

OUTLINE

NMX1000 Series flowmeter is the simple and compact product updated from current MX Series that is enjoying a good reputation. The unified 250mm face-to-face dimension makes piping design and work simpler which results in saving of the engineering cost and installation space. It covers liquids, gases and steam measurement in various industrial fields.

FEATURES

- The face-to-face dimensions are unified for all sizes from 15mm to 100mm, which allows well arranged piping design.
- Simple and rugged design allows many kinds of flow measurements of liquids, gases and steam for various applications.
- Highly anti-corrosive materials of 316SS or equal are resistant to corrosive fluids.



STANDARD SPECIFICATION

- Available size Meter size : 15mm to 100mm
Connection size : See the table
For the availability of the connection size
- Connection rating - Flange connection : JIS 10K, 20KRF
ANSI Class150,300RF
<Note * : The JIS 10K flange of the connection size 15mm to 40mm as marked "YES*" in the following table are made of JIS 20K flanges. The JIS 20K flanges are 2mm thicker than JIS 10K flanges and other dimensions are the same.>
- Fluid temperature : -20 to +300°C (local indication type)
-20 to +200°C (transmitter type)
- Ambient temperature -25 to +100°C (local indication type)
-20 to +60°C (transmitter type)
- Fluid pressure 4.1MPa at ambient temperature
3.3MPa at 120°C
<Maximum allowable operating pressure differs with temperature, complying with JIS and ANSI flanges standards.>
- Materials : Wet parts: 316SS or equal
- Flow rate range : 0.04 to 100m³/h
<Liquids equivalent to water, density 1.0g/cm³, viscosity 1.0mPa·s>
1.2 to 600 m³/h (nor)
<Gases equivalent to air at 0°C and 0MPa, i.e. 1atm>
- Indication accuracy : ±1.5%F.S.
- Range-ability 10:1
- Indicator construction Enclosure IP65 equivalent to NEMA 12/13
- Painting Standard Epoxy painting on indicator external surface only
Color Munsell 7.5BG4/1.5

• Connection size table

Meter Size mm	Connection Rating	Available of connection size Against meter size			
		1 rank Smaller Than meter	Same Size as meter	1 rank Larger Than meter	2 rank Larger Than meter
15	10K	NO	YES*	YES*	YES*
	20K	NO	YES	YES	YES
	150lb	NO	YES	YES	YES
	300lb	NO	YES	YES	<Note>
25	10K	NO	YES*	YES*	YES
	20K	NO	YES	YES	YES
	150lb	NO	YES	YES	YES
	300lb	NO	YES	YES	<Note>
40	10K	NO	YES*	YES	YES
	20K	NO	YES	YES	YES
	150lb	NO	YES	YES	YES
	300lb	NO	YES	YES	<Note>
50	10K	NO	YES	YES	YES
	20K	NO	YES	YES	YES
	150lb	NO	YES	YES	YES
	300lb	NO	YES	YES	<Note>
80	10K	NO	YES	YES	<Note>
	20K	NO	YES	YES	<Note>
	150lb	NO	YES	YES	<Note>
	300lb	NO	YES	NO	NO
100	10K	NO	YES	<Note>	NO
	20K	NO	YES	<Note>	NO
	150lb	NO	YES	<Note>	NO
	300lb	NO	YES	NO	NO

<Note>: Consult Tokyo Keiso Thailand

ADDITIONAL FUNCTIONS

● **ALARM OUTPUT FUNCTION**

An alarm output function can be added to local indicator upon your request. Please specify it when ordering including whether high or low alarm with its motion of open or close at alarm activation, which are required for manufacturing.

