

#### GENERAL

**AM-1000** series are most well accepted metal tube flowmeters which have been developed based on the long time experience of **TOKYO KEISO** in the field of flow measurement.

In addition to highly reliable local indicators, Pneumatic transmitters, Electric transmitters, Integrator with scaled pulse output as well as Alarm contact output versions are ready to meet the requirements. Standard metallic materials and full line-up of lined materials cover almost all fluids even they are very corrosive.

**AM-1000** covers liquids, gases and steam measurement applications in various industrial fields.



#### FEATURES

**FULL LINE-UP TO MEET ALL POSSIBLE REQUIREMENTS!**

All the necessary functions required for variable area flowmeters, i. e. local indication, pneumatic transmission, electric transmission, integration and alarm are now available from one line.

**COMPACT DESIGN**

Smaller and lighter . . . . To suit modern needs

**WIDE PRESSURE RANGE**

150 lbs and 300 lbs rating are available as standard and higher pressure versions are also available as option.

**WIDE RANGE OF MATERIAL SELECTION**

All possible metallic materials and a wide variety of lining materials are available even for corrosive fluids.

**FOR HAZARDOUS AREA**

Flame proof and Intrinsically safe version (AM-1700) are available to meet hazardous area applications.

Especially, the flame proof enclosure covering hydrogen atmosphere with analog output is available. It is classified as IIC T4 without barrier.

#### MODEL CODE

		MODEL CODE						DESCRIPTION
		AM-1		-	-	-		
Construction							Dust- and splash-proof (IP54)	
	EP-						Flame proof	
	IS-						Intrinsically safe *1	
Function		40					Local indication	
		31					Local indication + Pneumatic transmission	
		52					Local indication + Electric transmission	
		69					Local indication + Local integration + Pluse output	
		74					Local indication + Alam output	
Flow direction		1	-				Bottom-Top	
		1-LB	-				Bottom-Top, Long body design	
		2	-				Bottom-Top side	
		3	-				Bottom side-Top side	
		6	-				Left-Right (Horizontal)	
		7	-				Right-Left (Horizontal)	
	Additional function 1				D			Liquid damper *2
				DU			Gas damper	
				F			Cooling fin	
				DF			Damper + fin *2	
Additional function 2					-	JS	Semi Jacket	
						-	JF	Full Jacket
Pressure rating						-	General purpose 150 lbs (10K) class	
						-	M	Medium purpose 300 lbs (20K) class
						-	H	High pressure

\*1: Intrinsically safe versions is available for IS-AM-174□ with alarm output.

\*2: Liquid damper is available for Bottom side-Top side version (AM-1□□3), Left-Right version (AM-1□□6) and Right - Left version (AM-1□□7) only.

## STANDARD SPECIFICATION

### ● FUNCTIONS

AM-140□	AM-131□	AM-152□	AM-169□	AM-174□
Local indication	Local indication Pneumatic transmission	Local indication Electric transmission	Local indication Local integration Pulse output	Local indication Alarm output

- **METER SIZE** Standard 15~150  
(Please refer to M Series for more than 200.)
- **MATERIAL** Standard Carbon steel, SUS304, SUS316, SUS316L  
Rubber lining, Fluorocarbon resin lining, PVC lining and Glass lining  
On request Other metallic material
- **PRESSURE RATING** Standard 150lbs (10K) class  
300lbs (20K) class  
On request Consult factory for higher pressure.  
Only 150 lbs (10K) class is available for full jacketed flowmeters (AM-1□□□-JF) and lining material flowmeters.

### ● FLUID PRESSURE

		General purpose 150lbs (10K) class AM-1□□□-□			Medium pressure 300lbs (20K) class AM-1□□□-M				
Fluid Temp	°C	~120	~220	~300	~120	~220	~300	~350	~400
	°F	248	428	527	248	428	527	662	752
Max. Fluid Press.	MPa	1.4	1.2	1.0	3.4	3.1	2.9	2.6	2.3

Consult factory for the specifications of higher pressure model, AM-1□□□-H.

