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.

OVAL Colioiris Flowmeter

ALTImass Series

Remote-mount transmitter PA0K

High-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.

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**High accuracy model**

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

**ALTImass 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 explosion-proof instrument for cryogenic fluids such as LNG.

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**Single, straight-tube model**

Vibration resistant, single, straight-tube

**ALTImass 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.

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1. **Improved zero stability**

![Conventional model](chart1.png)

![Type U](chart2.png)

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.

![Transmitter](transmitter.png)

![Self-check screen](self-check.png)

Display screen of ALTImass Transmitter
New direction of Coriolis flowmeter presented by OVAL.

- Low priced, 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

<table>
<thead>
<tr>
<th>Error type</th>
<th>Name (Status display)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturated Alarm</td>
<td>Analog Output 1 Saturated</td>
<td>Analog output 1 value exceeds the output range and normal output is not available.</td>
</tr>
<tr>
<td></td>
<td>Pulse Output 1 Saturated</td>
<td>Pulse output 1 value exceeds 11kHz and normal output is not available.</td>
</tr>
<tr>
<td></td>
<td>Pulse Output 2 Saturated</td>
<td>Pulse output 2 value exceeds 11kHz and normal output is not available.</td>
</tr>
<tr>
<td>Sensor Failure</td>
<td>Drive Input Out of Range</td>
<td>Drive frequency is not within the regular range and normal measurement is not possible.</td>
</tr>
<tr>
<td></td>
<td>Temperature Out of Range</td>
<td>Temperature is not within the regular range and normal measurement is not possible.</td>
</tr>
<tr>
<td></td>
<td>Density Outside Limit</td>
<td>Density is not within the regular range and normal measurement is not possible.</td>
</tr>
<tr>
<td></td>
<td>P.O. Sig Error</td>
<td>Pickoff signal voltage is not within the regular range and normal measurement is not possible.</td>
</tr>
<tr>
<td></td>
<td>Temperature Connect Error</td>
<td>Temperature sensor cannot be checked for normal connection.</td>
</tr>
<tr>
<td></td>
<td>P.O. Connect Error</td>
<td>Pickoff sensor cannot be checked for normal connection.</td>
</tr>
<tr>
<td>Transmitter Failure</td>
<td>EEPROM Error</td>
<td>An error in parameters; inactive operation.</td>
</tr>
<tr>
<td></td>
<td>Data Update Error</td>
<td>Internal data is abnormal.</td>
</tr>
<tr>
<td>Parameter Alarm</td>
<td>Analog 1 Set Alarm</td>
<td>Analog output 1 parameter set value is abnormal.</td>
</tr>
<tr>
<td></td>
<td>Analog 2 Set Alarm</td>
<td>Analog output 2 parameter set value is abnormal.</td>
</tr>
<tr>
<td></td>
<td>H/S Alarm Point Set Alarm</td>
<td>H/S Alarm parameter set value is abnormal.</td>
</tr>
<tr>
<td>Calibration Failure</td>
<td>Auto Zero Failed</td>
<td>Auto Zero has not been completed normally.</td>
</tr>
<tr>
<td></td>
<td>Sensor Stability Check Failed</td>
<td>Air density adjustment has not been completed normally.</td>
</tr>
<tr>
<td></td>
<td>Slug Flow Alarm</td>
<td>Mixed bubble may possibly have caused abnormal measurement value.</td>
</tr>
<tr>
<td></td>
<td>Transmitter Alarm</td>
<td>Transmitter internal temperature is abnormal.</td>
</tr>
<tr>
<td></td>
<td>Xmt Operating Time Over</td>
<td>When the number of run hours has exceeded 100,000 hours.</td>
</tr>
</tbody>
</table>

(5) 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.
### GENERAL SPECIFICATIONS

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>CA00A, CA001, CA003, CA010, CA015, CA025, CA050, CA080, CA100, CA150, CA15H, CA200, CA20H, CA250</td>
</tr>
<tr>
<td>Nominal size</td>
<td>1/4&quot;, 10mm, 15mm, 25mm, 40mm, 50mm, 80mm, 100mm, 150mm, 200mm, 250mm</td>
</tr>
<tr>
<td>Process Connection</td>
<td>JIS 10, 20, 30, 40, 63K RF, ASTM 150, 300, 600 RF, JPI 150, 300, 600 RF, DIN PN 10, 16, 25, 63RF, Female, Screw</td>
</tr>
<tr>
<td>Acceptable fluids</td>
<td>Liquids, Gases</td>
</tr>
<tr>
<td>Flow range</td>
<td>0 to 2800000 kg/h (16 models)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.1%RD (CA003 to CA200) ±0.1%RD ±Zero stability error (CA20H to CA250, High temperature service model) ±0.2%RD ±Zero stability error (High pressure service model) ±0.5%RD ±Zero stability error</td>
</tr>
<tr>
<td>Temperature range</td>
<td>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)</td>
</tr>
<tr>
<td>Coriolis type</td>
<td>Type U, Type S, Type B</td>
</tr>
</tbody>
</table>

