Compact flow rate controller
RAPIFLOW

FCM Series

- For 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 CAD

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

Specifications

1 MPa = 10 bar

Descriptions					FCM-[*1] [*2]-[*3] [*4] [*5]						
Valve drive method					Proportional solenoid valve When not energized: Closed						
					Full scale flow rate	AI (Air, nitrogen)	AR (Argon)	O2 (Oxygen)	LN (City gas)	C1 (Methane)	C3 (Propane)
Flow rate range Note 1	*1	Standard model	9500		500 mℓ/min	●	●	●	●	●	●
			0001		1 ℓ/min	●	●	●	●	●	●
			0002		2 ℓ/min	●	●	●	●	●	●
			0005		5 ℓ/min	●	●	●	●	●	●
			0010		10 ℓ/min	●	●	●	●	●	●
			0020		20 ℓ/min	●	●				
			0050		50 ℓ/min	●	●				
			0100		100 ℓ/min (resin)	●					
		Low diff press model (SS)	L9500		500 mℓ/min	●		●	●	●	●
			L0001		1 ℓ/min	●		●	●	●	●
			L0002		2 ℓ/min	●		●	●	●	●
			L0005		5 ℓ/min	●		●	●	●	●
			L0010		10 ℓ/min	●		●	●	●	●
Applicable fluids Note 2	*2		AI		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		φ6 push-in, resin (excluding 50, 100 ℓ/min)	●					
			H8		φ8 push-in, resin	●					
			8A		Rc 1/4, stainless steel	●	●	●	●	●	●
			UF		9/16-18UNF, stainless steel	●	●	●	●	●	●
Control	Guaranteed accuracy range					3 to 100% F.S.					
	Response time	*1			9500 to 0020,L9500 to L0010	Within 0.5 sec. to setting ±5% F.S. (TYP.)					
					0050 to 0100	Within 1 sec. to setting ±5% F.S. (TYP.)					
	Accuracy					Within ±3% F.S.					
	Repeatability					Within ±1% F.S.					
	Temperature characteristics					Within ±0.2% F.S./°C (25°C (77°F) reference)					
	Pressure characteristics					Within ±1% F.S. per 98 kPa (≈14 psi) (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					
	Max. working pressure Note 5					Refer to the separate table					
	Proof pressure	*3			H6/H8 (Resin body)	490 kPa (≈71 psi, 4.9 bar)					
					8A/UF (SUS body)	980 kPa (≈140 psi, 9.8 bar)					
Operating ambient temperature, humidity						0 (32°F) to 50°C (122°F), 90% RH or less (no condensation)					
I/O	Input signal/ Preset input	*4			0	0 to 10 VDC (6.7 kΩ) / 4 points (2 bit)					
					1	0 to 5 VDC (10 kΩ) / 4 points (2 bit)					
					2	4 to 20 mADC (250 Ω) / 4 points (2 bit)					
					P	Parallel 10 bit/none					
	Output signal	*5			AN	Analog output: 1 to 5 V (connecting load impedance 500 kΩ and over) Error output: NPN open collector output, 50 mA or less, voltage drop 2.4 V or less					
					AP	Analog output: 1 to 5 V (connecting load impedance 500 kΩ and over) Error output: PNP open collector output, 50 mA or less, voltage drop 2.4 V or less					
					SN	Switch output: NPN open collector output, 50 mA or less, voltage drop 2.4 V or less Error output: NPN open collector output, 50 mA or less, voltage drop 2.4 V or less					
					SP	Switch output: PNP open collector output, 50 mA or less, voltage drop 2.4 V or less Error output: PNP open collector output, 50 mA or less, voltage drop 2.4 V or less					
Flow rate display	Display method					7-segment LED 3-digit, indicator accuracy: control accuracy ±1 digit					
	Display range, display resolution					Refer to the separate table					
Integrating functions						Refer to the separate table					
Power supply	Power supply voltage					24 VDC ± 10% (stabilized power supply with ripple rate 2% or less)					
	Current consumption Note 11					250mA or less					
Mounting orientation						Unrestricted in vertical/horizontal direction					
Wetted section materials		*3			H6/H8 (Resin body)	Polyamide resin, fluoro rubber, stainless steel, alumina, semiconductor silicon, soldering					
					8A/UF (SUS body)	Stainless steel, fluoro rubber, alumina, semiconductor silicon, soldering					
Weight		*3			H6/H8 (Resin body)	Approx. 200g					
					8A/UF (SUS body)	Approx. 480g					
Degree of protection						IEC standards IP40 or equivalent					
Protection circuit Note 6						Power reverse connection protection, switch output reverse connection protection, 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, Note 5

