



Pneumatic, Vacuum and Auxiliary Components
Catalog No. CB-024SA

Compact flow rate sensor (RAPIFLOW)

FSM3 Series

LCD display

●Stainless steel body (flow rate range: 500mL/min to 1000L/min)

P4 compliant
as standard

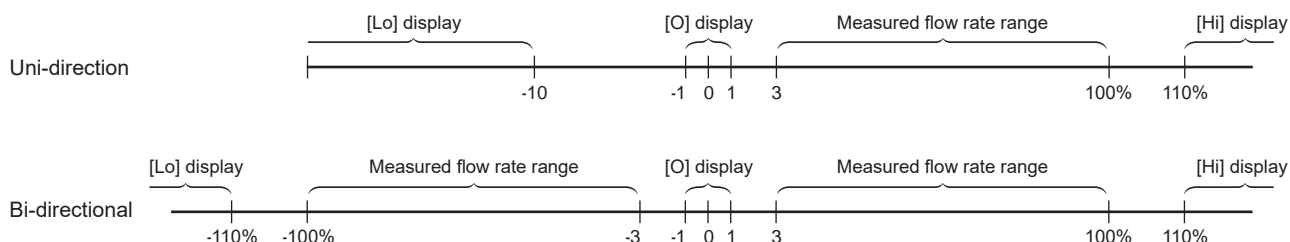


LCD display specifications * Products with needle valves are not P4 compliant.

Item			FSM3-[A][B][C][D][E][F][G][H][I]-[]											
			[B]											
			005	010	020	050	100	200	500	101	201	501	102	
Flow direction	[C]	U	Uni-direction											
		B	Bi-direction											
Measured flow rate range (□/min) *1	[B]	U	15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.15 to 5.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L	15 to 500L	30 to 1000L	
		B	-500 to -15, 15 to 500mL	-1000 to -30, 30 to 1000mL	-2.00 to -0.06, 0.06 to 2.00L	-5.00 to -0.15, 0.15 to 5.00L	-10.00 to -0.30, 0.30 to 10.00L	-20.0 to -0.6, 0.6 to 20.0L	-50.0 to -1.5, 1.5 to 50.0L	-100.0 to -3.0, 3.0 to 100.0L	-200 to -6, 6 to 200L	-500 to -15, 15 to 500L	-1000 to -30, 30 to 1000L	
Display			4 digit + 4 digit 2 color LCD											
Flow rate display range (□/min) *2	[B]	U	-49 to 549mL	-99 to 1099mL	-0.19 to 2.19L	-0.49 to 5.49L	-0.99 to 10.99L	-1.9 to 21.9L	-4.9 to 54.9L	-9.9 to 109.9L	-19 to 219L	-49 to 549L	-99 to 1099L	
		B	-549 to 549mL	-1099 to 1099mL	-2.19 to 2.19L	-5.49 to 5.49L	-10.99 to 10.99L	-21.9 to 21.9L	-54.9 to 54.9L	-109.9 to 109.9L	-219 to 219L	-549 to 549L	-1099 to 1099L	
Integration display (*3)		Display range	0 to ±99999999mL			0.00 to ±99999.99L			0.0 to ±999999.9L			0 to ±9999999L		
		Pulse output rate	5mL	10mL	0.02L	0.05L	0.1L	0.2L	0.5L	1L	2L	5L	10L	
Working conditions		Applicable fluids *4	Clean air (JIS B 8392-1:2012 1.1.1 to 5.6.2), compressed air (JIS B 8392-1:2012 1.1.1 to 1.6.2), nitrogen gas											
			Argon, carbon dioxide, and gas mixture (argon + carbon dioxide)											-
			Oxygen (When oxygen specification is selected, ㊟ Clean-room specifications of workpiece cannot be selected. Specifications automatically become oil-prohibited specifications.)											-
		Temperature range	0 to 50°C (no condensation)											
		Pressure range	-0.09 to 1.00 MPa										-0.09 to 0.75 MPa	
		Proof pressure	1.5 MPa											
Operating ambient temperature/humidity			0 to 50 °C, 90% RH or less											
Storage temperature			-10 to 60°C											
Accuracy *5 (Fluid: in dry air)		Accuracy *6	Within ±3% F.S. (Secondary side released to atmosphere) (The scope of warranty is in accordance with the “measured flow rate range.”)											
		Repeatability *7)	Within ±1% F.S. (Secondary side released to atmosphere)											
		Temperature characteristics	Within ±0.2% F.S./°C (15 to 35°C, base temperature 25°C)											
		Pressure characteristics	Within ±5%F.S. (secondary side released to atmosphere reference)									Within ±5% F.S (0.35 MPa reference)		
Response time		*8	50 msec or less (setting response time OFF)											
Switch output	[G]	A, B, E, F	NPN open collector output (50 mA or less, voltage drop 2.4 V or less)											
		C, D, G, H	PNP open collector output (50 mA or less, voltage drop 2.4 V or less)											
Analog output *9		A, B, C, D	1 to 5 V voltage output (connecting load impedance 50 kΩ or more)											
		E, F, G, H	4 to 20 mA current output (connecting load impedance 0 to 300 Ω)											
Power supply voltage *10	[G]	A, B, C, D	12 to 24 VDC (10.8 to 26.4 V) ripple rate 1% or less											
		E, F, G, H	24 VDC (21.6 to 26.4 V) ripple rate 1% or less											
Current consumption *11			45 mA or less											
Lead wire			ø3.7, AWG26 or equivalent x 5-conductor (connector), insulator O.D. 1.0											
Functions *12			①Gas switching, ②Setting copy function, ③Flow rate integration, ④Peak hold, etc.											
Degree of protection			IP40 or equivalent (IEC standard)											
Protection circuit *13			Power reverse connection protection, switch output reverse connection protection, switch output load short-circuit protection											
Vibration resistance			10 to 150 Hz, max. 100m/s ² , X, Y, Z directions, every 2 hours											
EMC Directive			EN55011, EN61000-6-2, EN61000-4-2/3/4/6/8											
Mounting	Mounting orientation *14	Unrestricted in vertical/horizontal direction												
	Straight piping section *15	Not required												

