

Key Features

- High Accuracy:
Controls flow rate within $\pm 3\%$ of set point
- Fast Control Response:
 ≤ 3 seconds (typically < 2 seconds for most applications)
- Wide range of flow control capability:
2 ccm - 4000 ccm (up to 100:1 turn-down with one device)
- No orifice or dead-leg (slurry module with pinch valve):
Ideal for slurries with abrasives
- All PTFE/PFA wetted part construction (chemical module with needle valve):
Ensures compatibility with high purity liquid chemicals and DIW
- Low Maintenance:
Module features ultrasonic flowmeter with NO moving parts providing minimal preventive maintenance cycle (tube lifetime in pinch valve is approximately three years and its replacement takes less than 20 minutes)



Description

The MFC-7000 Series is a line of high-performance closed-loop flow controllers designed for use in a wide variety of high-purity liquids including DI water, corrosive chemicals, and CMP polishing slurries. The MFC-7000 is capable of controlling the flow rate at $\pm 3\%$ of "set point" accuracy with less than a 3 second response time. Each controller module contains three primary components: Flowmeter, Flow Control Valve, and Electronics.

The M-2400 ultrasonic flowmeter has an all PFA construction with no moving parts or seals. It sets a standard for flow measurement in terms of accuracy, repeatability, turn-down and purity. Its digital signal processing technology ensures reliable performance even with a certain degree of bubbles present in the process fluids. The control electronics continuously compares the set point value with the measured flow rate and provides a continuous signal to modulate the control valve to maintain the flow rate to the desired set point. A state of the art control algorithm in the electronics and a high resolution stepper-motor actuated valve ensure the fast and repeatable control response.

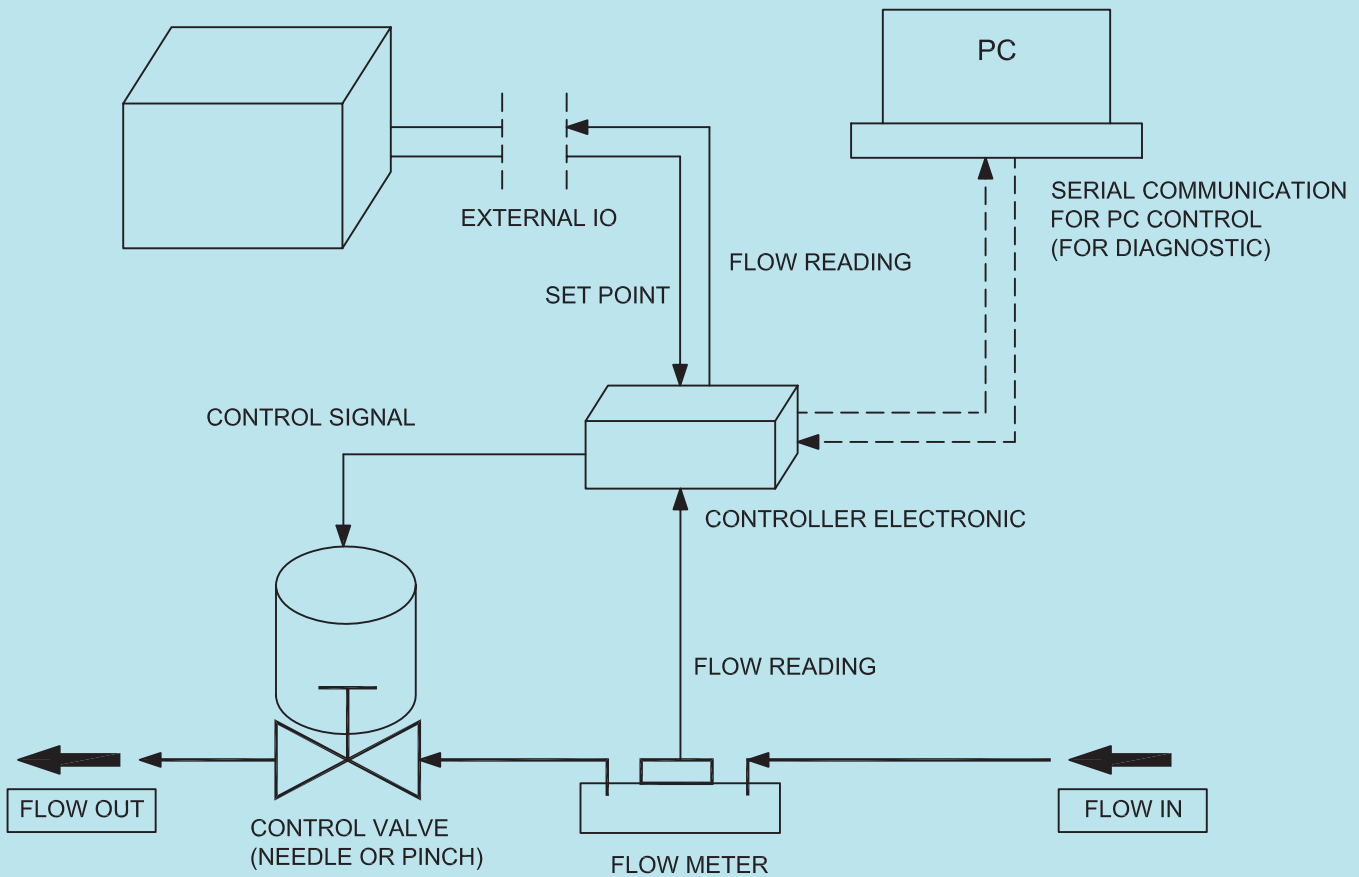
Each MFC-7000 controller is packaged in a compact IP-64 compliant enclosure, making it ideally suited for installation in "wet" environments. Communication with your PLC or other system device(s) is via standard analog signals, DeviceNet or EtherCat. The PC communication software for parameter monitoring/setting and data-logging is also available.