#### Type U

**Nominal size**: 1/4", 10mm, 15mm, 25mm, 40mm, 50mm, 80mm, 100mm, 150mm, 200mm, 250mm

**Process Connection**: JIS 10, 20, 30, 40, 63K RF, ASTM 150, 300, 600 RF, JPI 150, 300, 600 RF, DIN PN 10, 16, 25, 63RF, Female, Screw

**Acceptable fluids**: Liquids, Gases

**Flow range**: 0 to 2800000 kg/h (16 models)

**Accuracy**:
- ±0.1%RD (CA003 to CA200)
- ±0.1%RD ±Zero stability error (CA20H to CA250, High temperature service model)
- ±0.2%RD ±Zero stability error (High pressure service model)
- ±0.5%RD ±Zero stability error

**Temperature range**:
- 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)

**Flowrate**

<table>
<thead>
<tr>
<th>Gases</th>
<th>Liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>±0.1%RD</td>
<td>±0.003g/mL (CA00A, CA001, High temperature service model) ±0.004g/mL (High pressure service model)</td>
</tr>
<tr>
<td>±0.2%RD</td>
<td>±0.003g/mL (CA00A, CA001, High temperature service model) ±0.004g/mL (High pressure service model)</td>
</tr>
<tr>
<td>±0.5%RD</td>
<td>±0.003g/mL (CA00A, CA001, High temperature service model) ±0.004g/mL (High pressure service model)</td>
</tr>
</tbody>
</table>

**Accuracy**
- ±0.1%RD (CA003 to CA200)
- ±0.1%RD ±Zero stability error (CA20H to CA250, High temperature service model)
- ±0.2%RD ±Zero stability error (High pressure service model)
- ±0.5%RD ±Zero stability error

**Density**
- ±0.003g/mL (CA00A, CA001, High temperature service model)
- ±0.004g/mL (High pressure service model)

**Temperature range**
- 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 316, Alloy C, Alloy C

**Explosionproof specification**: TIS, ATEX, IECEx, CSA, EAC, NEPSI, ITRI

**Maritime certification**: UNV GL

### Type S

**Nominal size**: 10mm, 15mm, 25mm, 40mm, 50mm, 80mm

**Process Connection**: JIS 10, 20, 30K RF, ASME 150, 300, 600 RF, JPI 150, 300, 600 RF

**Acceptable fluids**: Liquids

**Flow range**: 0 to 180000 kg/h (6 models)

**Accuracy**:
- ±0.15%RD ±Zero stability error (Titanium alloy)
- ±0.2%RD ±Zero stability error (SUS 316L)
- ±0.2%RD

**Temperature range**:
- −40 to +130°C

**Max. operating press.**: Depends on flange rating

**Wetted materials**: Titanium alloy, SUS 316L

**Explosionproof specification**: TIS, ATEX, IECEx, CSA, EAC, NEPSI, ITRI

**Maritime certification**: UNV GL

### Type B

**Nominal size**: 10mm, 15mm, 25mm, 40mm, 50mm

**Process Connection**: JIS 10, 20, 30K RF, ASTM 150, 300, 600 RF, JPI 150, 300, 600 RF

**Acceptable fluids**: Liquids

**Flow range**: 0 to 96000 kg/h (6 models)

**Accuracy**:
- ±0.2%RD

**Temperature range**:
- −40 to +130°C

**Max. operating press.**: Depends on flange rating

**Wetted materials**: SUS 316L

**Explosionproof specification**: TIS, ATEX, IECEx, CSA, EAC, NEPSI, ITRI

**Maritime certification**: UNV GL

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

**Connectable sensor**: Mass flowmeter ALTImass 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. 216W or Max. 7W

**Ambient temperature**: −20 to +50°C

**Transmission distance**
- Type U: Max. 200m (CA00A, CA001, Max. 100m)
- Type S: Max. 100m (stainless steel)
- Type B: Max. 50m (all items are connected with dedicated 9-core cable) feeding

**Explosionproof configuration**
- TIS, ATEX, IECEx

**Communication protocol**
- HART communication type (standard)
- Modbus communication type (RS-485 Modbus protocol RTU or ASCII)

**Baudrate**: 9600bps, 19200bps, 38400bps (Standard)

**Display / Operation**
- LED for operating status display
- 1 (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 October, 2019 is stated in this catalog. Specifications and design are subject to change without notice.