1. Alarm output specification

Model Code

NMX1□□□ - ... / 1A or 1B or 1C or 1D

- Contact System : Read switch 1 point, variable with pointer
- Electric rating : Max. Voltage 125VAC or 100VDC
 Operating current capacity 10μA to 0.5A
 Max. switching capacity 10 VA or 10W
 <Note: the above mentioned rating shows the case of resistance load. When using other loads, welding of a contact may be caused by an inrush current. Use it not to exceed rating at the maximum inrush current.>

Kind of load	Inrush current
Lamp load	5 to 10 times of ordinary use
Motor load	10 to 15 times of ordinary use
Inductive load	4 to 5 times of ordinary use

- Suitable wiring : 0.2 to 2.5 mm² / 24 to 12 AWG (Single wire or standard wire)
- Insulation resistance : 100 MΩ or more (500V DC)
- Withstand voltage : 1500 VAC (Holding time 1 min.)
- Setting accuracy : ±2% F.S.
- Reset Span : Less than 15% F.S.
 (Less than 20% F.S. for flow range with "*" mark as shown in the flow rage table.)

2. Intrinsically safe specification

Intrinsically safe version is available for alarm output type.

Model Code

NMX1□□□ - ... / 1A or 1B or 1C or 1D/JI : TIIS certification

Protection class: Ex ia IIC T6

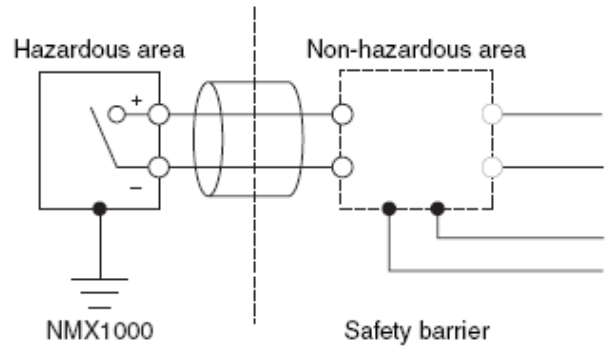
Recommended intrinsically safe relay : EB3C

(Ex ia IIC manufactured by IDEC)

Rating of intrinsically safe circuit

- Maximum input voltage : 30 V
- Maximum input current : 500 mA

The specified safety barrier is to be properly installed in non-hazardous area to establish the intrinsically safe system. See the following diagram.



● **CURRENT OUTPUT FUNCTION**

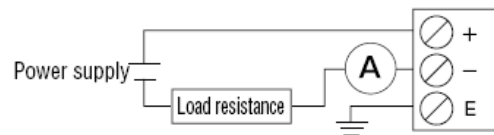
The current output function can be added to local indicator upon your request. If needed, please specify it when ordering.

1. Current output specification

Model Code

NMX1□□□ - ... / E1 : Non-intrinsically safe circuit transmitter

- Power Supply : 11 to 35 V
 (Voltage between transmitter terminals)
- Current output : 4 to 20 mA DC
- Output accuracy : ±1%F.S. (against plate scale)
- Allowable load resistant : 0 to 600Ω (at 24 VDC)
- Power supply variation influence : 0.2%F.S. or less
- Load resistance influence : 0.2%F.S. or less
- Insulation resistance : 100MΩ or more (500 VDC)
- Withstand voltage : 500 VAC (Holding time: 1min)
- Terminal schematics



2. Intrinsically safe specification

Intrinsically safe version is available for current output type.

Model Code

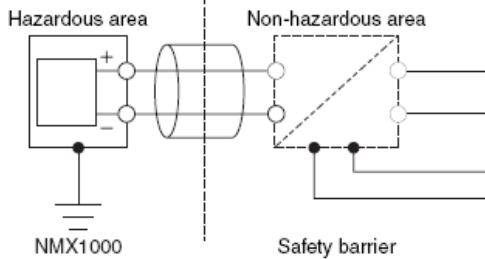
NMX1□□□ - ... / E2/JI : Intrinsically safe circuit transmitter

Protection class : Ex ia IIC T4

Rating of intrinsically safe circuit

- Maximum input voltage : 28V DC
- Maximum input current : 93 mA
- Maximum input power : 650 mW
- Maximum internal capacitance : 0.01302 μF
- Maximum internal inductance : 0.3697 mH

The specified safety barrier is to be properly installed in non-hazardous area to establish the intrinsically safe system. See the following diagram.



