# TRITON
## SERIES

# CORIOLIS MASS FLOWMETER

**NWI**
GROUP

# CORIOLIS MASS FLOWMETER

## 01 WORKING PRINCIPLE

Mass flowmeters function on the basis of Coriolis force, wherein under alternating current, a magnet and coil induce vibrations in two parallel tubes at a set frequency.

Fluid passing through these tubes results in a phase shift in their vibrations, directly correlating with the liquid's mass flow rate.

Additionally, variations in fluid density alter the vibration frequency, allowing for fluid density calculation. Temperature sensors in the pipeline, integrated with the measuring circuit, promptly ascertain fluid temperature.

## 02 APPLICATIONS

- **Gases:** Coriolis Mass Flowmeters are crucial for processes such as gas mixing, combustion control, or monitoring gas consumption in industrial operations.

- **Liquids:** Monitoring the flow of raw materials, or ensuring the consistency of liquid products during manufacturing processes.

- **Custody Transfer:** Where the accurate measurement of fluid quantities is essential for financial transactions, such as oil and gas distribution, custody transfer applications rely heavily on Coriolis Mass Flowmeters.

- **Reactor Feed Ratio:** Utilised in industries with chemical reactors for maintaining the proper ratio of feed materials, ensuring the correct amounts of reactants are introduced into the reactor.

- **Density Measurement:** Invaluable in industries where knowing the density of a substance is critical for process control, quality assurance, or compliance with regulatory standards.

- **Batch Control:** Coriolis Mass Flowmeters facilitate precise control over the quantities of materials added to each batch, ensuring consistency in product quality and help in achieving tight control over production processes.

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## 03 FEATURES

- U-shaped design for excellent stability and repeatability.

- Dedicated ASIC with digital closed-loop control for improved gas-liquid flow measurement performance.

- Dynamic vibration balance (DVB) technology for enhanced system stability.

- 2-point temperature compensation and process pressure compensation.

- Special configurations available for challenging applications, like high temperatures.
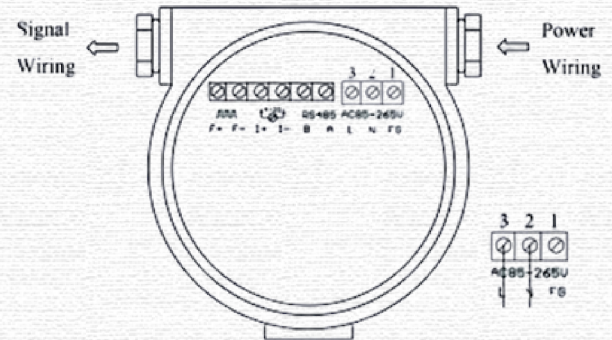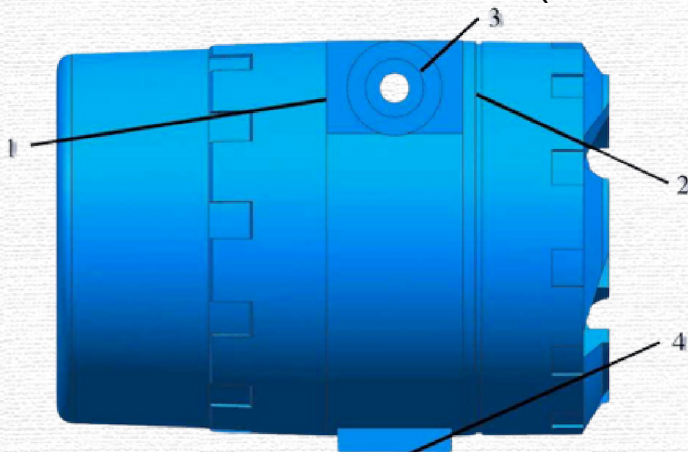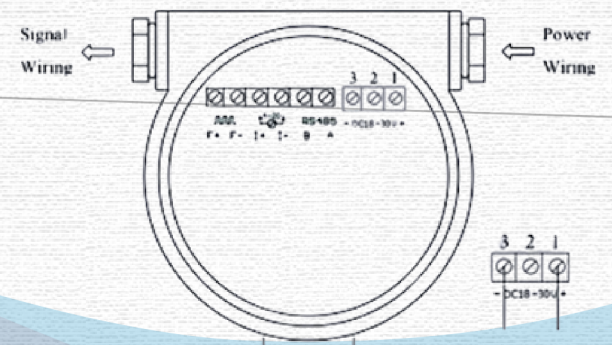
# CORIOLIS MASS FLOWMETER

