TECHNICAL GUIDANCE

R-700 Series

Glass tube flowmeter with alarm contact

OUTLINE

R-700 series is a glass tube area flowmeter with alarm contact(s). In addition to local flow rate indication by the position of float, reed switch alarm contact(s) are actuated at set flow rate.
R-700 is useful and effective for prevention of flow cut-off for cooling water system efc.

STANDARD SPECFICATION

Available sizes :

a. General version R-7□□
65,80 and 100mm
(With float guiding road)

b. Ribbed tapered tube version R-7□□-R
10,15,20,25,40 and 50mm

c. Wide designed tapered tube version R-7□□-E
25,40,50,65,80 and 100mm
(With float guiding road)

Measuring fluid : Liquids and gases

Fluid pressure :

Meter size	Max. fluid press. MPa		
	R-7□□	R-7□□-R	R-7□□-E
10	–	1.2	–
15	–	1	–
20	–	0.8	–
25	–	0.8	0.8
40	–	0.6	0.6
50	–	0.6	0.6
65	0.6	–	0.6
80	0.4	–	0.4
100	0.4	–	0.4

Fluid temperature :
Max.120°C (Allowable thermal shock:80°C)
NB.1) upto 80°C for NBR gasket version
2) up to 60°C for PVC body version
It is general data, and the maximum temperature may change by terms of use and environment.

Indication accuracy : std. ±1.5% (F.S)*
*±2.5% (F.S) for resin float version

Range ability : 10 : 1

Paint color: Munsell 7.5BG4/1.5 (except for the SUS body)

Material :
Tapered tube : Heat-resistant glass
Float : Standard For liquids SUS304
For gases Aluminum
Option SUS316, SUS316L, PVC
Packing : Standard NBR
Option FPM, other

Body : SS400*, SCS13, SCS14
Option PVC
*Only R-7□□-E types are available.

Process connection :
Standard ; JIS10K flange
Option ANSI, JPI, other flange
Flow direction ;
Standard Bottom→Top (R-7□1-□)
Option Bottom→Top side (R-7□-2-□)
Bottom side→Top side (R-7□3-□)
Bottom rear→Top rear (R-7□5-□)

No.of alarm point :

Meter size	Possible Alarm point		
	R-7□□	R-7□□-R	R-7□□-E
10	–	1×Low + 1×High	–
15	–	1×Low + 1×High	–
20	–	1×Low + 1×High	–
25	–	1×Low + 1×High	1×Low
40	–	1×Low + 1×High	1×Low
50	–	1×Low + 1×High	1×Low
65	1×Low	–	1×Low
80	1×Low	–	1×Low
100	1×Low	–	1×Low

Alarm Contact :
1) Reed Switch(R-75□-□)
2) Optical Switch(R-76□-□)
Refer to separate explanation for details

MODEL CODE

Model code						Description
R-	7					
Type of contact		5				Reed switch
		6				Optical switch
Flow direciton			1			Bottom→ Top
			2			Bottom→ Top side
			3			Bottom side→ Top side
			5			Bottom rear→ Top rear
Type of tapered tube						General purpose
				-	R	Rib guided
				-	E	Wide designed

FLOW RATE

1) For Liquid measurement

Meter size	Flow rate					
	R-7□□ General type		R-7□□-R Rib guided		R-7□□-E Wide designed	
	Water m³/h	Press Loss (kPa)	Water m³/h	Press Loss (kPa)	Water m³/h	Press Loss (kPa)
10	–	–	0.065 to 0.1	2.5	–	–
15	–	–	0.4	2.5	–	–
20	–	–	1	3.5	–	–
25	–	–	1.65	5	3 to 6.5	12
40 B	–	–	2.5	4	15	10
40 A			4.3	4		
50	–	–	6.7	4	25	12
65	9 to 12	5	–	–	40	18
80	21	9	–	–	55	18
100	50	19	–	–	80	15

General type (R-7□□) and Wide designed type (R-7□□-E) are suitable only for Water or water equivalent liquid having 1.0 mPa·s viscosity.

Above table shows maximum possible full scale for different meter sizes with stainless steel floats.

The figures are indicated by flow rate of Water having Density of 1.0g/cm³ and viscosity of 1.0 mPa·s In case actual operating condition is different from this, a conversion calculation is required. Consult factory for details.

2) For Gas measurement

Meter size	Flow rate R-7□□-R (Ribbed tapered tube version)	
	Air m³/h (nor)	Press. Loss (kPa)
15	2~7.5	3.5
20	17	2.5
25	28	2.5
40 B	39	3.5
40 A	85	3
50	130	3

Ribbed tapered tube version(R-7□□-R) is recommended for gas measurement. Available size is 15 to 50

Above table shows maximum possible full scale for different meter sizes with aluminum float.