*1: The value converted to volumetric flow rate at standard condition (20°C 1 barometric pressure (101 kPa) 65% RH).
(For gases other than air, 20°C, 1 barometric pressure (101 kPa), relative humidity 0%RH).

*2: Display at each flow rate is as follows.



*3: The accumulated flow is a calculated (reference) value. When using the integrated save function, take care to prevent the number of saves from exceeding the access count limit of the storage device (1 million times).(Changes to the settings are counted in number of accesses.)

$$\text{Number of saves} = \frac{\text{Usage time}}{5 \text{ mins}} < 1 \text{ million times}$$

When instantaneous flow rate is below 1% it is not counted as integrating flow.

*4: Use dry gas which does not contain corrosive elements such as chlorine, sulfur or acids, and which is clean and does not contain dust or oil mist. When using compressed air, use clean air that complies with JIS B 8392-1:2012 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oil oxides, foreign matter, etc.). To maintain the function of this product, filter and air dryer are provided on the primary side (upstream side) of this product.(Min. pressure dew point 10°C or less) and oil mist filter (max. oil content 0.1mg/m³) for use. The sensor for oxygen gas is a custom model. To prevent ignition accidents, do not allow oxygen to flow again when it has been used on fluids other than oxygen to flow even once.

*5: Compressed air is used for adjusting and inspecting this product. Accuracy for gas types other than air is a guideline.

*6: Accuracy is based on a CKD standard flow rate meter. It does not indicate absolute accuracy. Repeatability, temperature characteristics, and pressure characteristics are not included for an accuracy of $\pm 3\%$ F.S. Consider separately according to the working environment and working conditions.

*7: Repeatability is calculated during a short period of time. Change over time is not included. (Refer to the product specifications sheet for details.)

*8: The actual response time changes depending on the piping conditions. As a guideline, the response time can be set within the range of 50 msec to 1.5 sec.

*9: The output impedance of the analog output section is approx. 1 k Ω . If the impedance of the connecting load is small, output and error increase. Check error with the impedance of the connecting load before using.

*10: The power supply voltage specifications differ for the voltage output type and current output type.

*11: Current for when 24 VDC is connected, and no load is applied. Please note that the current consumption changes depending on the load connection status.

*12: The gas type switching function enables switching to argon, carbon dioxide and a gas mixture of argon 80% + carbon dioxide 20%. (Note that the oxygen, 500L/min, and 1000L/min models do not have a gas change function.) The full scale flow rate after switching to carbon dioxideHalf of the flow rate range. Analog output can also be selected as output.

Gas	Flow direction	Measurement flow rate range (xxx/min)							
		005	010	020	100	200	500	101	201
• Air • Nitrogen • Argon • Argon 80 % +Carbon dioxide 20%	Uni-direction	15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L
	Bi-direction	-500 to -15mL	-1000 to -30mL	-2.00 to -0.06L	-10.00 to -0.30L	-20.0 to -0.6L	-50.0 to -1.5L	-100.0 to -3.0L	-200 to -6L
		15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L
• Carbon dioxide	Uni-direction	15 to 250mL	30 to 500mL	0.06 to 1.00L	0.30 to 5.00L	0.6 to 10.0L	1.5 to 25.0L	3.0 to 50.0L	6 to 100L
	Bi-direction	-250 to -15mL	-500 to -30mL	-1.00 to -0.06L	-5.00 to -0.30L	-10.0 to -0.6L	-25.0 to -1.5L	-50.0 to -3.0L	-100 to -6L
		15 to 250mL	30 to 500mL	0.06 to 1.00L	0.30 to 5.00L	0.6 to 10.0L	1.5 to 25.0L	3.0 to 50.0L	6 to 100L

