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 SPECIFICTION

- Available size : 15mm(1/2") to 100mm(4")
- 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.)
  - Float : For liquids SUS304, PVC, HT-PVC* others
    For gases Aluminium, SUS304, others
  - Seal : NBR, EPDM, FPM

* High temperature use PVC

- Process connection
  - Standard : JIS10K flange
  - Option : ANSI, DIN, other flanges
    Rc, NPT threads (upto 50mm)

- Flow direction : Bottom to Top

- Press. range

Meter size (mm)	Max. Op. Press MPa	Meter size (mm)	Max. Op. 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

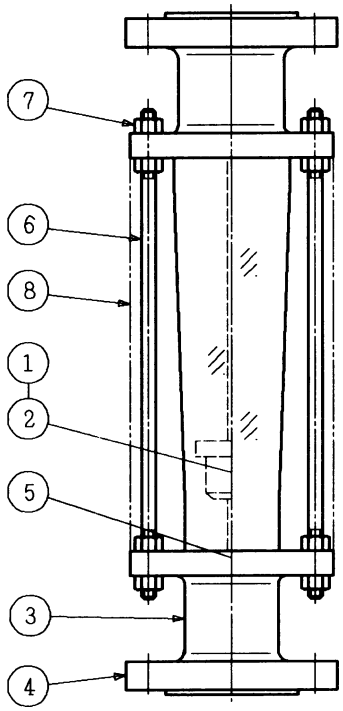
- Temp. range
  - Standard metallic material : upto 120°C
  - PVC material : upto 50°C
    (When exceeding 50°C, the heat-resisting glass is used for the tapered tube.)
  - HT-PVC material : upto 80°C
- Allowable thermal shock : 80°C
- Accuracy : Metallic float versions ±1.5% F.S.
  : Resin float versions ±2.5% F.S.
- Range ability : 10:1
- Paint : Munsell 7.5BG4/1.5
- Option : Double scaling

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

MODEL CODE

All products : **R-101-E**

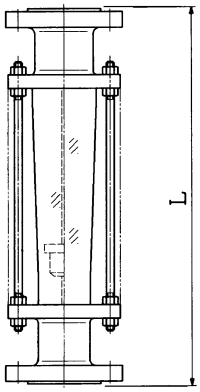
STANDARD MATERIAL



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

*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 15 to 25mm
*6: When exceeding 50°C, the heat-resisting glass is used up to 60°C.

DIMENSION



Meter size (mm)	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 (mm)	Mass (Approx.) kg		Meter size (mm)	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 ☐ m^3/h ☐ m^3/h (nor) ☐

Connection size ☐ mm ☐ inch _____

Connection rating ☐ JIS10KRF ☐ Rc thread ☐

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/cm^3, Vis.1.0mPa·s)

Meter size (mm)	Possible range (m^3/h)	Press. Loss kPa
15	Min. 0.25 Max. 1.6	0.8 10.8
20	Max. 4	7.8
25	Max. 6.5	11.8
40	Max. 16	9.8
50	Max. 30	14.7
65	Max. 40	17.7
80	Max. 55	19.6
100	Max. 100	19.6

● PVC, HT-PVC float, Water (Density 1.0g/cm^3, Vls.1.0mPa·s)

Meter size (mm)	Possible range (m^3/h)	Press. Loss kPa
15	Min. 0.25 Max. 1.0	0.8 5.4
20	Max. 2.7	4.9
25	Max. 5	7.8
40	Max. 12	6.9
50	Max. 20	6.9
65	Max. 32	9.8
80	Max. 50	15.7
100	Max. 65	15.7

● SUS304 float, Other than Water

Meter size (mm)	Possible range (m^3/h)	Press. Loss kPa
15	Min. 0.25 Max. 1.3	0.8 9.8
20	Max. 2.8	6.9
25	Max. 4.5	7.8
40	Max. 10	5.4
50	Max. 15.5	5.9
65	Max. 23	5.9
80	Max. 31	7.8
100	Max. 52	9.3

