FC6500 Series
Flow Control System

DESCRIPTION

A flow controller with all wetted parts made of fluorocarbon resin. The FC6500 series is a separate-type flow control system that captures flow signals from various sensors in analog form and controls valves to stabilize the flow rate at the target value. It consists of a control valve, of which the wetted parts are made of fluorocarbon resin, and a flow controller.



- Flow control valve : FCV series
- Flow controller : FCA6500 series

The FC6500 series can control a wide range of flow rates with an extensive lineup of control valves. Its design with physically separated control valve and control unit enhances safety and layout flexibility.
The FC6500 series is ideal for process management of chemical liquids and deionized water in semiconductor and other manufacturing processes.
Besides flow rate, the FC6500 series can also be used as a temperature or pressure control system by regulating the flow control valve.

KEY FEATURES

- **Enhanced safety and layout flexibility**
  The flow detector and the control valve in the process fluid part are separated from the measurement and control part, ensuring enhanced protection against liquid leakage as well as greater layout flexibility.

- **Support for a wide flow range**
  The FCV series control valves can cover a wide range of flow rates, from a minimum of 10 to 100 mL/min up to 1 to 10 L/min.

- **CE marking**
  Complies with EU EMC, RoHS2, and low voltage requirements
  (EMC standards: EN61326-1:2013, EN61326-2-3:2013)

APPLICATIONS

- **Flow rate setting for chemical liquids and DIW:**
  By installing the FCA6500 series in the supply line for various chemical liquids and DIW, which was previously controlled by a metering pump or pressure feed tank, highly accurate and stable supply control is possible.

- **Concentration control**
  The control units installed in both chemical liquids and DIW lines enable stable concentration control when diluting the chemical liquids with DIW to keep the concentration at a certain level.

- **Flow rate and pressure control of branch lines**
  The control units installed in each line branched from the main line enable the flow rate to be kept stable without mutual interference between the lines. Also, pressure control of the main line can be achieved by installing control valves in bypass lines.

SPECIFICATIONS

Control Valve

Model	FCV-1000S	FCV-3000
Actuator	High-resolution stepping motor	
Coupling cable	Multi-core cable, PVC cover, 5 m (standard)	
Wetted part material	PTFE, PFA	
End connection (tube OD size)	Ø3/8", Ø1/2"	Ø1/4"
Controllable differential pressure	0.05 to 0.2 MPa	
Maximum operating pressure	0.3 MPa	
Fluid temperature	5 to 50°C	
Ambient temperature	5 to 50°C	

Controller

Model	FCA6510	FCA6520	FCA6530
Power supply	24 V DC ± 10%		
Consumption current	200 mA		
	At startup: 1 A		
Analog input (Current flow rate)	4 to 20 mA DC	0 to 10 V DC	4 to 20 mA DC
	Input impedance: 250 Ω	Input impedance: 730 kΩ	Input impedance: 250 Ω
Digital input (Change of control)	Non-voltage contact input Close ON: Start control, Open OFF: Stop control		
Analog output (Flow rate re-output)	1 to 5 V DC	0 to 10 V DC	4 to 20 mA DC
	Allowable load resistance: 500 kΩ or higher	Allowable load resistance: 500 kΩ or higher	Allowable load resistance: 500 Ω or lower
Digital output (Alarm)	Open collector output (rated value: 30 V DC, 50 mA) Logic: A (NO)/B (NC) set at the factory		
Display	2 lines, 16 alphanumeric letters LCD with a backlight Alarm: red (LED), status: green (LED)		
Display digits, unit	X.XXX to XXXX (4 significant digits) mL/min, L/min, L/h, %, kPa, °C, etc.		
Construction/ Installation	Indoor use (IP 20 equivalent), panel mount		
Wiring	Power supply line (grounding line), valve cable, signal lines		
Connector	Divided-type tension spring connection 3P, 5P, 6P, 10P		
Housing material and color	ABS, black		
Ambient temperature	0 to 50°C (except LCD)		
Control accuracy Response	Flow rate (PV) > 30%FS: ±3% of the target value (SP) Flow rate (PV) ≤ 30%FS: ±5% of the target value (SP) Response time within 3 seconds * Analog inputs from detectors must be updated without delay.		

