

NM-1500 Series

MASS FLOWMETER

MASS FLOW CONTROLLER

OUTLINE

The NM-1500 Series is a thermal mass flowmeter that is capable of measuring and controlling the flow rates of various gases.

It supports flow rates ranging from 10 mL/min (nor) to 150 L/min (nor), and changes in temperature and pressure during measurement have little effect on accuracy.

It also supports monitoring and control via RS485 communication and can be used in a wide range of applications while maintaining low costs.



FEATURES

- ☐ Selectable between a mass flowmeter and a mass flow controller.
- ☐ Ambient temperature compensation function
- ☐ Equipped with dual RS485 communication terminals (RJ45) (for multi-communications)
- ☐ Self-diagnostic function
- ☐ Zero point adjustment function

MAIN APPLICATIONS

- ☐ Monitoring and control of gas supply to industrial facilities
- ☐ Gas analyzers
- ☐ Constant gas flow control
- ☐ Gas mixing/separation equipment

MODEL CODE

NM-	□□□□□□	-	□□□□	-	□□	-	□	□	□	□
Model	1500DC	MFC								
	1500DM	MFM								
Range	ABC		See Range Code on page 4.							
Gas	□□		See Gas Code on page 4.							
	ZZ		Others							
Fitting	VCR		V							
	SWL		S							
	Others		Z							
Nominal size	1/4"		1							
	3/8"		2							
	Others		Z							
Output	0 to 5 V DC		1							
	4 to 20 mA DC		2							
	1 to 5 V DC		3							
	Others		Z							
Power supply	24 V DC		1							
	±15 V DC		2							
	Others		Z							

SPECIFICATIONS

Model		NM-1510DM	NM-1520DM	NM-1530DM	NM-1510DC	NM-1520DC	NM-1530DC
Measurable gas codes (See the List of Gas Codes on page 4.)		Code 00 to 41		Code 00 to 17	Code 00 to 41		Code 00 to 17
Valve mechanism					Normally Closed		
N ₂ converted range (L/min (nor))(*1)	Min.	0.01	Over 5	Over 50	0.01	Over 5	Over 50
	Max.	5	50	150	5	50	150
Minimum controllable flow rate (% F.S.)					2		
Response time (sec) (2 to 100% F.S.)		1			1.5	1	
Accuracy (%F.S.)		±1.5					
Linearity (% F.S.)		±0.7					
Repeatability (% F.S.)		±0.5					
Control differential pressure	kPa				50 to 300	Based on N ₂ converted range 5 to 20 L/min (nor): 100 to 300 20 to 50 L/min (nor): 150 to 300	Based on N ₂ converted range 5 to 100 L/min (nor): 300 to 400 100 to 150 L/min (nor): 400 to 500
Maximum operation pressure (*2)	kPa				300	Based on N ₂ converted range 50 to 100 L/min (nor): 400 100 to 150 L/min (nor): 500	
Proof pressure	kPa	980					
He leak rate	Pa·m ³ /sec	Less than 1 x 10 ⁻¹¹		Less than 1 x 10 ⁻⁹	Less than 1 x 10 ⁻¹¹		Less than 1 x 10 ⁻⁹
Ambient and gas temperature	°C	0 to 50					
Temperature effect (*3) (% F.S.)/°C	Zero	0.1					
	Span	0.1					
Actuator					Solenoid		
Gas-wetted materials	Body	SUS316L					
	Valve				PTFE		
	Sealing	Ag or Au (*4)		FKM	Ag or Au (*4)		FKM
	Brazing	Nickel (Ni)					
Connection (*5)(*6)	Standard	OD 1/4" VCR, SWL		OD 3/8" SWL	OD 1/4" VCR, SWL		OD 3/8" SWL
	Optional	OD 3/8" SWL, VCR OD 1/4" VCO		OD 3/8" VCR	OD 3/8" SWL, VCR OD 1/4" VCO		OD 3/8" VCR
Flow rate output signal		0 to 5 V DC, 1 to 5 V DC 4 to 20 mA DC (Load resistance: Within 600 Ω (for 24 V DC power supply), within 300 Ω (for ±15 V DC power supply))					
Flow rate setting signal					0 to 5 V DC, 1 to 5 V DC, 4 to 20 mA DC		
Alarm indication		Normal: Green LED flashing, Hi/Lo alarm: Red LED flashing, Fault: Red LED lit					
Alarm output		Open-collector (NPN), +30 V DC, 20 mA Max					
Zero point adjustment		Setting via button or communication command					
Communication		RS485 (Modbus RTU)					
Electrical connection		D-Sub 9-pin connector					
Communication connection		RJ45 connector					
Power supply		+15 V DC 150 mA/-15 V DC 200 mA or 24 V DC 300 mA					

(*1) For details on N₂ conversion, see page 4.