### ● CONNECTION

- Standard Flange connection
- On request Screw connection (Consult factory)

Low pressure AM-1□□□-□	Standard JIS10KFF	ANSI, DIN, Other type are available
Middle pressure AM-1-□□□-M	Standard JIS20KRF	
High pressure AM-1-□□□-H	Consult factory	

Only RF (Raised faced) flange is available for glass, PVC and fluorocarbon resin lined flowmeters. Only FF (Flat faced) flange is available for rubber lined flowmeters.

### ● FLUID TEMPERATURE

#### a) Metallic material

Type		AM-1□□□1	AM-1□□□2/3	AM-1□□□-DU	AM-1□□□2/3-F
Max.Op.Temp	°C	200*1	149	149	400*2
	°F	392	302	302	752

\*1: Upto 250°C possible on request.

\*2: Max. 300°C for general purpose 150lbs (10K) class

#### b) Lining Material

Lining Material		Rubber Lining	Fluorocarbon resin Lining	PVC Lining	Glass Lining
Op.Temp.Range	°C	-10~80	-10~80	0~60	-10~110*
	°F	14~176	14~176	32~140	14~230

\*Max. 80°C for Fluorocarbon resin float

- **INDICATION ACCURACY** ± 1.5%F.S.\*  
(LOCAL INDICATION) On request ± 1.0%F.S., Consult factory  
± 2.0%F.S. for resin material float version
- **STANDARD SCALE LENGTH** 75mm
- **RANGE ABILITY** 10 : 1
- **INDICATOR CONSTRUCTION** Dust- and splash-proof (equiv. to IP54)

REFER TO THE PAGES OF APPLICABLE MODEL CODES FOR THE DETAILS OF TRANSMITTER SPECIFICATION.

### AM-1400 SERIES LOCAL INDICATOR

● Dimension of indicator

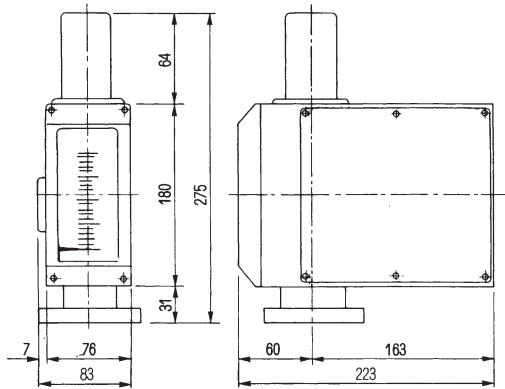


Fig. 1

Ambient Temp / -30-80°C



### AM-1300 SERIES LOCAL INDICATOR WITH PNEUMATIC TRANSMITTER

AM-1310 indicates flow rate by pointer and scale plate, and outputs pneumatic signal which is proportional to flow rate. The indicating mechanism and pointer moves by the magnet coupling in response to the movement of the float.



● Specification of transmitter

- Air supply : 0.14 ± 0.01MPa
- Outputs : Standard 20-100kPa (with output gauge)
- Air consumption : 14L/min(nor)
- Connection : Standard Rc 1/4  
On request NPT 1/4
- Output accuracy : ±1.0%F.S.
- Construction : Dust- and splash-proof (equiv. to IP54)
- Ambient Temp : -20-80°C  
Provide heat insulation if required.
- Accessory : Air set (On request)

● Dimension of indicator/transmitter

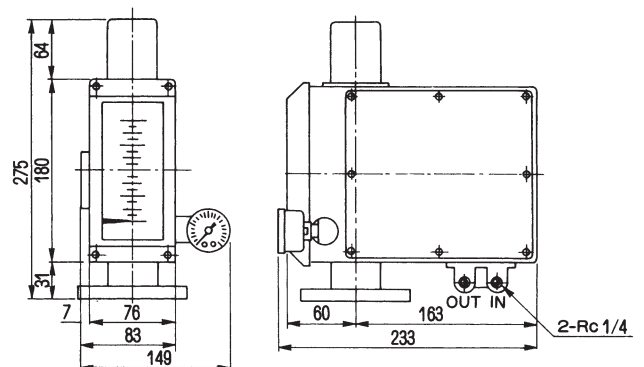


Fig. 2

**AM-1520 SERIES LOCAL INDICATOR WITH ELECTRIC TRANSMITTER**

AM-1520 indicates flow rate by pointer and scale plate, and outputs electric (4~20 mA DC) signal which is proportional to flow rate. In addition to dust- and splash-proof versions, flame-proof versions are available.