## 04 LCD DISPLAY
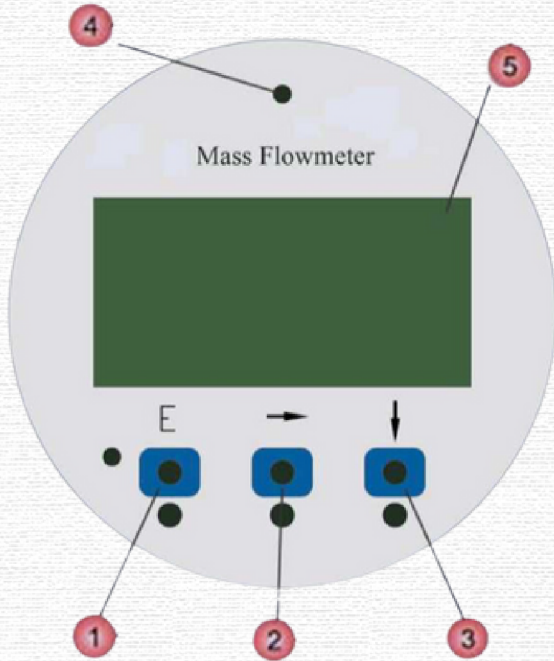


| No. | Notes |
|-----|-------|
| 1 | E key: enter |
| 2 | → key: move curse or return |
| 3 | ↓ key : page down |
| 4 | Light for working status |
| 5 | Two line OLED |

## 05 WIRE TERMINAL DESCRIPTION

Overview of the transmitter (same for both integrate & remote type)



AC Power Wiring for DSP transmitter

DC Power Wiring for DSP transmitter

| No. | Position of thread | Pitch | Thread form + quality of pitch | Threads engaged | Thread length |
|-----|-------------------|-------|-------------------------------|-----------------|---------------|
| (1) Case | Thread on front cover | 2mm | Medium，6h | ≥6 | 25mm |
| (1) Front cover | Thread on front cover | 2mm | Medium，6H | ≥6 | 25mm |
| (2) Case | Thread on back cover | 2mm | Medium，6h | ≥6 | 25mm |
| (2) Back cover | Thread on back cover | 2mm | Medium，6H | ≥6 | 25mm |
| (3) A/F | Thread for cable gland 1/2" NPT | 1.814mm | Medium，6H | ≥6 | 15mm |
| (4) A/F | Thread for case | 1.5 | Medium，6H | ≥6 | 26mm |

TRITON SERIES

# CORIOLIS MASS FLOWMETER

## 06  TECHNICAL DATA

| Measuring Tube | SS316L; Hastelloy C | |
|---|---|---|
| Pressure | Refer to chart shown above. Special orders would be placed for high pressure | |
| Medium Temperature | -50°C…+130°C | |
| | -50°C…+180°C | |
| | -50°C…+250°C | |
| | -50°C…+350°C | |
| Ambient Temperature | -25°C…+60°C(with LCD); -40°C…+85°C (without LCD) | |
| Flow Rate Accuracy | ±0.1%; ±0.2%; ±0.5% | |
| Density Measurement Accuracy | ERROR: $0.0005g/cm^3(0.5g/m^3)$ | |
| Repeatability | Liquid | ≤0.05% |
| | Gas | ≤0.17% |
| Uncertainty | Liquid | ± 0.10% |
| | Gas | ± 0.35% |
| Output | 4-20mA; Pulse | |
| Communication | RS485; HART; Profibus DP; FF | |
| Explosion Proof | ExdibllCT6Gb | |
| Protection | IP67 | |