(Standard model)

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

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

(Low differential pressure model)

1 MPa = 10 bar

			Flow rate range *1				
			L9500	L0001	L0002	L0005	L0010
Applicable fluids *2	AI/O2 LN/C1 C3 Note 7	Std diff press (kPa)	20 (≈2.9 psi)	20 (≈2.9 psi)	20 (≈2.9 psi)	20 (≈2.9 psi)	20 (≈2.9 psi)
		Operating diff press (kPa)	5 (≈0.8 psi) to 50 (≈7.2 psi)	5 (≈0.8 psi) to 50 (≈7.2 psi)	5 (≈0.8 psi) to 50 (≈7.2 psi)	5 (≈0.8 psi) to 50 (≈7.2 psi)	10 (≈1.5 psi) to 50 (≈7.2 psi)
		Max. working pressure (kPa)	50 (≈7.2 psi)	50 (≈7.2 psi)	50 (≈7.2 psi)	50 (≈7.2 psi)	50 (≈7.2 psi)

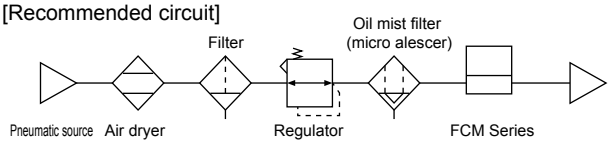
Display, integrating functions

		Flow rate range *1							
		9500 L9500	0001 L0001	0002 L0002	0005 L0005	0010 L0010	0020	0050	0100
Flow rate display	Display range	0 to 500 mℓ/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	1 mℓ/min	0.01 ℓ/min	0.01 ℓ/min	0.01 ℓ/min	0.1 ℓ/min	0.1 ℓ/min	0.1 ℓ/min	1 ℓ/min
Integrating functions	Display range	999999 mℓ	9999.99 ℓ	9999.99 ℓ	9999.99 ℓ	99999.9 ℓ	99999.9 ℓ	99999.9 ℓ	999999 ℓ
	Display resolution	1 mℓ	0.01 ℓ	0.01 ℓ	0.01 ℓ	0.1 ℓ	0.1 ℓ	0.1 ℓ	1 ℓ
Note 10	Pulse output rate	5 mℓ	0.01 ℓ	0.02 ℓ	0.05 ℓ	0.1 ℓ	0.2 ℓ	0.5 ℓ	1 ℓ

Note 1: The value converted to volumetric flow rate at standard condition (20°C 1 barometric pressure (101 kPa) relative humidity 65%). Full scale stands for max. scale flow rate in the flow rate range.

Note 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 compliant with JIS B8392-1: 2012 (ISO 8573-1: 2010) [1: 1: 1 to 1: 6: 2]. Compressed air from the compressor contains drainage-water, oil oxide, foreign substances, etc. To maintain the function of this product, install a filter, air dryer (min. pressure dew point 10˚C or less), and oil mist filter (max. oil content 0.1 mg/m^3) on the primary side (upstream side) of this product.

[Recommended circuit]



[Recommended device]
Air filter: F series
Oil mist filter: M series

Note 3: The value for city gas 13A is a value for methane (CH_4) 88% gas generated from LNG.

Note 4: Standard differential pressure is the differential pressure when this product is calibrated. (Secondary side released to atmosphere)

Note 5: Operating differential pressure is the differential pressure required for normal operation of this product. Note that the values depend on the flow rate range and applicable fluids.
The min. value of operating differential pressure is the differential pressure required for the full scale flow rate to flow when secondary side is released to atmosphere. The max. working pressure (max. value of operating differential pressure) is the max. value of primary side pressure. If more pressure is applied, control may become unstable, or the max. flow rate may not be controllable.

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

Note 7: When using a low pressure city gas line (1 to 2.5 kPa), the operating differential pressure range is exceeded.

Note 8: The valve inside this product cannot be used as a stop valve requiring zero leakage. Slight leakage is allowed for in the specifications.

Note 9: The output impedance of the analog output voltage 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.

Note 10: The integrating flow is a reference value. It is reset when the power is turned OFF.

Note 11: Current for when 24 VDC is connected, no load is applied, and flow rate is full scale. The current consumption will vary depending on the load.