● DIMENSION OF INDICATOR/TRANSMITTER

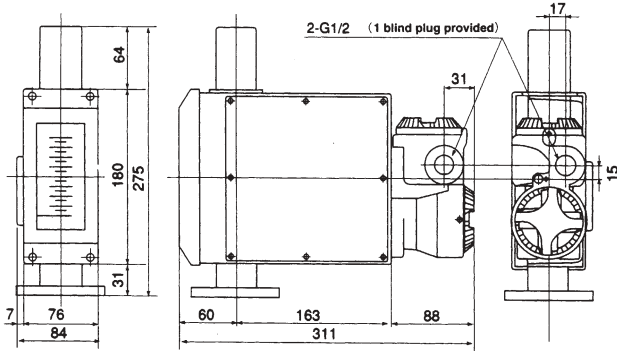


Fig. 3: Dust- and splash-proof AM-152□ and Exd EP-AM-152□



● TERMINAL AND WIRING

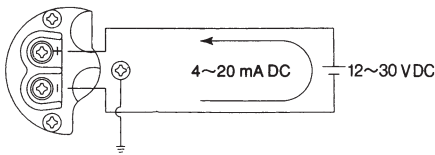


Fig. 4: Weather proof AM-152□ and Exd EP-AM-152□

● SPECIFICATION OF TRANSMITTER

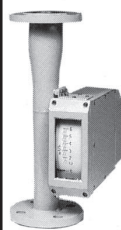
- Power supply voltage : Dust- and splash-proof and flame proof  
12~30 V DC
- Output : 4~20 mA DC
- Max load : Dust- and splash-proof and flame proof  
600Ω (24 V DC)
- Cable entry : Dust- and splash-proof  
: 2xG1/2 or 2xNPT1/2  
Flame proof : 2xG1/2 or 2xNPT1/2  
Option : Cable glands with a TIIS flame-proof applicable cable diameter ø8 to 12 (standard: ø10 mm to 12 mm)  
Specified cable gland (Type SXC-16B Shimada Electric Co.) to be used for flame proof construction work.
- Output accuracy : ±1.0%F.S. (Against flow calibration)
- Construction : Dust- and splash-proof ; Equ. to IP54 AM-152□  
Flame proof ; Exd II CT4 EP-AM-152□
- Ambient Temp : Dust- and splash-proof ; -30 ~ +70°C  
Flame proof ExdIICT4 ; -20 ~ +55°C

OPTIONAL UNITS

**IR series universal totalizer**

IR universal totalizer is an Indicator and Totalizer which is used in combination with AM series flowmeters having 4~20 mA DC or Pulse output for flow rate. Indication, Totalization, Alarm, 4~20 mA DC and Pulse re-output by one unit.

■ Combination with AM-152□ / 4~20 mA DC output, 2 wire



● IR4600-02

- Standard specification
- Flowrate indication : 4 digit, 0~9999
- Totalizing indication  
IR4600 : 6 digit LED, 0~18000c/h
- Alarm output : 2 points (H+L)
- Scaled pulse output: Open collector (IR4600 : 30 V DC, 50 mA)
- Analog reoutput : 4~20 mA DC
- Loop power supply : 24 V DC (integrated)

Refer to Technical guidance of IR series for the details.