Gas	Flow direction	Analog output			
		Output A		Output B	
		Voltage	Current	Voltage	Current
• Carbon dioxide	Uni-direction	1 to 3 V	4 to 12mA	1 to 5 V	4 to 20mA
	Bi-direction	2 to 4 V	8 to 16mA	1 to 5 V	4 to 20mA

The "Setting copy function" setting is selected at "© Output specifications".

Note that the "External input" function is not available on models on which the "Setting copy function" is enabled.

*13: This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.

*14: This product measures changes in heat distribution that are caused by flow. If installed vertically, the heat distribution may change due to the effect of convection, and the zero point may be shifted.

*15: Accuracy may be affected by the piping conditions. For more accurate measurements, use a straight pipe with a ten-times greater internal diameter. With the 500 L/min and 1,000 L/min models, use piping with an internal diameter of 9 mm or more. If it is less than 9 mm, accuracy may be negatively affected.

How to order

FSM3 - L 005 U 2 AA 1 A 1 N - B M R - P80

Model No.

A Display

B Flow rate range
(Full scale flow rate)

C Flow direction

D Body material/applicable fluids

E Port size

F Piping direction

G Output specifications

H Unit specifications

I Valve
Option

J Lead wire

K Mounting attachment

L Included documents

M Clean
Specifications

[Example of model No.]

FSM3-L005U2AA1A1N-BMR-P80

Model: RAPIFLOW FSM3 Series

A Display L : Liquid crystal display

B Flow rate range 005 : 500mL/min

C Flow direction U : Uni-direction

D Body material/applicable fluids 2 : SUS/air

E Port size AA : Rc1/8

F Piping direction 1 : Straight

G Output specifications A : Analog voltage output X1,
NPN switch output X1, With
setting copy function

H Unit specifications 1 : SI units only

I Valve option N : No

J Lead wire B : 5 conductor 3 m

K Mounting attachment M : DIN rail mount

L Included documents R : inspection certificate

M Clean-room specifications P80 : Oil-prohibited

! Precautions for model No. selection

*1: During selection, always check the compatibility table on page 517.

*2: "3: Oxygen" cannot be selected with 500 L/min and 1000 L/min models.

*3: The G thread connection shape is ISO16030-compliant.

*4: G thread connection shape is JIS B 2351-10 type compliant.

*5: Models with the unit switching function are not sold in Japan.

*6: Optional parts will come with the product. They are not pre-assembled.
*7: The product surface is degreased and cleaned before packaging, and heat-sealed into an antistatic bag on a clean bench (Class 1000 or more).

*8: P70 specifications and gas-contact sections are degreased and cleaned.

*9: This cannot be selected on an oxygen type (blank only).

Code	Description
A Display	
L	Liquid crystal display

B Flow rate range (full scale flow rate)			
005	500mL/min	500	50L/min
010	1000mL/min	101	100L/min
020	2L/min	201	200L/min
050	5L/min	501	500L/min
100	10L/min	102	1000L/min
200	20L/min		

C Flow direction	
U	Uni-direction
B	Bi-direction

D Body material/applicable fluids		
	Body material	Applicable fluid
2	SUS	Air (gas switchable)
3	SUS	Oxygen (oil-prohibited specifications) *2

E Port size	
AA	Rc1/8
BA	Rc1/4
CA	Rc1/2
AF	G1/8
BF	G1/4
CF	G1/2
AB	G1/8
BB	G1/4
CB	G1/2
AC	NPT1/8
BC	NPT1/4
CC	NPT1/2
AD	1/4" double barbed fitting (50 L/min or less)
BD	1/4" double barbed fitting (50 to 200 L/min)
AE	1/4" JXR male fitting (50 L/min or less)
BE	1/4" JXR male fitting (50 to 200 L/min)

F Piping direction	
1	Straight

G Output specifications			
	Analog output	Switch output	Setting copy function
A	1 points	1 points (NPN)	Yes
B	(Voltage	2 points (NPN)	-
C	output)	1-point output (PNP)	Yes
D	1-5V	2-point output (PNP)	-
E	1 points	1 points (NPN)	Yes
F	Current output	2 points (NPN)	-
G	4 to 20mA	1-point output (PNP)	Yes
H		2-point output (PNP)	-

H Unit specifications	
1	SI units only
2	With unit change function (only for overseas) *5

