MF01 / 02 series

DIGITAL FLOW SENSOR

mindman

MF01 user manual

MF02 user manual

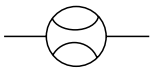
Selection table



Feature

- Display can be vertically inverted. To set and watch monitor easily.
- 3-Color & 7 segment LCD display.
- 8 digit accumulated flow rate display.
- Real-time monitoring.
- RS485 Modbus control.

Symbol



MF01 Specification

Model				005	010	050	100	500	101	201
Sensor element	Flow	Measured flow rate range		0 ~ 500 mL/min	0 ~ 1000 mL/min	0 ~ 5 L/min	0 ~ 10 L/min	0 ~ 50 L/min	0 ~ 100 L/min	0 ~ 200 L/min
		Flow direction		Unidirection						
Display	Display			4 digital (Flow) / 8 digital (Accumulated flow), 7 segment LCD display (Red / Green / Orange)						
	Instant flow rate	Display range		0 ~ 525 mL/min	0 ~ 1050 mL/min	0 ~ 5.25 L/min	0 ~ 10.50 L/min	0 ~ 52.5 L/min	0 ~ 105.0 L/min	0 ~ 210 L/min
		Min. setting scale	LPM	1 mL/min		0.01 L/min		0.1 L/min		1 L/min
			CFM *1	0.01 ft^3/min		0.1 ft^3/min		1 ft^3/min		
	Accumulated Flow	Display range		99999999 mL		999999.99 L		9999999.9 L		99999999 L
		Min. Setting Scale *1		1 mL		0.01 L		0.1 L		1 L
				0.01 ft^3		0.1 ft^3		1 ft^3		
Switch outout Accumulated pulse output *1				5 mL/Pulse	10 mL/Pulse	0.05 L/Pulse	0.1 L/Pulse	0.5 L/Pulse	1 L/Pulse	2 L/Pulse
				0.02 ft^3/Pulse	0.04 ft^3/Pulse	0.2 ft^3/Pulse	0.4 ft^3/Pulse	2 ft^3/Pulse	4 ft^3/Pulse	7 ft^3/Pulse
Port size		R6, F1C		●	●	●	●	●		
		R8, F4C							●	●
Weight (with 2 meter lead wire)				Approx. 109.3 g (ø6 port) ; Approx. 112.7 g (ø8 port); Approx. 118 g (Rc1/4 port); Approx. 128.5 g (Rc1/8 port)						

*1. When the display unit is CFM, ft^3, the actual flow is the display value×10^{-2}.

MF02 Specification

Model				501	102	202
Sensor element	Measured flow rate range			2 ~ 500 L/min	5 ~ 1000 L/min	10 ~ 2000 L/min
	Flow direction			Unidirection		
Display	Display			4 digital (Flow) / 8 digital (Accumulated flow), 7 segment LCD display (Red / Green / Orange)		
	Instant flow rate	Display range		0 ~ 525 L/min	0 ~ 1050 L/min	0 ~ 2100 L/min
		Min. setting scale	LPM	1 L/min		
			CFM	0.1 ft^3/min		
	Accumulated flow	Display range		99999999 L		
		Min. setting scale		1 L		
				1 ft^3		
Switch outout Accumulated pulse output *1				5 L/Pulse	10 L/Pulse	10 L/Pulse
				20 ft^3/Pulse	40 ft^3/Pulse	40 ft^3/Pulse
Port size	Rc1/2, F7C			●	●	
	G1/2, F9C			●	●	
	Rc3/4, F10C					●
	G3/4, F12C					●
Weight (without 2 meter lead wire)				Approx. 281.7 g (500 / 1000 L) ; Approx. 344 g (2000 L)		

(Continued)

