

azbil



Air Flow Meter

CE



Air Flow Meter

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A superb way to save energy when using compressed air or nitrogen.



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<https://www.azbil.com/products/factory/order.html>

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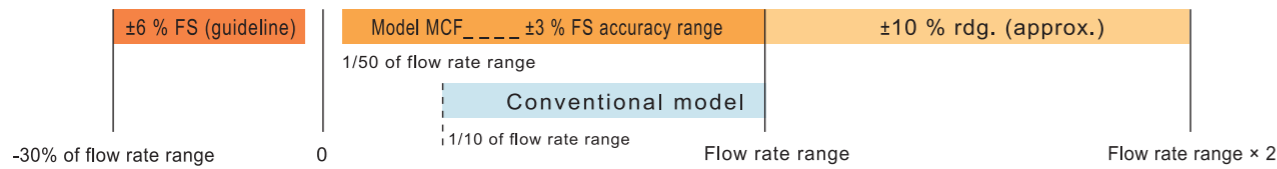
1st Edition: Feb. 2008-SK
 11th Edition: Apr. 2020-AZ

Features of the Air Flow Meter



A dedicated air/nitrogen mass flowmeter, indispensable for cutting compressor energy use.

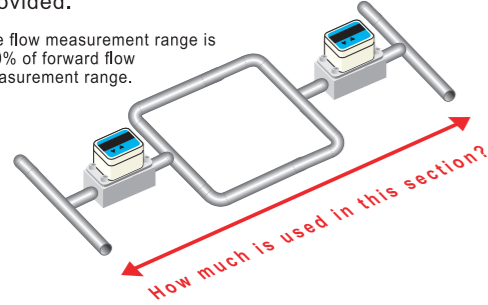
■ Practical measurement range of 50:1 and extended range function providing up to 2 times the standard range are useful for detecting air leakage



Reverse flow detection function

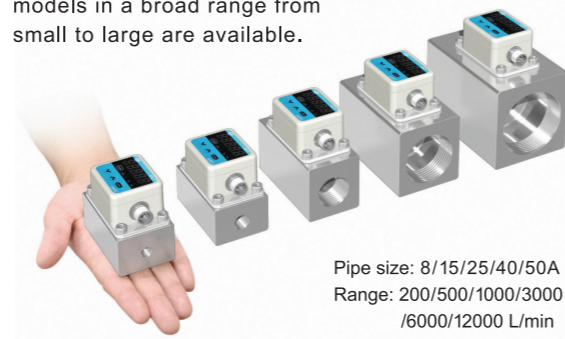
Useful for loop piping. Reverse flow detection and forward-reverse flow integration functions are provided.

- Reverse flow measurement range is up to 30% of forward flow rate measurement range.



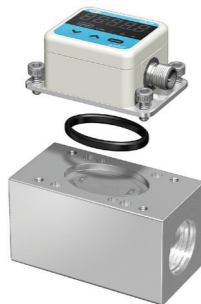
Model lineup meets a variety of application requirements

For ease of use and ease of selection, models in a broad range from small to large are available.



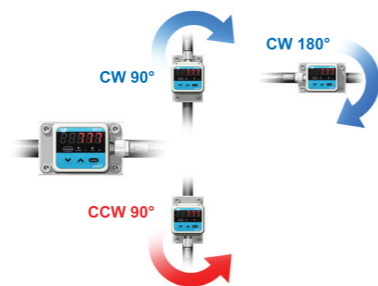
Easy maintenance without removal from the piping

The measurement unit can be dismantled and replaced for easy maintenance at the application site without disconnecting the pipes. (Pipe sizes 25/40/50A only)



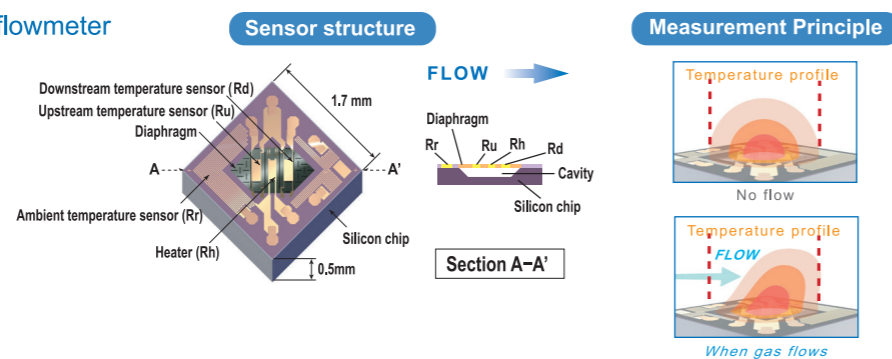
Use a single Model MCF for flow in various directions

The display unit can rotate more than 90° counterclockwise and more than 180° clockwise.



Model MCF___ is a mass flowmeter

Thermal mass flow measurement using Azbil Corporation's Micro thermal flow sensor ensures correct measurement even if gas temperature or pressure changes.



Application examples

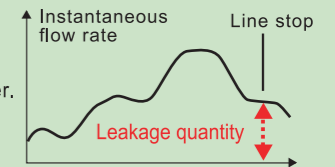
Detecting air leakage



Substantial reduction of air leakage by determining the leakage quantity — generally said to be around 30% — and repairing the leaks.