Integrated Flow Control Module

Applications

- Semiconductor CMP tools – used to precisely control the flow of chemicals and polishing slurries dispensed to the polishing platen; an ideal replacement for peristaltic pump based delivery systems
- Cleaning tools – for accurate and reliable control of the blending and delivery of cleaning chemistries on wet clean tools
- Copper plating tools

Operation Block Diagram



Specifications

Performance Specifications

Flow Range*	2 - 20 ccm
	5 - 50 ccm
	10 - 100 ccm
	15 - 125 ccm
	25 -250 ccm
	50 - 500 ccm
	125 - 1250 ccm
	150 - 1500 ccm
	200 - 2000 ccm
	400 - 4000 ccm
Accuracy of Flow Control (for 30 % to 100 % of F.S)	± 3% R.D
Accuracy of Flow Control (for less 30 % of F.S)	± 5% R.D
Control Response Time (95% of step change)	< 3 sec
Fluid Temperature**	Max 60°C
Ambient Temperature/Humidity	0 - 35°C, 30-80% RH, No condensation
Maximum Safe Internal Pressure	70 psi
Minimum Differential Pressure***	7 psid
Maximum Differential Pressure	30 psid (slurry module)
	40 psid (chemical module)

* Controller with the range of 100:1 turn-down is available.

** Controller with maximum fluid temperature rating of 80C is available.

*** The minimum differential pressure for 200-2000 ccm flow range is 10 psid.
The minimum differential pressure for 400-4000 ccm flow range is 20 psid.

Electrical Specifications

Power Supply Input	24 Vdc ± 10 %, 500 mA
Analog Output (Flow Rate)	4-20mA or 0-10 Vdc
Analog Input (Set Point)	4-20 mA or 0-10 Vdc
Alarm Output	30 Vdc, 50 mA max.

Material Specifications

Wetted parts	PFA, PTFE, Stapur* [*]
Non wetted parts, enclosure	PPS, PEEK, PP, PVC

* Stapur used only on slurry modules

Integrated Flow Control Module

Physical Specifications

Mounting Orientation (Available in two versions)	Horizontal or Vertical with either pinch valve or needle valve
Dimensions mm(in) - L x H x W	Horizontal: L 229.9 (9.1) x H 72.9 (2.9) x W 114.3 (4.5)
	Vertical: L 266.2 (10.5) x H 72.9 (2.9) x W 114.3 (4.5)
Inlet/Outlet Port	1/4" , 3/8" or 1/2"
Protection Rating	IP64

Power and Signal Connections

It is always recommended to use a dedicated power supply with 24 Vdc ($\pm 10\%$), 500mA. The configuration of the 12 pin connector is shown in the table below. Its mating cable can be provided with a module.

Custom pin configurations and connectors are available upon request.