MF01 / 02 Specifications

DIGITAL FLOW SENSOR

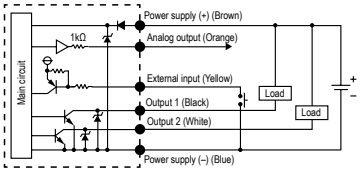
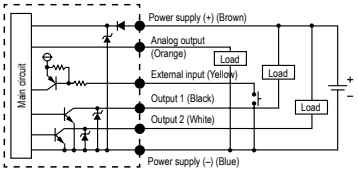
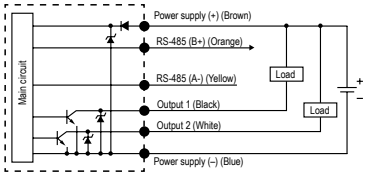
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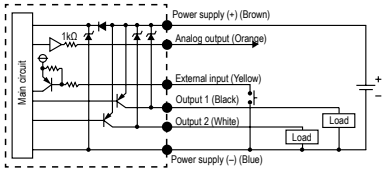
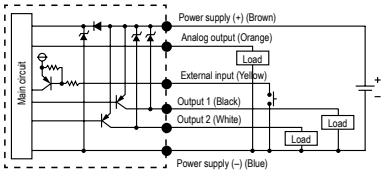
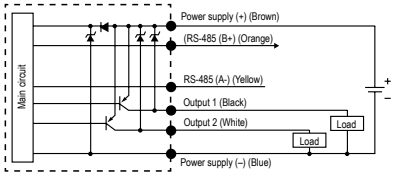
MF01 & 02 Specification

Model		MF01	MF02
Fluid		Dry air, N_2, Non-corrosive / Non-flammable gas	
Accuracy	Guaranteed range	2 ~ 100 % F.S.	
	Indicator accuracy	± 3 % F.S. ± 1 digit *1	
	Analog output accuracy	± 5 % F.S. *1	
	Repeatability	± 1 % F.S. ± 1 digit *2	± 1 % F.S. ± 1 digit (± 2 % F.S. when response time is set to 50 ms) *2
	Linearity	± 3 % F.S. *2	
	Temp. characteristic	± 2 % F.S. (15 ~ 35 °C) ; ± 5 % F.S. (0 ~ 15 °C, 35~ 50 °C) (compare with *3)	± 5 % F.S. (compare with*3)
	Pressure characteristic	± 5 % F.S. ± 1 digit *3	
Switch output	Switch output	2 NPN : open collector 2 outputs Max. Load Current : 125 mA Max. Supply Voltage : 28 V DC Voltage Drop : ≤ 1.5 V	2 PNP : open collector 2 outputs Max. Load Current : 125 mA Max. Supply Voltage : 24 V DC Voltage Drop : ≤ 1.5 V
	Response time	800 ms (50 ms, 80 ms, 120 ms, 200 ms, 400 ms, 1500 ms selectable)	
	Output mode	Hysteresis Mode, Window Comparator Mode, Accumulated Output, Accumulated Pulse Output	
	Hysteresis	Adjustable	
	Output short circuit proterction	Yes	
Analog output	Voltage output	Voltage Output Range: 1 ~ 5 V , Output Impedance: 1 KΩ	
	Current output	Current Output Range: 4 ~ 20 mA, Load Impedance: ≤ 300 Ω	
	Response time	≤ 100 ms	
External input		Non-voltage input, < 0.4 V, ≥ 30 ms	
Communication interface		RS485 *4,5	
Power	Power supply voltage	12 ~ 24 V DC ± 10 %, Ripple (P-P) ≤ 10 %	
	Current consumption	≤ 50 mA	
Environment	Working pressure range	–0.09~0.8 MPa	0~1 MPa
	Withstand pressure	1 MPa	1.5 MPa
	Enclosure	IP40	
	Working Fluid Temp.	0 ~ 50 °C (No condensation or freezing)	
	Ambient Temp. Range	Operation: 0 ~ 50°C, Storage: -10 ~ 60°C (No condensation or freezing)	
	Ambient Humidity Range	Operation / Storage: 35 ~ 85% R.H. (No condensation)	
	Insulation Resistance	≥ 50 MΩ (500 V DC, between case and lead wire)	≥ 2 MΩ (50 V DC, between case and lead wire)
	Withstand Voltage	1000 V AC 1-min (between case and lead wire)	250 V AC 1-min (between case and lead wire)
	Vibration	Total amplitude 1.5 mm or 10 G, 10 Hz ~ 55 Hz ~ 10 Hz scan for 1 minute, 2 hours each direction of X, Y and Z	
	Shock	100 m/s² (10 G), 3 times each in direction of X, Y and Z	
	EMC	IEC 61000-6-2, IEC 61000-6-4	
Lead wire		ø4 Oil-resistance cable (PVC) - 26 AWG (0.15 mm2) - 6 cores	

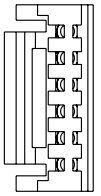
*1. Condition: Inlet pressure: 300 kPa (MF01), 600 kPa (MF02), Outlet pressure: 1 atmospheric pressure, 25 °C
*2. Condition: Outlet pressure: 1 atmospheric pressure, 25 °C.
*3. MF01: -0.09 ~ 0.8 MPa, Outlet pressure: 1 atmospheric pressure, 25 °C.
MF02: 0 ~ 1.0 MPa, Outlet pressure : 1 atmospheric pressure, 25 °C
*4. This function only available for output specification -02 and -04.
*5. 4 data reading per time.

