TECHNICAL GUIDANCE

Two in One Design

FC-7000 series

Compliant with CE marking

Controller with ultrasonic flow converter for small flow

OUTLINE

- FC-7000 series consists of UCUF series Flow-meter, FCA-7000 Flow controller and FCV-1000/ 3000 series Control Valve.
- FCA-7000 controller computes the flow rate based on the signal from the flowmeter and the set point. And the control valve is adjusted until the set point is achieved.
- Combining the functions both of flowmeter with electric output of flow rate and of controller to actuate a control valve. Thus, resulting in saving the spaces and eliminating the wiring and the noise influence to the flow signals.
- Realizing the stable flow control by eliminating both the transmission loss of the signal and the signal converting loss.
- It has the same abilities as SFC-710 for which SFC-700 well accepted as an anti-bubble capability has been developed and also as FCA-3000 well refined as a flow controller for a control valve.
- Excellent corrosive resistance has been achieved by using UCUF series as the flowmeter and FCV-1000 and 3000 series as the control valve, thanks to all fluororesin made constructions.
- Suitable for the high grade process control in semiconductor field as well as various chemical liquid fields.

FEATURES

- Space saving
  Combining the functions of a converter and a controller to a new converter.
- Simplified wiring
  Eliminating the flow signal lines to connect a controller with a converter, uniting the power lines necessary for each instrument, and adapting highly reliable SMB Coaxial connecter with Mold Locking System.
- Stability of flow control
  The stability of flow control has been improved to make free from the transmission loss of the signal and the signal conversion loss.
- Improvement of electrical noise effects
  CE marking enriched with countermeasure against noise has been complied.
  EMS: EN61000-6-2:2001
  EMI: EN55011:1998+A1:1999+A2:2002
- Lead free design
  It is an environmentally favorable product.

MAIN APPLICATIONS

1) Stabilization of flow for many branch lines
   Possible to set up the stabilized flow without any mutual interference by installing the control units to every branch line from main line.
2) Concentration control for diluting process
   Example: Constant concentration process by diluting the chemical liquid with pure water.
   Possible to keep the stable concentration by installing the control units to two lines for chemical liquid and pure water.

REFERENCE

Refer to the following Technical Guidance for the detailed specifications of both flowmeter and controller:

Flowmeter: TG-F1000
Controller: TG-F986

SPECIFICATIONS

Control Valve

Model	FCV-1000 series	FCV-3000 series	FCV-3000T series
Actuator	High Resolution Stepping Motor		
Wetted Parts Materials	PTFE, PFA		
End Connection (Tube OD size)	3/8",1/2"	1/4"	4mm
Controllable Differential Pressure	0.05 to 0.2MPa		
Max. Operating Pressure	0.3MPa		
Ambient Temperature	5 to 50°C		10 to 50°C

Ultrasonic Flowmeter (Detector)

Model	UCUF-03PC	UCUF-04MC	UCUF-04C	UCUF-04PC	UCUF-06C	UCUF-06PC	UCUF-10C
Nominal Size	3mm	4mm			6mm		10mm
Wetted Parts Materials	NewPFA						
End Connection (Tube OD size)	3/8"	1/4"	3/8"				1/2"
Construction	IP65 (Jet-proof)						
Fluid Temperature	10 to 60°C						
Accuracy	±2mL/min	Flow velocity≧1m/s: ±1%R.D, Flow Velocity<1m/s: ≦±0.01m/s					

Controller

Type		Current Output	Voltage Output	Current Input
Model		FCA-7100	FCA-7200	FCA-7300
Power Supply		DC 24 V ±10 %		
Consumption Current		In case of turning on backlight: 250mA		
		In case of turning off backlight: 220mA		
		At starting time: 1A		
Output Signal	Flow Rate Signal	4-20mA (Max. Load 500Ω)	0-10V (Output Impedance 500Ω)	4-20mA (Max. Load 500Ω)
	Flow Rate Alarm	2 Open collector outputs (DC30V, 50mA)		
	Action Mode	NO (Normal Open) / NC (Normal Close)		
	Pulse Output	Open Collector Output (DC30V, 50mA) Pulse Width: 0.5ms, 50ms, 100ms		
Input Signal	Flow Set Point	1-5V	0-10V	4-20mA
	Control Start/Stop	Relay Contact (On: Start, Off: Stop)		
	Totalizer Reset	Relay Contact (One Shot)		
	Sensor	Exclusive Cable (SMB Connecter with a lock)		
Display		2 Lines, 16 Alphanumeric letters LCD with backlight Alarm: Red (LED), Status: Green (LED)		
Construction / Installation		Indoor Use (IP 20 Equivalent) / Panel Mount		
Wiring		Cable for Signal: SMB Connecter with a lock		
Connecter		Divided type Tension spring connection 5P, 9P, 3P, 5P (Black)		
Housing Material and Color		Aluminum, Black		
Ambient Temperature		0 to 50°C (Except LCD)		
Flow Rate Accuracy		Flow velocity≧1m/s: ±1%R.D, Flow Velocity<1m/s: ≦±0.01m/s		
Control Accuracy		More than 30% of Full Scale : ±3% of set point Less than 30% of Full Scale : ±5% of set point		

