



OVAL

OVAL Coriolis Flowmeter



Liquid



Gas

# ALTI<sup>mass</sup> Series

**Sufficient self-diagnosis! Density accuracy improved!**

**Large screen! Setting changes available on-site!**

Improved zero point stability. Fast response.

A Coriolis flowmeter capable of highly accurate measurement even at extra low flow range and short-time filling.



Integral-mount



Remote-mount

Remote-mount  
(Stainless Steel Enclosure)Remote-mount transmitter  
PA0KHigh-Performance  
Small Transmitter (Rack-Mount)  
PA5K

OVAL provides a product lineup to meet customer needs.  
You can find your desired Coriolis flowmeter meeting your requirements.

Ease of use, general-purpose use, and reliability. The source of these features stem from OVAL's ever-evolving sophisticated technologies.

### High accuracy model

The ultimate "U" shaped flow tube, a fruitage of our optimized and unified design concept.

## ALTI<sub>mass</sub> Type U

Top-of-the-line model in OVAL Coriolis flowmeters. The highest performance you can think in every aspect - in accuracy, repeatability, flow range, pressure loss, and safety.

- ◎ U-shaped flow tubes sense the Coriolis force reasonably and efficiently.
- ◎ High accuracy, low pressure loss model. A 1:200 flow range is attainable.
- ◎ Both of sensor integrated and separated transmitters are available.
- ◎ High-temperature sensor is best suited for flow and density measurements of fluids of max. temperature up to +350°C.
- ◎ Cryogenic sensor is applicable as an explosionproof instrument for cryogenic fluids such as LNG.



### Single, straight-tube model

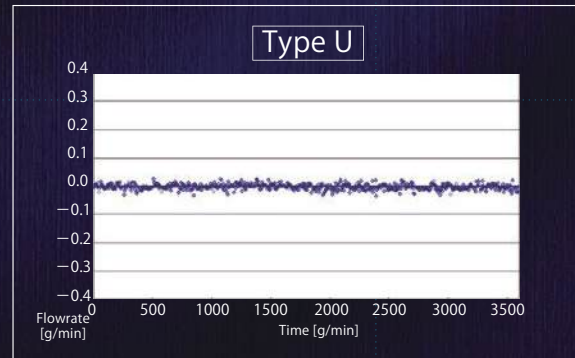
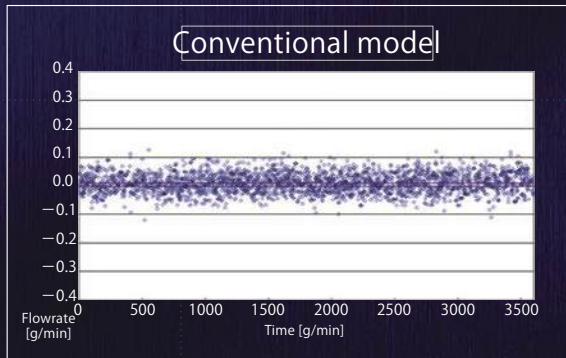
Vibration resistant, single, straight-tube

## ALTI<sub>mass</sub> Type S

Ideally suited for clean processes where the metered process fluid tends to build up or solidify, or where fast and positive process fluid replacement or draining of the pipeline is required.

- ◎ A mass flowmeter built with a single, straight flow tube. Facilitates cleaning job of wetted parts.
- ◎ Requires minimum installation space, ideally suited for clean processes.
- ◎ A rangeability of 1:30 is attainable.
- ◎ The transmitter comes in a variety of types - mounted integrally or separately with the sensor.

### (1) Improved zero stability



### (2) Improved liquid density accuracy (Type U)

By the improvement of the density measurement processing, density measurement has become more stable than conventional model, improving the liquid density accuracy.

### (3) Improved responsibility

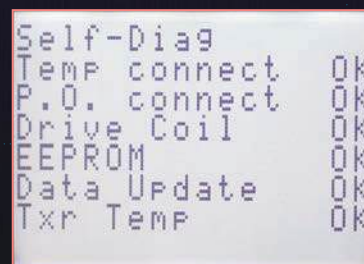
By using high speed real-time processing (10 times as fast as OVAL's conventional model), the responsiveness to change of flowrate and short-time batch measurement has been improved.

### (4) Large-size display! Settings can be changed in the field!

Display screen is large and easy to view with a backlight facilitating setting in a dark place.



(a) Transmitter



(b) Self-check screen

Display screen of ALTI<sub>mass</sub> Transmitter



# OVAL Coriolis Flowmeter ALTI<sub>mass</sub> Series

## General-purpose model

OVAL technology pursuing  
Rainbow type flow tube

**ALTI<sub>mass</sub> Type B**

New direction of Coriolis flowmeter presented by OVAL.  
Small-size, stable truly innovative product with high cost performance.