The figures are indicated by flow rate of Air under Normal condition (Density 1.293kg/m³(nor) ,0°C,1atm). In case the fluid is different from air, and / or operating condition is not under Normal condition, a conversion calculation is required. Consult factory for details.

ACCEPTABLE CONNECTION FLANGE SIZES

Possible connection flange sizes against selected meter size are shown in the following tables.

1)For R-7□□ (General type) and R-7□□-R (Ribbed tapered tube type)

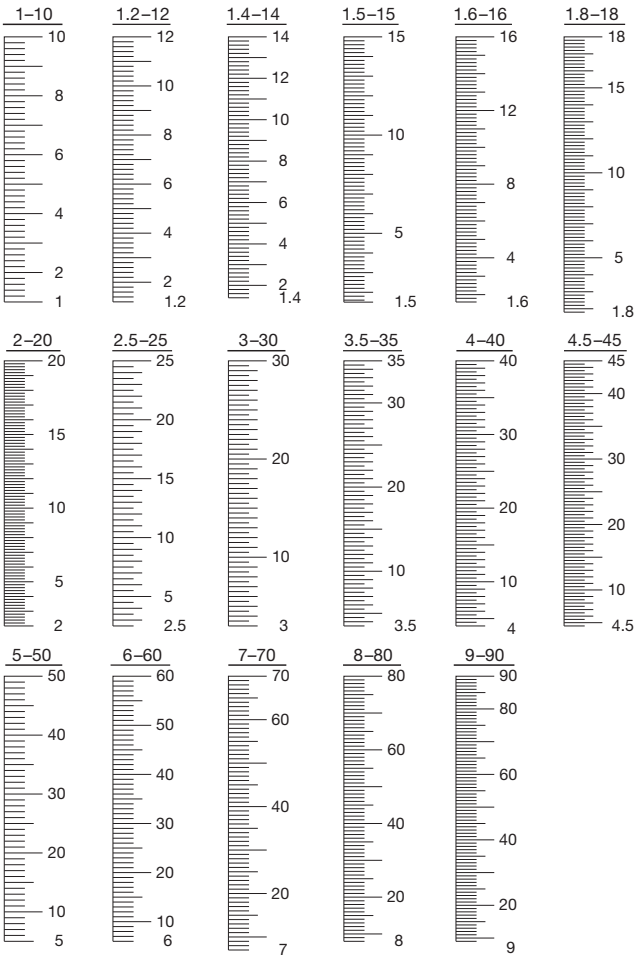
Body material	Connection flange size (against meter size)		
	–1	±0	+1
SCS14	○	○	○

2)For R-7□□-E (Wide designed type)

Body material	Connection flange size (against meter size)		
	–1	±0	+1
SS400/SGP	×	○	○
SCS13,SCS14	×	○	○
PVC	×	○	×

STANDARD GRADUATION

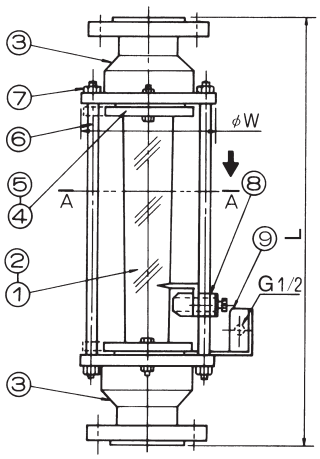
The follwing 17 different standard graduations are ready to choose. Fix your full scale to meet the availability.



Graduation examples are for R-7□□ and R-7□□-R, They may slightly differ for R-7□□-E

DIMENSIONS

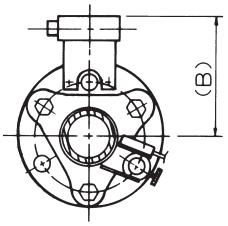
R-751, R-751-R



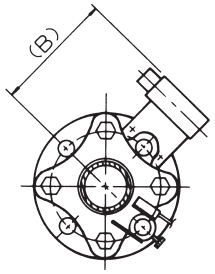
Front view

No.	Parts name	Material
1	Tapered tube	Heat-resistant glass
2	Float	SUS304, Aluminum, Others
3	Body	SCS14, Others
4	Packing follower	SCS13, SUS304
5	Packing	NBR, FPM, Others
6	Column	SUS304
7	nut	SS400, SUS304
8	Switch	Assembly
9	Terminal Box	ADC12