(*2) Please contact us if you require operating pressures outside the standard range.

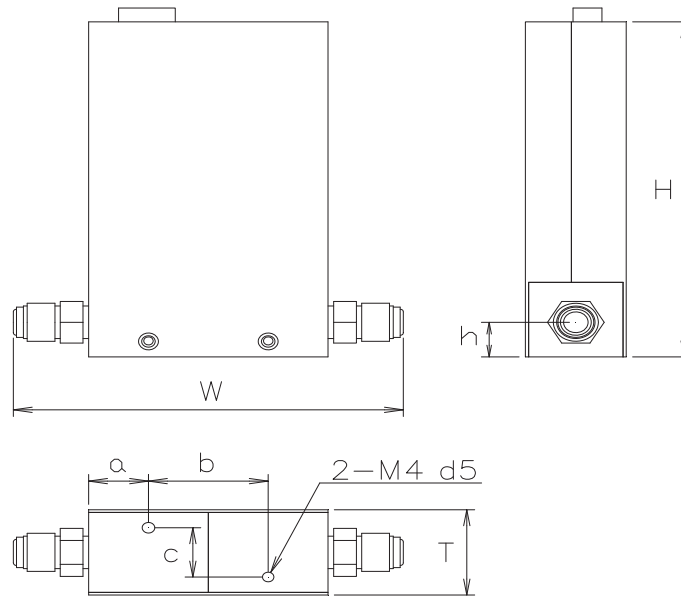
(*3) This is the temperature effect for the temperature range of 15 to 35°C.

(*4) Determined by the gas used. (For details, see the List of Gas Codes on page 4.)

(*5) Please contact us if you require connection specifications not listed in the catalog.

(*6) For Swagelok, VCR, and VCO connections, equivalent fittings will be used.

DIMENSIONS



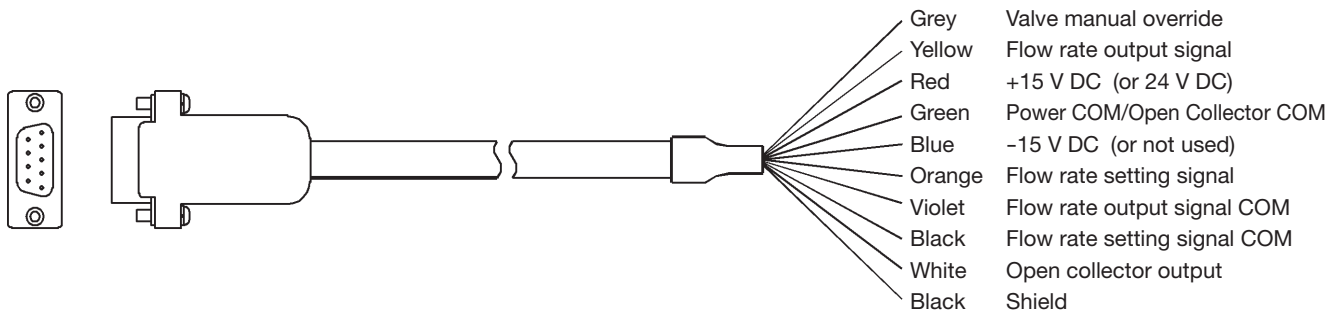
Unit: mm

Model	W (*)			T	H	h	Bottom		
	1/4" VCR	1/4" SWL	3/8" SWL				a	b	c
NM-1500	123.8	127.4	130.0	32	126	13	19	38	18.5

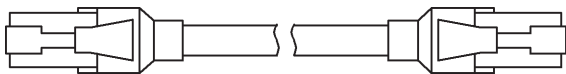
(*) For face-to-face dimensions of non-standard fittings, please contact us.