Output circuit wiring graph

Model	MF01/02-□-010	MF01/02-□-011	MF01/02-□-02
Connect diagram			
Output method	NPN output / Analog voltage output / External input	NPN output / Analog current output / External input	NPN output / RS-485 MODBUS mode

Model	MF01/02-□-030	MF01/02-□-031	MF01/02-□-04
Connect diagram			
Output method	PNP output / Analog voltage output / External input	PNP output / Analog current output / External input	PNP output / RS-485 MODBUS mode

* Procedure to wiring RS485 products : To prevent product damage due to short circuit , MUST do RS485 line conneciton BEFORE power line connection.



❶	Brown
❷	Orange
❸	Yellow
❹	Black
❺	White
❻	Blue

Pin no.	Line color	Content
❶	Brown	Power supply (12 ~ 24 V DC)
❷	Orange	Analog voltage output: 1 ~ 5 V Analog current output: 4 ~ 20 mA
		RS485 (B+)
❸	Yellow	External input
		RS485 (A-)
❹	Black	Output 1 (Max. load current: 125 mA)
❺	White	Output 2 (Max. load current: 125 mA)
❻	Blue	0 V (GND)

MF01 / 02 Order example

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Order example

MF02 – 501 – 010 – F7C

1 2 3 4

1 2 3 4

MODEL	FLOW RATE RANGE	OUTPUT METHOD	PORT SIZE
MF01	**005**: 500 (ml/min) **010**: 1000 (ml/min) **050**: 5 (l/min) **100**: 10 (l/min) **500**: 50 (l/min)	**010**: 2 NPN output + 1 Analog output (1~5V) **011**: 2 NPN output + 1 Analog output (4~20mA) **02** : 2 NPN output + RS485 **030**: 2 PNP output + 1 Analog output (1~5V) **031**: 2 PNP output + 1 Analog output (4~20mA) **04** : 2 PNP output + RS485	**R6**: ø6 mm **F1C**: Rc1/8", with internal threads
	101: 100 (l/min) **201**: 200 (l/min)		**R8**: ø8 mm **F4C**: Rc1/4", with internal threads
MF02	**501**: 500 (l/min) **102**: 1000 (l/min)		**F7C**: Rc1/2" **F9C**: G1/2"
	202: 2000 (l/min)		**F10C**: Rc3/4" **F12C**: G3/4"

Mounting accessories

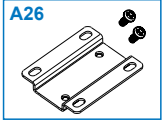
MP – A27

1 2

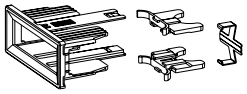
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MODEL	OPTION PARTS
MF01	**A26**: Mounting bracket **B4**: Panel adapter **C4**: Panel adapter + Front protective lid
MF02	**A27**: Mounting bracket, for 501, 102 **A28**: Mounting bracket, for 202

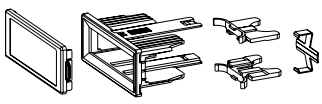
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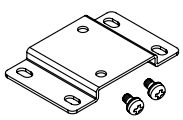
B4



