

### NM series

### Mass flow controller

#### GENERAL

**NM series** is Thermal Mass Controller, by which various kinds of gas can be measured and controlled.

The flow rate of gas can be measured from 5mL/min(nor) to 150L/min(nor) and controlled without being influenced by the change in temperature and pressure.

Models of cost effective type in high performance was lined up in order to comply with any requirements.



#### FEATURES

- Analog Mass Flow Controller:
  - Low cost.
  - Environment temperature compensation
  - Wide flow range available  
10mL/min(nor)~150L/min(nor)
  - 3-points linearity calibration
- Digital Mass Flow Controller :
  - Linearity calibration function
  - Environmental temperature compensation
  - Self-Diagnosis On-line zero switch
  - Central Monitor System(CMS)
  - Software for monitor & control
  - 5-points linearity calibration
- High accuracy  
±1.0%F.S.
- Complete supporting instruments  
Power source , digital indicator and potentiometer are integrated in one set.
- Handily usable and cost effective.

#### APPLICATIONS

- Utility gas supply lines in industries
- Various instruments for analysis
- Gas constant flow control
- Gas mixture and division system

#### MODEL CODE

NM-□□□□	□	□	-	□□□	-	□□	-	□	□	□
Type	A	Analog								
	D	Digital								
Function	M	Meter								
	C	Controller								
Range*	ABC		(10xA+B)x10 <sup>C</sup>							
Gas			00	N2						
			01	Air						
			02	O2						
			03	Ar						
			04	CO2						
			05	He						
			FF	Other						
Connector	1/4"VCR				1					
	3/8"VCR				2					
	1/4"SWL				3					
	3/8"SWL				4					
	Other				F					
Signal	DC 0~5V				1					
	Others				2					
Power	DC 24V				1					
	DC+/-15V				2					

\*The scale range is shown by the exponential expression as the unit of multiplier unit of mL/min(nor) ,

Example:

5mL/min(nor) is 0|5|0

500mL/min(nor) is 5|0|1

50 L/min(nor) is 5|0|3

**Analog Type**

Standard Model		NM-4400	NM-1200		
*Valve operation mode		Normally Closed	Normally Closed		
Range(full scale)	mL/min(nor)	10,20,50,100,200,500	N.A.		
	L/min(nor)	1,2,5	10,20,	30,50	100,150
*Minimum controllable flow rate(% F.S.)		2	2		
Response time(sec)(2-98% F.S.)		1	1		
Accuracy(%F.S.)		±1.0			
Linearity(%F.S.)		±0.5			
Repeatability(% F.S.)		±0.2			
*Required differential pressure	kg/cm2 kpa	0.5-3.0 49 -294	0.5-3.0 49-294	1.0-3.0 98-294	2.0-4.0 196-392
*Maximum operation pressure	kg/cm2 kpa	3.0 294			4.0 392
Withstand pressure	kg/cm2 kpa	10 980			
Operation temperature	°C	0-50			
Temperature coefficient (% F.S.)/ °C	Zero Span	0.05 0.05	0.05 0.1		
Leak rate	atm-cc/sec pa·m3/sec	<1·10 <sup>-10</sup> <1·10 <sup>-11</sup>	<1·10 <sup>-8</sup> <1·10 <sup>-9</sup>		
*Control valve		Solenoid			
Materials exposed by gas	Body	SUS-316L			
	*Control valve	PTFE			
	Seals	Gold	Viton		
	Blazing at sensor	Nickel(Ni)			
Fitting	Standard	1/4"VCR,SWL	1/4" ,3/8"SWL		
	Optional	1/4"VCO	1/4" , 3/8" VCO,VCR		
Flow rate output signal		0-5V DCV (1-5DCV/0-20mA/4-20mA)			
*Flow rate setting signal		0-5V DCV (1-5DCV/0-20mA/4-20mA)			
Zero adjustment		Zero VR			
Cable connector		D-Sub 9 pin connector			
Power supply requirement		+15V DC 60mA, -15V DC 200mA 24DCV, 300mA			