**AM-1690 SERIES LOCAL INDICATOR WITH LOCAL INTEGRATOR AND PULSE TRANSMITTER**

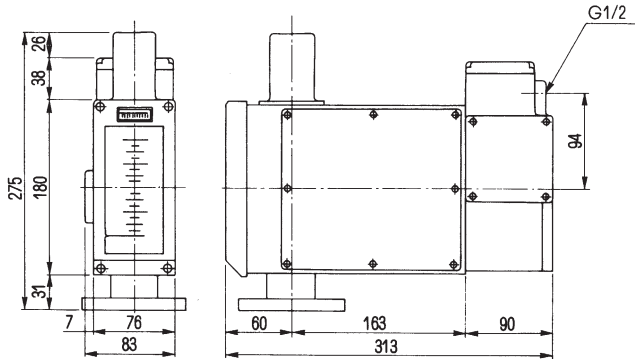
**AM-1690** indicates flow rate by pointer and scale plate and total flow by 6 digit mechanical counter locally. In addition, scaled pulse output is provided for remote totalization function. Watertight and flame proof construction is available.

● **Specification of transmitter**

- Integration : 6 digit with reset
- Count rate : 50~2000c/h
- Pulse output : Open collector output  
Pulse width 100ms, Rating 35 V DC, 50mA  
(Signal circuit and power supply circuit are isolated.)
- Integration accuracy : ±2.0%F.S. (Against flow calibration)
- Power supply : 100 V AC, 50/60Hz as standard. 110 V AC, 50/60Hz is also available on your request except flame proof version.  
A separate transformer is required for other voltage.
- Power consumption : Max. 5 VA
- Cable entry :  
Standard : G1/2 with female screw  
Cable glands with a TIIS flame-proof gasket are available (ø7 mm to 12 mm (standard: ø11 mm to 12 mm))  
  
On request : NPT1/2
- Enclosure : Dust- and splash-proof (equiv. to IP54)  
type AM-169□  
Flame proof (JISd2G4)  
type EP-AM-169□
- Ambient temp : -20~80°C for type AM-169□  
-10~60°C for type EP-AM-169□  
Provide heat insulation if required



● **Dimension of indicator/transmitter**



AM-169, EP-AM-169□  
Fig. 5

● **Wiring diagram**

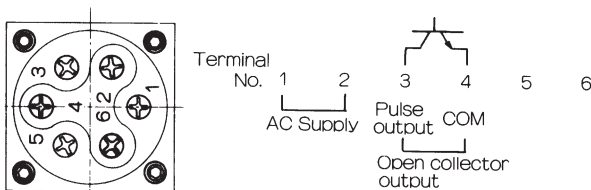


Fig. 6

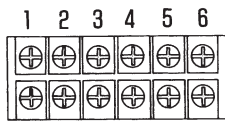
## AM-1740 SERIES LOCAL INDICATOR WITH ALARM

AM-1740 indicates flow rate by pointer and outputs SPDT contact at set point for flow alarm. Watertight, flame proof and intrinsically safe versions are available.

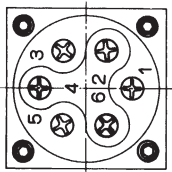
### ● Specification of transmitter

- Alarm point : 1 point high alarm or  
1 point low alarm or  
2 points high and low
- Switch : Micro switch SPDT
- Rating : 125/250 V AC, 5 A
- On request : 30 V DC, 0.1A
- Setting accuracy : ±1.5% F.S. (Against flow calibration)  
Note: The indication of flow rates except for the alarm setting value may be less accurate just after turning on the switch.
- Reset span : Weather proof and Intrinsically safe less than 20% (F.S.) (Against flow calibration)  
Flame proof EP-AM-174□ less than 30% (F.S.)
- Cable entry : G1/2 with female screw  
Cable glands with a TUIS flame-proof gasket are available (ø7 mm to 12 mm, standard: ø11 mm to 12 mm)
- On request : NPT 1/2
- Enclosure : Dust- and splash-proof (equiv. to IP54)  
type AM-174□  
Flame proof (JISd2G4) type EP-AM 174□  
Intrinsically safe (ExialICT6) type IS-AM-174□\*
- Ambient temp : -25~80°C for type AM-174□  
-10~60°C for type EP-AM-174□  
IS-AM-174□  
Provide heat insulation if required

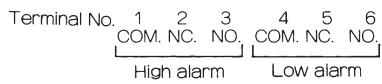
### ● Wiring diagram



AM-174□ and IS-AM-174□



EP-AM-174□



\* Terminals 4, 5, 6 (1, 2, 3) are not used in case of one point alarm of high (Low).