- ◎ General-purpose mass flowmeter.
- ◎ Rainbow-shaped flow tube design, facilitating self drain, offers ease of cleaning and consistent performance.
- ◎ A complete set of ferrule fittings are available.
- ◎ High metering accuracy and low pressure loss. A rangeability of 1 : 50 is attainable.

## (5) Satisfactory self-diagnostic feature

- Status of the flowmeter is presented by two-color backlight (white, orange) and two LEDs (red, green).
- Input signal (sensor) check for disconnection
- Pipeline vibration check

Error type	Name (Status display)	Description	Display status at error		
			RED LED	Green LED	Backlight (White, Orange)
Saturated Alarm	Analog Output 1 Saturated	Analog output 1 value exceeds the output range and normal output is not available.	Blink	ON	White
	Analog Output 2 Saturated	Analog output 2 value exceeds the output range and normal output is not available.			
	Pulse Output 1 Saturated	Pulse output 1 value exceeds 11kHz and normal output is not available.			
	Pulse Output 2 Saturated	Pulse output 2 value exceeds 11kHz and normal output is not available.			
Sensor Failure	Drive Input Out of Range	Drive frequency is not within the regular range and normal measurement is not possible.	ON	OFF	Orange
	Scale Over	Mass flowrate exceeds 110% of max. allowable range; possible failure to make proper measurement.			
	Temperature Out of Range	Temperature is not within the regular range and normal measurement is not possible.			
	Density Outside Limit	Density is not within the regular range and normal measurement is not possible.			
	P.O. Sig Error	Pickoff signal voltage is not within the regular range and normal measurement is not possible.			
	Temperature Connect Error	Temperature sensor cannot be checked for normal connection.			
	P.O. Connect Error	Pickoff sensor cannot be checked for normal connection.			
Transmitter Failure	EEPROM Error	An error in parameters; inactive operation.	Blink (≠ 1)	OFF	Orange
	Data Update Error	Internal data is abnormal.	ON	OFF	Orange
Parameter Alarm	Analog 1 Set Alarm	Analog output 1 parameter set value is abnormal.	Blink	ON	White
	Analog 2 Set Alarm	Analog output 2 parameter set value is abnormal.			
	H/L Alarm Point Set Alarm	H/L Alarm parameter set value is abnormal.			
Calibration Failure	Auto Zero Failed	Auto Zero has not been completed normally.	Blink	OFF	White
	Sensor Stability Check Failed	Air density adjustment has not been completed normally.			
Slug Flow Alarm	Slug Flow Alarm	Mixed bubble may possibly have caused abnormal measurement value.	Blink	ON	White
Transmitter Alarm	Xmtr Temperature Alarm	Transmitter internal temperature is abnormal.	Blink	ON	White
	Xmtr Operating-Time Over	When the number of run hours has exceeded 100,000 hours.	OFF	ON	White

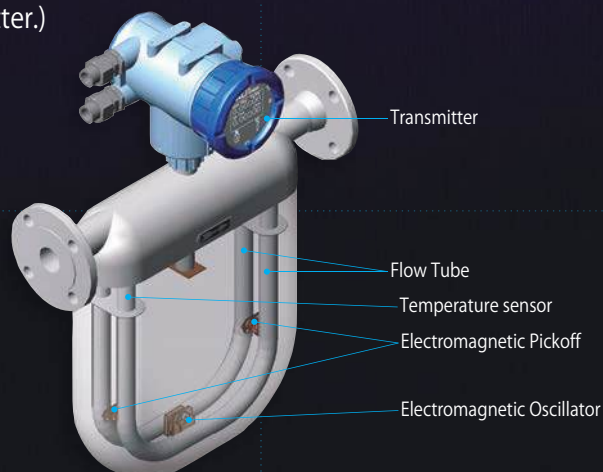
(※ 1) LED blinking at EEPROM error (100ms interval) is faster than that in other alarm condition (250ms interval)

## (6) Satisfactory maintenance function

- Error logging
- Clock (Accumulated time from power on is saved in the transmitter.)
- Data storage at the shipment from the factory

## ■ Measurement Principle and Construction

The mass flowmeter operates on the principle of Coriolis force. A pair of flow tubes fixed at both ends is excited by an electromagnetic oscillator to maintain oscillation at resonant frequency. A twist of these flow tubes takes place in proportion to the mass flowrate of the process fluid, which is sensed by the right-hand and left-hand electromagnetic pickoffs. The transmitter then sends its output as a mass flow signal.



Coriolis Mass  
Flowmeters

## GENERAL SPECIFICATIONS

※: For details, please refer to general specification sheets.

