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 : FC200*, SCS13, SCS14
Option PVC
*SS400/SGP for R-7□□-E

Process connection : Through flanges
Rating ; JIS10KFF
Option JIS10KRF, JIS5KFF (RF)
ANSI Class 150 flanges
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	–	–	1.0	3.5	–	–
25	–	–	1.65	5	3 to 6.5	12
40 B	–	–	2.5	4	13	10
40 A			4.3	4		
50	–	–	6.7	4	24	12
65	9 to 12	5	–	–	37	18
80	21	9	–	–	50	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)
10		2.1 to 3	3.5
15		12.5	3.5
20		20	2.5
25		33	2.5
40	B	52	3.5
	A	95	3
50		160	3

Ribbed tapered tube version(R-7□□-R) is recommended for gas measurement. Available size is 10 to 50

Above table shows maximum possible full scale for different meter sizes with aluminum float. (Stainless steel for 10 and 15)
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
FC200	○	○	×
SCS13,SCS14	○	○	○
PVC* Mater size 20	○	○	○

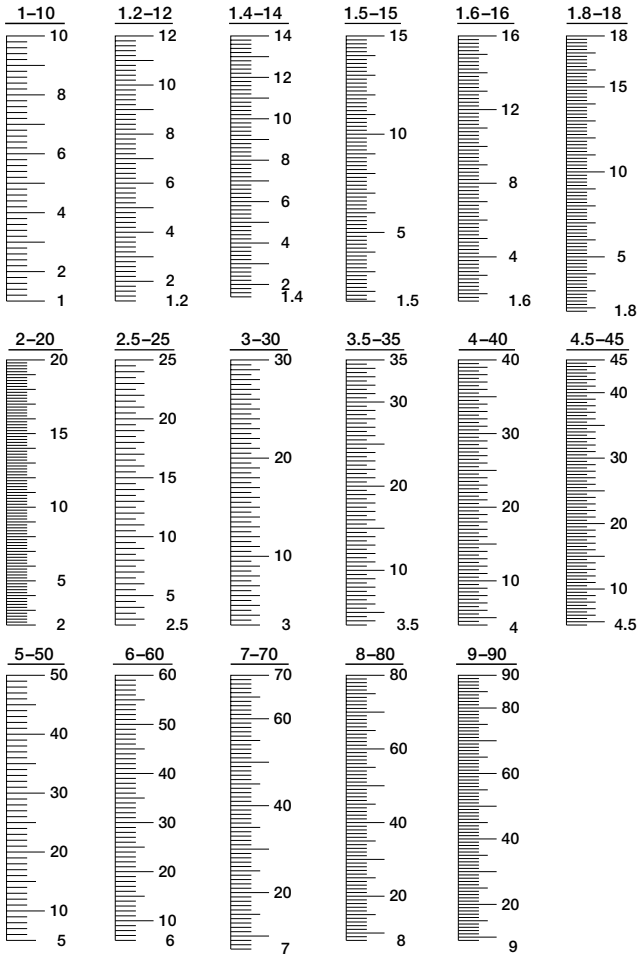
2)For R-7□□-E (Wide designed type)

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

*PVC material for more than 25 in meter size is the PVC lining.

■ STANDARD GRADUATION

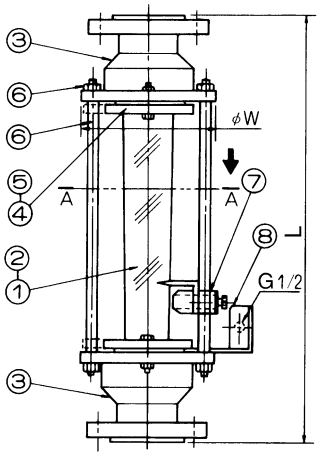
The follwing 17 different standard graduations are ready to choose.
Fix your full scale to meet the availability.
〔Ex. In case full scale is 300Nm³/h, graduation will be 3 to 30×10m³/h (nor)〕



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

■ DIMENSIONS

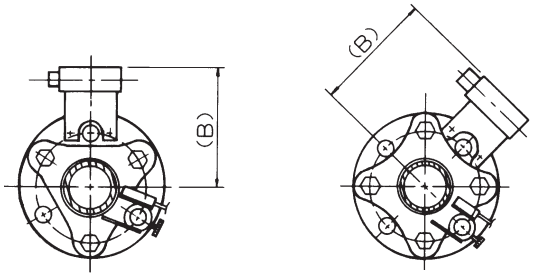
R-7 □ 1, R-7 □ 1-R



Front view

No.	Parts name	Material
1	Tapered tube	Heat-resistant glass
2	Float	SUS304, Aluminum, Others
3	Body	FC200, SCS13, Others
4	Packing follower	FC200
5	Packing	NBR, FPM, Others
6	Column and nut	SS400, SUS304
7	Switch	Assembly
8	Terminal Box	ADC12

Meter size 10 to 40 Meter size 40 to 100

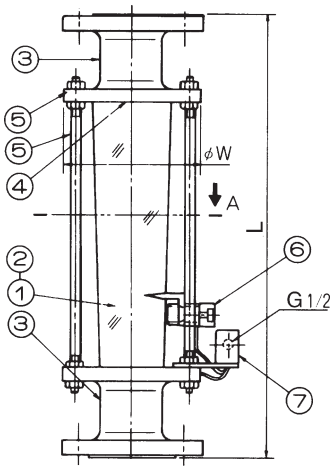


Top view

Meter size	Dimension (mm)				Mass (Approx.) kg
	L	W	B		
			1 point alarm	2 point alarm	
10	420	67	80*1	115*1	3.5
15	420	88	90*1	125*1	4.5
20	430	98	95*1	135*1	5.5
25	500	119	105	140	8.5
40B	500	129	110	145	12
40A	500	144	115	150	15
50	530	171	130	165	18
65	530	186	135	–	23
80	570	206	145	–	30
100	590	242	165	–	42

*1:10mm is added for SUS304, SUS316 and SUS316L material.

R-7 □ 1-E



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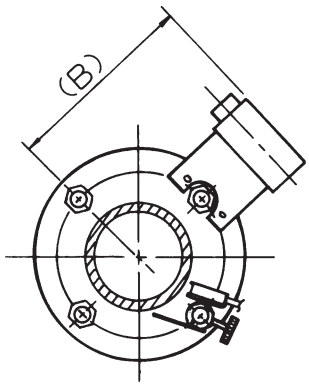

Top view

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	110	135	100	105	6.5
40	370	400	120	140	105	110	8
50	370	400	144	155	115	115	12
65	370	410	160	175	125	125	13
80	400	410	180	185	130	130	17
100	400	410	200	210	140	145	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☐)

- Components : 1) Optical projector and receiver
  (Provided onto flowmeter)
  2) Amplifier unit
  (Separate installation)
- Type of switch : In stantaneous transfer contact
  (Holding circut to be arranged by customer)
- Capacity : 230 V AC,1A(Resistance load)
- Setting Accuracy : ±2% F.S. (Against flow calibration)
- Amb.Temp : –10 to +40°C
- Amb.Hurnid : 45 to 85%RH
- En closure : Non-weather proof
- Power supply : 100/200 V AC ±10%, 50/60Hz
- Consumption : ≦5VA
- Cable : 1m cable provided (Max. 10m)

■ 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
Cable Length (only for R-76☐-☐)	☐ 1m ☐ ____ m
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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