Leakage check method

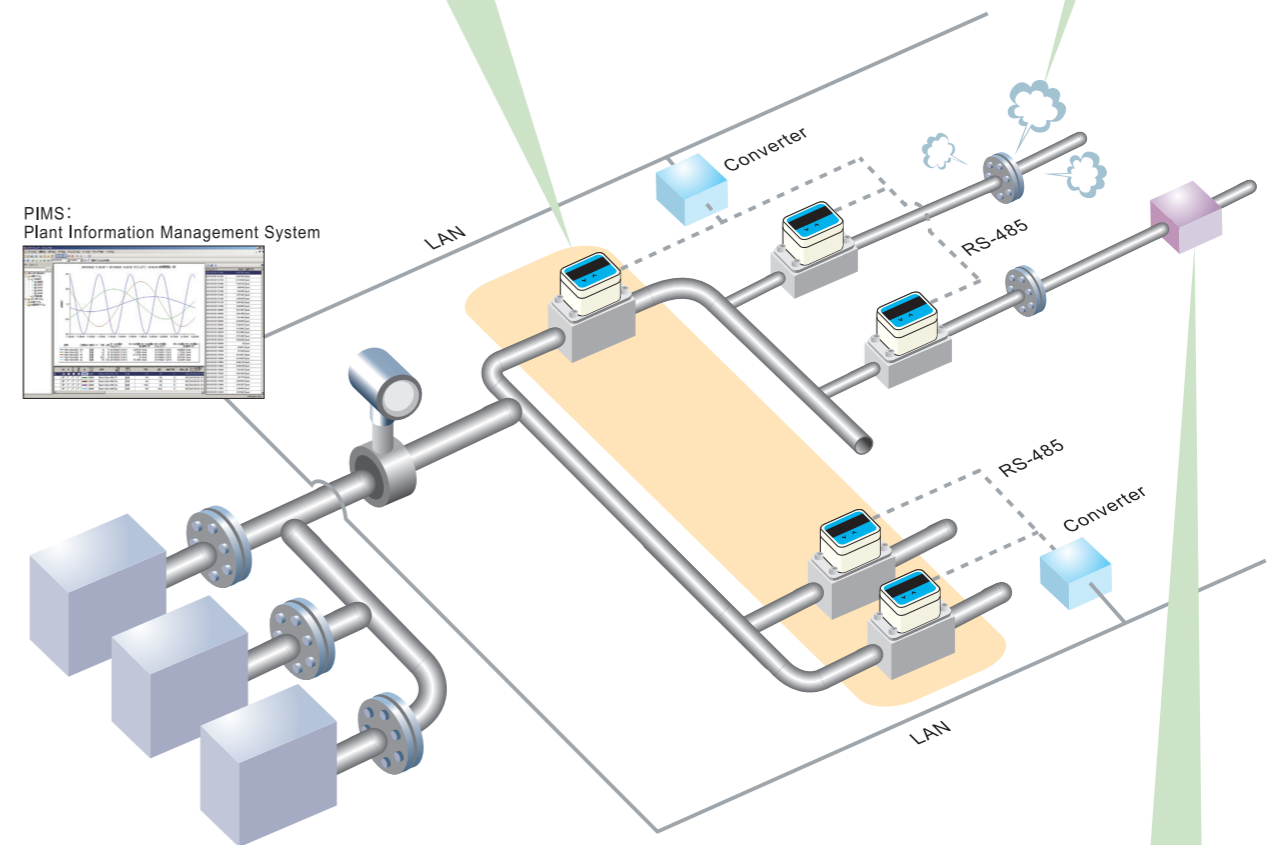
- 1 Read the instantaneous flow rate from the flowmeter.
- 2 Plot the instantaneous flow rate using a PC.



Cost management for production line or whole department



Knowing the total flow quantity and cost for an area, and budgeting by area, is sure to increase cost consciousness and enable measurement of cost reduction efforts.



Supply of appropriate quantities

Since the air quantity used by equipment can be checked to know if it is appropriate, waste can be reduced by restricting the air supply to an appropriate quantity.



Specifications

Model No.	MCF0080	MCF0150	MCF0151	MCF0250	MCF0400	MCF0500
Gas types	Air/nitrogen. (Note that gas must be dry, without corrosive components such as chlorine, sulfur and acid. It must also be clean, without dust or oil mist.)					
Flow rate range [L/min(normal)] ^{*1}	0 to 200	0 to 500	0 to 1000	0 to 3000	0 to 6000	0 to 12000
Reverse flow range [L/min(normal)] ^{*2}	-60	-150	-300	-900	-1800	-3600
Extended range[L/min(normal)] ^{*3}	400	1000	2000	6000	12000	24000
Accuracy guaranteed flow rate range [L/min(normal)]	4 to 200	10 to 500	20 to 1000	60 to 3000	120 to 6000	240 to 12000
Measurement accuracy	± 3% FS					
Smallest detectable flow rate [L/min(normal)]	2	5	10	30	60	120
Display resolution [L/min(normal)]	1	1	2	5	10	10
Temperature	-10 to +60 °C (without freezing)					
Storage temperature	-20 to +70 °C (without freezing)					
Humidity	0 to 90 % RH (without condensation)					
Pipe size	8A(1/4B)	15A(1/2B)	15A(1/2B)	25A(1B)	40A(1 1/2B)	50A(2B)
Connection type	MCF_____R: Rc thread MCF_____G : G thread					
Body material	Aluminum alloy					
O-ring material	MCF_____A : H-NBR MCF_____F : FKM					
Case material	Denatured PPO					
Operating pressure range	-0.07 to +1.0 MPa					
Pressure resistance	1.5 MPa					
Mounting orientation	Horizontal (flow: left → right, right → left) Vertical (flow: up → down, down → up)					
Rated voltage	24V DC, 120 mA max.					
Sampling cycle/ response time	50 ms to 1.5 s max. (time for 95 % of response to 0 →100 % FS step input)					
Output signal ("D01" 4 to 20 mA model only) ^{*4}	4 to 20 mA, allowable load resistance 300 Ω max.					
Event output ("D01" 4 to 20 mA model only) ^{*4}	One open collector output (rating 30V DC, 50 mA), with output type selectable from event function.					
Event function ("D01" 4 to 20 mA model only) ^{*4}	Selectable from pulse output for integration ^{*5} , instantaneous flow rate high/low limit alarm, integration count up/down, or alarm output.					
Communications("D10" RS485 Communication model only)	RS-485 Communications (3-wire system), MODBUS Protocol Transmission speed 19200 bps max.					
Electrical connection	PA5 Series VA connector (4 pins)					
Display	7-segment, 5-digit display changeable between instantaneous flow rate, integrated (cumulative) flow, and cost.					
Protective structure	IP65. (Rating is based on JIS C 0920 and IEC529. For purposes of installation indoors, device is waterproof and dustproof.)					
Standards compliance	CE marked : EN61326-2-3 : 2006					
Weight	400 g	400 g	400 g	500 g	700 g	1100 g