Meter size 10 to 40B



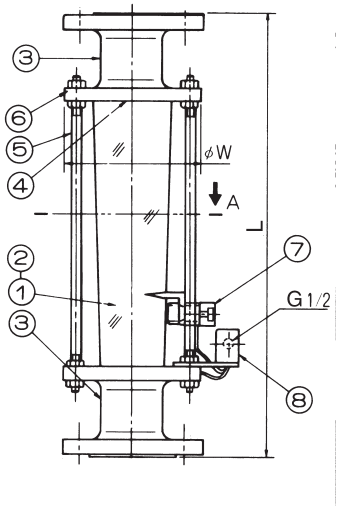
Meter size 40A to 100



Top view

Meter size	Dimension (mm)				Mass (Approx.) kg
	L	W	B		
			1 point alarm	2 point alarm	
10	420	62	90	126	3.5
15	420	84	99	135	4.5
20	430	94	104	140	5.5
25	500	119	117	153	8.5
40B	500	129	122	158	12
40A	500	144	129	165	15
50	530	171	143	179	18
65	530	186	135	171	23
80	570	206	144	180	30
100	590	242	162	198	42

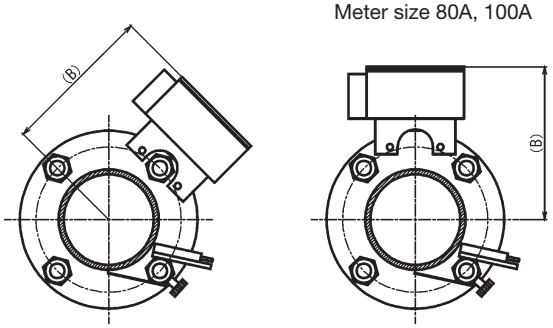
R-751-E



Front view

No.	Parts name	Material
1	Tapered tube	Heat-resistant glass
2	Float	SUS304, Aluminum, Others
3	Body	SGP/SS400, SCS13, SCS14 Others
4	Packing	NBR, FPM, Others
5	Column	SUS304
6	nut	SS400, SUS304
7	Switch	Assembly
8	Terminal Box	ADC12

Metal Body
Meter size 80A, 100A



Top view

Meter size	Dimension (mm)						Mass (Approx.) kg
	L		ϕW		B		
	Metal Body	PVC Body	Metal Body	PVC Body	Metal Body	PVC Body	
25	320	360	102	102	94	106	6.5
40	370	400	120	120	103	115	8
50	370	400	144	144	114	126	12
65	370	410	160	160	122	134	13
80	400	410	180	180	129	141	17
100	400	410	200	200	139	151	20

ALARM CONTACTS

Reed switch type (R-75☐)

- Type of switch : Self holding type.
  Normal open or Normal close
- Capacity : AC.DC,10W(Resistance load)
  Max.voltage AC 120V, DC 170V
  Max.Current AC 0.25A, DC 0.25A
- Setting Accuracy : ± 2% F.S. (Against flow calibration)
- Reset span : ≦15% F.S. (R-75☐, R-75☐-R)
  ≦20% F.S. (R-75☐-E)
  (Against flow calibration)
- Enclosure : Splash-proof

Optical switch type (R-76☐)

- Output : Open collector (NPN)
- Output rating : Max. sink current 80 mA (30V DC)
- Operation : Dark ON (Open collector ON when light is shielded)
- Response time : 0.5 msec or less
- Power supply : 24V DC ± 10% (Power ripple : max. 10%)
- Power consumption : Projector 15 mA or less
  Receiver 22 mA or less
- Photosensitivity adjustment
  : Included
- Operation display : Operation indication (Red LED)
  Stability indication (Green LED)
- Connection : Cable pullout type (Cable outer diameter ø2.8 mm)
  Cables
  Projector 0.15 mm^2 two-core cable, 2 m (Gray)
  Receiver 0.15 mm^2 three-core cable, 2 m (Black)
- Structure : Waterproof hermetic (Equivalent to IP64)
- Material : Case (Liquid crystal polyester/Polypropylene filler)
- Ambient illuminance : 3,000 lux or less
- Ambient temperature : –25 to +55ºC (No freezing)
- Ambient humidity : 85%RH or less (No condensation)

ORDERING INFORMATION

Model	
Q'ty	
Fluid name	
Density	
Viscosity	
Pressure	
Temperature	
Scale range	
Alarm setting point	☐ LO_____ ☐ HI_____
Action	LO ☐ Open ☐ Close for decrease HI ☐ Open ☐ Close for increase
Material	Body _____ Float _____ Gasket _____
Special instruction	

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.

* Specification is subject to change without notice.

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