Fig. 9

### ● Safety Relay

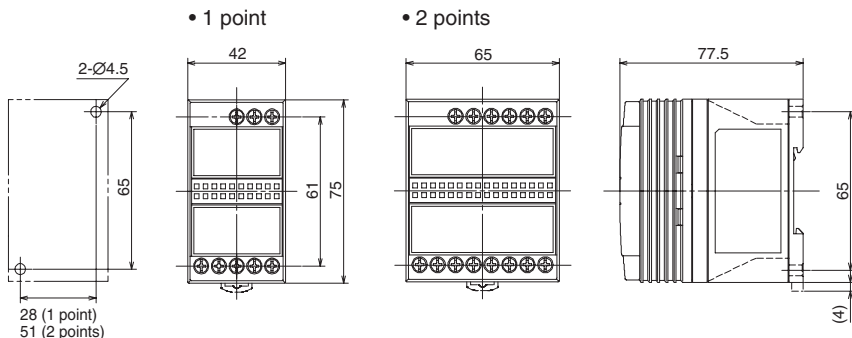
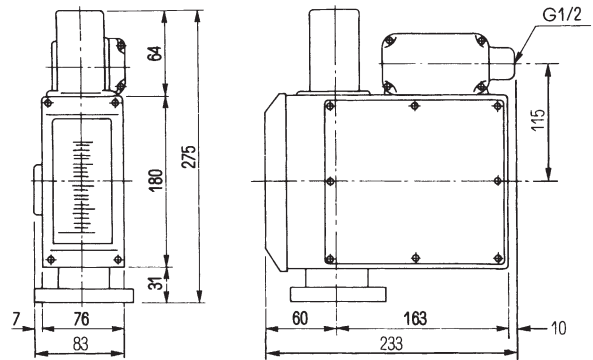


Fig. 10

Another brand safety relay also available.

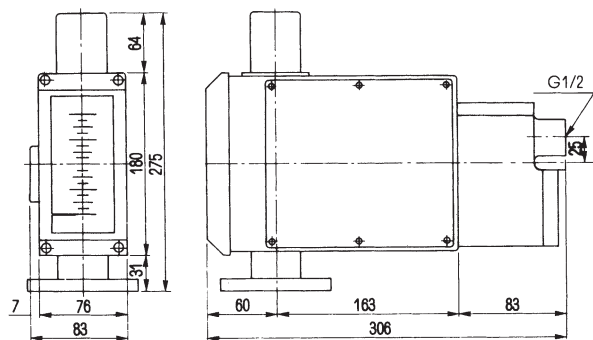


### ● Dimension of indicator / transmitter



AM-174□ and IS-AM-174□

Fig. 7



EP-AM-174□

Fig. 8



**ADDITIONAL FUNCTIONS**

● **Liquid damper (Type AM-1□□□-D)**

A damper is to be provided for steam and gas applications to prevent vibration of float. A damper pot is provided at the bottom of tube part in which damper liquid (silicon or diflon oil) is contained. The friction between damper liquid and damper makes the float movement smooth for stable indication and durability of moving part. Damper is also recommended for liquid application with heavy pulsation. Available types are AM-1□□□3 (bottom side-top side), AM-1□□□6 (left-right) and AM-1□□□7 (right-left). (Refer to Fig. 11)

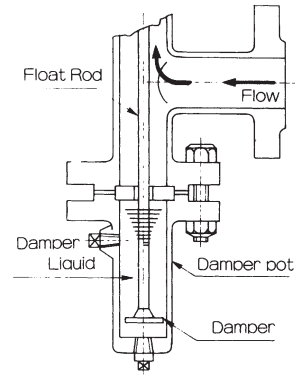


Fig. 11

● **Cooling fin (Type AM-1□□□-F)**

A cooling fin is to be provided between tube part and indicator housing to release fluid heat in case fluid temperature is more than 150°C. Cooling fin is available for models AM-1□□□2 (bottom-top side), AM-1□□□3 (bottom side-top side), AM-1□□□6 (left-right) and AM-1□□□7 (right-left), (Refer to Fig. 12)

