TECHNICAL GUIDANCE

Flow Monitoring and Control for Cleaning Process and CMP equipment
ULTRA-CLEAN ULTRASONIC FLOWMETER

UCUF-P Series

For low liquid flow

OUTLINE

UCUF-P series is accurate low flow ultrasonic flowmeter for ultra pure water and chemical liquid services.
All wet parts made of molded specific grade NEW PFA has no moving part and no sealing mechanism.
The simple and smooth construction leaving no residues is best suited for such process as semiconductor manufacturing where cleanliness is required.
The inlet and outlet have standardized tubes suitable various PFA fittings.
The 4mm and 6mm diameter sizes cover such a low flow range as conventional clamp-on type could not measure so far.
With reasonable cost, the current local indication changes to the remote monitoring system.

FEATURES

- ❑ High accuracy ±1% of reading
- ❑ Flow measurement as low as 10mL/min with 4 and 6 mm diameters
  They cover small flow ranges that are not covered with vortex flowmeters.
- ❑ All wet parts consisting of specific grade NEW PFA for semiconductor equipment have simple and clean construction without moving parts leaving no residues in the measuring tube.
- ❑ High viscosity liquids can be measured
  The linearizer built in the converter have the memories of actual flow measuring data based on long measuring experiences.
- ❑ Corrosion resistant
  All detector parts made of resin are resistant to corrosive atmosphere.
- ❑ Easy installation
  The lightweight and compact detector can be installed easily independently from the converter.
- ❑ Cost-effective
  The simple design is cost-effective serving various remote flow monitoring applications.

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.

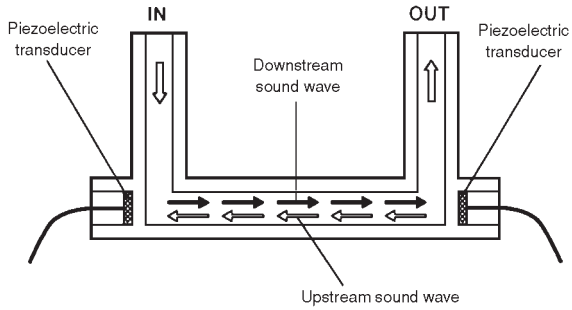

Figure 1. Operating Principle

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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 to 40mm^2 /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 to 0.1	0 to 3.0	3/8"
UCUF-06P	0 to 0.4	0 to 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 to 0.8	±0.008	0.8 to 3	±1%
UCUF-06P	0 to 1.7	±0.017	1.7 to 8	±1%

※Note: Accuracy statement is based on water calibration

Pressure Loss :

Pressure Loss for Water (kPa) = C X Q^2

where C : Pressure loss 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

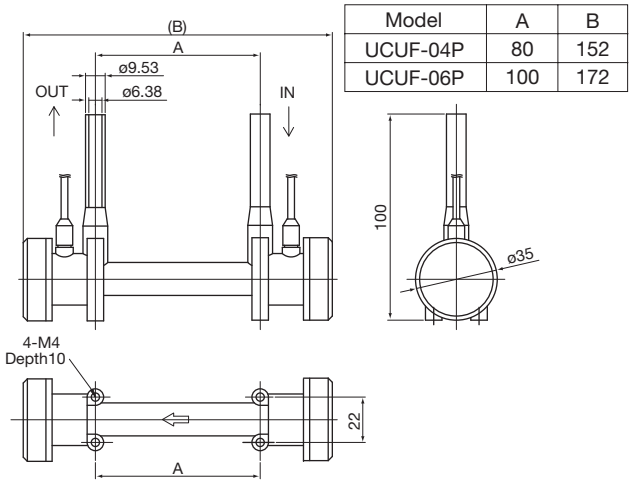
Model Code	Description	Connector type
SFC-710	Increased bubble resistant type/DSP method/CE compatible	C
SFC-720	Increased bubble resistant type/DSP method/CE compatible	B
SFC-780	Increased bubble resistant/No indicator /DSP method/CE compatible	B
FCA-7000	Combined type with controller/DSP method/CE compatible	C

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: It is recommended 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 avoided. If they are inevitable, a surge suppressor should be fitted.
- ❑ 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



Model	A	B
UCUF-04P	80	152
UCUF-06P	100	172

* Specification is subject to change without notice.

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