



Small size flow controller

FCM Series

- Air, nitrogen, argon, oxygen, city gas, methane, propane (flow rate range: 0.5 to 100 ℓ/min.)
- Hydrogen, helium (flow rate range: 0 to 20 ℓ/min.)

RoHS

■ FCM Series for air, nitrogen, argon, oxygen, city gas, methane, propane

Specifications

Descriptions				FCM- (*1) (*2) - (*3) (*4) (*5)							
Valve drive method				Proportional solenoid valve			When not energized: Closed				
				Flow range	Al (air, nitrogen)	AR (argon)	O2 (oxygen)	LN (city gas)	C1 (methane)	C3 (propane)	
Full scale flow Note 1	* 1	Standard model	9500	0 to 500m ℓ/min.	●	●	●	●	●	●	
			0001	0 to 1 ℓ/min.	●	●	●	●	●	●	
			0002	0 to 2 ℓ/min.	●	●	●	●	●	●	
			0005	0 to 5 ℓ/min.	●	●	●	●	●	●	
			0010	0 to 10 ℓ/min.	●	●	●	●	●	●	
			0020	0 to 20 ℓ/min.	●	●					
			0050	0 to 50 ℓ/min.	●	●					
			0100	0 to 100 ℓ/min. (only resin)	●						
	Low pressure differential model (Only stainless steel)	L9500	0 to 500m ℓ/min.	●		●	●	●	●		
		L0001	0 to 1 ℓ/min.	●		●	●	●	●		
		L0002	0 to 2 ℓ/min.	●		●	●	●	●		
L0005		0 to 5 ℓ/min.	●		●	●	●	●			
L0010		0 to 10 ℓ/min.	●		●	●	●	●			
Applicable fluids Note 2	* 2	Al	Compressed air, nitrogen	●							
		AR	Argon		●						
		O2	Oxygen (oil-prohibited specifications)			●					
		LN	City gas (13A) Note 3				●				
		C1	Methane (CH4 100%)					●			
		C3	Propane (C3H8 100%)						●		
Port size/ Body material	* 3	H6	φ 6 push-in, resin (excluding 50, 100 ℓ/min)	●							
		H8	φ 8 push-in, resin	●							
		8A	Rc1/4, stainless steel	●	●	●	●	●	●		
		UF	9/16-18UNF, stainless steel	●	●	●	●	●	●		
Control	Control range			3 to 100%F.S.							
	Responsiveness	* 1	9500 to 0020, L9500 to L0010	Within 0.5sec. at setting ±5%F.S. (TYP)							
			0050 to 0100	Within 1sec. at setting ±5%F.S. (TYP)							
	Precision			±3%F.S. or less							
	Repeatability			±1%F.S. or less							
	Temperature characteristics			±0.1%F.S./℃ or less (25℃ reference)							
	Pressure characteristics			±1%F.S. or less per 98kPa (standard differential pressure reference)							
Pressure	Standard differential pressure Note 4			Refer to the separate table							
	Operating differential pressure range Note 5			Refer to the separate table							
	Withstanding pressure	* 3	H6/H8 (resin body)	490kPa							
			8A/UF (SUS body)	980kPa							
Ambient temperature / humidity				0 to 50℃, 90%RH or less (no dew)							
I/O	Input signal/ pre-set input	* 4	0	0 to 10 VDC (6.7 Ω) / 4 points (2 bit)							
			1	0 to 5 VDC (10 Ω) / 4 points (2 bit)							
			2	4 to 20 VDC (250 Ω) / 4 points (2 bit)							
			P	Parallel 10bit / None							
	Output signal	* 5	AN	Analog output: 1-5V (connected load impedance 500k Ω and over) Error output: NPN open collector output, 50mA or less, voltage drop 2.4V or less							
			AP	Analog output: 1-5V (connected load impedance 500k Ω and over) Error output: PNP open collector output, 50mA or less, voltage drop 2.4V or less							
			SN	Switch output: NPN open collector output, 50mA or less, voltage drop 2.4V or less Error output: NPN open collector output, 50mA or less, voltage drop 2.4V or less							
			SP	Switch output: PNP open collector output, 50mA or less, voltage drop 2.4V or less Error output: PNP open collector output, 50mA or less, voltage drop 2.4V or less							
				3-digit 7-segment LED, Display precision: control precision ±1 digit							
Flow display	Display method			3-digit 7-segment LED, Display precision: control precision ±1 digit							
	Display range, display resolution			Refer to the separate table							
Function of integration				Refer to the separate table							
Power supply	Power voltage			24 VDC ±10% (safety power supply with ripple ratio 2% or less)							
	Current consumption			250mA or less							
Installation attitude				Free							
Wet area material	* 3	H6/H8 (resin body)	Polyamide resin, fluoro rubber, stainless steel, alumina, silicone, solder								
		8A/UF (SUS body)	Stainless steel, fluoro rubber, alumina, silicone, solder								
Weight	* 3	H6/H8 (resin body)	Approx. 200g								
		8A/UF (SUS body)	Approx. 480g								
Protective structure				IEC standards IP40							
Protective circuit				Note 6	Power supply reverse connection prevention, switch output reverse connection prevention, switch output load short-circuit protection						
EMC directive					EN55011, EN61000-6-2, EN61000-4-2/3/4/6/8						