\* Specification for Controller only

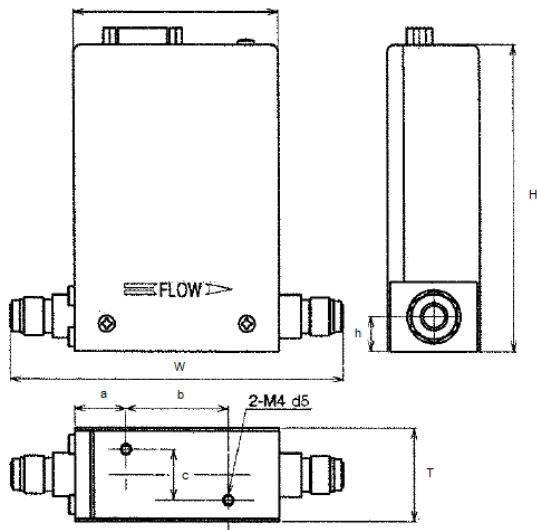
**Digital Type**

Standard Model		NM-2100	NM-2100P	NM-2200			NM-2300			
Compact Model		NM-3100	N.A.	NM-3200			N.A.			
*Valve operation mode		Normally Open/Closed		Normally Open/Closed			Normally Closed			
Range(full scale)	mL/min(nor)	5,10,20,50,100,200,500			N.A			N.A		
	L/min(nor)	1,2,5		10,20	30	50	10,20	30,50	100,150	
*Minimum controllable flow rate(% F.S.)		2								
Response time(sec)(2-98% F.S.)		1								
Accuracy(%F.S.)		±1.0								
Linearity(%F.S.)		±0.5								
Repeatability(% F.S.)		±0.2								
*Required differential pressure	kg/cm <sup>2</sup> kpa	0.5-3.0 49 -294		1.0-3.0 98-294	1.5-3.0 147-294	2.0-3.0 196-294	0.5-3.0 25-294	1.0-3.0 147-294	2.0-4.0 294-392	
*Maximum operation pressure	kg/cm <sup>2</sup> kpa	3 294							4 392	
Withstand pressure	kg/cm <sup>2</sup> kpa	10 980								
Operation temperature	°C	0-50								
Temperature coefficient (% F.S.)/ °C	Zero	0.02					0.05			
	Span	0.02					0.05			
Leak rate	atm-cc/sec pa·m3/sec	<1*10 <sup>-10</sup> <1*10 <sup>-11</sup>					<1*10 <sup>-8</sup> <1*10 <sup>-9</sup>			
*Control valve		Piezo-electric actuator					Solenoid			
Materials exposed by gas	Body	SUS-316L								
	*Control valve	SUS-316L:diaphragm,PCTFE:plug					PTFE			
	Seals	Gold(Au)					Viton			
	Blazing at sensor	Nickel(Ni)								
Fitting	Standard	1/4"VCR,SWL		1/4",3/8" VCR,SWL			1/4",3/8"SWL			
	Optional	1/4"VCO		1/4",3/8"VCO			1/4",3/8"VCR			
Flow rate output signal		0-5V DCV								
*Flow rate setting signal		0-5V DCV								
Alarm display	Normal Condition change Abnormal	Green LED flash, Red LED flash, Red LED continuous ON								
Zero adjustment		Zero switch and auxiliary input								
Digital communication		RS-232/485/ Profibus Open collector output			RS-232/485 Open collector output					
Cable connector		D-Sub 9 pin connector								
Power supply requirement		+15V DC100-250 mA,-15V DC150mA **24V DC 300mA								

\* Specification for Controller only

\*\* Adaptor Box is necessary for 24V type.

**Dimension**

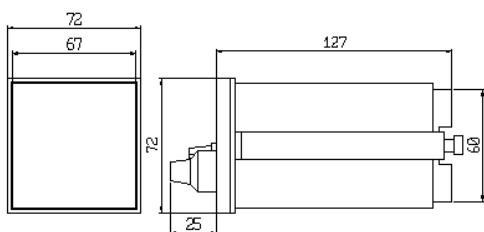


	a	b	c
A	19	38	18.5
B	20	38	24.5
C	18	38	18.5
D	18	38	24.5

Model	W(Install)						T	H	h	Bottom view
	1/4" VCR	1/4" SWL	1/4" VCO	3/8" VCR	3/8" SWL	3/8" VCO				A/B/C/D
	NM-1200	155.8	159.4	---	163.4	162.4				158.5
NM-4400	123.8	127.4	115.6	---	---	---	38	126	13	A
NM-2100	123.8	127.4	115.6	---	---	---	34	126	13	A
NM-2100P	123.8	127.4	---	---	---	---	34.5	126	13	A
NM-2200	155.8	159.4	147.6	163.4	162.4	158.5	39	134	17	B
NM-2300	155.8	159.4	---	163.4	162.4	158.5	42	136	17	B
NM-3100	106	---	---	---	---	---	32	126	13	C
NM-3200	123.8	---	---	---	---	---	42	134	13	D

Dim.:mm

**ARP-100 : SETTING+DISPLAY+POWER UNIT**



- Read Out: DC(0~5V)
- Accuracy: 0.1%(25°C±10°C)
- Sampling Rate: 3HZ
- Display Unit: SCCM, SLM (Selectable)
- Display: 3 And 1/2 Digit, LED
- AC Power:
- AC100V~240V (47~63HZ) 0.25A Max.
- DC Power Supply (For MFC):
- +15V(150mA).-15V(250mA)
- Pre-set Flow Rate:
- Six Set (Manual Mode)
- Remote Control: External 0-5V Analog
- Command Type: Open/Close~Control
- Operation Temperature:
- 0-50°C (Humidity<85%)
- Alarm Output: Two Set Alarm
- Special Connection Cable Is Available

\*Specification is subject to change without notice