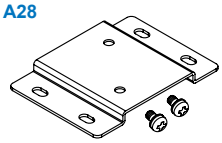
C4



A27

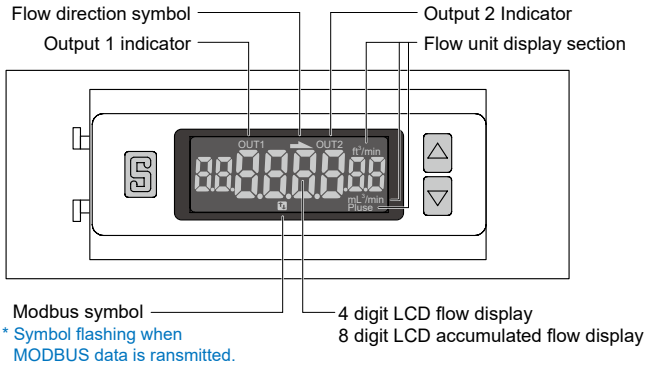


A28

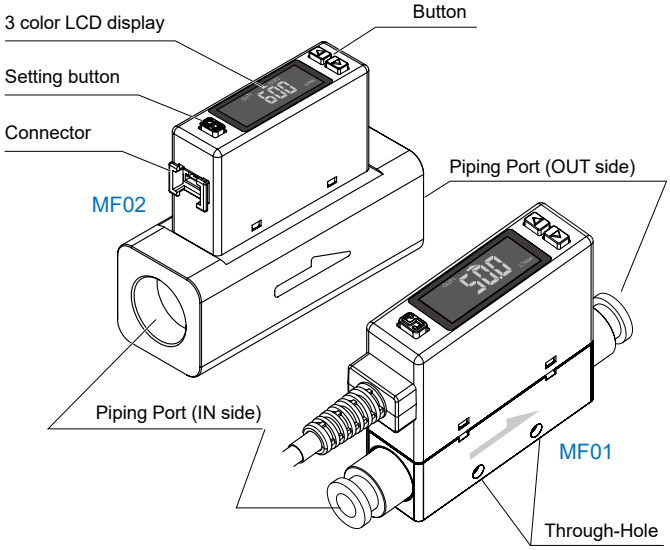


Name and functions of individual parts

Panel description



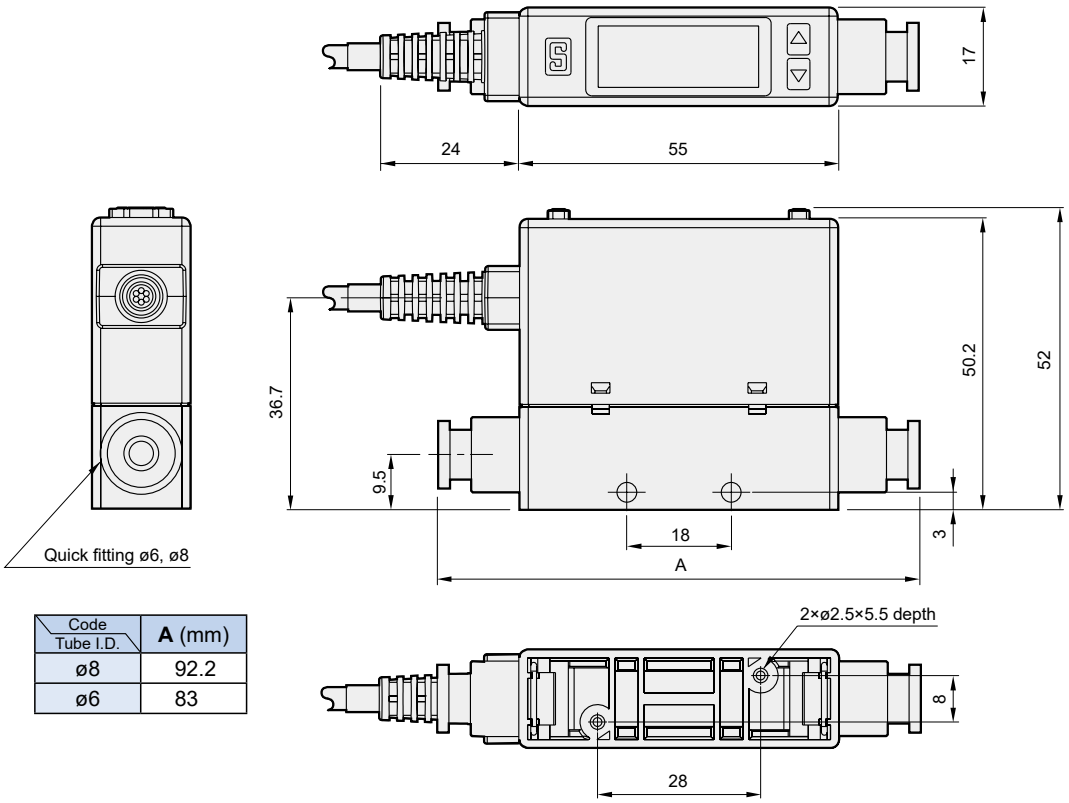