Pressure

Standard differential pressure / operating differential pressure Note 4, 5

(Standard model)

			Flow rate range *1							
			9500	0001	0002	0005	0010	0020	0050	0100
Applicable fluids *2	AI	Standard differential pressure (kPa)	50	100	100	100	100	150	200	300
		Operating differential pressure (kPa)	20 to 150	50 to 200	50 to 250	50 to 250	50 to 250	100 to 300	150 to 300	250 to 350
	AR	Standard differential pressure (kPa)	50	100	100	100	100	150	200	
		Operating differential pressure (kPa)	20 to 150	50 to 200	50 to 250	50 to 250	50 to 250	100 to 300	150 to 300	
	O2	Standard differential pressure (kPa)	50	100	100	100	100			
		Operating differential pressure (kPa)	20 to 150	50 to 200	50 to 250	50 to 250	50 to 250			
	LN/C1	Standard differential pressure (kPa)	50	50	50	50	50			
		Operating differential pressure (kPa)	20 to 150	20 to 150	20 to 150	20 to 150	30 to 150			
	C3	Standard differential pressure (kPa)	50	50	50	50	50			
		Operating differential pressure (kPa)	20 to 150	20 to 150	20 to 150	20 to 150	30 to 150			

(Low pressure differential model)

			Flow rate range *1				
			L9500	L0001	L0002	L0005	L0010
Applicable fluids *2	AI/O2 LN/C1	Standard differential pressure (kPa)	20	20	20	20	20
		Operating differential pressure (kPa)	5 to 50	5 to 50	5 to 50	5 to 50	10 to 50
	C3	Standard differential pressure (kPa)	20	20	20	20	20
		Operating differential pressure (kPa)	5 to 50	5 to 50	5 to 50	5 to 50	10 to 50

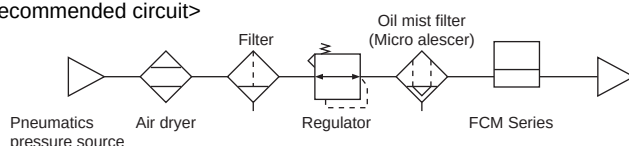
Display/integration

		Flow rate range *1							
		9500 L9500	0001 L0001	0002 L0002	0005 L0005	0010 L0010	0020	0050	0100
Flow display	Display range	0 to 500m ℓ/min.	0.00 to 1.00 ℓ/min.	0.00 to 2.00 ℓ/min.	0.00 to 5.00 ℓ/min.	0.0 to 10.0 ℓ/min.	0.0 to 20.0 ℓ/min.	0.0 to 50.0 ℓ/min.	0 to 100 ℓ/min.
	Display resolution	1mℓ/min	0.01ℓ/min	0.01ℓ/min	0.01ℓ/min	0.1ℓ/min	0.1ℓ/min	0.1ℓ/min	1ℓ/min
Function of integration	Display range	999999m ℓ	9999.99 ℓ	9999.99 ℓ	9999.99 ℓ	99999.9 ℓ	99999.9 ℓ	99999.9 ℓ	999999 ℓ
	Display resolution	1mℓ	0.01ℓ	0.01ℓ	0.01ℓ	0.1ℓ	0.1ℓ	0.1ℓ	1ℓ
	Pulse output rate	5mℓ	0.01ℓ	0.02ℓ	0.05ℓ	0.1ℓ	0.2ℓ	0.5ℓ	1ℓ

Note 1: Converted to volumetric flow at 20°C 1 barometric pressure (101kPa)

Note 2: When using compressed air, use clean air that complies to JIS B 8392-1:2003 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oxidized oil, foreign matter, etc.). Install a filter (filtration: 5 μm), air dryer (minimum pressure dew point: 10 °C or less), and oil mist filter (maximum oil concentration: 0.1 mg/m³) on the primary side of this product to maintain product functions.