Notes: *1. The unit L/min (normal) refers to the volumetric flow rate adjusted for 0 °C, 101.325 kPa. *2. Flow is displayed as a negative value even if the setting is not changed. *3. Indication value and integrated pulse output can be displayed and output even if the setting is not changed, but 4–20 mA output requires a change of the span setting. *4. For RS485 communication models, there is no terminal output. *5. Integrated pulse output specifications (selectable by settings)

Model No.	Pulse weight (L/pulse)	Model No.	Pulse weight (L/pulse)	Model No.	Pulse weight (L/pulse)
MCF0080	10, 100, 1000	MCF0151	10, 100, 1000	MCF0400	100, 1000, 10000
MCF0150	10, 100, 1000	MCF0250	10, 100, 1000	MCF0500	100, 1000, 10000

Selection guide

MCF_____ND_00_0

Basic model no	Pipe size/range	Material	Connection	Gas type	Power output	Option 1	Option 2	Option 3	Design code	Description
MCF										Air flowmeter MCF
	0080									8A(1/4B) 200L/min
	0150									15A(1/2B) 500L/min
	0151									15A(1/2B) 1000L/min
	0250									25A(1B) 3000L/min
	0400									40A(1 1/2B) 6000L/min
	0500									50A(2B) 12000L/min
		A								Body : aluminum alloy O-ring:H-NBR
		F								Body : aluminum alloy with treated to be oil inhibiting,O-ring : fluororubber(FKM)
			R							Rc thread
			G							G thread
				N						Air/Nitrogen
					D01					24V DC / 4--20 mA output / one open collector
					D10					24V DC / RS-485 communication / none outputs ^{*1}
						0				(None)
							0			(None)
								0		(None)
								K		Antisulfidization ^{*2}
								D		Inspection data provided
								L		Antisulfidization + inspection data ^{*2}
								Y		Traceability certificate
								X		Antisulfidization + traceability Certificate ^{*2}
								0		Product version

*1. For RS485 communication models, there isn't other output. *2. Options "K", "L" and "X" are not available for Model MCF_____F models

Accessories (sold separately)

Model PA5___ connector cables

Shape	Power	Cable properties	Cable length	Model No.	Lead color
	DC	Vinyl-insulated cable with high resistance to oil and vibration (UL/NFPA79 CM, CL3)	2 m	PA5-4ISX2SK	1: Brown, 2: White, 3: Blue, 4: Black
			5 m	PA5-4ISX5SK	1: Brown, 2: White, 3: Blue, 4: Black

Note: Types other than the above are available. Please contact Azbil Corporation.

Mounting bracket (for Models MCF0080/0150/0151/0250)

Model No.
81446721-001

Measurement module (for Models MCF025,040,050)^{*1}

Model No.	MCF model No.	Description
81447192-201	For MCF_____A_ND01___* *" is 0,D or Y	With 4 to 20 mA output, No anti-sulfide treatment
81447192-221	For MCF_____A_ND10___* *" is 0,D or Y	With RS485 communications, No anti-sulfide treatment
81447192-401	For MCF_____F_ND01___* *" is 0,D or Y	With 4 to 20 mA output, Oil inhibiting, No anti-sulfide treatment
81447192-421	For MCF_____F_ND10___* *" is 0,D or Y	With RS485 communications, Oil inhibiting, No anti-sulfide treatment
81447192-601	For MCF_____A_ND01___* *" is K,L or X	With 4 to 20 mA output, With anti-sulfide treatment
81447192-621	For MCF_____A_ND10___* *" is K,L or X	With RS485 communications, With anti-sulfide treatment

*Note 1 Measurement modules in models MCF008, 015 (pipe sizes 8A, 15A) cannot be replaced.

Mist Separator Model MFF25S

Selection guide

Basic model No.	Type	Pipe size + treated flow rate	Design code	Description
MFF25S				Mist separator for MCF models
	N			Housing + element
				Pipe size Treated flow rate
		080300	8A(1/4B)	300 L/min For MCF0080
		080750	8A(1/4B)	750L/min
		150750	15A(1/2B)	750L/min For MCF0150
		151500	15A(1/2B)	1500L/min For MCF0151
		254000	25A(1B)	4000L/min For MCF0250
		256000	25A(1B)	6000L/min
			000	None

Options

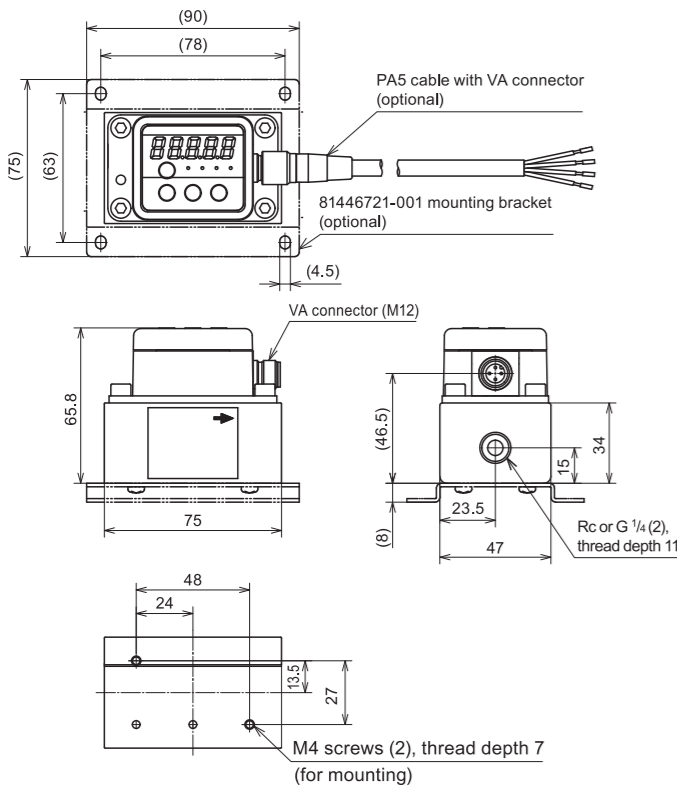
Name	Model No.	Notes
Replacement filter element	81441628-001	For MFF25SN080300000
	81441628-002	For MFF25SN080750000, For MFF25SN150750000
	81441628-003	For MFF25SN151500000
	81441628-004	For MFF25SN254000000
	81441628-005	For MFF25SN256000000
Mounting bracket	81441629-001	For MFF25SN080300000
	81441629-002	For MFF25SN080750000, For MFF25SN150750000, For MFF25SN151500000
	81441629-003	For MFF25SN254000000, For MFF25SN256000000