Body description



MF01 Dimensions

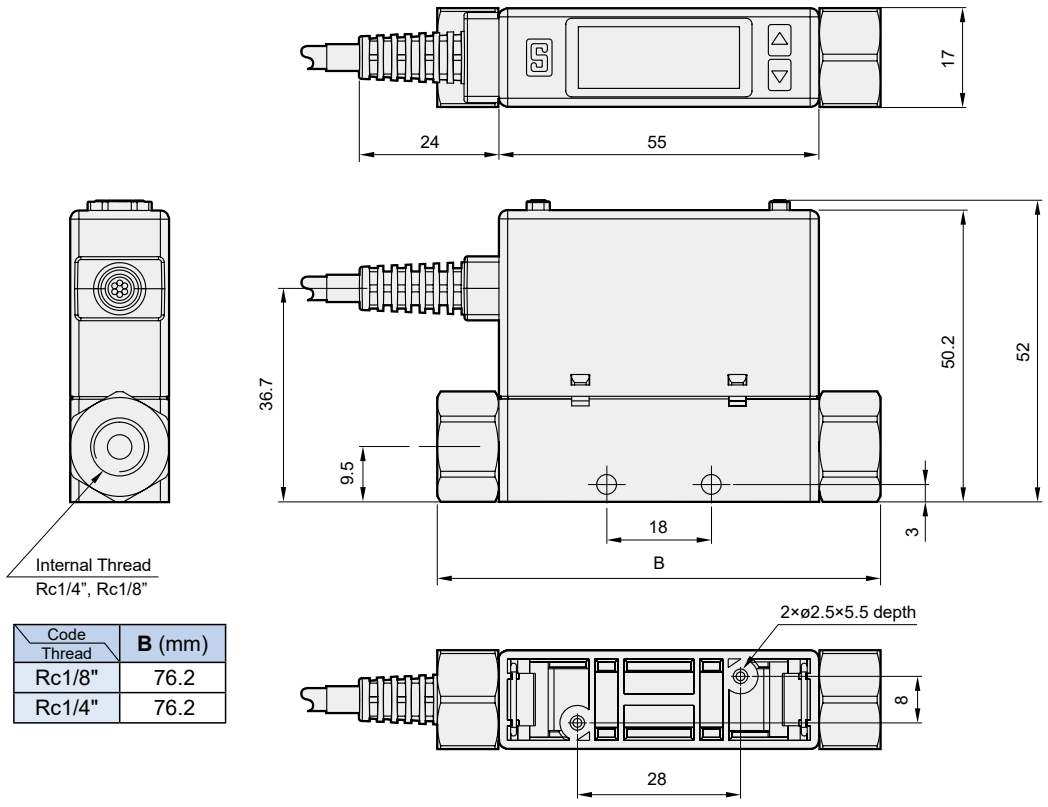
DIGITAL FLOW SENSOR

Port size
R6 (ø6)
R8 (ø8)



Code Tube I.D.	**A** (mm)
ø8	92.2
ø6	83

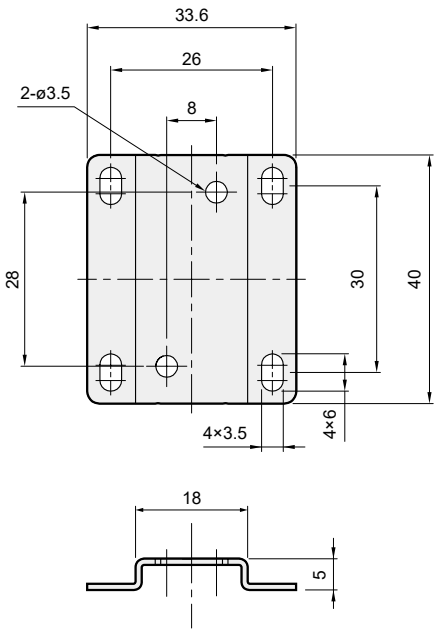
Port size
F1C (Rc1/8")
F4C (Rc1/4")