12 Pin Connector Configuration				
Pin No.	Wire Color	Description	Specification	Remarks
1	Red	Power (+) 24 Vdc	24 Vdc $\pm 10\%$	
2	Black	Power (-) 0 Vdc		
3	Pink	Set Point (+)	4-20 mA or 0 - 10 Vdc	20 mA correspond to full scale 10 Vdc correspond to full scale
4	Gray	Set Point (-)		
5	Blue	Flow Out (+)	4-20 mA (Max. load 300 ohm) or 0 - 10 Vdc	Monitor output of flow meter*
6	White	Flow Out (-)		
7	Red/Black	Valve Alarm (+)	Max. rating 30 Vdc, 50 mA	Open Collector Output
8	White/Black	Valve Alarm (-)		
9	Yellow	Sensor Alarm (+)	Max. rating 30 Vdc, 50 mA	Open Collector Output
10	Brown	Sensor Alarm (-)		
11	Green	Zero Adjust**	0 Vdc: Normal operation 24 Vdc: Zero Adjust	Pull up to power supply voltage starts the zero adjustment
12	Violet	No Connection		

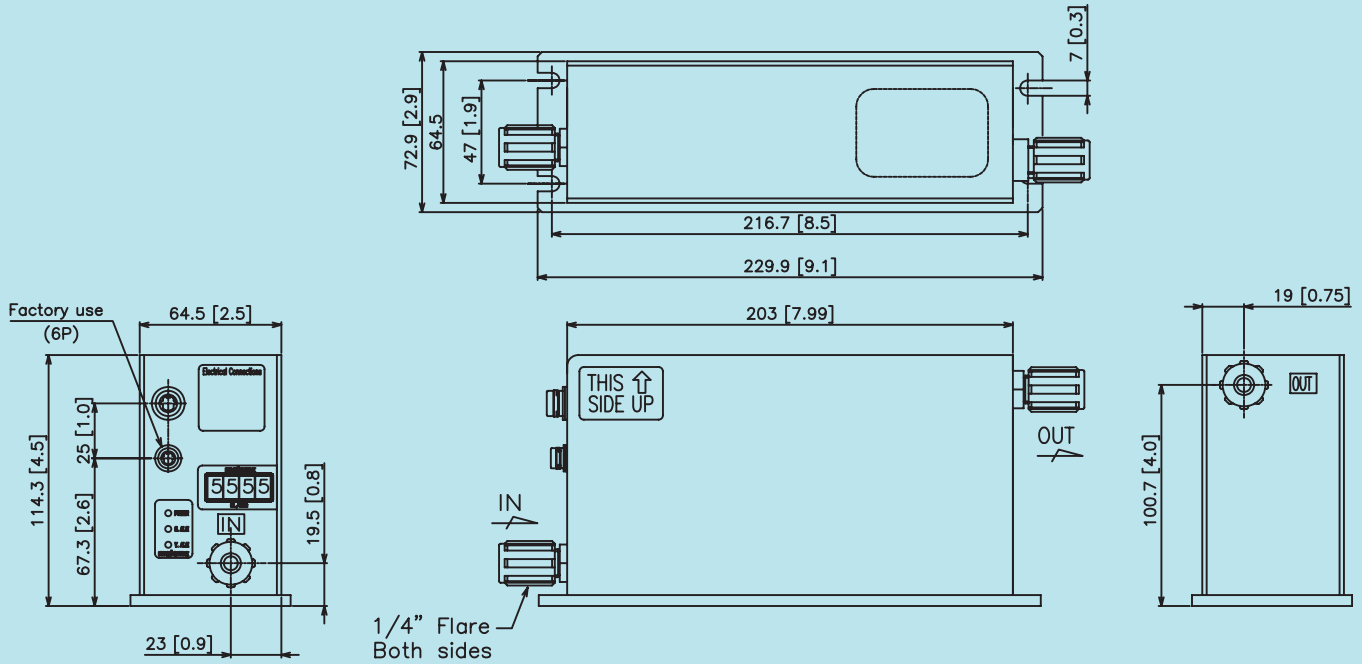
*The current output signal (4-20 mA) of the unit is a source type (It is not a sink type like two wire system).