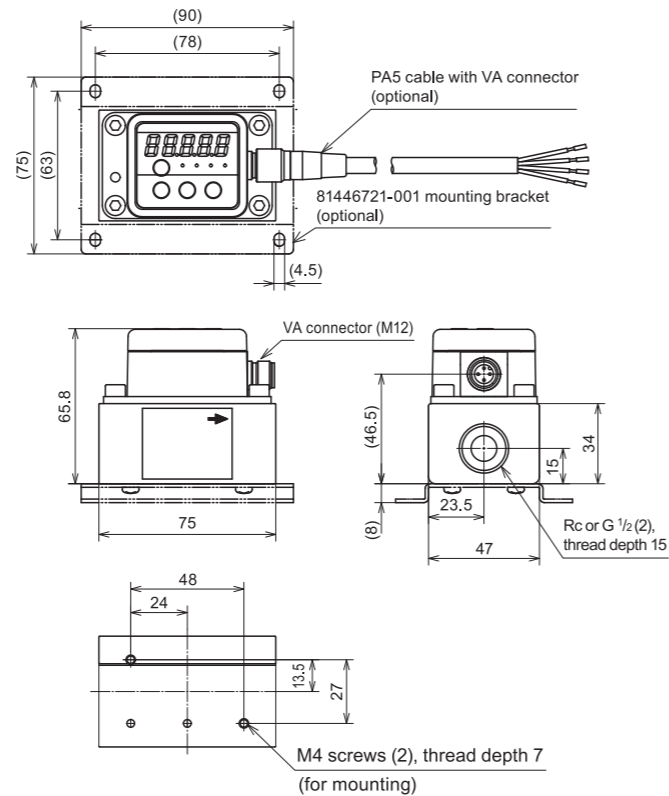
External dimensions (Unit: mm)