I Valve option	
N	No

J Lead wire	
Blank	No
A	5 conductor 1 m
B	5 conductor 3 m

K Mounting attachment	
Blank	No
H	Bracket 1 (for models 200 L or less)
J	Bracket 2 (for 500 or 1000 L models)
K	Panel mounting (for sensor products of models 200 L or less)
M	DIN rail mounting (for models 200 L or less)

L Included documents	
Blank	No
R	inspection certificate
S	Company certification + Traceability certification

M Clean-room specifications	
Blank	No
P70	Anti-dust generation
P80	Oil-prohibited



Compact flow rate sensor (RAPIFLOW)

FSM3 Series

Bar display


●Stainless steel body (flow rate range: 500mL/min to 1000L/min)

P4 compliant
as standard

P4
Series



Bar display specifications

Item			FSM3-[A][B][C][D][E][F][G][H][I]-[]										
			[B]										
			005	010	020	050	100	200	500	101	201	501	102
Flow direction	[C]	U	Uni-direction										
		B	Bi-direction										
Measured flow rate range (□/min) *1	[B]	U	15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.15 to 5.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L	15 to 500L	30 to 1000L
		B	-500 to -15, 15 to 500mL	-1000 to -30, 30 to 1000mL	-2.00 to -0.06, 0.06 to 2.00L	-5.00 to -0.15, 0.15 to 5.00L	-10.00 to -0.30, 0.30 to 10.00L	-20.0 to -0.6, 0.6 to 20.0L	-50.0 to -1.5, 1.5 to 50.0L	-100.0 to -3.0, 3.0 to 100.0L	-200 to -6, 6 to 200L	-500 to -15, 15 to 500L	-1000 to -30, 30 to 1000L
Display			LED bar display										
Working conditions	Applicable fluids *2	Clean air (JIS B 8392-1:2012 1.1.1 to 5.6.2), compressed air (JIS B 8392-1:2012 1.1.1 to 1.6.2), nitrogen gas											
		Oxygen (When oxygen specification is selected,  Clean-room specifications cannot be selected. Specifications automatically become oil-prohibited specifications.)											-
	Temperature range	0 to 50°C (no condensation)											
	Pressure range	-0.09 to 1.00 MPa											-0.09 to 0.75MPa
	Proof pressure	1.5 MPa											
Operating ambient temperature/humidity			0 to 50°C, 90% RH or less										
Storage temperature			-10 to 60°C										
Accuracy	Accuracy *3	Within ±3% F.S. (Secondary side released to atmosphere) (The scope of warranty is in accordance with the “measured flow rate range.”)											
	Repeatability *4	Within ±1% F.S. (Secondary side released to atmosphere)											
	Temperature characteristics	Within ±0.2% F.S./°C (15 to 35°C, base temperature 25°C)											
	Pressure characteristics	Within ±5%F.S. (secondary side released to atmosphere reference)										Within ±5% F.S (0.35MPa reference)	
Response time *5			50 msec or less										
Analog output *6	[G]	J	1 to 5 V voltage output (connecting load impedance 50 kΩ or more)										
		K	4 to 20 mA current output (connecting load impedance 0 to 300 Ω)										
Power supply voltage *7	[G]	J	12 to 24 VDC (10.8 to 26.4 V) ripple rate 1% or less										
		K	24 VDC (21.6 to 26.4 V) ripple rate 1% or less										
Current consumption *8			45 mA or less										
Lead wire			ø3.7 AWG26 equivalent × 4-conductor (connector connection), insulator outer diameter ø1.0										
Degree of protection			IP40 or equivalent (IEC standard)										
Protection circuit *9			Power reverse connection protection										
Vibration resistance			10 to 150 Hz, max. 100m/s ² , X, Y, Z directions, every 2 hours										
EMC Directive			EN55011, EN61000-6-2, EN61000-4-2/3/4/6/8										
Mounting	Mounting orientation *10	Unrestricted in vertical/horizontal direction											
	Straight piping section *11	Not required											

Pneumatic actuator
Pneumatic cylinder
Hand/Chuck
Relaxed products
Cylinder Switch
Vacuum components
Pneumatic valves
Clean air components
Pneumatic auxiliary components
Speed controller
Fitting
Auxiliary valve
Silencer
Tube
Gas generator
Fluid control components
Electric actuator
Motor specification