** Make sure the flow is completely stopped before zero adjust. It takes about 20 seconds for the unit to zero set.

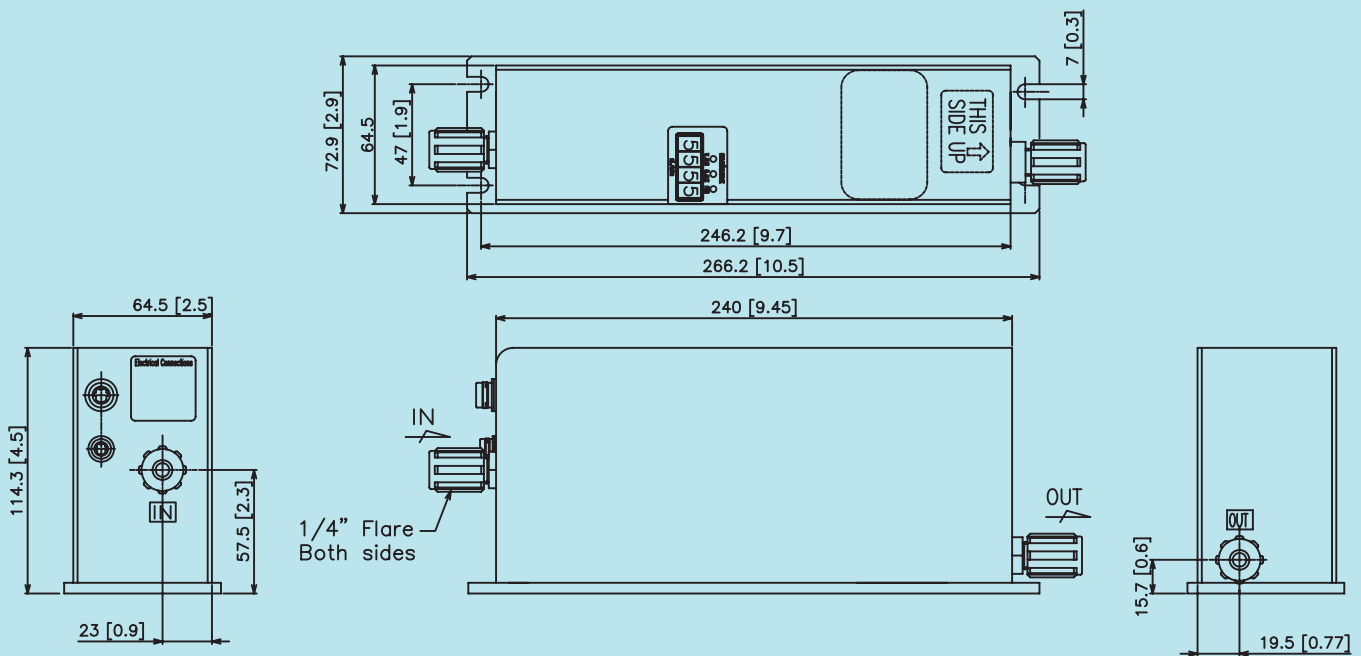
Integrated Flow Control Module

Dimensions Drawings

Typical Dimensions shown for Chemical Module with horizontal mounting



Typical Dimensions shown for Chemical Module with vertical mounting



Ordering Information

Model Code											Description
MFC-700											Non-display Version
MFC-701											Display on Top Face
MFC-702											Display on Inlet Face
MFC-704											Display on Outlet Face
Alarms	0										No Alarms
	1										Alarms Displayed on Top Face
	2										Alarms Displayed on Inlet Face
	4										Alarms Displayed on Outlet Face
	-										
Tube Material	T										PFA
Tube Size	2										1/4"
	3										3/8"
	4										1/2"
Connection	1										Flare Ends
	2										Super Pillar 300
Flow Range	08										2 - 20 ccm
	09										5 - 50 ccm
	10										10 - 100 ccm
	11										15 - 125 ccm
	03										25 - 250 ccm
	04										50 - 500 ccm
	06										125 - 1250 ccm
	12										150 - 1500 ccm
	16										200 - 2000 ccm
	14										400 - 4000 ccm
	-										
Sensor / Converter	09										M-2400 / DSP
	19										M-2400 / Non-DSP
Input / Output*	2										0 to 10 Vdc / 0 to 10 Vdc
	4										4 to 20 mA / 4 to 20 mA
	5										0 to 10 Vdc / 4 to 20 mA
	-										
Valve Type	N										Needle
	P										Pinch
Mounting Orientation	H										Horizontal
	V										Vertical
Accessories	0										without plug connector
	1										with plug connector and cable

*For Any other combination, please contact the factory.

NOTE: Specifications are subject to change without notice.