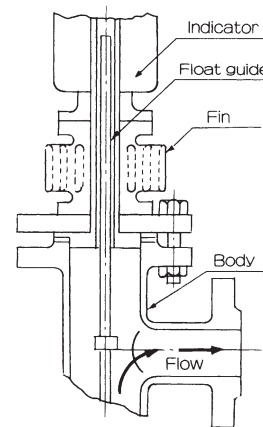


Fig. 12

● **Gas damper (Type AM-1□□□-DU)**

Gas damper is available for gas measurement application which does not require damper liquids. (Gas dampers are available for metallic flowmeters only.)

Mechanical damper is integrated at the part of float guide which consists of piston and cylinder. (Fig. 13) As it is not required to install liquid damper at the bottom of flowmeters, it contributes to increase the flexibility of piping design. Also it is not required to fill damper liquid that saves maintenance labour works.

Gas damper is applicable for gas measurement applications and not suitable for liquids and steam. Also chlorine gas (easy to form chemical compound) and gas containing rust, trash and oil may hinder the function of piston part. Consult factory for details. Available size is 20mm to 100mm (Not available for 15mm) and Only for metallic material (Not for lined material).

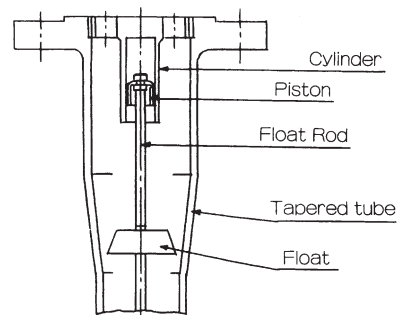


Fig. 13

● **Steam jacket (Type AM-1□□□-JS; Semi jacket AM-1□□□-JF; Full jacket)**

Heating jacket is available for the application of high viscosity and/or sticky fluids. Semi jacket covers tube part only and full jacket covers flanges as well. Steam inlet/outlet is screw connection (Rc or NPT).

Heating jacket is available for AM-1□□□1 (bottom-top) and AM-1□□□2 (bottom-top side). Only 150 lbs rating is available for full jacketed flowmeters (AM-1□□□-JF).

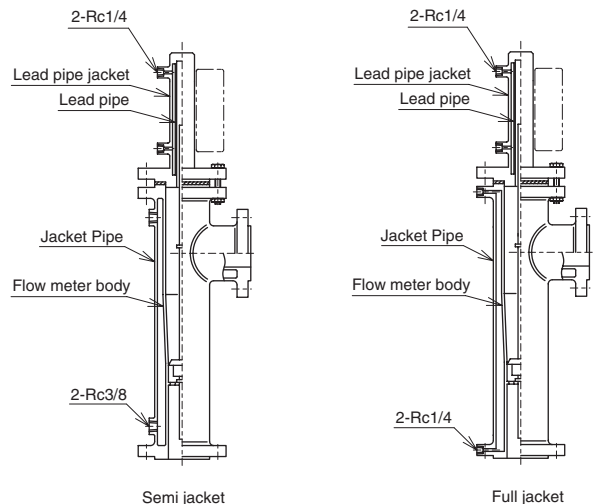


Fig. 14

**DIMENSIONS, MATERIAL, PRESS. DROP, FLOW RATE TABLE**

**[METALLIC MATERIAL]**

- Type AM-1□□1 (Flow direction:Bottom-Top) For liquids
- Type AM-1□□1-LB (Bottom-Top, Long body design)

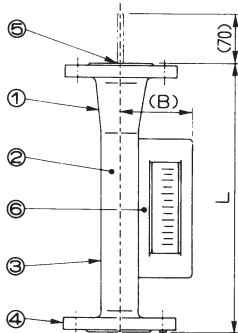


Fig. 15

\*1 Float rod comes out 70mm during operation in meter size 20~150. In case of AM-1□□1-LB (Bottom-Top, Long body design) this coming out is avoided by extending the tube length, The extension length of body (L dimension) is 130mm for 10K (150lbs) version. Consult factory for length of 20K (300lbs) version.