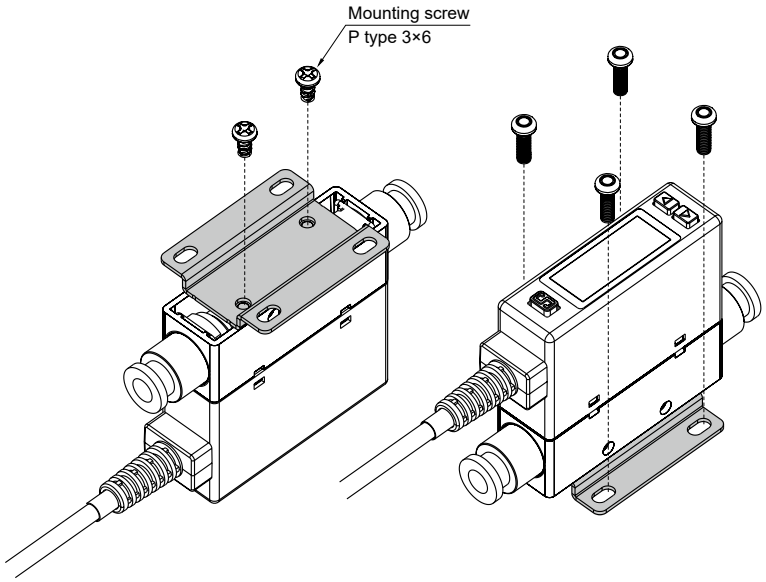


Code Thread	**B** (mm)
Rc1/8"	76.2
Rc1/4"	76.2

Mounting bracket

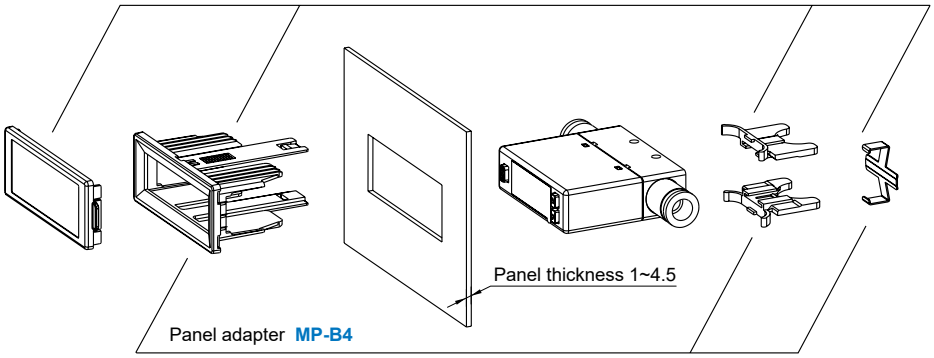
MP-A26



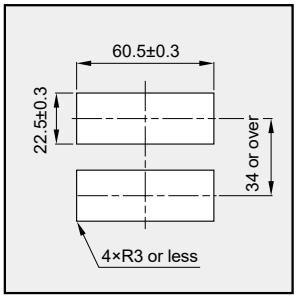


Panel type

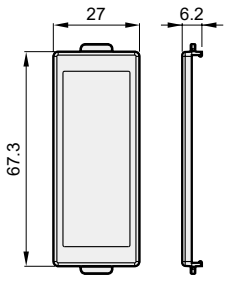
Front protective lid + Panel adapter **MP-C4**



