UCUF-04MT/SFC-010T Ultrasonic Flowmeter

DESCRIPTION

The UCUF-04MT ultrasonic flowmeter for high-temperature applications is an enhanced version of the UCUF series which are best suited for measuring low flows such as ultra-pure water and chemical liquids. All the wetted parts are made of specialgrade PFA material and have no moving parts or mechanical seals such as O-rings. This clean structure without dead pockets makes the flowmeter the perfect choice for the semiconductor industry, which requires extreme cleanness.

The SFC-010T is a thin converter, which can be installed on the DIN rail.
Using state-of-the-art technologies such as digital signal processing (DSP), this converter ensures stable flow measurement by minimizing the adverse effects of bubbles in the fluid, which are significant problems in semiconductor manufacturing and chemical liquids handling processes.
Furthermore, measurement at low flow rate has been stabilized by increasing the time resolution and accelerating signal processing compared with existing products.



APPLICATIONS

- Measuring the flow rate of high-temperature chemical liquids in the semiconductor manufacturing process (Contact us about applicable fluids.)
- Measuring the flow rate of chemical liquids in the supply process (Contact us about applicable fluids.)
- Measuring micro flow rates

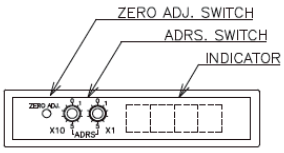
KEY FEATURES

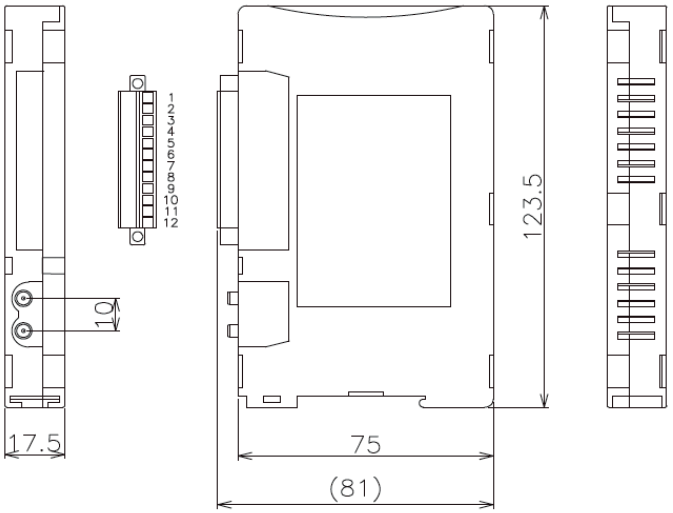
- **Saves energy and space**
  The SFC-010T is more compact than conventional models.
- **High-speed calculation**
  The SFC-010T achieves 10-ms high-speed sampling.
- **Significantly improved resistance to bubbles**
  Bubbles contained in liquids interfere with the propagation of ultrasonic waves and can prevent flow measurement.
  Based on proven field experience and state-of-the-art DSP signal processing technology, this tool has succeeded in achieving stable measurement by detecting the effect of bubbles from waveforms and then eliminating the abnormal output from the measurement values.
- **Standards**
  CE marking
  RoHS2 compliant
- **Detector**
  Applicable to high-temperature liquids (up to 180°C
  Measurable high kinetic viscosity liquids (up to 40 mm^2/s)
  Ideal clean construction
  High resistance to corrosion and easy installation
- **Converter**
  Zero-point check
  Zero-point adjustment in advance ensures optimal measurement.
  Parameter setting
  The dedicated configurator software facilitates parameter setting (requires RS-485 communication converter).
  Display
  Flow rate and status are displayed in 7-segment red LED (4 digits).