■ Table 1

Meter size	Q <sub>water</sub> (m <sup>3</sup> /h)	Pressure Loss (kPa)	10K Class AM-1□□□□□			20K Class AM-1□□□□-M		
			L *1 (mm)	(B) (mm)	Mass (approx.)(kg)	L (mm)	(B) (mm)	Mass (approx.)(kg)
15	0.1 to 0.75 (0.7)	6.5	350	89	5	350	89	5
20	1.5 (1.5)	6.0	350	89	5	400	89	6
25	4.06 (3.8)	7.3	350	92	6	400	92	7
40	7.15 (7.15)	9.0	400	99	8	400	99	9
50	15.1 (15.1)	6.3	400	105	10	450	105	12
65	27.5 (26.5)	7.8	450	113	13	500	113	18
80	40.5 (39.5)	9.1	450	120	15	500	120	20
100	71.9 (67.5)	12.0	450	132	20	500	132	28
125	110 ( - )	14.0	500	145	32	-	-	-
150	150 ( - )	18.0	500	158	50	-	-	-

Note: The values for mass (approx.) in these tables are all for models with local indication.

Figures in ( ) are those of 20K class.

■ Table 2

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Lower body	SUS304	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Float guide	SUS304	SUS304	SUS316	SUS316L
6	Indicator	ADC12	ADC12	ADC12	ADC12

Other special metallic material available on request.

- Type AM-1□□1-DU (Flow direction : Bottom-Top with damper) For gases

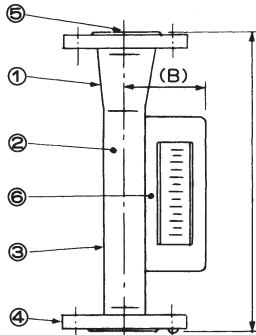


Fig. 16

■ Table 3

Meter size	Q <sub>air</sub> m <sup>3</sup> /h(nor)	Pressure Loss (kPa)	Size (mm)		Mass (approx.)(kg)
			L	(B)	
20	16 to 50	10.0	500	89	5
25	120	10.0	500	92	6
40	210	12.0	500	99	8
50	420	10.0	500	105	10
65	820	16.5	600	113	13
80	1200	23.0	600	120	15
100	2050	24.0	600	132	20

■ Table 4

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Lower body	SUS304	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Float guide	SUS304	SUS304	SUS316	SUS316L
6	Indicator	ADC12	ADC12	ADC12	ADC12

Other special metallic material available on request.

- Type AM-1□□2 (Flow direction : Bottom-Top side) For liquids

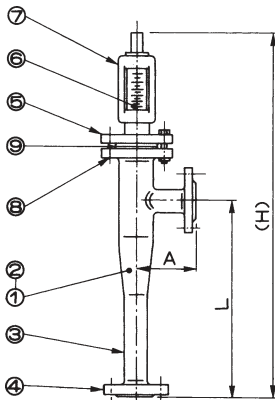


Fig. 17

■ Table 5

Meter size	Q <sub>water</sub> (m <sup>3</sup> /h)	Pressure Loss (kPa)	10K Class AM-1□□□□□			20K Class AM-1□□□□-M				
			(H) (mm)	L (mm)	A (mm)	Mass (approx.)(kg)	(H) (mm)	L (mm)	A (mm)	Mass (approx.)(kg)
15	0.1 to 0.69 (0.69)	8.5	650	250	100	8	650	250	100	10
20	1.6 (1.6)	9.1	650	250	100	8	660	250	100	10
25	4.19 (3.6)	6.0	650	250	100	10	670	250	100	12
40	7.73 (5.9)	5.0	670	250	100	12	680	250	100	15
50	15.1 (12.4)	8.0	680	250	100	15	720	250	100	20
65	29.3 (25.0)	6.5	780	350	150	22	810	350	150	28
80	40.8 (34.3)	12.7	820	350	150	25	840*1	350	180	35
100	70.8 (55.0)	13.6	840*1	350	150	43	880*1	350	180	55
125	110 ( - )	16.0	860*1	370	250	55	-	-	-	-
150	150 ( - )	21.0	970*1	480	250	75	-	-	-	-

Figures in ( ) are those of 20K class.