## 07  FLOW RANGE (U-TYPE)

Table 1: Flow range for liquid (U type)

| DN | Allowable Flow Range (kg/h) | Normal Flow Range for Accuracy 0.1% (kg/h) | Normal Flow Range for Accuracy 0.2% (kg/h) | Normal Flow Range for Accuracy 0.5% (kg/h) | Stability of Zero Point (kg/h) |
|---|---|---|---|---|---|
| 10 | 10~1000 | 100~1000 | 70~1000 | 50~1000 | 0.03 |
| 15 | 20~3000 | 300~3000 | 200~3000 | 150~3000 | 0.07 |
| 25 | 80~8000 | 800~8000 | 600~8000 | 400~8000 | 0.15 |
| 40 | 240~32000 | 2000~32000 | 1500~32000 | 1500~32000 | 0.9 |
| 50 | 500~50000 | 3500~50000 | 2500~50000 | 2000~50000 | 1.5 |
| 80 | 800~140000 | 8000~140000 | 7000~140000 | 6000~140000 | 3.5 |
| 100 | 1500~200000 | 15000~200000 | 12000~200000 | 10000~200000 | 7 |
| 150 | 5000~500000 | 50000~500000 | 35000~500000 | 28000~500000 | 17 |
| 200 | 10000~1000000 | 200000~1000000 | 120000~1000000 | 80000~1000000 | 45 |
| 300 | 25000~2500000 | 50000~25000000 | 300000~2500000 | 200000~2500000 | 70 |

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# CORIOLIS MASS FLOWMETER

## 08 FLOW RANGE (W/V-TYPE)

Table 2: Flow range for liquid (V type)

| DN | Max. Flow range (kg/h) | Normal flow range for 0.1% accuracy(Kg/h) | Normal flow range for 0.2% accuracy(Kg/h) | Normal flow range for 0.5% accuracy(Kg/h) | Stability of Zero point (Kg/h) |
|---|---|---|---|---|---|
| 3 | 1.2~120 | 10~120 | 8~120 | 6~120 | 0.004 |
| 8 | 8~800 | 80~800 | 55~800 | 40~800 | 0.035 |
| 10 | 10~1000 | 100~1000 | 70~1000 | 50~1000 | 0.045 |
| 15 | 20~3000 | 300~3000 | 200~3000 | 150~3000 | 0.09 |
| 25 | 80~8000 | 600~8000 | 400~8000 | 300~8000 | 0.25 |
| 40 | 240~24000 | 2400~24000 | 1200~24000 | 1000~24000 | 1 |
| 50 | 500~45000 | 5000~45000 | 2500~45000 | 2000~45000 | 2 |
| 80 | 800~120000 | 10000~120000 | 8000~120000 | 6000~120000 | 3.5 |
| 100 | 1500~200000 | 20000~200000 | 15000~200000 | 10000~200000 | 7 |
| 150 | 5000~500000 | 50000~500000 | 35000~500000 | 30000~500000 | 23 |
| 200 | 10000~1000000 | 100000~1000000 | 70000~1000000 | 50000~1000000 | 45 |
| 250 | 15000~1500000 | 150000~1500000 | 120000~1500000 | 75000~1500000 | 70 |