Temperature class

	Temperature class
Rating	T4
TIIS	Certified

3. HART Communication

HART communication version is available for current output type.

Model Code

NMX1□□□-.../E1/HC : Non-intrinsically safe circuit
 NMX1□□□-.../E2/HC/JI : Intrinsically safe circuit

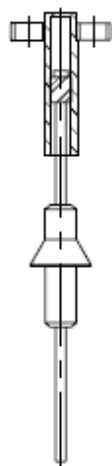
● **CABLE ENTRY SIZE**

Select from Model Code table.

● **DAMPER DEVICE**

These units of all size for gas measurement type are equipped with dampers as a standard. The damper device can be added at the liquid measurement with pulsation.

The damper should be avoided of such services as chlorine gas that tends to form chemical compounds and fluids that contain rusts, debris and oil. They might hinder the damping effect.



FLOW RATE TABLE

Meter Size mm	Water		Air	
	Flow Rate m ³ /h	Max.press. Loss kPa	Flow rate m ³ /h(nor)	Max.press. Loss kPa
15	0.04 – 1.85	11	1.2 – 45	17
25	1.5 – 5.4	16	45 – 135	30
	5.4 – 6*	19		
40	5 – 10.5	8	130 – 230	10
50	9 – 16.8	10	220 – 300	8
	16.8 – 21.5*	16	300 – 400*	10
80	20 – 40	22	390 – 600*	13
	40 – 50*	32		
100	50 – 100*	26	-	-

Flow Rate range marked as * has the alarm reset span of 20% of F.S. The above flow rate shows the value converted into water (Density 1.0g/cm³, Viscosity 1.0mPa·s) and air (0°C, 0 MPa, i.e. 1 atm). The numeric values as indicated shows the flow range in the maximum graduation.

FLOW CONVERSION METHOD

1. Liquid application

Flow rates on the Flow rate table are for liquid application equivalent to water (Density 1.0g/cm³, Viscosity 1.0mPa·s). If actual fluid condition has different values, a conversion calculation is required per following formula.

$$Q_w = Q \times 2.59 \div \sqrt{((7.7 / \rho) - 1)}$$

Q_w : Water converted flow rate (m³/h)

Q : Flow rate of actual fluid (m³/h)

ρ : Density of actual fluid (g/cm³)

<Consult us about high viscosity specification>

2. Gas application

Flow rate on the Flow rate table are measurable flow rates for air (0°C, 0 MPa). If actual fluid condition has different values, a conversion calculation is performed by the following formula:

$$QA = Q \times 0.01635 \times \sqrt{(\rho \times (273 + t) / (0.1013 + P))}$$

QA : Converted flow rate in air 0°C, 0 MPa [m³/h(nor)]

Q : Flow rate of gas to be measured [m³/h(nor)]

ρ : Density of actual fluid [kg/m³(nor)]

P : Operating pressure (MPa)

t : Operating temperature (°C)

3. Steam application

Steam flow rate is be converted into Air (0°C, 0 MPa) flow rate by the following formula.