MODEL CODE

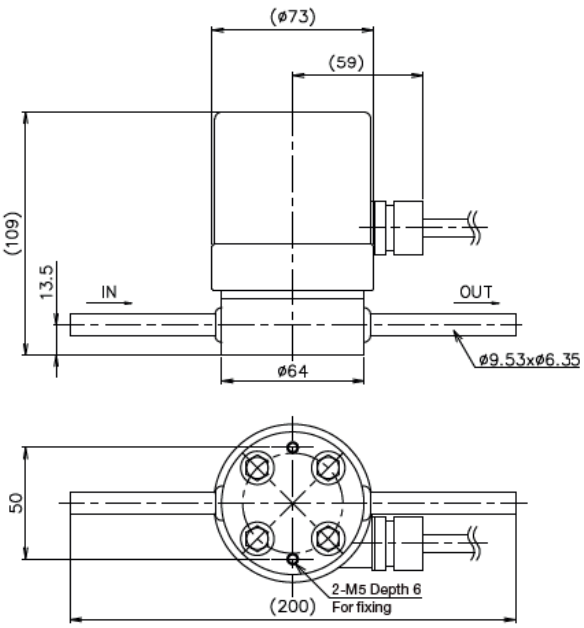
FC65	□	□	–	□□	□	/	□	Specification	Remarks
Electrical specifications	1							4 to 20 mA/1 to 5 V	FCA6510
	2							0 to 10 V/0 to 10 V	FCA6520
	3							4 to 20 mA/ 4 to 20 mA	FCA6530
	*							Others	
Valve model		0						FCV-3000	5 types, 10 mL/min up to 2 L/min
		1						FCV-1000S	6 types, 200 mL/min up to 10 L/min
		3						FCV-3000D	Double seal (chemically resistant)
		*						Others	
Flow range			–	02				10 to 100 mL/min	FCV-3200
				03				20 to 200 mL/min	FCV-3300
				04				50 to 500 mL/min	FCV-3400
				05				100 to 1000 mL/min	FCV-3500
				06				200 to 2000 mL/min	FCV-3600/1100S
				07				300 to 3000 mL/min	FCV-1200S
				08				400 to 4000 mL/min	FCV-1300S
				09				600 to 6000 mL/min	FCV-1400S
				10				800 to 8000 mL/min	FCV-1500S
				11				1 to 10 L/min	FCV-1600S
				*				Others	
Valve connection size (OD)					2			1/4 tube connection	FCV-3000 series
					3			3/8 tube connection	FCV-1000S (4 L/min or lower)
					4			1/2 tube connection	FCV-1000S only (6 L/min or higher)
					*			Others	
Special specification (2)							Blank	Standard	
							*	Others	

* The code will be named according to the specification.

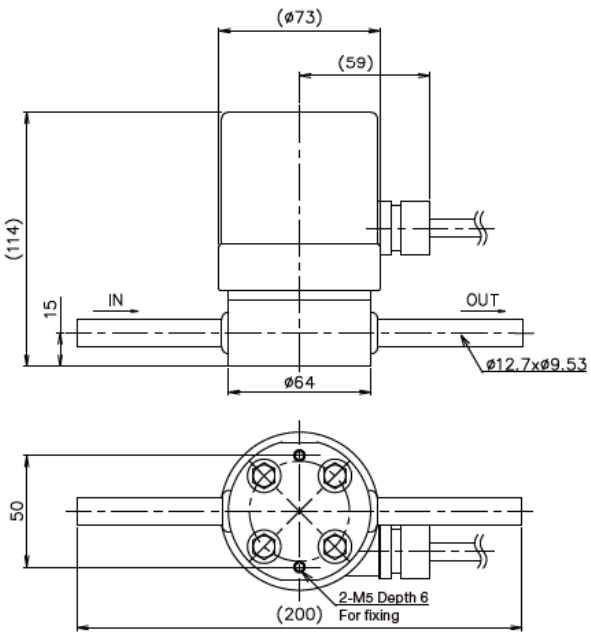
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EXTERNAL DIMENSIONS

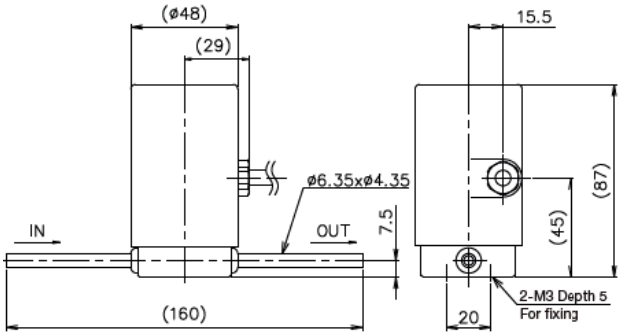
FCV1000S (3/8")