MCF_..._ND_00_ : DC 24V Model

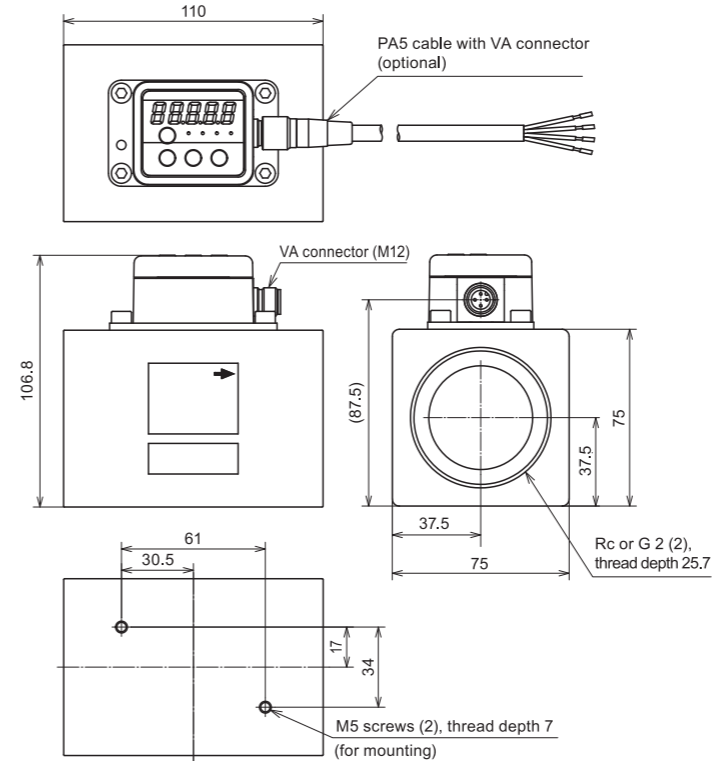
Model MCF0080



Model MCF0150 / MCF0151

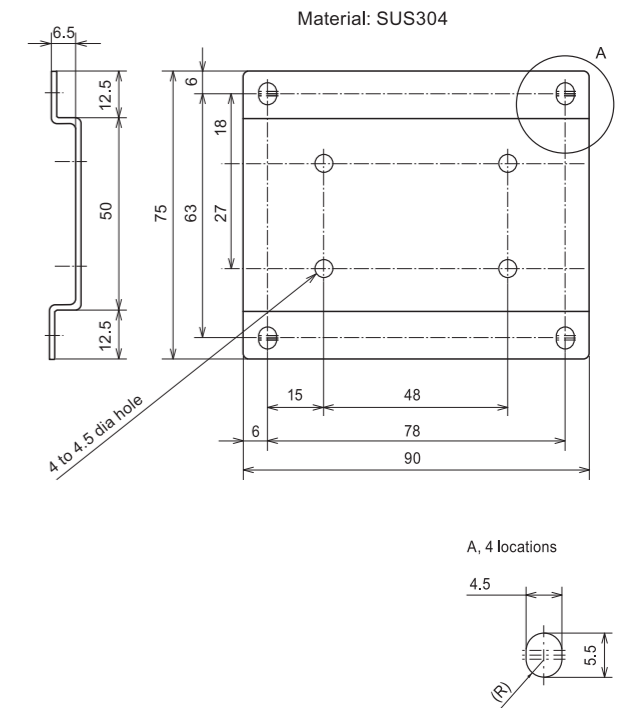


Model MCF0500

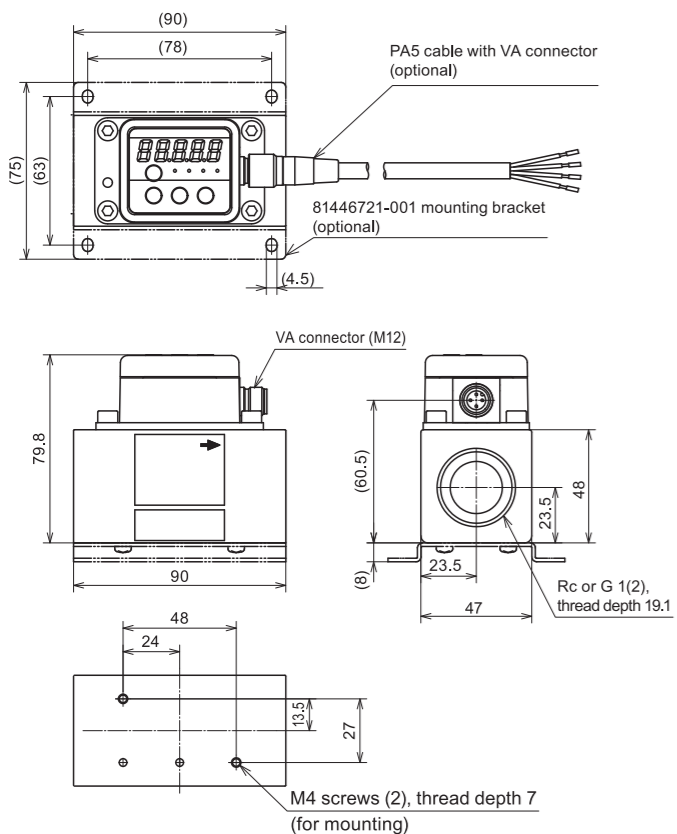


Mounting bracket, (for model MCF0080/0150/0151/0250)

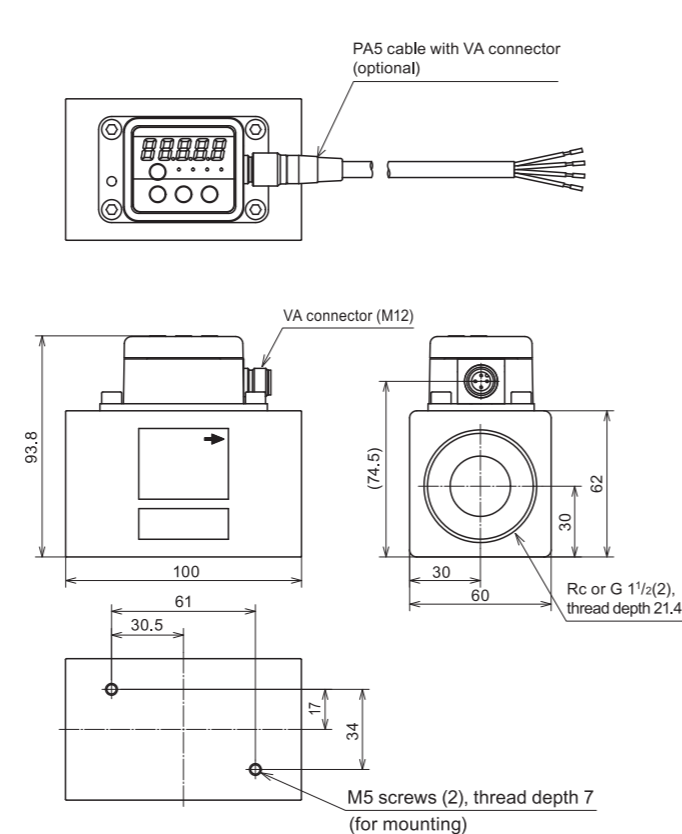
81446721-001



Model MCF0250

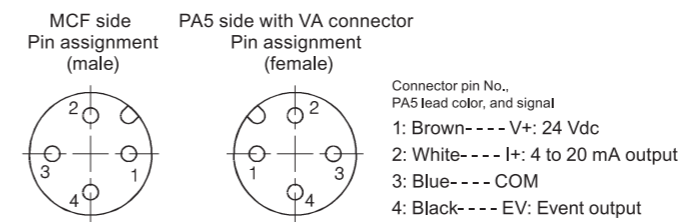


Model MCF0400

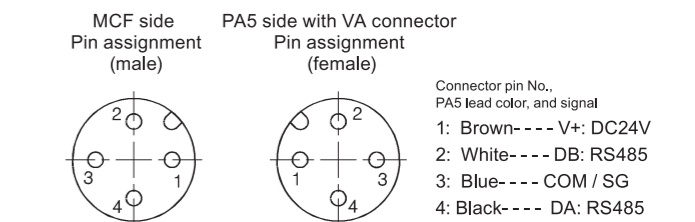


Wiring pin assignment

(1) Model MCF_..._ND01_...
4-20mA, open collector output

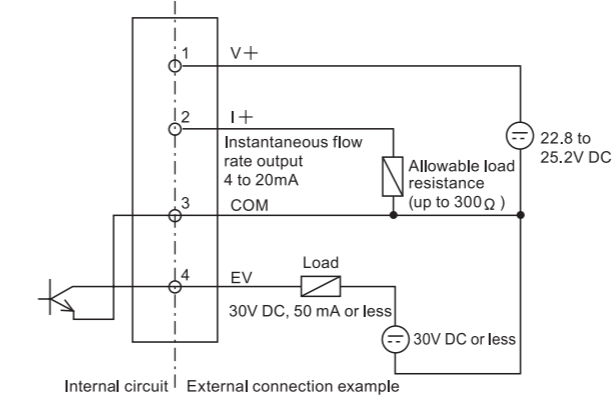


(2) Model MCF_..._ND10_...
(RS-485)

