

### OUTLINE

The UCUF (Ultra-Clean Ultrasonic Flowmeter) series Ultrasonic Flowmeter is designed for low flowrate applications. The flowmeter consists of the UCUF flow detectors and its associated signal converter. The non-wetted detector design, constructed of PFA material, makes the UCUF series an ideal choice for semiconductor industry, where the extreme cleanness of pipe inside is required. Diameter of measuring tube is available in 4 and 6mm, and this flow meter widely covers such a low flowrate range as conventional clamp-on type ultrasonic flowmeter could not measure so far.



### FEATURES

- ❑ All wetted parts made of PFA  
Extremely low contamination with ions or particles
- ❑ Accuracy  $\pm 1\%$  of Reading
- ❑ Size line-up : 4mm and 6mm
- ❑ Low flow measurement down to 10mL/min
- ❑ Measures viscous fluids up to 40mm<sup>2</sup>/s
- ❑ Corrosion resistant
- ❑ Easy installation with compact meter body

### APPLICATIONS

- ❑ Pure water and ultra-pure water in semiconductor manufacturing plants
- ❑ Chemical Mechanical Polishing (CMP) slurries
- ❑ Chemical feeds
- ❑ Highly corrosive chemicals
- ❑ Low flow measurement of liquid

### OPERATING PRINCIPLE

The fluid to be measured flows through the U-shaped tube. Two piezoelectric transducers, mounted at both ends of the measuring section, generate and receive an ultrasonic wave alternately. The wave travelling with the fluid is accelerated and the wave travelling against the fluid is slowed. The difference in transit time of wave is proportional to the velocity of the fluid.

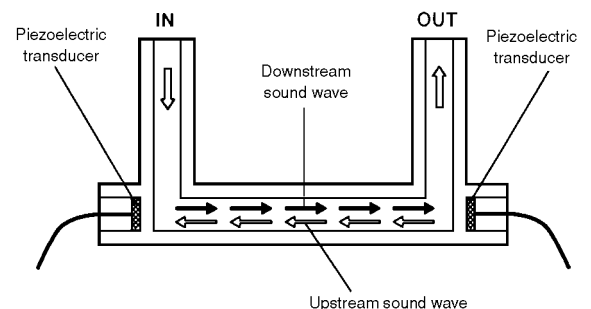


Figure 1. Operating Principle

## SPECIFICATIONS

### Flow detector

Measurable Fluid	: Liquids with no bubbles
Fluid Sound Speed	: 1000 to 2200 m/s
Fluid Temperature	: 10 to 60 °C
Fluid Pressure	: 0 to 0.5 MPa
Fluid Kinematic Viscosity	: 0.8 ~ 40mm <sup>2</sup> /s
Process Connection	: PFA Tube End (Refer to Table 1)
Material (Wetted part)	: PFA
Enclosure Classification	: IP65
Flow Range	: Refer to Table 1

Table 1. Flow Range and Connecting Tube Size

Model	Flow Range(L/min)		Connecting Tube Size
	Min. Range	Max. Range	
UCUF-04P	0 ~ 0.1	0 ~ 3.0	3/8"
UCUF-06P	0 ~ 0.4	0 ~ 8.0	3/8"

Accuracy : Refer to Table 2

Table 2. Accuracy

Model	Flow Velocity < 1m/s		Flow Velocity ≥ 1m/s	
	Flowrate (L/min)	Accuracy (L/min)	Flowrate (L/min)	Accuracy (of Reading)
UCUF-04P	0~0.8	±0.008	0.8~3	±1%
UCUF-06P	0~1.7	±0.017	1.7~8	±1%

※ Note: Accuracy statement is based on water calibration

Pressure Loss :

$$\text{Pressure Loss for Water (kPa)} = C \times Q^2$$

where C : Factor ( Refer to Table 3 )

Q : Flowrate ( L/min )

Table 3. Pressure Loss Factor

Model	C
UCUF-04P	3.04
UCUF-06P	0.537

Signal Cable : Two 5m Coaxial Cables

Note : Extension Cables available up to 30m

Material : Refer to Table 4

Table 4. Materials of Flow Detector

Parts Name		Material
Wetted Part	Body	PFA
	Tube	PFA
Sensor Cover		PP
Cable Fitting		PP
Cable Sheath		PVC

## MODEL CODE

Table 5. Flow Detector

Model Code				Description
UCUF	-□□	□	□	
Meter Size	-04P			4mm
	-06P			6mm
Connector		B		BNC connector
		C		SMB w/ lock
Shape		(Blank)		Standard (U shaped)
		Z		"Z" shaped

\* In case of special specifications required, put "Z" at the end of Code Number, and describe contents separately.  
(Contact Tokyo Keiso in advance about manufacturing possibility)

### Flow Converter

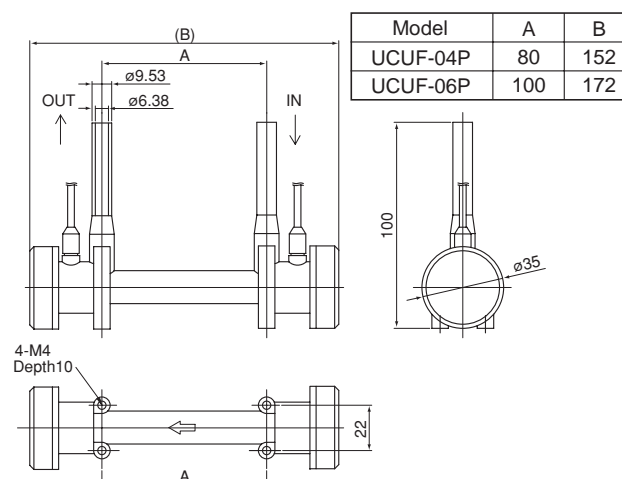
Model Code	Description
SFC-450	Standard type
SFC-700	Improved anti-bubbles capability / DSP type
SFC-750	Improved anti-bubbles capability / DSP type / Without display
FCA-5000	Unit with Flow controller / DSP type converter

## CAUTIONS ON INSTALLATION

- Installation Area for Flow Detector: Select the area of pipe where no air or gas bubbles exist in the flow.
- Mounting of Flow Detector: Recommend to install detector vertically with upward flow, in order to prevent deposit of slurry or bubbles in low flowrate conditions.
- Location of Control Valve: If a flow control valve is installed in the piping, it should be located on the downstream side of the flow detector to keep the fluid pressure high. The high fluid pressure will prevent the formation of bubbles in the flow.
- Noise Suppression: All electrical noise sources near the flowmeter, such as power relays or solenoid valves, should be fitted with a surge suppressor.
- Signal Cable Wiring: Keep signal cables away from high voltage or high current power cables to avoid induced electrical noise.

## OUTLINE DIMENSIONS (Detector)

UCUF-04P/06P



\* Specification subject to change without notice

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