<Recommended circuit>



<Recommended component>

Air filter: F Series

Oil mist filter: M Series

When using for other than compressed air, use dry gas that does not contain corrosive elements such as chlorine, sulfur, or acids, and clean gas that does not contain dust or oil mist.

Note 3: City gas 13 A is for methane (CH₄) 88% gas generated from LNG.

Note 4: The standard differential pressure is the differential pressure when this product is calibrated.

Note 5: The operating differential pressure is the differential pressure required to operate this product normally. Contact CKD when using this product at a level exceeding the operating differential pressure.

Note 6: This product's protective circuit is effective only for specific incorrect connections and load short-circuits. It does not necessarily provide protection for all incorrect connections.

Refrigerating type dryer
Desiccant type dryer
High polymer membrane dryer
Air filter
Auto. drain / others
F.R.L. (Module unit)
F.R.L. (Separate)
Compact F.R.
Precise regulator
F.R.L. (Related products)
Clean F.R.
Electro pneumatic regulator
Air booster
Speed control valve
Silencer
Check valve / others
Joint / tube
Vacuum filter
Vacuum regulator
Suction plate
Magnetic spring buffer
Mechanical pressure SW
Electronic pressure SW
Contact / close contact conf. SW
Air sensor
Pressure SW for coolant
Small flow sensor
Small flow controller
Flow sensor for air
Flow sensor for water
Total air system
Total air system (Gamma)
Ending

Small size flow controller

FCM Series for hydrogen, helium

Specifications

Specifications				FCM- (*1) (*2) - (*3) (*4) (*5)	
Descriptions				Proportional solenoid valve When not energized: Closed	
Valve drive method				Flow range	
				H2 (hydrogen)	HE (helium)
Full scale flow Note 1	* 1	0002	0 to 2 ℓ/min.	●	●
		0005	0 to 5 ℓ/min.	●	●
		0010	0 to 10 ℓ/min.	●	●
		0020	0 to 20 ℓ/min.	●	●
Applicable fluids	* 2	H2	Hydrogen	●	
		HE	Helium		●
Port size	* 3	8A	Rc1/4	●	●
		UF	9/16-18UNF	●	●
		4S	1/4 inch double barbed joint	●	●
		4RM	1/4 inch JXR male joint	●	●
Control	Control range			3 to 100%F.S.	
	Responsiveness		* 1	Within 0.5sec. at setting ±5%F.S. (TYP)	
	Precision			±3%F.S. or less	
	Repeatability			±1%F.S. or less	
	Temperature characteristics			±0.2%F.S./°C or less (25°C reference)	
Pressure	Pressure characteristics			±1%F.S. or less per 98kPa (standard differential pressure reference)	
	Standard differential pressure		Note 2	Refer to the separate table	
	Operating differential pressure range		Note 3	Refer to the separate table	
	Withstanding pressure			980kPa	
Ambient temperature / humidity				0 to 50°C, 90%RH or less (no dew)	
External leakage				1 x 10 ⁻⁶ Pa/m ³ /s or less (helium leak rate)	
I/O	Input signal/ pre-set input	* 4	0	0 to 10 VDC (6.7 Ω) / 4 points (2 bit)	
			1	0 to 5 VDC (10 Ω) / 4 points (2 bit)	
			2	4 to 20 VDC (250 Ω) / 4 points (2 bit)	
			P	Parallel 10bit / None	
	Output signal	* 5	AN	Analog output: 1-5V (connected load impedance 500kΩ and over) Error output: NPN open collector output, 50mA or less, voltage drop 2.4V or less	
			AP	Analog output: 1-5V (connected load impedance 500kΩ and over) Error output: PNP open collector output, 50mA or less, voltage drop 2.4V or less	
			SN	Switch output: NPN open collector output, 50mA or less, voltage drop 2.4V or less Error output: PNP open collector output, 50mA or less voltage drop 2.4V or less	
			SP	Switch output: PNP open collector output, 50mA or less, voltage drop 2.4V or less Error output: PNP open collector output, 50mA or less, voltage drop 2.4V or less	
Flow display	Display method			3-digit 7-segment LED, display system: control precision ±1 digit	
	Display range, display resolution			Refer to the separate table	
Function of integration				Refer to the separate table	
Power supply	Power voltage			24 VDC ±10% (safety power supply with ripple ratio 1% or less)	
	Current consumption			270mA or less	
Installation attitude				Free	
Wet area material				Stainless steel, fluoro rubber, alumina, silicone, solder	
Weight		* 3	8A/UF	Approx. 480g	
			4S/4RM	Approx. 560g	
Protective structure				IEC standards IP40	
Protective circuit				Note 4	Power supply reverse connection prevention, switch output reverse connection prevention, switch output load short-circuit protection
EMC directive				EN55011, EN61000-6-2, EN61000-4-2/3/4/6/8	