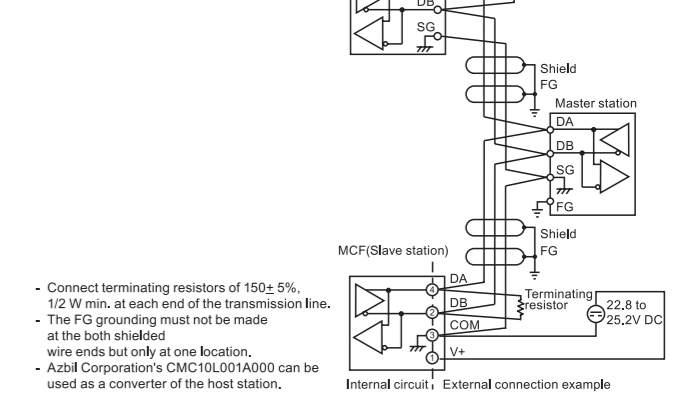


Wiring example

(1) Model MCF_..._ND01_...
4-20mA, open collector output



(2) Model MCF_..._ND10_...
(RS-485)

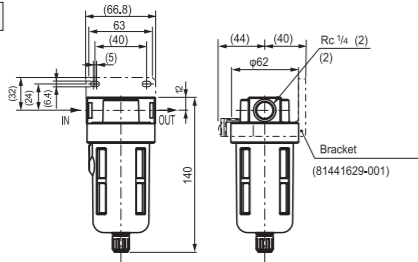


Mist Separator External dimensions (Unit: mm)

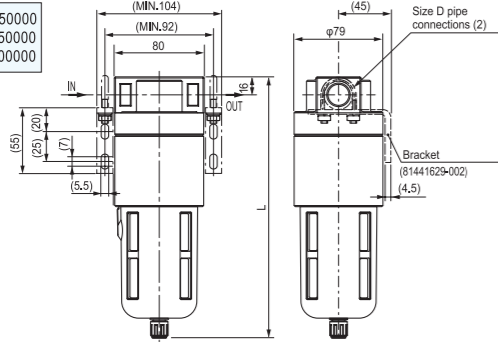
Model MFF25S

Model MFF25S

Model MFF25SN080300000

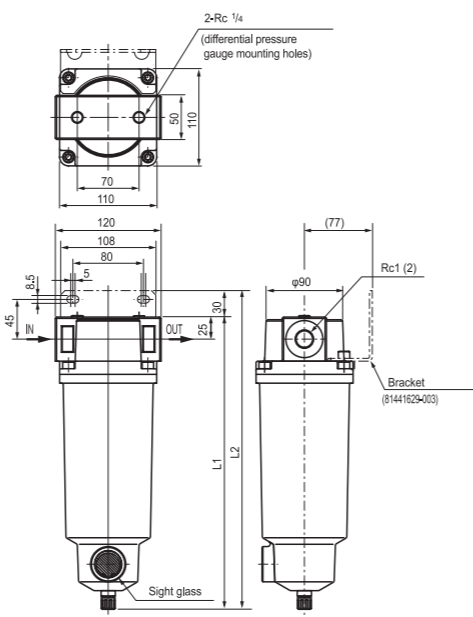


Model MFF25SN080750000
MFF25SN150750000
MFF25SN151500000



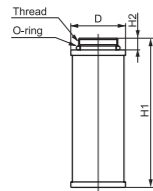
Model No.	L	D
MFF25SN080750000	167.5	Rc 1/4
MFF25SN150750000		Rc 1/2
MFF25SN151500000	231	Rc 1/2

Model MFF25SN254000000
MFF25SN256000000



Model No.	L1	L2
MFF25SN025400000	253.5	283.5
MFF25SN025600000	331.5	361.5

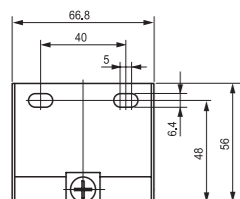
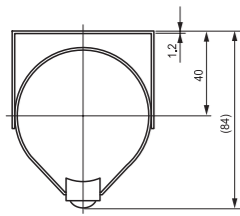
Filter element



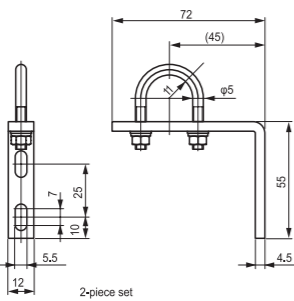
Model No.	H1	H2	D	Thread	Notes
81441628-001	65	10	φ35	M22X1.5	For MFF25SN080300000
81441628-002	78	12	φ48	M32X1.5	For MFF25SN080750000, MFF25SN150750000
81441628-003	127	12	φ48	M32X1.5	For MFF25SN151500000
81441628-004	110	15	φ70	M50X2	For MFF25SN254000000
81441628-005	191	15	φ70	M50X2	For MFF25SN256000000

Bracket

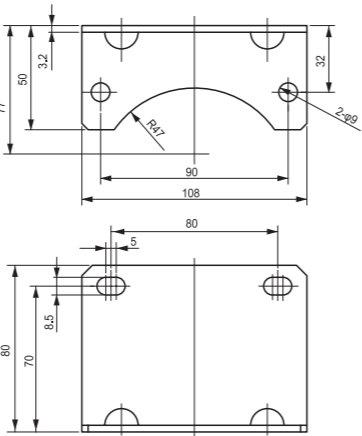
81441629-001
(For MFF25SN080300000)



81441629-002
(For MFF25SN080750000, MFF25SN150750000,
MFF25SN151500000)



81441629-003
(For MFF25SN254000000,
MFF25SN256000000)

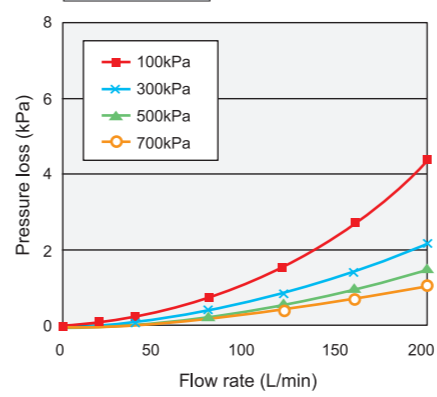


M8x28 hexagon socket head cap screws (2) are included.

