



TECHNICAL GUIDANCE

BEST COST PERFORMANCE

R-101-E

GLASS TUBE FLOWMETER

GENERAL

R-101-E is a glass tube type variable area flowmeter. The flow rate is indicated by the position of float and the graduation engraved on the glass tube.

Although it has a very simple construction, it is widely used for measurement of flow rate of liquids and gases in various applications thanks to its high reliability and easy handling capability.

A large sized tapered tube is adopted compared to standard type glass tube flowmeters and wide scale range is possible. In addition to standard material of steel and stainless steel, PVC is also available for corrosive applications.



STANDARD SPECIFICATION

- Available size : 15 to 100
- Measuring fluid : All kinds of liquids and gases
(Not suitable for steam measurement. AM series Metal Tube Flowmeters are recommended)
- Available material
 - Fittings : Carbon steel, SUS304, PVC, HT-PVC*
 - Tapered tube : Heat-resistant glass
(Acryl tapered tube is available on request.)
If the fluid temperature exceeds 50°C, the heat-resistant glass tapered tube is only available.
 - Float : For liquids SUS304, PVC, HT-PVC* others
For gases Aluminium, SUS304, others
* High temperature use PVC
 - Packing : NBR, EPDM, FPM
- Process connection
 - Standard : JIS10K flange
 - Option : ANSI, DIN, other flanges
Rc, NPT (upto 50mm)
- Flow direction : Bottom to Top
- Fluid temp. : Select the fluid temperature for the material in the following table in the operating temperature limit.

● Press. range

Meter size	Max. fluid press. MPa	Meter size	Max. fluid press. MPa
15	1.0	50	0.6
20	0.8	65	0.6
25	0.8	80	0.4
40	0.6	100	0.4

- Allowable thermal shock : 80°C
- Indication accuracy : Metallic float versions ±1.5% F.S.
: Resin float versions ±2.5% F.S.
- Range ability : 10:1
- Paint : Munsell 7.5BG4/1.5 (except for the SUS body)
- Option : Double scaling

NB : Alarm contact version (R-751-E) available. Contact Tokyo Keiso for separate Technical Guidance

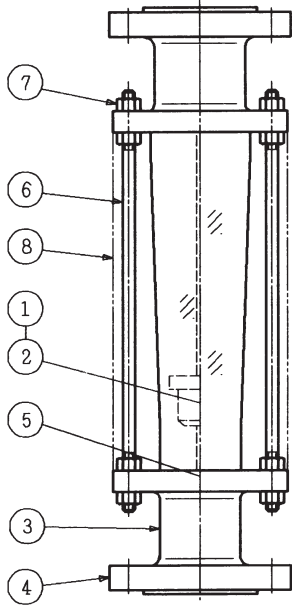
Parts name	Material	Fluid temperature limit (°C)					
		0	50	60	70	80	120
Tapered tube	Heat-resistant glass						
	Acrylic						
Main body	Metal						
	PVC						
	HT-PVC						
Packing	NBR						
	FPM						
	EPDM						

It is general data, and the maximum temperature may change by terms of use and environment.

MODEL CODE

All products : R-101-E

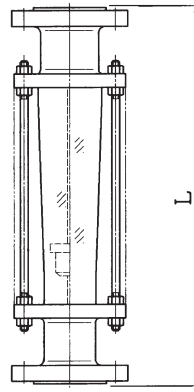
STANDARD MATERIAL



No.	Parts description	Material class1			
		1	2	3	4
1	Tapered tube	Heat-resistant glass*1		Acryl*7	Heat-resistant glass*1
2	Float	SUS304*2	SUS304*2	PVC	HT-PVC
3	Fittings	SGP*5	SUS304*6	PVC	HT-PVC
4	Flange	SS400	SUS304	PVC	HT-PVC
5	Packing	NBR*3			
6	Column	SS400			
7	Nut	SS400			
8 *4	Cover	Acryl			

- *1: Acryl tapered tube is available on request
- *2: Aluminium is used for gas applications as standard
- *3: EPDM or FPM gaskets available on request
- *4: Option
- *5: SCS13 for those with a meter size of 15 to 25
- *6: SCS13 or SCS14 for those with a meter size of 15 to 65
- *7: When exceeding 50°C, the heat-resisting glass is used up to 60°C.

DIMENSION



Meter size	L (mm)	
	Metallic material	PVC
15	320	320
20	320	320
25	320	360
40	370	400
50	370	400
65	370	410
80	400	410
100	400	410

PRODUCT WEIGHT

Meter size	Mass (Approx.) kg		Meter size	Mass (Approx.) kg	
	Metallic material	PVC		Metallic material	PVC
15	2.5	0.7	50	9.5	4.0
20	3.5	1.0	65	13	6.0
25	5.5	2.0	80	17	7.0
40	7.0	3.0	100	20	9.0

ORDERING INFORMATION

Notify the following for order/inquiry;

Fluid name _____

Density _____

Viscosity _____ mPa·s _____

Press. _____ MPa _____

Temp. _____ °C _____

Full scale _____ m³/h _____ m³/h (nor)

Connection size _____ mm inch _____

Connection rating JIS10KRF Rc _____

Material class 1 (Carbon steel) 2 (SUS304)
 3 (PVC) 4 (HT-PVC)

Cautions on the use of glass tube variable area flowmeters

CAUTION

Avoid the use of glass tube variable area flowmeters for the following services.