Pressure

Standard differential pressure / operating differential pressure

			Flow rate range *1			
			0002	0005	0010	0020
Applicable fluids *2	H2	Standard differential pressure (kPa)	20	50	50	50
		Operating differential pressure (kPa)	10 to 50	30 to 80	30 to 80	30 to 80
	HE	Standard differential pressure (kPa)	50	100	100	100
		Operating differential pressure (kPa)	20 to 100	50 to 150	50 to 150	50 to 150

Display/integration

			Flow rate range *1			
			0002	0005	0010	0020
Flow display	Display range		0.00 to 2.00 ℓ /min.	0.00 to 5.00 ℓ /min.	0.0 to 10.0 ℓ/min.	0.0 to 20.0 ℓ/min.
	Display resolution		0.01 ℓ/min	0.01 ℓ/min	0.1 ℓ/min	0.1 ℓ/min
Function of integration	Display range		9999.99 ℓ	9999.99 ℓ	99999.9 ℓ	99999.9 ℓ
	Display resolution		0.01 ℓ	0.01 ℓ	0.1 ℓ	0.1 ℓ
	Pulse output rate		0.02 ℓ	0.05 ℓ	0.1 ℓ	0.2 ℓ

Note 1: Converted to volumetric flow at 20°C 1 barometric pressure (101kPa)

Note 2: The standard differential pressure is the differential pressure when this product is calibrated.

Note 3: The operating differential pressure is the differential pressure required to operate this product normally.

Note 4: This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.

Refrigerating type dryer
Desiccant type dryer
High polymer membrane dryer
Air filter
Auto. drain / others
F.R.L. (Module unit)
F.R.L. (Separate)
Compact F.R.
Precise regulator
F.R.L. (Related products)
Clean F.R.
Electro pneumatic regulator
Air booster
Speed control valve
Silencer
Check valve / others
Joint / tube
Vacuum filter
Vacuum regulator
Suction plate
Magnetic spring buffer
Mechanical pressure SW
Electronic pressure SW
Contact / close contact conf. SW
Air sensor
Pressure SW for coolant
Small flow sensor
Small flow controller
Flow sensor for air
Flow sensor for water
Total air system
Total air system (Gamma)

Ending

Small size flow controller

FCM Series for air, nitrogen, argon, oxygen, city gas, methane, propane

How to order

FCM - 9500 AI - H6 0 AN R 1 B T

Model no. Traceability Bracket

Flow rate range

Working fluid

Port, body material

Input specifications

Output specifications

Display direction

Cable

<Example of model number>

FCM-0001AI-H81ANR1BK

Model: Small size flow controller FCM

- Flow rate range : 0 to 1ℓ/min.
- Working fluid : Compressed air, nitrogen
- Port/body material : Push-in (φ8), resin body
- Input specifications : Analog 0-5 VDC
- Output specifications : 1-5V analog, error (NPN)
- Display direction : Reverse direction
- Cable : 1m
- Bracket : With bracket
- Traceability : With inspection results

Note on model no. selection

Note 1: Refer to the dimensions on page 1348 for the 9/16-18UNF screw shape.

Discrete option model no.

FCM - AC1

Symbol	Descriptions
AC1	Analog 9-conductor, cable 1 m
AC3	Analog 9-conductor, cable 3 m
PC1	Parallel 15-conductor, cable 1 m
PC3	Parallel 15-conductor, cable 3 m
LB1	Bracket

Symbol	Descriptions						
A Flow rate range							
Working fluid		AI	AR	O2	LN	C1	C3
9500	Standard model	0 to 0.5 ℓ/min.	●	●	●	●	●
0001		0 to 1 ℓ/min.	●	●	●	●	●
0002		0 to 2 ℓ/min.	●	●	●	●	●
0005		0 to 5 ℓ/min.	●	●	●	●	●
0010		0 to 10 ℓ/min.	●	●	●	●	●
0020		0 to 20 ℓ/min.	●	●			
0050		0 to 50 ℓ/min.	●	●			
0100		0 to 100 ℓ/min. (only resin body)	●				
L9500	Low pressure differential model (Only stainless steel)	0 to 0.5 ℓ/min.	●		●	●	●
L0001		0 to 1 ℓ/min.	●		●	●	●
L0002		0 to 2 ℓ/min.	●		●	●	●
L0005		0 to 5 ℓ/min.	●		●	●	●
L0010		0 to 10 ℓ/min.	●		●	●	●