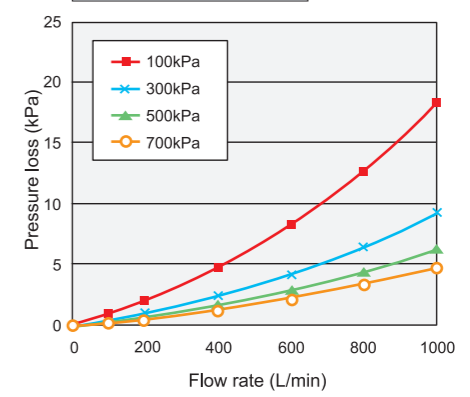
Pressure loss

Model MCF_ _ _ _

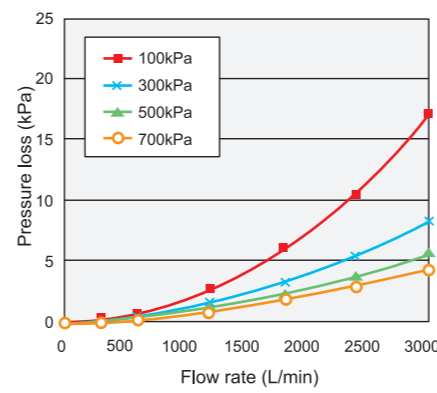
Model MCF0080



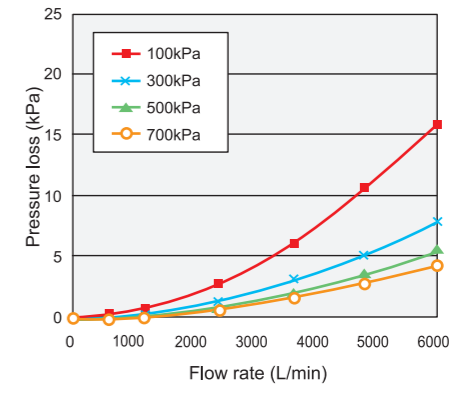
Model MCF0150 / MCF0151



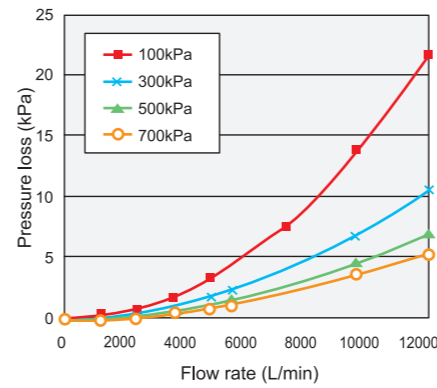
Model MCF0250



Model MCF0400

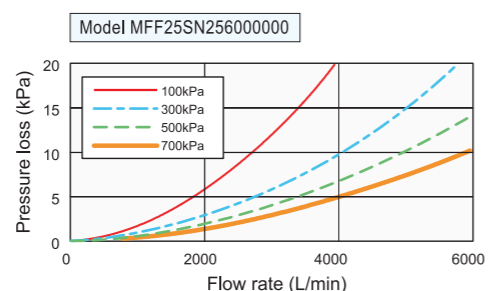
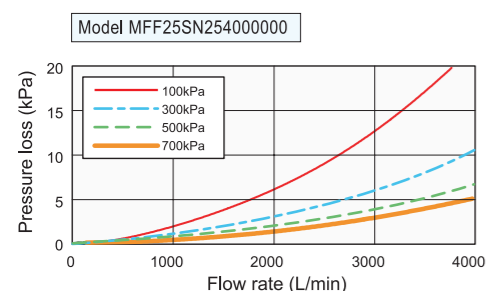
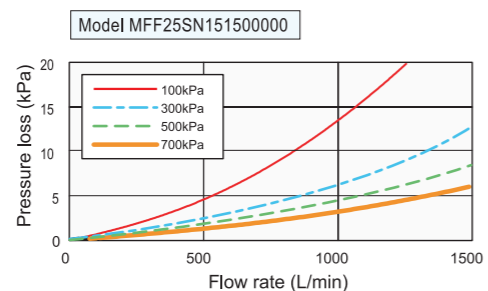
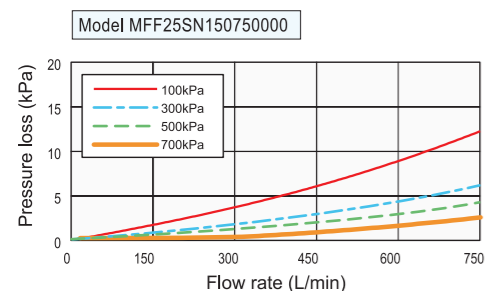
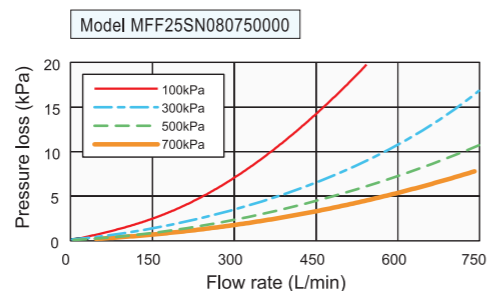
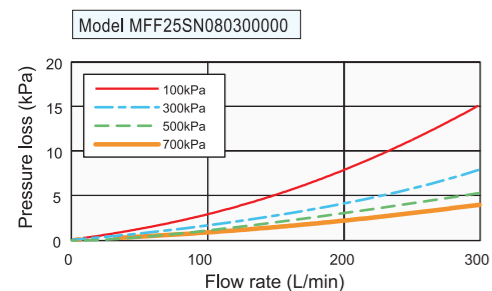


Model MCF0500



Mist Separator

Model MFF25S



Handling precautions Do not apply more than maximum operating pressure to the air inlet.