1. Liquid services subject to impulse pressure in the process.
2. Secondary accidents might occur due to the breakage of glass in such services :
 - Toxic fluids such as poisons, stimulant and narcotics
 - Flammable fluids
 - Explosive fluids
3. Gas handling process where breakage of glass might result in gas leakage or scattering of glass fragments.
4. The installation places of the flowmeters where breakage of glass might be caused by the accidents from the surrounding piping or equipment.
5. On-off operation where breakage of glass might be caused by the collision of the float inside meter due to the abrupt change of flow.
6. Services where the heat shock by abrupt change of temperature is expected.

FLOW RATE TABLE

● SUS304 float, Water (Density 1.0g/cm³, Vls.1.0mPa·s)

Meter size	Flow rate (m ³ /h)	Press. Loss kPa
15	0.25 to 1.6	16
20	1.3 to 4	16
25	2.4 to 6.5	17.5
40	4.6 to 16	14
50	9.5 to 30	15
65	14 to 40	20
80	23 to 55	20
100	31 to 100	30

Note: When the flow rate is faster than 28 m³/h and the connection size is larger than 65 mm, the meter size is 65.

● SUS304 float, Other than Water

Meter size	Water flow rate (m ³ /h)	Press. Loss kPa
15	0.25 to 1.3	10
20	1.3 to 2.8	8.5
25	2.4 to 4.6	8.5
40	4.6 to 10	7
50	9.5 to 15	9
65	14 to 23	11
80	23 to 31	10
100	31 to 52	14

Above table is indicated by flow rate of water. Convert flow rate by the following formula for liquids than water.

$$Q \times (2.63 \div \sqrt{(7.9/\rho) - 1})$$

ρ : Density of liquid to be measured

● Gas measurement with Aluminium float

Meter size	Flow rate (Air) m ³ /h (nor)	Press. Loss kPa
15	4.5 to 21	3.5
20	48	3
25	77	3
40	170	2.5
50	250	2
65	380	3
80	530	4
100	850	5

Above table is indicated by flow rate of air at 0°C, 1 atm. Convert flow rate by the following formula for different conditions.

$$Q \times 0.0541 \times \sqrt{\rho \times (273+t) / (0.1013+p)}$$

● PVC, HT-PVC float, Water (Density 1.0g/cm³, Vls.1.0mPa·s)

Meter size	Flow rate (m ³ /h)	Press. Loss kPa
15	0.25 to 1	6
20	0.6 to 2.5	6
25	1.4 to 5	9
40	2.7 to 12	7
50	4 to 20	13.5
65	8.5 to 32	16
80	8.5 to 50	15
100	14 to 65	15.5

● PVC, HT-PVC float, Other than Water

Meter size	Water flow rate (m ³ /h)	Press. Loss kPa
15	0.25 to 0.6	2.5
20	0.6 to 1.5	3
25	1.4 to 2.7	3
40	2.7 to 6	2.5
50	4 to 8.5	3.5
65	8.5 to 14	4.5
80	8.5 to 19	3.5
100	14 to 25	4.5

Above table is indicated by flow rate of water. Convert flow rate by the following formula for liquids than water.

$$Q \times (1.58 \div \sqrt{(3.5/\rho) - 1})$$

ρ : Density of liquid to be measured

● Gas measurement with SUS304 float

Meter size	Flow rate (Air) m ³ /h (nor)	Press. Loss kPa
15	8 to 35	8
20	80	9.5
25	130	10
40	280	7.5
50	390	6.5
65	600	8
80	800	8
100	1100	9

Above table is indicated by flow rate of air at 0°C, 1 atm. Convert flow rate by the following formula for different conditions.

$$Q \times 0.0541 \times \sqrt{(\rho \times (273+t) / (0.1013+p))}$$

Gases with a pressure lower than 0.1 MPa may cause hunting of the SUS float. Contact Tokyo Keiso for details.

PROCESS CONNECTION

· Metal body (JIS10K, ANSI class150, JPI class150)

Meter size	Connection size										
	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A
15	○	○	△								
20		○	○	△	△						
25			○	△	○	△					
40					○	○	△				
50						○	○	△			
65							○	○	△		
80								○	○	△	
100									○	○	△

· PVC body (JIS10K)

Meter size	Connection size								
	15A	20A	25A	32A	40A	50A	65A	80A	100A
15	○	△	△						
20		○	△	△					
25			○	△	△				
40					○				
50						○			
65							○		
80								○	
100									○

○...Standard

△...Option. Contact Tokyo Keiso.