# Type U



Item			Description
Model			CA00A, CA001, CA003, CA006, CA010, CA015, CA025, CA040, CA050, CA080, CA100, CA150, CA15H, CA200, CA20H, CA250
Nominal size			1/4", 10mm, 15mm, 25mm, 40mm, 50mm, 80mm, 100mm, 150mm, 200mm, 250mm
Process Connection			JIS 10, 20, 30, 40, 63K RF ASME 150, 300, 600 RF, JPI 150, 300, 600 RF DIN PN 10, 16, 25, 40RF, Ferrule, Screw
Acceptable fluids			Liquids, Gases
Flow range			0 to 2800000kg/h (16 models)
Accuracy	Flow	Liquids	±0.1%RD (CA003 to CA200) ±0.1%RD±Zero stability error (CA20H to CA250, High temperature service model) ±0.2%RD (CA00A, CA001) ±0.2%RD±Zero stability error (High pressure service model)
		Gases	±0.5%RD±Zero stability error
	Density	Liquids	±0.0005g/mL (CA003 to CA250) ±0.003g/mL (CA00A, CA001, High temperature service model) ±0.004g/mL (High pressure service model)
Temperature range (Differs by explosionproof specification)			Standard model : -200 to +200°C (Applicable to all models) High temperature service model : -40 to +350°C (CA025 to CA150) Low temperature service model : -200 to +50°C (CA025 to CA250) (Explosionproof model)
Max. operating pressure			Depends on flange rating
Wetted materials			SUS 316L, SUS 316L + Alloy C, Alloy C
Explosionproof specification			JPEx, ATEX, IECEx, KCs, CSA, NEPSI, TAIWAN (IECEx)
Maritime certification			DNV GL

# Type S



Item			Description
Model			CS010, CS015, CS025, CS040, CS050, CSR50
Nominal size			10mm, 15mm, 25mm, 40mm, 50mm, 80mm
Process Connection			JIS 10, 20K RF ASME 150 RF, JPI 150 RF Ferrule
Acceptable fluids			Liquids
Flow range			0 to 91800kg/h (6 models)
Accuracy			±0.15%RD±Zero stability error
Temperature range (Differs by explosionproof specification)			-40 to +130°C
Max. operating press.			Depends on flange rating
Wetted materials			Titanium alloy
Explosionproof specification			JPEX, ATEX, IECEx, KCs, CSA, NEPSI, TAIWAN (IECEx)
Maritime certification			DNV GL

※ In case of non-explosionproof type, the maximum measurement temperature of integral type is 130°C.

# Type B



Item			Description
Model			CB006, CB010, CB015, CB025, CB040, CB050
Nominal size			10mm, 15mm, 25mm, 40mm, 50mm
Process Connection			JIS 10, 20, 30K RF ASME 150, 300, 600 RF, JPI 150, 300, 600 RF Ferrule
Acceptable fluids			Liquids
Flow range			0 to 96000kg/h (6 models)
Accuracy	Flowrate		±0.2%RD
	Density		±0.003g/mL
Temperature range (Differs by explosionproof specification)			-40 to +130°C
Max. operating press.			Depends on flange rating
Wetted materials			SUS 316L
Explosionproof specification			JPEX, ATEX, IECEx, KCs, CSA, NEPSI, TAIWAN (IECEx)
Maritime certification			DNV GL

## High-Performance Small Transmitter (Rack-Mount) MODEL: PA5K

Item			Description
Connectable sensor			Mass flowmeter ALTI mass Type U, S, and B
Power supply			AD specifications: 100V - 240V 50/60Hz (allowable voltage range: AC 85V - 264V) DC specifications: 20V - 30V (recommended power supply capacity of DC specifications: 24VDC, 1A or higher)
Power consumption			Max. 21VA or Max. 7W
Ambient temperature			-20 to +50°C
Transmission distance			Type U: Max. 200m (CA00A, CA001: Max. 100m) Type S: Max. 100m Type B: Max. 50m (all items are connected with dedicated 9-core cable) ※1
Explosionproof configuration			JPEX, ATEX, IECEx, KCs
Communication protocol	HART communication type (standard)		Superimposed on HART 7 analog output 1
	Modbus communication type		RS-485 Modbus protocol RTU or ASCII Baudrate: 9600bps, 19200bps, 38400bps (Standard) *Analog output 1 and 2 are not applicable to Modbus communication type.
Display / Operation			LED for operating status display ... 2 (red) (green), zeroing button

This product may be used in applications as a flowmeter, densitometer, gas meter, water meter, and concentration measurement device, as well as in systems functioning as a calorimeter and viscometer.

The specification as of December, 2024 is stated in this catalog. Specifications and design are subject to change without notice.



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