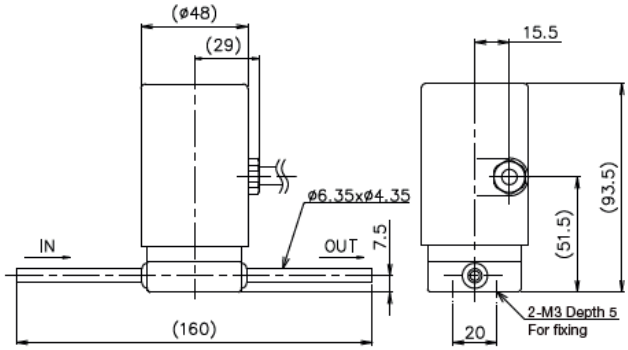
FCV1000S (1/2")



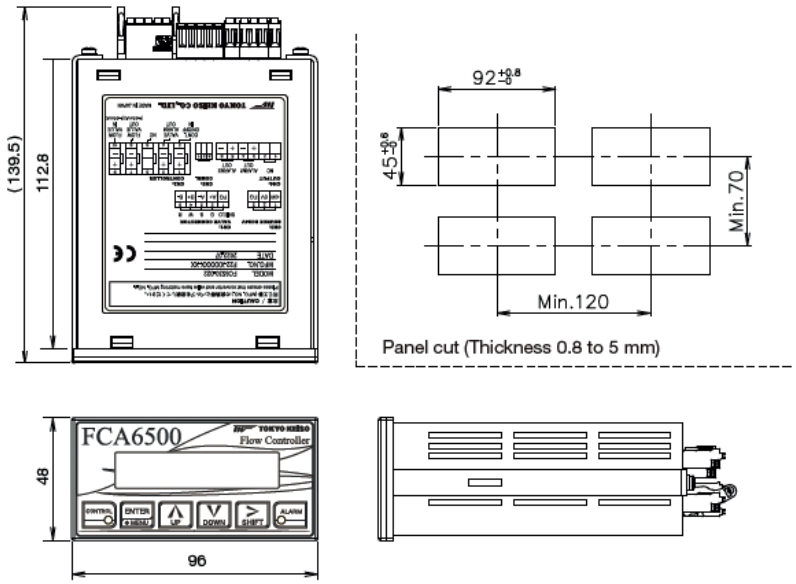
FCV-3000



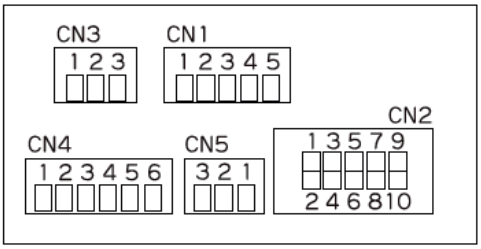
FCV-3000D



FCA6500



Controller terminal diagram



Wiring

CN	No.	Polarity	Description	CN	No.	Polarity	Description
1	Motor drive connector			3	Power connector		
	1	FG	Motor ground		1	+24 V	Power
	2	Green	Motor A phase +		2	0 V	
	3	Black	Motor A phase –		3	FG	Frame ground
	4	White	Motor B phase +	4	Alarm output connector		
	5	Red	Motor B phase –		1		Unused
2	Controller connector				2		
	1	+	Control start/stop input *1		3	+	Flow rate alarm 1
	2	–			4	–	
	3	+	Valve abnormal alarm output		5	+	Flow rate alarm 2
	4	–			6	–	
	5		Unused	5	Serial communication connector		
	6				1		For maintenance use
	7	+	Flow output		2		
	8	–			3		
	9	+	Flow input				
	10	–					

*1 CN2 1, 2 Non-voltage input Close: Start control, Open: Stop

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CONTROL PERFORMANCE AND ACCURACY

The FCA6500 is a feedback type controller that captures the current flow rate (PV values) in analog form and automatically adjusts the control valve opening to stabilize the flow rate at the target flow rate (SP value) set on the indicator. Although it controls flow rate within ±3% of the set point within 3 seconds, the performance depends on the data update cycle and time constant of sensors.
Be careful when selecting detectors, because sensors with a sampling period or time constant of 100 ms or longer cause delays in the controller response.

CAUTIONS

1. The control valve should be installed on the downstream side of the flowmeter.
2. The control valve and flowmeter (detector) should be piped within 500 mm of each other.
3. Do not use this control valve for piping with large pulsation (e.g. fluid supply by a diaphragm pump, etc.).
4. For combining with ultrasonic flowmeters (UCUF series), select the FC6000 series for the flow controller.
5. Cascade (RSP) control by analog input of the target flow rate can be achieved by using a signal conversion unit. Contact us.

*Specification is subject to change without notice.

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