Electric actuator		Fluid control components		Gas generator		Pneumatic auxiliary components					Pneumatic valves		Vacuum components		Pneumatic actuators			
Motorless specifications	Motor specification					Tube	Silencer	Auxiliary valve	Fitting	Speed controller	Clean air components				Cylinder Switch	Related products	Hand/Chuck	Pneumatic cylinders
<p>*1: The value converted to volumetric flow rate at standard condition (20°C 1 barometric pressure (101 kPa) 65% RH) (For gases other than air, 20°C, 1 barometric pressure (101 kPa), relative humidity 0%RH.</p> <p>*2: Use dry gas which does not contain corrosive elements such as chlorine, sulfur or acids, and which is clean and does not contain dust or oil mist. When using compressed air, use clean air that complies with JIS B 8392-1:2012 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oil oxides, foreign matter, etc.). To maintain the function of this product, filter and air dryer are provided on the primary side (upstream side) of this product.(Min. pressure dew point 10°C or less) and oil mist filter (max. oil content 0.1mg/m³) for use.</p> <p>The sensor for oxygen gas is a custom model. To prevent ignition accidents, do not allow oxygen to flow again when it has been used on fluids other than oxygen to flow even once.</p> <p>*3: Accuracy is based on a CKD standard flow rate meter. It does not indicate absolute accuracy. Repeatability, temperature characteristics, and pressure characteristics are not included for an accuracy of ± 3% F.S. Consider separately according to the working environment and working conditions.</p> <p>*4: Repeatability is calculated during a short period of time. Change over time is not included. (Refer to the product specifications for details.)</p> <p>*5: The actual response time changes depending on the piping conditions.</p> <p>*6:The output impedance of the analog output section is approx. 1 kΩ. If the impedance of the connecting load is small, output and error increase. Check error with the impedance of the connecting load before using.</p> <p>*7: The power supply voltage specifications differ for the voltage output type and current output type.</p> <p>*8: Current for when 24 VDC is connected, and no load is applied. Please note that the current consumption changes depending on the load connection status.</p> <p>*9: This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.</p> <p>*10: This product measures changes in heat distribution that are caused by flow. If installed vertically, the heat distribution may change due to the effect of convection, and the zero point may be shifted.</p> <p>*11:Accuracy may be affected by the piping conditions. For more accurate measurements, use a straight pipe with a ten-times greater internal diameter. With the 500 L/min and 1,000 L/min models, use piping with an internal diameter of 9 mm or more. If it is less than 9 mm, accuracy may be negatively affected.</p>																		

How to order

FSM3 - B 005 U 2 AA 1 J 1 N - D H S - P70

Model No.

A Display

B Flow rate range
(Full scale flow rate)

C Flow direction

D Body material/applicable fluids

E Port size

F Piping direction

G Output specifications

H Unit specifications

I Valve
Option

J Lead wire

K Mounting
attachment ment

L Included
documents

M Clean-room
specifications

Code		Description	
A Display			
B	Bar display		
B Flow rate range (full scale flow rate)			
005	500mL/min	500	50L/min
010	1000mL/min	101	100L/min
020	2L/min	201	200L/min
050	5L/min	501	500L/min
100	10L/min	102	1000L/min
200	20L/min		
C Flow direction			
U	Uni-direction		
B	Bi-direction		
D Body material/applicable fluids			
	Body material	Applicable fluid	
2	SUS	Air	
3	SUS	Oxygen (oil-prohibited specifications)*3	
E Port size			
AA	Rc1/8		
BA	Rc1/4		
CA	Rc1/2		
AF	G1/8		
BF	G1/4		
CF	G1/2		
AB	G1/8		
BB	G1/4		
CB	G1/2		
AC	NPT1/8		
BC	NPT1/4		
CC	NPT1/2		
AD	1/4" double barbed fitting (50 L/min or less)		
BD	1/4" double barbed fitting (50 to 200 L/min)		
AE	1/4" JXR male fitting (50 L/min or less)		
BE	1/4" JXR male fitting (50 to 200 L/min)		
F Piping direction			
1	Straight		
G Output specifications			
J	Analog voltage outputx 1 point		
K	Analog current outputx 1 point		
H Unit specifications			
1	SI units only		
I Valve option			
N	No		
J Lead wire			
Blank	No		
C	4 conductor 1 m		
D	4 conductor 3 m		
K Mounting attachment			
Blank	No		
H	Bracket 1 (for models 200 L or less)		
J	Bracket 2 (for 500 or 1000 L models)		
M	DIN rail mounting (for models 200 L or less)		
L Included documents			
Blank	No		
R	inspection certificate		
S	Company certification + traceability certificate		
M Clean-room specifications			
Blank	No		
P70	Anti-dust generation		
P80	Oil-prohibited		

[Example of model No.]

FSM3-B005U2AA1J1N-DHS-P70

Model: RAPIFLOW FSM3 Series

A Display B : Bar display

B Flow rate range 005 : 500mL/min

C Flow direction U : Uni-direction

D Body material/applicable fluids 2 : SUS/air

E Port size AA : Rc1/8

F Piping direction 1 : Straight

G Output specifications J : Analog voltage output X1

H Unit specifications 1 : SI units only

I Valve option N : No

J Lead wire D : 4 conductor 3 m

K Mounting attachment H : Bracket

L Included documents S : Company certification + traceability certificate

M Clean-room specifications P70 : Anti-dust generation

⚠ Precautions for model No. selection

*1: During selection, always check the compatibility table on page 517.