Note: The standard and optional PVC bodies may differ in appearance.

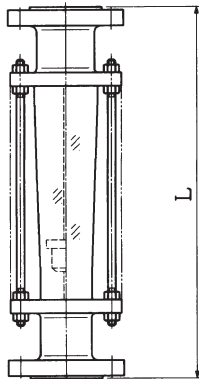
SCALE GRADUATION

Scale range	Scale graduation								
1 to 10	1	2	4	6	8	10			
1.2 to 12	1.2	2	4	6	8	10	12		
1.4 to 14	1.4	2	4	6	8	10	12	14	
1.5 to 15	1.5	2	5	10	15				
1.6 to 16	1.6	2	4	8	12	16			
1.8 to 18	1.8	5	10	15	18				
2 to 20	2	5	10	15	20				
2.5 to 25	2.5	5	10	15	20	25			
3 to 30	3	10	20	30					
3.5 to 35	3.5	10	20	30	35				
4 to 40	4	10	20	30	40				
4.5 to 45	4.5	10	20	30	40	45			
5 to 50	5	10	20	30	40	50			
5.5 to 55	5.5	10	20	30	40	50	55		
6 to 60	6	10	20	30	40	50	60		
6.5 to 65	6.5	10	20	30	40	50	60	65	
7 to 70	7	10	20	40	60	70			
7.5 to 75	7.5	10	20	40	60	70	75		
8 to 80	8	10	20	40	60	80			
8.5 to 85	8.5	10	20	40	60	80	85		
9 to 90	9	20	40	60	80	90			
9.5 to 95	9.5	20	40	60	80	90	95		

STANDARDIZED ITEM

NE series are ready for quick delivery with standardized specification. Order by Model code only.

Calibration condition	: Water, Density 1.0g/cm ³ , 1.0mPa·s
Connection	: JIS10KRF flange
Scale Graduation	: Double scaled by m ³ /h (L/h) and L/min
Fluid pressure	: As per standard R-101-E
Fluid temperature	: As per standard R-101-E
Dimension	: As per standard R-101-E (Refer to following table)
Material	Fittings : ① Carbon steel Type NE-□□□-□□S : ② SUS304 Type NE-□□□-□□4
	Tapered tube : Heat-resistant glass
	Float : SUS304
	Packing : NBR



Model code	Connection size	L (mm)
NE-015-□□-□	15A	320
NE-020-□□-□	20A	320
NE-025-□□-□	25A	320
NE-040-□□-□	40A	370
NE-050-□□-□	50A	370
NE-065-□□-□	65A	370
NE-080-□□-□	80A	400
NE-100-□□-□	100A	400

↑ Flange material
S : Carbon steel
4 : SUS304

Model code	Connection size	Flow scale	
		m ³ /h	L/min
NE-015-03-□	15A	30 to 300L/h	0.5 to 5
NE-015-05-□		50 to 500L/h	1 to 10
NE-015-08-□		80 to 800L/h	1.3 to 13
NE-015-10-□		0.1 to 1	1.8 to 18
NE-015-15-□		0.15 to 1.5	2.5 to 25
NE-020-15-□	20A	0.15 to 1.5	2.5 to 25
NE-020-20-□		0.2 to 2	3 to 30
NE-020-30-□		0.3 to 3	5 to 50
NE-025-20-□	25A	0.2 to 2	4 to 40
NE-025-30-□		0.3 to 3	5 to 50
NE-025-40-□		0.4 to 4	6 to 60
NE-025-50-□		0.5 to 5	9 to 90
NE-025-60-□		0.6 to 6	10 to 100
NE-040-05-□	40A	0.5 to 5	8 to 80
NE-040-08-□		0.8 to 8	13 to 130
NE-040-10-□		1 to 10	15 to 150
NE-040-15-□		1.5 to 15	25 to 250
NE-050-10-□	50A	1 to 10	18 to 180
NE-050-15-□		1.5 to 15	25 to 250
NE-050-20-□		2 to 20	35 to 350
NE-050-25-□		2.5 to 25	40 to 400
NE-065-15-□	65A	1.5 to 15	25 to 250
NE-065-20-□		2 to 20	35 to 350
NE-065-30-□		3 to 30	50 to 500
NE-065-40-□		4 to 40	70 to 700
NE-080-30-□	80A	3 to 30	50 to 500
NE-080-40-□		4 to 40	70 to 700
NE-080-50-□		5 to 50	—*
NE-100-40-□	100A	4 to 40	70 to 700
NE-100-50-□		5 to 50	—*
NE-100-70-□		7 to 70	120 to 1200
NE-100-90-□		9 to 90	150 to 1500

* L/min graduation is not available.

* Specification is subject to change without notice.

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