0.0002
DN25	0.12 ~ 6.00	0.40 ~ 6.00	0.30 ~ 6.00	0.0006
DN40	0.6 ~ 30.0	2.0 ~ 30.0	1.5 ~ 30.0	0.0030
DN50	1.0 ~ 50.0	3.5 ~ 50.0	2.5 ~ 50.0	0.0050
DN80	2.4 ~ 120	6.0 ~ 120	6.0 ~ 120	0.0120
DN100	4.0 ~ 200	15 ~ 200	10 ~ 200	0.0200
DN150	10.0 ~ 500	35 ~ 500	25 ~ 500	0.0500
DN200	20.0 ~ 1000	70 ~ 1000	50 ~ 1000	0.1000
DN250	30.0 ~ 1500	100 ~ 1500	75 ~ 1500	0.1500
DN300	50.0 ~ 2500	170 ~ 2500	125 ~ 2500	0.2500

Note:Please ask for flow range for micro-bend series transmitter upon purchase

4.3. Repeatability

Table5

Accuracy	0.1%	0.2%	0.5%
Repeatability	± 0.05%	± 0.1%	± 0.25%
Accuracy is calculated based on the water measurement under the condition of +20°C ~25°C and 0.1MPa ~0.2MPa.			

4.4. Measurement of Density

Table6

Density Range	(0.2 ~ 2.0) g/cm ³
Basic Error	± 0.002g/cm ³ (Affected by the sensor)
Repeatability	0.001g/cm ³

4.5. Measurement of Temperature

Table7

Temperature Range	(-50 ~ +125) °C	Integrated Type
	(-50 ~ +200) °C	Separate Type
	(-50 ~ +350) °C	High Temperature Separate Type
Basic Error	≤ ± 1.0°C	

5. Specification and Function

5.1 Circuit Loop Output

4 to 20 mA current output can be configured to denote the mass flow or volume Flow.

Output Range	4 to 20 mA
Resolving Power	0.000244 mA
Basic Error	0.2% FS
Temperature Drift	+/- 0.005% F.S / Deg.C

5.2 Frequency Output

Active Frequency output can be configured to denote the mass flow or volume flow.

Output Range	0 to 10 KHz
Resolving Power	0.152 Hz
Basic Error	+/- 0.075%
Temperature Impact	+/- 0.001% F.S / Deg.c
Max. Capability of Outrage is 12 KHz.	

5.3 Low Flow cut off

When the flow value measured is lower than the value of Low cutoff, the CMF will output stop to accumulate. The value of cutoff is usually sets to be 1% of the maximum flow rate.

5.4 Ambient Limitation

5.4.1 Ambient Vibration

Frequency Range	10 to 2000 Hz
Acceleration amplitude Value	2 g
Circulation Time	50 times

5.4.2

Ambient Temperature

Working Temperature	-20 to 55 Deg.C
Storage Temperature	-20 to 70 Deg.C

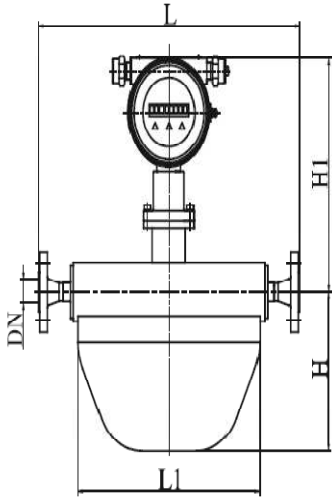
5.4.3 Ambient Humidity

Working Humidity	< 90 %
Storage Humidity	< 95 %

5.4.4 Enclosure Grade : IP 65

6.0 Dimensions

6.1 Micro-bend Shape Outline Dimension (Drawing1 and Table13)

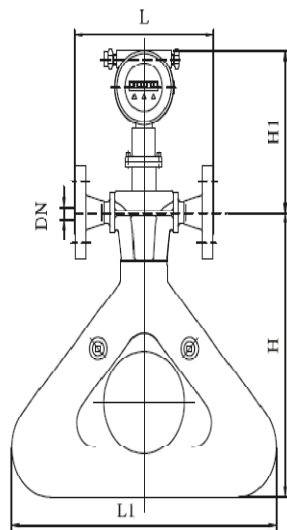


Drawing 1

Table 13

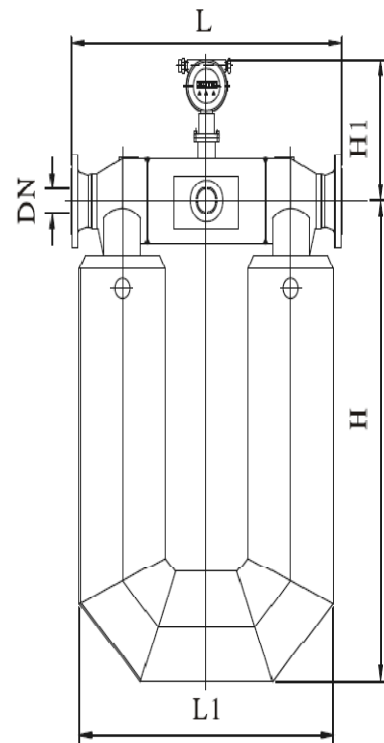
Model LZYN	DN(mm)	L(mm)	L1(mm)	H(mm)	H1(mm)
008	8	590	530	120	310
010	10	345	230	170	310
015	15	400	280	170	310
025	25	475	360	200	310
050	50	800	640	410	310
080	80	1170	980	560	340
100	100	1375	1150	780	360
150	150	1840	4590	1140	390
250	250	2340	1970	1400	420

6.2 Common Shape Outline Dimension (Drawing2 and Table14)



DN (10~25)

Drawing 2



DN (40~200)

MODEL	CMF	DN	L	L1	H	H1
008		8	150	350	290	260
010		10	180	350	290	260
015		15	180	350	290	260
020		20	200	450	400	290
025		25	200	450	400	390
040		40	520	470	660	280
050		50	558	550	750	290
080		80	780	710	1040	320
100		100	920	860	1290	350
150		150	1100	1050	1600	380
200		200	1365	1150	1700	420

All dimensions are in mm

Model Selection:

CMF

1 2 3 4 5 6 7 8 9 10 11

1 : Pipe Line size in mm

2 : Structure : 1, Integral indicator type 2 : Separate indicator type

3 : Sensor : W : Weather proof, E : Explosion proof (EXdib II CT4-T6), for H2 add II C)

4 : Transmitter : W : Weather proof, E : Explosion proof (EXdib II CT4-T6), for H2 add II C)

5 : Medium : Q – Gas. Y – Liquid

6 : Power supply : 1 – 24 VDC. 2. 220 VAC.

7: Output Interface : S- RS 485 Modbus

8. Nominal Pressure (Bar) 1 : 16 bar max. 2: 25 bar max . 3: 40 Bar Max. 4 : 64 bar max.

9 : working temperature (deg.C) : 1 : -50 to 125 Deg.c

2: -50 to 200 Deg.c

3: -50 to 350 deg. C

10. Signal output : F: Pulse, I : 4 to 20 mA

11. Accuracy : A : 0.25%, B : 0.5%

Manufactures by :-

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