MODE CODE

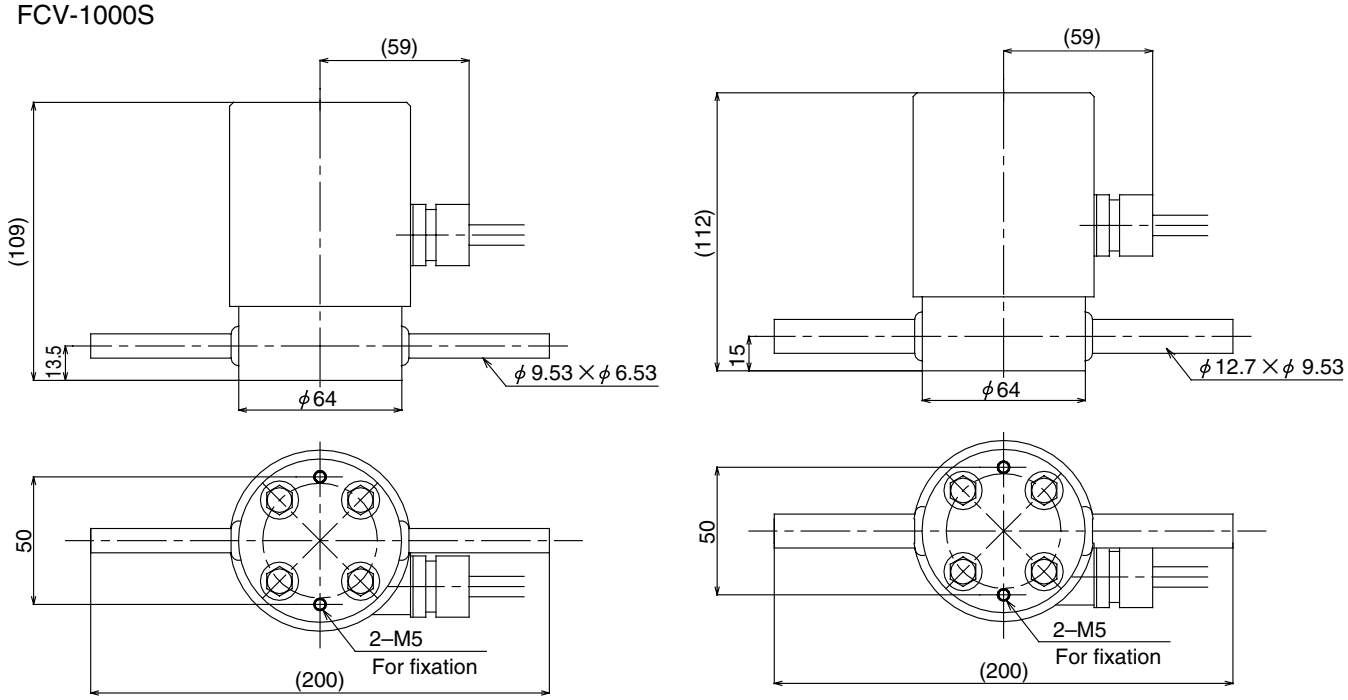
FC-7	□	□	□	–	□□	□	–	□□	□	□	/	□	Specification	Remarks
Flow Output /Input	1												4-20mA/1-5V	FCA-7100
	2												0-10V/0-10V	FCA-7200
	3												4-20mA/4-20mA	FCA-7300
	*												Others	
Valve model		0											FCV-3000 Series	
		1											FCV-1000S Series	
		2											FCV-3000T Series	50 to 500mL/min only
		*											Others	
Special specification (1)			0										Standard	
			*										Others	
													Specification	Remarks
Flow Range				–	00								2.5 to 25mL/min	FCV-3000
					01								5 to 50mL/min	FCV-3100
					02								10 to 100mL/min	FCV-3200
					03								20 to 200mL/min	FCV-3300
					04								50 to 500mL/min	FCV-3400/3000T
					05								100 to 1000mL/min	FCV-3500
					06								200 to 2000mL/min	FCV-3600/1100S
					07								300 to 3000mL/min	FCV-1200S
					08								400 to 4000mL/min	FCV-1300S
					09								600 to 6000mL/min	FCV-1400S
					10								800 to 8000mL/min	FCV-1500S
					11								1 to 10L/min	FCV-1600S
					*								Others	
Valve Connection Size (OD)						1							4mm Tube Connection	FCV-3000T
						2							1/4" Tube Connection	
						3							3/8" Tube Connection	FCV-1000S only
						4							1/2" Tube Connection	FCV-1000S only
						*							Others	
Flowmeter model							–	3P					UCUF-03PC	Max 0.1L/min
								4M					UCUF-04MC	Max 2L/min
								4C					UCUF-04C	Max 3L/min
								4P					UCUF-04PC	Max 3L/min
								6C					UCUF-06C	Max 8L/min
								6P					UCUF-06PC	Max 8L/min
								10					UCUF-10C	Max 20L/min
								*					Others	
Flowmeter shape (1) (Tube direction)									U				U shape	Standard
									Z				Z shape	
									*				Others	
Flowmeter shape (2) (Cable direction against the tube)										N			Standard	
										W			Others	UCUF-04MC only
Special specification (2)											/	Blank	Standard	
												*	Others	