Precautions (For details, refer to the user's manual.)

Precautions for use

- Do not use for gases other than air and nitrogen. Doing so might have serious consequences, such as fire or explosion.
- Do not use in excess of the operating pressure range. Do not apply a pressure greater than the pressure resistance. Doing so might result in measurement error or damage to this device.
- Application of more than 10 times the full-scale flow rate might result in measurement error or damage to this device.
- Position the display, which can be rotated up to 270°, in an easy-to-see direction, taking into account the location of the cable and the location of the display.
- When changing the output settings, stop the control system equipment first to avoid unexpected operational errors.
- Since this device does not have built-in protection against lightning, be sure to provide lightning surge protection for the equipment.
- If there is equipment or a device (e.g., electromagnetic lift, high-frequency induction furnace) generating surges nearby, take countermeasures at the surge-generating equipment, and do not run its wiring together with that of the model MCF.
- Be sure to use within the specified flow rate range. To prevent flow at an excessive rate, use instrumentation with appropriate supply pressure management and install a throttling valve. If the flow rate exceeds 10 times the upper limit of the range, the displayed and output values might be lower than the actual flow rate.

Precautions for installation and piping

- Handle this precision device with much care. Dropping it or subjecting it to impact may result in damage.
- To attach this device to a pipe, fix the model MCF in place, and then rotate the connecting pipe to the tightening torque specified in the table below.

Model No.	Pipe size	Tightening torque (N·m)
MCF0080	1/8B	12 to 14
MCF0150	1/2B	31 to 33
MCF0151		
MCF025	1B	36 to 38
MCF040	1 1/2B	59 to 61
MCF050	2B	74 to 76

- Prevent foreign matter from entering the device. If rust, water droplets, oil mist, or dust in the piping enters the device, measurement error or damage to the device might result. Before installation, thoroughly flush the upstream and downstream piping and check that no foreign matter remains. If there is a possibility of foreign matter entering the device, install an upstream filter, strainer or mist trap capable of eliminating foreign matter 1 μm or greater in diameter, and be sure to periodically inspect and replace the filter.
- Use an appropriate amount of sealant on the pipe threads, but do not coat the top two threads. If too much sealant is applied, it might enter the pipe, causing measurement error or damage to this device.
- This device can be mounted in any direction. However, if it is mounted on a horizontal pipe with the display in front (in a vertical plane), a measurement error might occur, depending upon the application pressure (see specifications). Also, if the device is mounted on a horizontal pipe with the display facing downward, rust, water droplets, oil mist, or dust in the piping may stick to the sensor, resulting in measurement error or damage.
- Do not install near the output of a compressor or in a similar location affected by pulsing flow or drift. Do not install near a check valve that is hunting. Measurement error might result.

Accuracy and straight pipe length

(Connection with different size piping, valve or filter)

- Install straight pipes as needed with the lengths given in the table below*1. If a device that is not listed in the table is installed either upstream or downstream, contact Azbil Corporation for the length of the straight pipe section. If reverse flow is also expected, it is necessary to have the same length of straight pipe downstream as upstream.

Pipe or connected device model	Location in relation to the MCF	Straight pipe section for this device	
		For accuracy within product specification range (±3% FS)	For accuracy of ±5% FS
MFF25S mist separator for MCF0080/0150/0151/0250 ^{*2}	Upstream	10D	(Not required)
MFF25L mist separator for MCF0400/0500 ^{*2}	Upstream	20D	(Not required)
Pipe one size larger in dia. (connected with reducer)	Upstream	5D	(Not required)
MCF0080 3/8B → 1/4B	Downstream	(Not required)	(Not required)
MCF0150/0151 3/4B → 1/2B			
MCF0250 1 1/4B → 1B			
MCF0400 2B → 1 1/2B			
Pipe one size larger in dia. (connected with reducer)	Upstream	10D	5D
MCF0500 2 1/2B → 2B	Downstream	5D	5D
Pipe more than one size smaller in dia. (connected with enlarging pipe)	Upstream	20D	5D
MCF0080 1/8B → 1/4B	Downstream	(Not required)	(Not required)
MCF0150 / 0151 3/8B → 1/2B			
MCF0250 3/4B → 1B			
MCF0400 1 1/4B → 1 1/2B			

Notes: *1. Do not connect a carbon steel pipe for pressure service (JIS G3454) or stainless steel pipe (JIS G3459) that is larger than schedule 40. Doing so might cause a deterioration of accuracy. (If the pipe schedule number is larger, the inner pipe diameter is smaller, resulting in reduced accuracy.) *2. The straight pipe section lengths given in the right-hand columns above are for connection of a filter the same size (internal diameter) as the MCF.

Pipe or connected device model	Location in relation to the MCF	Straight pipe section for this device	
		For accuracy within product specification range (±3% FS)	For accuracy of ±5% FS
Pipe more than one size smaller in dia. (connected with enlarging pipe)	Upstream	25D	10D
MCF0500 1 1/2B → 2B	Downstream	5D	5D
Single elbow	Upstream	10D	(Not required)
	Downstream	(Not required)	(Not required)
Double elbow	Upstream	10D	10D
	Downstream	(Not required)	(Not required)
Ball valve (full-bore type full open)	Upstream	(Not required)	(Not required)
	Downstream	(Not required)	(Not required)
Regulator for MCF0080	Upstream	200D	(Not required)
	Downstream	10D	(Not required)
Regulator for MCF0150/0151/0250/0400/0500	Upstream	30D	(Not required)
	Downstream	5D	(Not required)
Air filter	Upstream	25D	(Not required)

Precautions for electric wiring

- Supply electrical power within the specified range.
- Be sure to check that the wiring is correct before turning the power ON. Incorrect wiring can cause damage or malfunction. Do not wire while the power is ON.
- Do not rotate the connector after it is inserted into the device. If it is rotated, the internal wiring might be twisted and damaged.
- Run the wiring for this device separately from power or high voltage lines (use a separate electrical conduit).