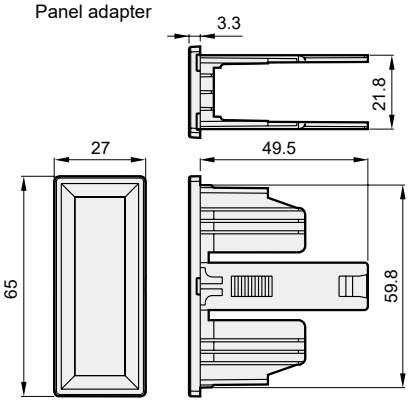
Panel cut dimensions



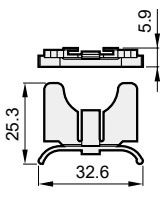
Front protective lid



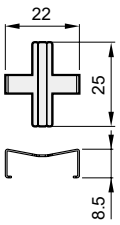
Panel adapter



Panel adapter

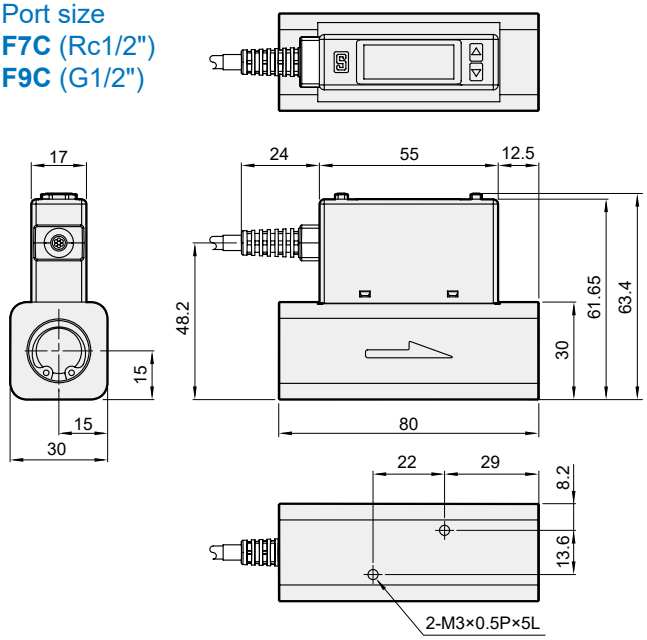


Panel adapter

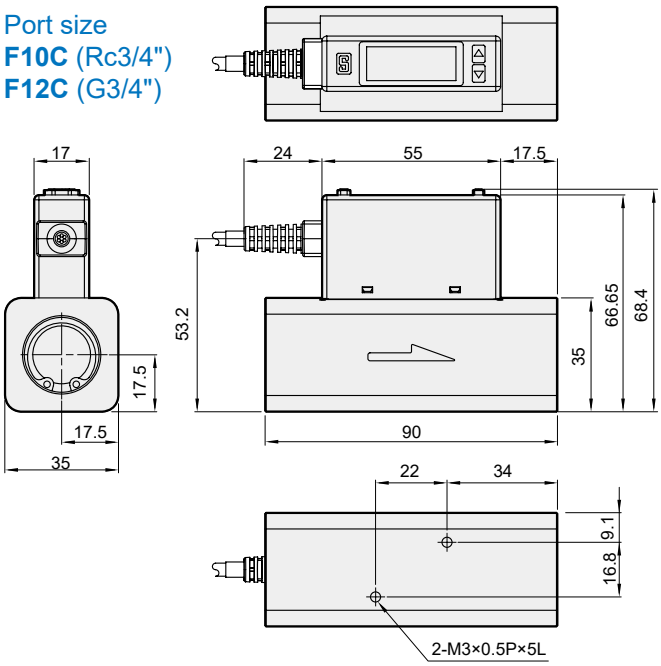


Dimensions

Port size
F7C (Rc1/2")
F9C (G1/2")

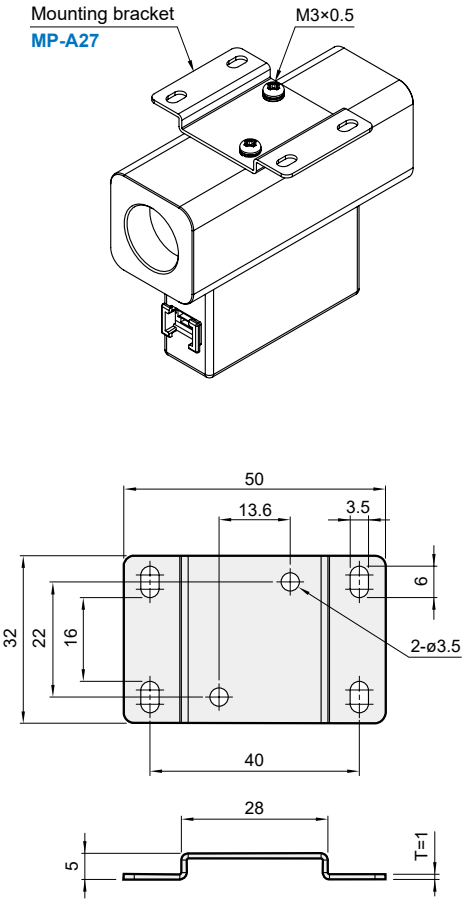


Port size
F10C (Rc3/4")
F12C (G3/4")



Mounting bracket

MP-A27



MP-A28