*2: When using in combination with a separated display (FSM2-D), select "J".

*3: "3: Oxygen" cannot be selected with 500 L/min and 1000 L/min models.

*4: The G thread connection shape is ISO16030-compliant.

*5: The G thread connection shape is JIS B 2351-1 O type-compliant.

*6: Optional parts are provided with the product. They are not pre-assembled.

*7: The product surface is degreased and cleaned before packaging, and heat-sealed into an antistatic bag on a clean bench (Class 1000 or more).

*8: P70 specifications and gas-contact sections are degreased and cleaned.

*9: This cannot be selected on an oxygen type (blank only).

P4
Series

Pneumatic actuator
Pneumatic cylinders
Hand/Chuck
Related products

Cylinder
Switch

Vacuum components

Pneumatic valves

Clean air
components

Pneumatic auxiliary components
Speed controller
Fitting
Auxiliary valve
Silencer
Tube

Gas generator

Fluid control components

Electric actuator
Motor
Specification



Pneumatic, Vacuum and Auxiliary Components
Catalog No. CB-024SA

Compact flow rate sensor (RAPIFLOW)

FSM3 Series

IO-Link

●Stainless steel body (flow rate range: 500mL/min to 1000L/min)

P4 compliant
as standard



IO-Link specifications

Item			FSM3-[A][B][C][D][E][F][G][H][I]-[]											
			[B]											
			005	010	020	050	100	200	500	101	201	501	102	
Flow direction	[C]	U	Uni-direction											
		B	Bi-direction											
Measured flow rate range (□/min) *1	[B]	U	15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.15 to 5.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L	15 to 500L	30 to 1000L	
		B	-500 to -15, 15 to 500mL	-1000 to -30, 30 to 1000mL	-2.00 to -0.06, 0.06 to 2.00L	-5.00 to -0.15, 0.15 to 5.00L	-10.00 to -0.30, 0.30 to 10.00L	-20.0 to -0.6, 0.6 to 20.0L	-50.0 to -1.5, 1.5 to 50.0L	-100.0 to -3.0, 3.0 to 100.0L	-200 to -6, 6 to 200L	-500 to -15, 15 to 500L	-1000 to -30, 30 to 1000L	
Display			LED display (power and status indicators)											
Working conditions			Applicable fluids *2	Clean air (JIS B 8392-1:2012 1.1.1 to 5.6.2), compressed air (JIS B 8392-1:2012 1.1.1 to 1.6.2), nitrogen gas										
				Argon, carbon dioxide, and gas mixture (argon + carbon dioxide)										-
				Oxygen (When oxygen specification is selected, ⓘ Clean-room specifications cannot be selected. Specifications automatically become oil-prohibited specifications.)										-
			Temperature range	0 to 50°C (no condensation)										
			Pressure range	-0.09 to 1.00 MPa										-0.09 to 0.75 MPa
			Proof pressure	1.5 MPa										
Operating ambient temperature/humidity			0 to 50°C, 90% RH or less											
Storage temperature			-10 to 60°C											
Accuracy *3			Accuracy *4	Within ±3% F.S. (Secondary side released to atmosphere) (The scope of warranty is in accordance with the “measured flow rate range.”)										
			Repeatability *5	Within ±1% F.S. (Secondary side released to atmosphere)										
			Temperature characteristics	Within ±0.2% F.S./°C (15 to 35°C, base temperature 25°C)										
			Pressure characteristics	Within ±5%F.S. (secondary side released to atmosphere reference)								Within ±5% F.S (0.35MPa reference)		
Response time *6			50 msec or less											
Power supply voltage			18 to 30 VDC (ripple rate 1% or less)											
Current consumption *7			45 mA or less											
Lead wire *8			M12 both-end connector lead wire (3 m), AWG23 or equivalent, 4-conductor											
Functions *10			①Gas switching, ②Flow rate integration, ③Peak hold, etc.											
Degree of protection			IP40 or equivalent (IEC standard)											
Protection circuit *11			Power reverse connection protection											
Vibration resistance *12			10 to 150 Hz, max. 100m/s ² , X, Y, Z directions, every 2 hours											
EMC Directive			EN55011, EN61000-6-2, EN61000-4-2/3/4/6/8											
Mounting	Mounting orientation *13	Unrestricted in vertical/horizontal direction												
	Straight piping installation section *14	Not required												

*1: The value converted to volumetric flow rate at standard condition (20°C 1 barometric pressure (101 kPa) 65%).

(For gases other than air, 20°C, 1 barometric pressure (101 kPa), 0%RH.