* The code is named according to the specification.

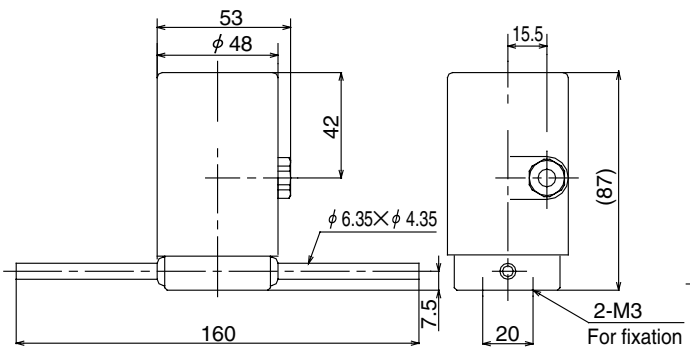
EXTERNAL DIMENSION (mm)

Control Valve

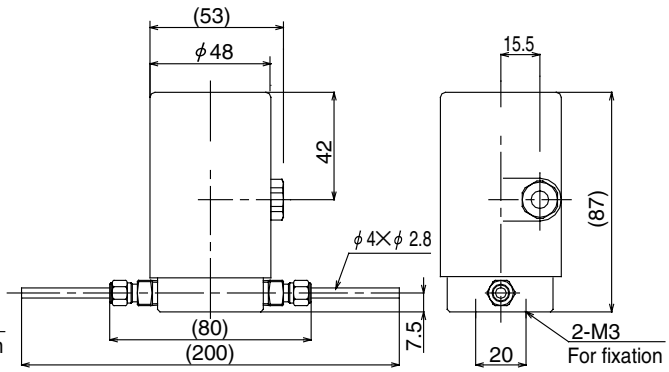
FCV-1000S



FCV-3000

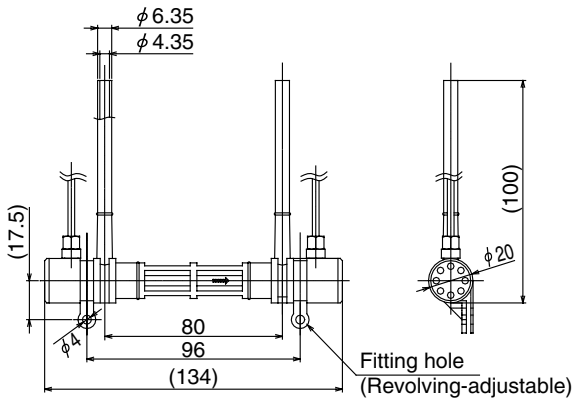


FCV-3000T

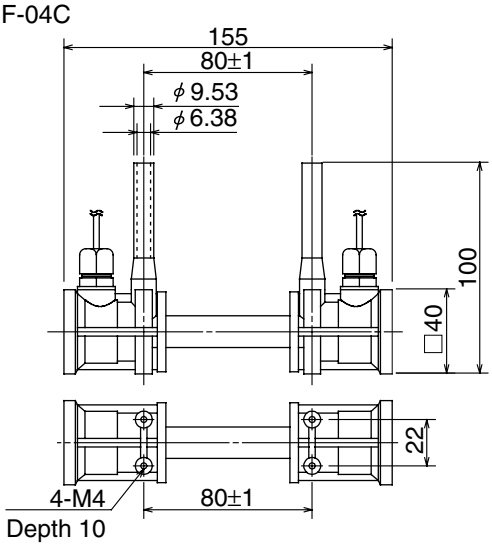


Ultrasonic Flowmeter (Detector)