SPECIFICATIONS OF CONVERTER (SFC-010T)

- Detector to be connected : 1 unit
- Power supply : 24 V DC ±10 %
- Consumption current : Approx. 155 mA
- Minimum driving current : Approx. 350 mA
- Inrush current : Approx. 2 A/2 ms
- Display : 4-digit LED (flow rate and status)
- Communication function : RS-485 half-duplex asynchronous serial communication
  Modbus Protocol,
  RTU mode
  Baud rate: 19.2 kbps
  Data size: 8 bits
  Parity: Even
  Stop bits: 1 bit
  Address switch: 01 to 32
- Output : Analog output: 4 to 20 mA DC,
  0 to 20 mA DC,
  1 to 5 V DC,
  0 to 5 V DC,
  0 to 10 V DC,
  Load resistance is less than 500Ω.
  Frequency output: 0 to 1 kHz
  Rating: Open collector pulse 30 V DC/10 mA
  Alarm output: High/Low 2 points
  Rating: Open collector pulse 30 V DC/10 mA
- Output cycle : 10 ms
- Time constant : 0.0 to 25.0 sec.
- Low cutoff : 0.0 to 25.0 % F.S.
- Connector : SMB connector
- Detector : UCUF-04MT
- Parameter setting : Setting through the dedicated configurator software
- Ambient temperature : 0 to 45°C for 1 unit
  0 to 25°C for more than 2 units closely installed
  At least 10-mm intervals are required between multiple units. Ventilation is required for installing in a sealed environment.
- Humidity : 30 to 80 % RH
- Standard : EN IEC61326-1, EN IEC61326-2-3 (EMC Directive)
  RoHS2
- Installation : DIN rail installation
- Enclosure classification : IP20 equivalent (indoor)
- Case material : Heat-resistant ABS (white)
- Mass : Approx. 150 g

DIMENSIONS OF CONVERTER





SMB connector



OUT IN	Sensor signal input

Terminal

No.		Description
1	+	Power supply input 24 V DC
2	–	
3	FG	Grounding
4	+	Analog output
5	–	
6	+	Alarm output 1
7	+	Alarm output 2
8	COM	Common
9	+	Pulse output
10	–	
11	+	RS-485
12	–	

STANDARD SPECIFICATIONS OF DETECTOR

- Measurable fluid : Liquids
  (No bubbles. PFA-permeable or corrosive liquids are not allowed.)
- Flow rate range : 0 to 2000 mL/min
- Fluid temperature : 10 to 180°C
- Fluid pressure : 0 to 0.5 MPa (See Table 1.)
- Fluid sound speed : 1000 to 2200 m/s
- Fluid kinematic viscosity : 0.3 to 40.0 mm^2/s
- Flow range : See Table 2.
- Accuracy : See Table 2. (No boiling, bubbling, or chemical reaction)
- Process connection : PFA tube end (See Table 3.)
- Enclosure classification : IP65 (indoor)
- Ambient temperature : 5 to 60°C
- Pressure loss : Pressure loss for water (kPa)
  $= C \times Q^2$
  where, C: Pressure loss coefficient (See Table 3.)
  Q: Flow rate (L/min)
- Materials : See Table 4.
- Dedicated cable : Two coaxial cables
  Length: 0.5 m (PTFE-covered: White)
- Connector : SMB connector
- Detector : SFC-010T
- Mass : Approx. 250 g

Table 1: Relation between pressure and fluid temperature

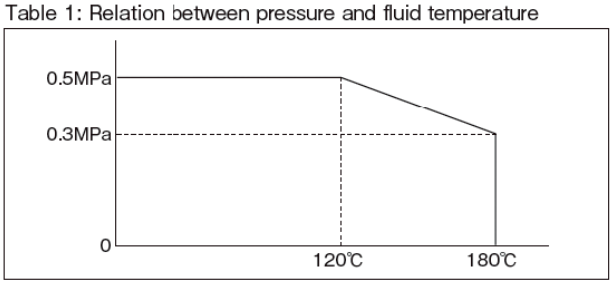


Table 2: Detector characteristic 1

Model	Flow velocity < 1 m/s		Flow velocity ≥ 1 m/s	
	Flow rate (L/min)	Accuracy (L/min)	Flow rate (L/min)	Accuracy (% of R.D.)
UCUF-04MT	0.1 to 0.8	±0.008*	0.8 to 2.0	±1%*

* Note: For DIW of 20°C

Table 3: Detector characteristic 2

Model	Pressure loss coefficient: C	Connection tube size	Mass
UCUF-04MT	4.5	1/4"	Approx. 250 g