*2: Use dry gas which does not contain corrosive elements such as chlorine, sulfur or acids, and which is clean and does not contain dust or oil mist. When using compressed air, use clean air that complies with JIS B 8392-1:2012 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oil oxides, foreign matter, etc.). To maintain the function of this product, filter and air dryer are provided on the primary side (upstream side) of this product. (Min. pressure dew point 10°C or less) and oil mist filter (max. oil content 0.1mg/m³) for use.

The sensor for oxygen gas is a custom model. To prevent ignition accidents, do not allow oxygen to flow again when it has been used on fluids other than oxygen to flow even once.

*3: Compressed air is used for adjusting and inspecting this product. Accuracy for gas types other than air is a guideline.

*4: Accuracy is based on a CKD standard flow rate meter. It does not indicate absolute accuracy. Repeatability, temperature characteristics, and pressure characteristics are not included for an accuracy of ± 3% F.S. Consider separately according to the working environment and working conditions.

*5: Repeatability is calculated during a short period of time. Change over time is not included. (Refer to the product specifications for details.)

*6: The actual response time changes depending on the piping conditions.

*7: Current for when 24 VDC is connected, and no load is applied. Please note that the current consumption changes depending on the load connection status.

*8: The male end is straight, and the female end is angled. Tighten the M12 connector with a torque of 0.5 N·m or lower. Tightening with excessive force may lead to damage.

*9: The gas type switching function enables switching to argon, carbon dioxide and a gas mixture of argon 80% + carbon dioxide 20%. The measurement flow rate ranges after switching are as follows. (Note that the gas type cannot be changed with the oxygen, 500 L/min, and 1000 L/min models.)

Gas	Flow direction	Measurement flow rate range (xxx/min)							
		005	010	020	100	200	500	101	201
• Air • Nitrogen • Argon • Argon 80% + Carbon dioxide 20%	Uni-direction	15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L
	Bi-direction	-500 to -15mL	-1000 to -30mL	-2.00 to -0.06L	-10.00 to -0.30L	-20.0 to -0.6L	-50.0 to -1.5L	-100.0 to -3.0L	-200 to -6L
• Carbon dioxide	Uni-direction	15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L
		15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L
	Bi-direction	-250 to -15mL	-500 to -30mL	-1.00 to -0.06L	-5.00 to -0.30L	-10.0 to -0.6L	-25.0 to -1.5L	-50.0 to -3.0L	-100 to -6L
	Uni-direction	15 to 250mL	30 to 500mL	0.06 to 1.00L	0.30 to 5.00L	0.6 to 10.0L	1.5 to 25.0L	3.0 to 50.0L	6 to 100L
	Bi-direction	-250 to -15mL	-500 to -30mL	-1.00 to -0.06L	-5.00 to -0.30L	-10.0 to -0.6L	-25.0 to -1.5L	-50.0 to -3.0L	-100 to -6L
		15 to 250mL	30 to 500mL	0.06 to 1.00L	0.30 to 5.00L	0.6 to 10.0L	1.5 to 25.0L	3.0 to 50.0L	6 to 100L

*10: The accumulated flow is a calculated (reference) value. When using the integrated save function, take care to prevent the number of saves from exceeding the access count limit of the storage device (1 million times). (Changes to the settings are counted in number of accesses.)

$$\text{Number of saves} = \frac{\text{Usage time}}{5 \text{ mins}} < 1 \text{ million times}$$

When instantaneous flow rate is below 1% it is not counted as integrating flow.

*11: This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.

*12: A communication error might occur depending on the vibration conditions. Install this product in a place not subject to vibration.

*13: This product measures changes in heat distribution that are caused by flow. If installed vertically, the heat distribution may change due to the effect of convection, and the zero point may be shifted.

*14: Accuracy may be affected by the piping conditions. For more accurate measurements, use a straight pipe with a ten-times greater internal diameter. With the 500 L/min and 1,000 L/min models, use piping with an internal diameter of 9 mm or more. If it is less than 9 mm, accuracy may be negatively affected.

How to order

FSM3 - C 005 U 2 AA 1 L 1 N - G H R - P70

Model No.