$$QA = 0.8488 \times Q_{s1} \div \sqrt{\rho_s}$$

$$QA = 0.8488 \times Q_{s2} \times \sqrt{\rho_s}$$

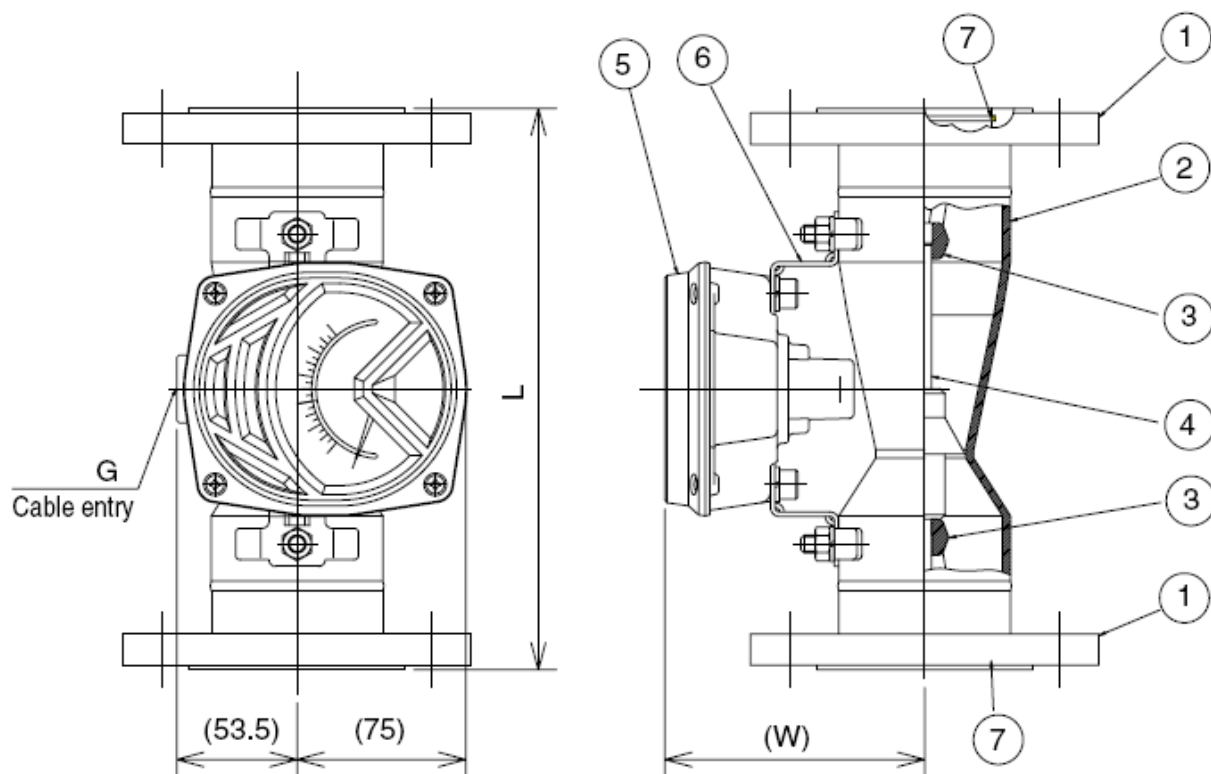
QA : Air (0°C, 0 MPa) converted flow rate [Unit: m³/h(nor)]

Q_{s1} : Flow rate (Mass) (Unit: kg/h)

Q_{s2} : Flow rate (Volume) (Unit: m³/h)

ρ_s : Density of steam (kg/m³)

DIMENSTIONS



SIZE AND WEIGHT

Meter size (mm)	Connection size JIS A size (inch)	Dimensions (mm)		Approx. mass *1 (kg)
		L	W	
15	15 (1/2)	250	115.5	2.5
25	25 (1)	250	115.5	4.0
40	40 (1-1/2)	250	115.5	4.5
50	50 (2)	250	115.5	7.0
80	80 (3)	250	115.5	13.0
100	100 (4)	250	135.5	18.0

*1 Approx. mass shows the case of ANSI Class 150.

MATERIALS

No.	Description	Material
1	Flange	316 SS
2	Tapered tube	SCS14
3	Float guide	SCS16
4	Float	316 SS
5	Indicator	ADC 12
6	Fittings	316 SS
7	Stop ring	316 SS

Note)

- The upper float guide is replaced with the damper (cylinder) for gas, steam services and other services where a damper required.
- Material 316 SS might be changed to 316L SS in case.
- The lower float guides being fixed to the flanges of 15mm and 100mm meter size can not be removed.