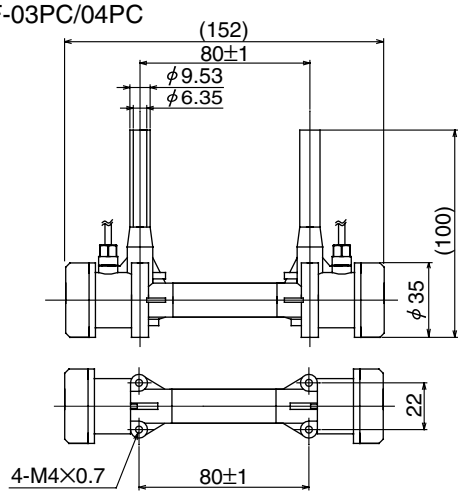
UCUF-04MC



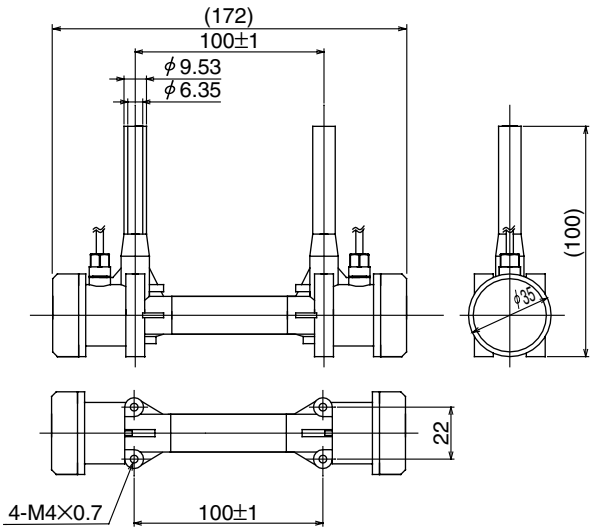
UCUF-04C



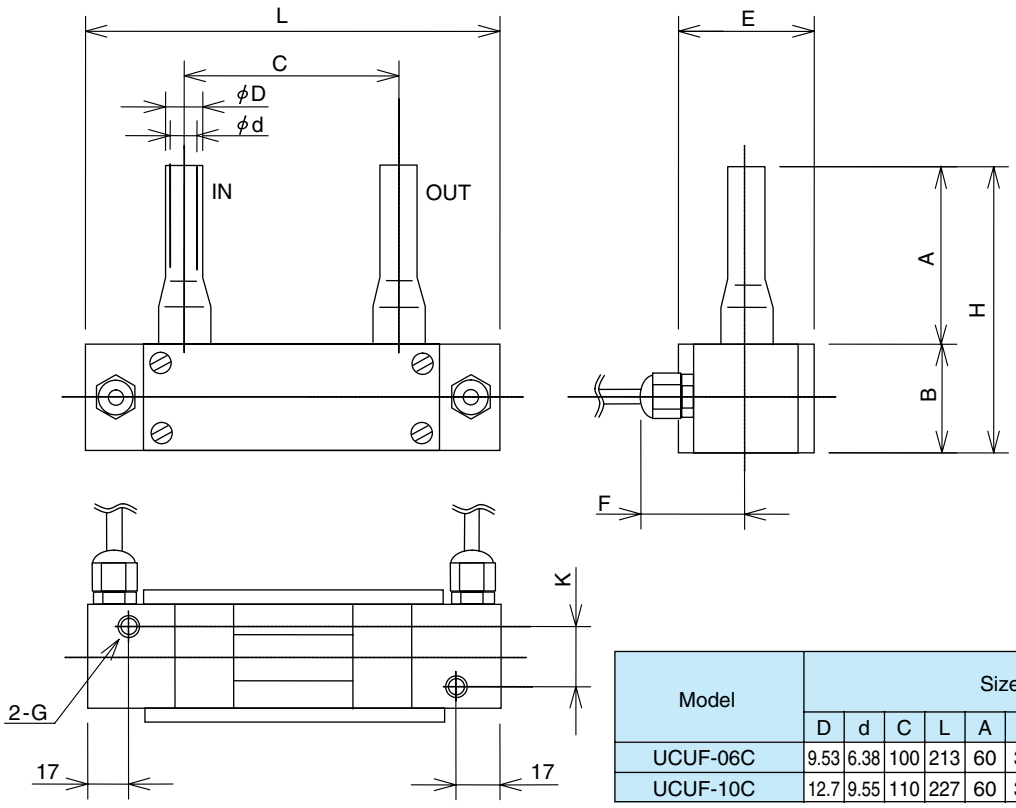
UCUF-03PC/04PC



UCUF-06PC



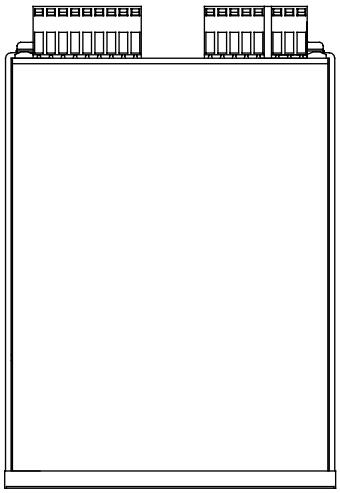
UCUF-06C/10C

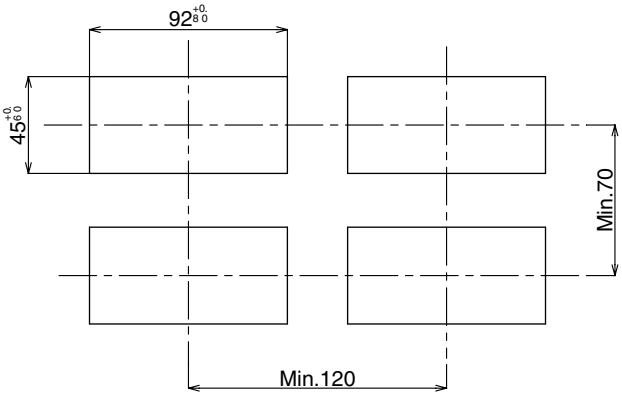


Model	Size (mm)										
	D	d	C	L	A	B	H	E	F	G	K
UCUF-06C	9.53	6.38	100	213	60	30	90	40	35	M4	18
UCUF-10C	12.7	9.55	110	227	60	30	90	40	35	M4	18