Working fluid	
AI	Compressed air, nitrogen gas
AR	Argon
O2	Oxygen (oil-prohibited specifications)
LN	City gas (13A)
C1	Methane (CH4)
C3	Propane (C3H8)

Port, body material	
Working fluid	
AI	AR O2 LN C1 C3
H6	Push-in (φ6), resin body (Excluding flow rate range: 0050, 0100)
H8	Push-in (φ8), resin body
8A	Rc1/4, stainless steel body
UF Note 1	9/16-18 UNF, stainless steel body

Input specifications	
0	Analog 0-10 VDC
1	Analog 0-5 VDC
2	Analog 4-20mADC
P	Parallel 10bit

Output specifications	
AN	1-5V analog error (NPN)
AP	1-5V analog error (PNP)
SN	Switch (NPN), error (NPN)
SP	Switch (PNP), error (PNP)

Display direction	
Blank	Positive direction
R	Reverse direction

Cable	
Blank	None
1	1m
3	3m

Bracket	
Blank	None
B	With bracket

Traceability	
Blank	None
T	Traceability Certificate, system diagram, inspection results included
K	Inspection results included

■ For hydrogen, helium

How to order

FCM - 0002 H2 - 8A 0 AN R 1 B T

Model no.

① Traceability
⑧ Bracket

① Flow rate range

② Working fluid

③ Port

④ Input specifications

⑤ Output specifications

⑥ Display direction

⑦ Cable

Symbol	Descriptions		
A Flow rate range			
Working fluid		H2	HE
0002	0 to 2 ℓ/min.	●	●
0005	0 to 5 ℓ/min.	●	●
0010	0 to 10 ℓ/min.	●	●
0020	0 to 20 ℓ/min.	●	●
B Working fluid			
H2	Hydrogen		
HE	Helium		
C Port			
Working fluid		H2	HE
8A	Rc1/4	●	●
UF	9/16-18UNF	●	●
4S	1/4 inch double barbed joint	●	●
4RM	1/4 inch JXR male joint	●	●
D Input specifications			
0	Analog 0-10 VDC		
1	Analog 0-5 VDC		
2	Analog 4-20mADC		
P	Parallel 10bit		
E Output specifications			
AN	1-5V analog error (NPN)		
AP	1-5V analog error (PNP)		
SN	Switch (NPN), error (NPN)		
SP	Switch (PNP), error (PNP)		
F Display direction			
Blank	Positive direction		
R	Reverse direction		
G Cable			
Blank	None		
1	1m		
3	3m		
H Bracket			
Blank	None		
B	With bracket		
I Traceability			
Blank	None		
T	Traceability Certificate, system diagram, inspection results included		
K	Inspection results included		

<Example of model number>

FCM-0002H2-8A1ANR1BK

- ① Flow rate range : 0 to 2 ℓ/min.
- ② Working fluid : Hydrogen
- ③ Port : Rc1/4
- ④ Input specifications : Analog 0-5 VDC
- ⑤ Output specifications : 1-5V analog, error (NPN)
- ⑥ Display direction : Reverse direction
- ⑦ Cable : 1m
- ⑧ Bracket : With bracket
- ⑨ Traceability : With inspection results

Discrete option model no.

FCM - AC1

Symbol	Descriptions
AC1	Analog 9-conductor, cable 1 m
AC3	Analog 9-conductor, cable 3 m
PC1	Parallel 15-conductor, cable 1 m
PC3	Parallel 15-conductor, cable 3 m
LB1	Bracket

Refrigerating type dryer
Desiccant type dryer
High polymer membrane dryer
Air filter
Auto. drain / others
F.R.L. (Module unit)
F.R.L. (Separate)
Compact F.R.
Precise regulator
F.R.L. (Related products)
Clean F.R.
Electro pneumatic regulator
Air booster
Speed control valve
Silencer
Check valve / others
Joint / tube
Vacuum filter
Vacuum regulator
Suction plate
Magnetic spring buffer
Mechanical pressure SW
Electronic pressure SW
Contact / close contact conf. SW
Air sensor
Pressure SW for coolant
Small flow sensor
Small flow controller
Flow sensor for air
Flow sensor for water
Total air system
Total air system (Gamma)

Ending

Small size flow controller