MODEL CODE

NMX	*	*	*	*	_*	*	*	_*	*	*	*	/**	Specification	Restriction of selection					
														Liquid service	Gas service				
Indicator type	1												Non-frame-proof type indicator						
Main body	1												Standard						
Material in contact with liquid	6												316 SS						
Float material	6												316 SS						
Rating													J1	JIS10K	The connection size is 50mm or more.				
													J4	JIS20K	No restriction				
													A2	ANSI 150Lb					
													A5	ANSI 300Lb	Refer to the Connection size.				
Connection													RF	RF flange	Selection is not necessary.				
Connection size													1	15A (1/2")	As the standard, connection size is the same as meter size or 1 or 2 rank larger than meter size. For details refer to the connection size.				
													2	20A (3/4")					
													3	25A (1")					
													4	40A (1 1/2")					
													5	50A (2")					
													6	65A (2 1/2")					
													7	80A (3")					
													8	100A (4")					
Meter size													-1	15mm	Qw (m3/h)	0.04 to 1.85	QA (m3/h)	1.2 to 45	
													-3	25mm		1.5 to 6		45 to 135	
													-4	40mm		5 to 10.5		130 to 230	
													-5	50mm		9 to 21.5	220 to 400		
													-7	80mm		20 to 50	390 to 600		
													-8	100mm		50 to 100			
Tapered tube									*					Tapered tube number	Selection is not necessary .Manufacture's code				
Float									*					Float number					
Float damper													1	Not provided	Standard	N.A.			
													2	Provided	<Consult us>	Standard			
Additional function	Alarm output (1 point)												/1A	1 point alarm (High Close)	Duplicated selection has no effect.				
													/1B	1 point alarm (High Open)					
													/1C	1 point alarm (Low Close)					
													/1D	1 point alarm (Low Open)					
	Current output(2-wire, 4 to 20mA DC output)													/E1	TYPE 1(Non intrinsic safe circuit)	Available for /E1 or E2			
														/E2	TYPE 2(Intrinsically safe circuit)				
	Intrinsic safety													/HC	HART communication	Available for TYPE 2 (/E2) and alarm output			
	Cable entry													/M1	M16 x 1.5 (F)	Duplicated selection has no effect.			
													/M2	M20 x 1.5 (F) – Standard					
													/GH	G 1/2 (F)					
													/NP	NPT 1/2 (F)					
Special	Cleaning												/OL	Degrease treatment	No restriction				
													/WL	Non-water treatment					
													/AP	Acid pickling					
	Painting												/PS	Special painting	No restriction				
Inspection												/LT	Gas leakage test	No restriction					
Accessories												/AC	Provided	IR series, Amplifier for alarm etc.					
Special specification													/Z	Others	Consult us for details.				

● **STANDARD GRADUATION DIVISION**

Following table shows 17 kinds of standard graduation pattern.

Scale range	Subdivision of graduation						
1 – 10	1	2	4	6	8	10	
1.2 – 12	1.2	2	4	6	8	10	12
1.5 – 15	1.5	2.5	5	7.5	10	12.5	15
1.6 – 16	1.6	5	10	15	16		
1.8 – 18	1.8	5	10	15	18		
2 – 20	2	5	10	15	20		
3 – 30	3	5	10	15	20	25	30
3.5 – 35	3.5	10	20	30	35		
4 – 40	4	10	20	30	40		
4.5 – 45	4.5	10	20	30	40	45	
5 – 50	5	10	20	30	40	50	
6 – 60	6	10	20	30	40	50	60
7 – 70	7	20	40	60	70		
7.5 – 75	7.5	20	40	60	75		
8 – 80	8	20	40	60	80		
9 – 90	9	20	40	60	80	90	

CAUTIONS

- This flowmeter in its principle transmits the displacement caused by the magnet coupling. The surrounding magnet field might affect the performance of the instrument.
- Avoid the installation in the magnet field and do not bring the magnet close less than 20cm including insulation cover which may affect the performance.
- When installing two or more flowmeters, install them in more than 30cm distance to avoid the mutual interference.

- Specification is subject to change without notice.



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