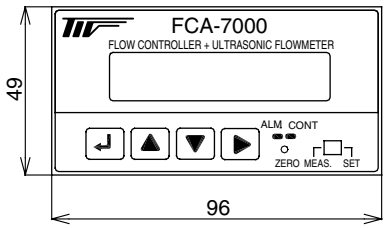
Controller

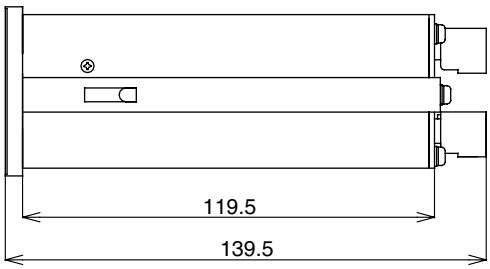
FCA-7000



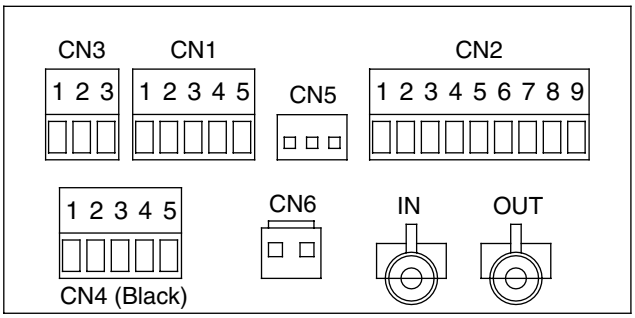


Panel cut





Terminals



Wiring

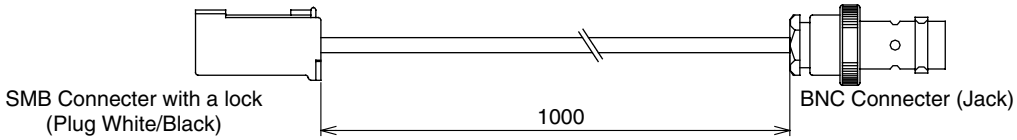
CN	No.	Polarity	Description
1	Motor Drive Connecter		
	1	FG	Motor Ground
	2	Green	Motor A Phase +
	3	Black	Motor A Phase –
	4	White	Motor B Phase +
	5	Red	Motor B Phase –
2	Controller Connector		
	1	+	Control Start/Stop Input *
	2	COM	Common
	3	+	Valve Abnormal Alarm Output
	4	–	
	5	+	Reset Signal Input for Totalizer**
	6	+	Flow Rate Output
	7	–	
	8	+	Flow Set Point Input
	9	–	

CN	No.	Polarity	Description
3	Power Connecter		
	1	+24V	Power (DC24V)
	2	0V	
	3	FG	Frame Ground
4	Flowmeter Connecter		
	1	+	Scaled Pulse Output
	2	–	
	3	+	Flow Rate Alarm (Hi) or Preset Output (HH)
	4	–	
	5	+	Flow Rate Alarm (Lo) or Preset Output (H)
IN	SMB Connecter with a lock		Upstream side of Detector
OUT			Downstream side of Detector

* Control Start/Stop CN2 1, 2 Close: Controlling Open: Stop

** Reset Signal Input for Totalizer CN2 5, 2 Close: Reset (One shot)

CONVERSION CABLE WITH DIFFERENT TYPE OF CONNECTOR (SMB-BNC)



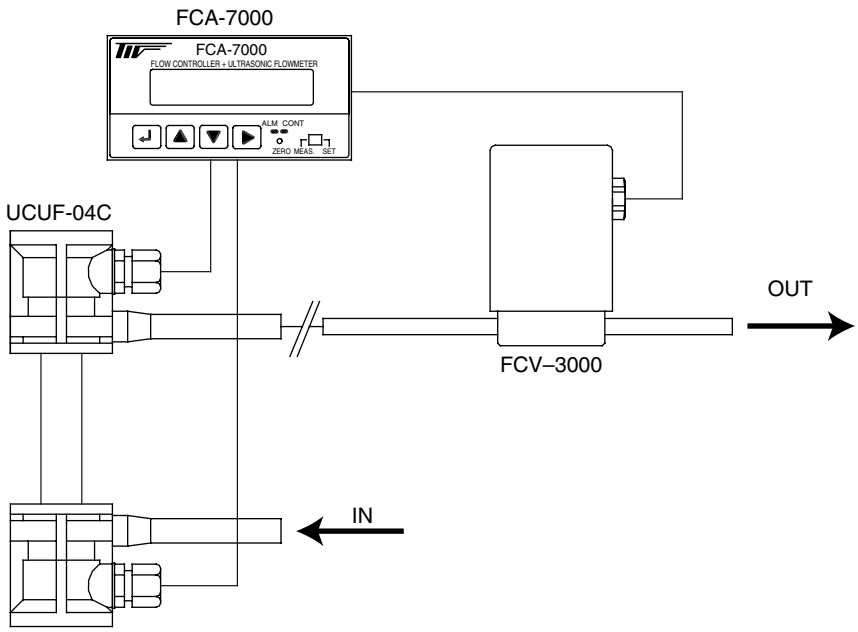
Conversion cable is ready for the combination with UCUF flowmeter with BNC connector.
It is helpful to use UCUF flowmeter with BNC connector to be connected with FCA-7000 controller.

CONTROL PERFORMANCE AND ACCURACY

FC-7000 series is a feedback type control unit, which measures current flow and outputs a signal to actuate the control valve until the current flow goes to the set point.
It is possible to control flow with ±3% of set point within about 3 sec.

EXAMPLE

FCA-7000, FCV-3000 and UCUF-04C are combined.



CAUTIONS

1) A control valve should be surely installed on the downstream side of the flowmeter.
2) A control valve and a flowmeter (sensor) should be piped with distance of less than 500mm.
3) Not use this control valve for piping with big pulsation.
   (For example, in case of fluid supply by a diaphragm pump etc.)

* Specification is subject to change without notice.

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