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

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

γ : Density of liquid to be measured

● PVC, HT-PVC float, Other than Water

Meter size (mm)	Possible range (m^3/h)	Press. Loss kPa
15	Min. 0.25 Max. 0.6	0.8 5.4
20	Max. 1.9	4.9
25	Max. 3.6	7.8
40	Max. 7.0	6.9
50	Max. 11.5	6.9
65	Max. 15.5	9.8
80	Max. 25	15.7
100	Max. 42	15.7

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

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

γ : Density of liquid to be measured

● Gas measurement with Aluminium float

Meter size (mm)	Possible range m^3/h (nor)	Press. Loss kPa
15	Min. 4.5 Max. 21	0.3 2.5
20	Max. 48	3.4
25	Max. 77	4.9
40	Max. 170	3.9
50	Max. 250	3.9
65	Max. 380	2.9
80	Max. 530	2.9
100	Max. 850	3.4

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

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

● Gas measurement with SUS304 float

Meter size (mm)	Possible range m^3/h (nor)	Press. Loss kPa
15	Min. 8 Max. 35	0.9 7.0
20	Max. 85	9.8
25	Max. 130	11.8
40	Max. 280	8.8
50	Max. 390	7.8
65	Max. 600	7.8
80	Max. 800	8.5
100	Max. 1100	8.8

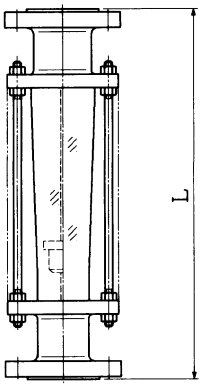
Above table is indicated by flow rate of air at 0°C, 1 atm. Convert flow rate by the following formula for different conditions.

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

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
Press. rating : As per standard R-101-E
Temp. rating : As per standard R-101-E
Dimension : As per standard R-101-E (Refer to following table)
Material Flange : ① Carbon steel Type NE-□□□-□□S
: ② SUS304 Type NE-□□□-□□4
Tapered tube : Heat-resistant glass
Float : SUS304
Seal : 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	Scale graduation m^3/h	Scale graduation L/min
NE-015-03-□	15A	30~300 L//h	0.5~5
NE-015-05-□		50~500 L//h	1~10
NE-015-08-□		80~800 L//h	1.3~13
NE-015-10-□		0.1~1	1.8~18
NE-015-15-□		0.15~1.5	2.5~25
NE-020-15-□	20A	0.15~1.5	2.5~25
NE-020-20-□		0.2~2	3~30
NE-020-30-□		0.3~3	5~50
NE-025-20-□	25A	0.2~2	4~40
NE-025-30-□		0.3~3	5~50
NE-025-40-□		0.4~4	6~60
NE-025-50-□		0.5~5	9~90
NE-025-60-□		0.6~6	10~100
NE-040-05-□	40A	0.5~5	8~80
NE-040-08-□		0.8~8	13~130
NE-040-10-□		1~10	15~150
NE-040-15-□		1.5~15	25~250
NE-050-10-□	50A	1~10	18~180
NE-050-15-□		1.5~15	25~250
NE-050-20-□		2~20	35~350
NE-050-25-□		2.5~25	40~400
NE-065-15-□	65A	1.5~15	25~250
NE-065-20-□		2~20	35~350
NE-065-30-□		3~30	50~500
NE-065-40-□		4~40	70~700
NE-080-30-□	80A	3~30	50~500
NE-080-40-□		4~40	70~700
NE-080-50-□		5~50	– *
NE-100-40-□	100A	4~40	70~700
NE-100-50-□		5~50	– *
NE-100-70-□		7~70	120~1200
NE-100-80-□		8~80	130~1300
NE-100-90-□		9~90	150~1500
NE-100-100-□		10~100	180~1800

* NE-80-50-□ and NE-100-50-□ : L/min graduation is not available.

* Specification is subject to change without notice.

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