ACCESSORIES

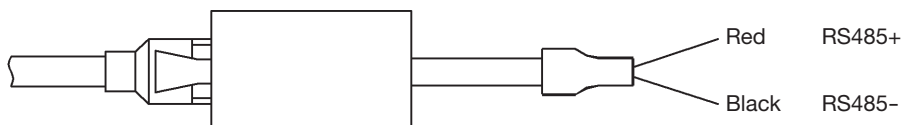
- Signal and power cable: 2 m (standard) to a maximum of 5 m (NM-1500DC) or a maximum of 10 m (NM-1500DM)



- Communication cable (RJ45 connectors on both ends): 2 m (standard) or 5 m



- Adapter for communication cable



EXAMPLE OF MODEL SELECTION

For this product, the flow range is converted to an N₂ equivalent value using the formula below for model selection. Refer to the Range Code and Gas Code lists for the flow range and conversion factor (CF).

$$N_2 \text{ converted range} = \frac{\text{Range}}{\text{CF of gas used}}$$

The CF for a mixed gas is calculated using the following formula.

$$\text{CF of mixed gas} = \frac{1}{\frac{X_1}{\text{CF}_1} + \frac{X_2}{\text{CF}_2} + \dots}$$

X_n: Composition ratio of component n (volume %/100)

CF_n: CF of component n

Example: For NH₃ specification, 5 L/min (nor) (Gas Code 20, Range Code 502), the N₂ converted range is calculate using the following formula.

$$N_2 \text{ converted range} = \frac{5}{0.795} \approx 6.289 \text{ L/min (nor)}$$

Therefore, the suitable equipment is NM-1520DM or NM-1520DC based on pages 3 and 4 of the catalog.

LIST OF GAS CODES

Code	Gas	Sealing	CF	Code	Gas	Sealing	CF
00	N ₂	Ag	1.000	20	NH ₃	Au	0.795
01	Air	Ag	1.000	21	NO ₂₍₃₎	Au	0.740
02	O ₂	Ag	0.990	22	HCl	Au	0.990
03	Ar	Ag	1.400	23	HBr	Au	1.040
04	He	Ag	1.400	24	SO ₂	Au	0.620
05	H ₂	Ag	1.010	25	SiF ₄	Au	0.350
06	CO	Ag	1.000	26	SiH ₄	Au	0.645
07	CO ₂	Ag	0.740	27	PH ₃	Au	0.760
08	NO	Ag	0.990	28	B ₂ H ₆	Au	0.440
09	N ₂ O	Ag	0.730	29	WF ₆	Au	0.240
10	Ne	Ag	1.400	30	NF ₃	Au	0.510
11	CH ₄	Ag	0.790	31	BCl ₃	Au	0.470
12	C ₂ H ₂	Ag	0.630	32	BF ₃	Au	0.530
13	C ₂ H ₄	Ag	0.510	33	AsH ₃	Au	0.670
14	C ₂ H ₆	Ag	0.500	34	ClF ₃	Au	0.440
15	C ₃ H ₆	Ag	0.410	35	SiCl ₄	Au	0.315
16	C ₃ H ₈	Ag	0.360	38	CF ₄	Au	0.450
17	C ₄ H ₁₀	Ag	0.260	39	H ₂ S	Au	0.800
18	Cl ₂	Au	0.860	40	TMDS	Au	0.142
19	F ₂	Au	0.1000	41	SF ₆	Au	0.285

LIST OF RANGE CODES

Code	Range
100	10 mL/min (nor)
200	20 mL/min (nor)
500	50 mL/min (nor)
101	100 mL/min (nor)
201	200 mL/min (nor)
501	500 mL/min (nor)
102	1 L/min (nor)
202	2 L/min (nor)
502	5 L/min (nor)
103	10 L/min (nor)
203	20 L/min (nor)
503	50 L/min (nor)
104	100 L/min (nor)
154	150 L/min (nor)
ABC	Others*

* Please contact us to inquire whether we can manufacture products in flow ranges and units not listed in the Range Code list.

* Specification is subject to change without notice.

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