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# CORIOLIS MASS FLOWMETER

## 10 MODEL SELECTION

| Model | Stuffix Code | | | | | | | | | | | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCM- | ❶ | ❷ | ❸ | ❹ | ❺ | ❻ | ❼ | ❽ | ❾ | ❿ | ⓫ | **Coriolis Mass Flow Meter** |
| Type | U | | | | | | | | | | | U Type |
| | V | | | | | | | | | | | V Type |
| Diameter | | XXX | | | | | | | | | | Stand for diameter 001: DN1; 250: DN 250 |
| Signal Output | | | 1 | | | | | | | | | 4-20mA/0-10KHz |
| Communication | | | | 1 | | | | | | | | RS485 |
| | | | | 2 | | | | | | | | Hart |
| | | | | 3 | | | | | | | | PF |
| | | | | 4 | | | | | | | | FF |
| | | | | 5 | | | | | | | | None |
| Temperature Rating | | | | | T1 | | | | | | | -50...+130°C |
| | | | | | T2 | | | | | | | -50...+180°C |
| | | | | | T3 | | | | | | | -50...+250°C |
| | | | | | T4 | | | | | | | -50...+350°C |
| Measuring Tube | | | | | | S6 | | | | | | SS316 |
| | | | | | | HC | | | | | | Hastelloy C |
| | | | | | | XX | | | | | | On request |
| Accuracy Rating | | | | | | | 01 | | | | | ±0.1% of rate |
| | | | | | | | 02 | | | | | ±0.2% of rate |
| | | | | | | | 05 | | | | | ±0.5% of rate |
| | | | | | | | XX | | | | | On request |
| Connection | | | | | | | | AXX | | | | ANSI Flange;A15:ANSI 150#;A30:ANSI 300#... |
| | | | | | | | | DXX | | | | DIN Flange;D16:DIN PN16;DN25:DIN PN25... |
| | | | | | | | | JXX | | | | JIS Flange;J10K:JIS 10K;J20K:JIS 20K... |
| | | | | | | | | TRC | | | | Tri-clamp type(Sanitary connection) |
| | | | | | | | | THR | | | | Thread connection (<DN 40) |
| Body Material | | | | | | | | | S4 | | | SS304 |
| | | | | | | | | | S6 | | | SS316 |
| Structure | | | | | | | | | | S | | Compact type with local display |
| | | | | | | | | | | L | | Remote display include bracket |
| Power Supply | | | | | | | | | | | 0 | 24V DC |
| | | | | | | | | | | | 1 | 220V AC |

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## 11 INSTALLATION

**①** **Location:** Determine the installation location of the sensor, which should take the installation area, pipeline, transmitter location and valve into account.

**②** **Direction:** Determine the installation direction of the sensor in the pipeline.

**③** **Installation:** Install the sensor and transmitter in the pipeline.

**④** **Connection:** When the Mass Flowmeter is installed separately, the sensor and the transmitter should be connected through a special nine-core cable.

**⑤** **Start-up.**

The Coroilis Mass Flowmeter only works well when the liquid fills the measuring tube. In principle, as long as the measuring tube is full of liquid, the mass flowmeter will function in any orientation installation. Generally speaking, the mass flowmeter will be installed in the orientation required to make liquid fill the measuring tube.

For horizontal installation, the measuring tube should be installed underside the pipeline when the process medium is liquid/slurry (shown in Diagram 1) and topside the pipeline when the process medium is gas (shown in Diagram 2). For vertical installation, the measuring tube should be installed besides the pipeline when the process medium is liquid/slurry/gas.
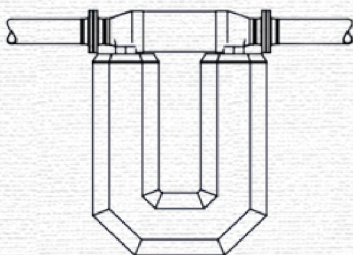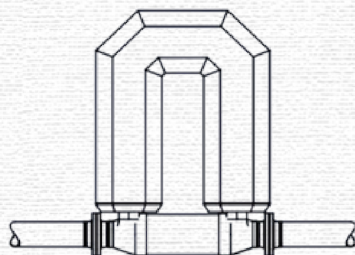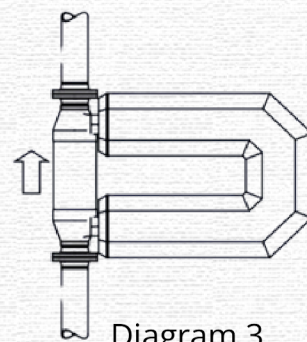
Diagram 1          Diagram 2          Diagram 3

The installation of the Mass Flowmeter should decrease the tortuosity of the process connection. Meanwhile, do not support the pipeline by the sensor of the Mass Flowmeter.
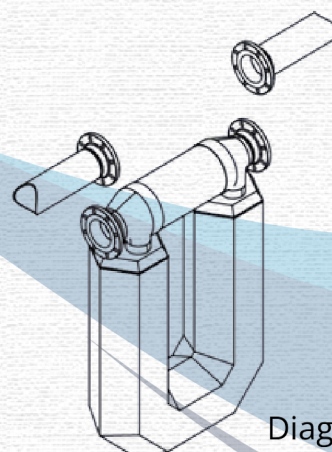(Shown in Diagram 4)

Diagram 4

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