B Flow rate range
(Full scale flow rate)

A Display

C Flow direction

D Body material/applicable fluids

E Port size

F Piping direction

G Output specifications

H Unit specifications

I Valve option

J Lead wire

K Mounting attachment

L Included documents

M Clean-room specifications

Code	Description
A Display	
C	IO-Link

B Flow rate range (full scale flow rate)			
005	500mL/min	500	50L/min
010	1000mL/min	101	100L/min
020	2L/min	201	200L/min
050	5L/min	501	500L/min
100	10L/min	102	1000L/min
200	20L/min		

C Flow direction	
U	Uni-direction
B	Bi-direction

D Body material/applicable fluids		
	Body material	Applicable fluid
2	SUS	Air (gas switchable)
3	SUS	Oxygen (oil-prohibited specifications)*2

E Port size	
AA	Rc1/8
BA	Rc1/4
CA	Rc1/2
AF	G1/8
BF	G1/4
CF	G1/2
AB	G1/8
BB	G1/4
CB	G1/2
AC	NPT1/8
BC	NPT1/4
CC	NPT1/2
AD	1/4" double barbed fitting (50 L/min or less)
BD	1/4" double barbed fitting (50 to 200 L/min)
AE	1/4" JXR male fitting (50 L/min or less)
BE	1/4" JXR male fitting (50 to 200 L/min)

F Piping direction	
1	Straight

G Output specifications	
L	IO-Link communication

H Unit specifications	
1	SI units only

I Valve option	
N	No

J Lead wire	
Blank	No
G	M12 both-end lead wire with connector (3 m)

K Mounting attachment	
Blank	No
H	Bracket 1 (for models 200 L or less)
J	Bracket 2 (for 500 or 1000 L models)
M	DIN rail mounting (for models 200 L or less)

L Included documents	
Blank	No
R	inspection certificate
S	Company certification + traceability certificate

M Clean-room specifications	
Blank	No
P70	Anti-dust generation
P80	Oil-prohibited

[Example of model No.]

FSM3-C005U2AA1L1N-GHR-P70

Model: RAPIFLOW FSM3 Series

- A** Display C : IO-Link
- B** Flow rate range 005 : 500mL/min
- C** Flow direction U : Uni-direction
- D** Body material/applicable fluids 2 : SUS/air
- E** Port size AA : Rc1/8
- F** Piping direction 1 : Straight
- G** Output specifications L : IO-Link
- H** Unit specifications 1 : SI units only
- I** Valve option N : No
- J** Lead wire G : M12 both-end lead wire with connector (3 m)
- K** Mounting attachment H : Bracket
- L** Included documents R : inspection certificate
- M** Clean-room specifications P70 : Anti-dust generation

⚠ Precautions for model No. selection

- *1: During selection, always check the compatibility table on page 517.
- *2: "3: Oxygen" cannot be selected with 500 L/min and 1000L/min models.
- *3: The G thread connection shape is ISO16030-compliant.
- *4: The G thread connection shape is JIS B 2351-1 O type-compliant.
- *5: Optional parts will come with the product. They are not pre-assembled.
- *6: The product surface is degreased and cleaned before packaging, and heat-sealed into an antistatic bag on a clean bench (Class 1000 or more).
- *7: P70 specifications and gas-contact sections are degreased and cleaned.
- *8: This cannot be selected on an oxygen type (blank only).

Flow rate range and port size

		E Port size													
		AA	BA	CA	AF	BF	CF	AB	BB	CB	AC	BC	CC	AD	BD
		Rc1/8	Rc1/4	Rc1/2	G1/8	G1/4	G1/2	G1/8	G1/4	G1/2	NPT1/8	NPT1/4	NPT1/2	1/4" Double barbed fitting	1/4" JXR male fitting
B Flow rate range	005	●			●			●			●			●	
	010	●			●			●			●			●	
	020	●			●			●			●			●	
	050	●			●			●			●			●	
	100	●			●			●			●			●	
	200	●			●			●			●			●	
	500	●	●		●	●		●	●		●	●		●	●
	101		●			●			●			●			●
	201		●			●			●			●			●
	501			●			●			●			●		
	102			●			●			●			●		

Discrete option model No. method

FSM3 - K - P70

A Option

B Clean-room specifications

Code	Description
A Option	
A	5-conductor lead wire 1 m (for LCD display)
B	5-conductor lead wire 3 m (for LCD display)
C	4-conductor lead wire 1 m (for bar display)
D	4-conductor lead wire 3 m (for bar display)
G	M12 both-end lead wire with connector (3 m) (for IO-Link)
H	Bracket 1 (for models with a flow rate range below 200 L/min)
J	Bracket 2 (for models with a flow rate range of 500 L/min or 1000 L/min)
K	Panel mounting kit 1 (for sensor unit models with a flow rate range below 200 L/min)
M	DIN rail mountKit (for models with a flow rate range below 200L/min)
B Clean-room specifications	
Blank	No
P70	Anti-dust generation (FSM3-G-P70 cannot be selected.)

P4
Series

Pneumatic actuator
Pneumatic cylinders
Hand/Chuck
Related products
Cylinder Switch

Vacuum components
Pneumatic valves

Pneumatic auxiliary components
Clean air components
Speed controller
Fitting
Auxiliary valve
Silencer
Tube

Gas generator

Fluid control components

Electric actuator
Motor specification
Motorless specifications