Table 4: Materials of detector

Part		Material
Wetted part	Body	PFA
	Tube	PFA
Cable fitting		PP
Cable sheath		PTFE(White)
Sensor cap		PPS/GF30(Black)

MODEL CODE OF DETECTOR

Model code							Specification
UCUF	−□□	MT	−	□	□	□	
Meter size	−04						4 mm
Shape				U			U shaped (Standard)
				Z			Z shaped
Cable length					0.5		0.5m (Standard) *1
Special						(Blank)	None
						/Z	*2

*1 It corresponds with an extension cable 0.5m or more. Required cable length is filled in (Standard 1, 3, 6m).
They are 1.5 and entry in the case of a standard cable (0.5m) + extension cable (1.0m).
*2 If any special specification are required, add [/Z] at the end of the code and describe them separately. Please contact us for their availability.

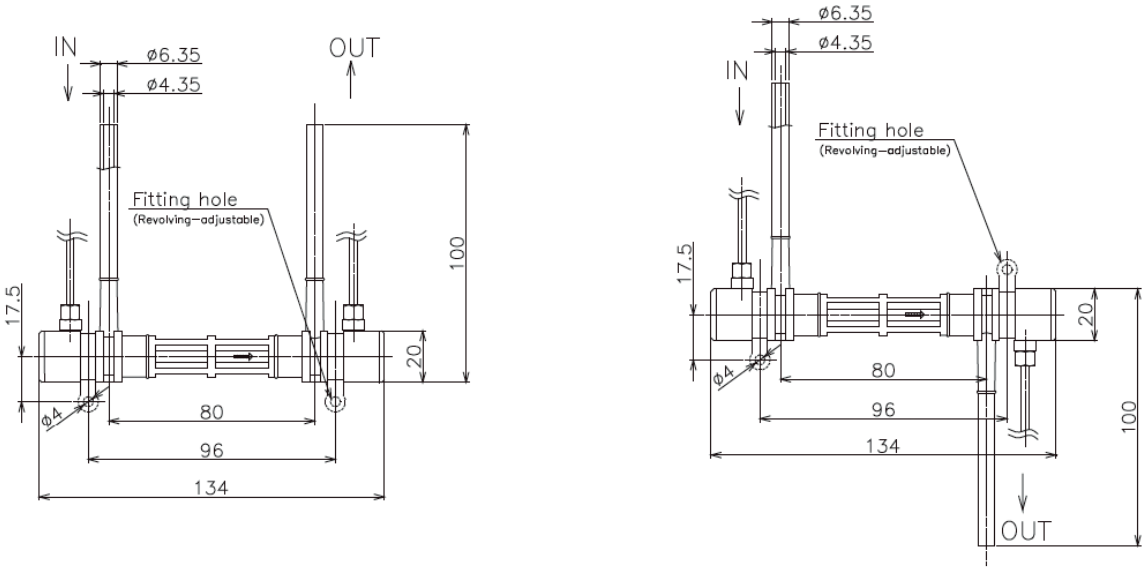
MODEL CODE OF CONVERTER

SFC-010T	−	□	□	Specification
Analog output type		0		4 to 20 mA
		1		0 to 20 mA
		2		1 to 5 V
		3		0 to 5 V
		4		0 to 10 V
Special specification			(Blank)	None
			/Z	Special *1

*1 If any special specification are required, add [/Z] at the end of the code and describe them separately. Please contact us for their availability.

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DIMENSIONS OF DETECTOR (LEFT: U-SHAPED, RIGHT: Z-SHAPED)



CAUTIONS ON INSTALLATION

- Install the detector in piping where no air or gas bubbles exist.
- The detector must be full with liquid.
  Although the detector can be installed in horizontal, vertical or tilted piping, it is recommended to place the bottom of the U-shaped tube vertically so that liquid inside drains easily.
- Install the control valve downstream of the detector.
- Install the detector and converter away from power relays and solenoid valves that may generate noise.
- Keep the signal cables away from power cables with high voltage and current.

*Specification is subject to change without notice.

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