■ Table 6

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SGP*2	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Upper flange	SS400	SS400	SS400	SS400
6	Lead pipe	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12
8	Bolt&nut	SS400	SS400	SS400	SS400
9	Gasket	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE

"H" dimension will be extended by 130mm if a cooling fin is provided

\*1 "H" dimension will be extended by 30mm with pneumatic transmitter without fin.

\*2 STPG 370 for Medium press. 300 lbs (20K) class.

Other special metallic material available on request.



● Type AM-1□□2-DU (Flow direction : Bottom-Top side, with damper) For gases

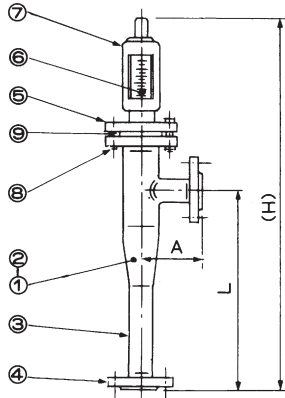


Fig. 18

■ Table 7

Meter size	Qair m <sup>3</sup> /h(nor)	Pressure Loss (kPa)	Size(mm)			Mass (approx.) (kg) JIS 10K
			(H)	L	A	
15	2.92 to 17.1	2.8	690	250	100	8
20	39.3	4.0	690	250	100	8
25	77.7	2.7	690	250	100	10
40	129.9	2.9	690	250	100	12
50	254.7	3.4	700	250	100	15
65	440.8	2.6	800	350	150	22
80	630.6	4.0	820	350	150	25
100	1233.8	5.5	860*1	350	150	43

■ Table 8

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SGP*2	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Upper flange	SS400	SS400	SS400	SS400
6	Lead pipe	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12
8	Bolt&nut	SS400	SS400	SS400	SS400
9	Gasket	Non-asbestos/ PTFE	Non-asbestos/ PTFE	Non-asbestos/ PTFE	Non-asbestos/ PTFE

\*1 "H" dimension will be extended by 30mm with pneumatic transmitter without fin.

\*2 STPG 370 for Medium press. 300 lbs (20K) class.

Other special metallic material available on request.

● Type AM-1□□3 (Flow direction : Bottom side-Top side) For liquids

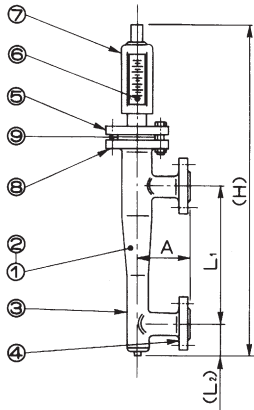


Fig. 19

● Table 9

Meter size	Qwater (m <sup>3</sup> /h)	Pressure Loss (kPa)	10K Class AM-1□□□-□					20K Class AM-1□□□-□-M				
			(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Mass (approx.)(kg)	(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Mass (approx.)(kg)
15	0.1 to 0.69 (0.69)	8.5	690	250	40	100	8	690	250	40	100	10
20	1.6 (1.6)	9.1	690	250	40	100	8	700	250	40	100	10
25	4.19 (3.6)	6.0	690	250	45	100	10	720	250	50	100	12
40	7.73 (5.9)	5.0	720	250	55	100	12	740	250	60	100	16
50	15.1 (12.4)	8.0	740	250	65	100	16	790	250	70	100	21
65	29.3 (25.0)	6.5	860	350	75	150	23	900	350	90	150	30
80	40.8 (34.3)	12.7	910	350	90	150	26	950*1	350	110	180	37
100	70.8 (55.0)	13.6	940*1	350	100	150	44	1000*1	350	120	180	58
125	110 ( - )	16.0	980*1	370	120	250	57	-	-	-	-	-
150	150 ( - )	21.0	1110*1	480	140	250	77	-	-	-	-	-

Figures in ( ) are those of 20K class.

● Table 10

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SGP*2	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Upper flange	SS400	SS400	SS400	SS400
6	Lead pipe	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12
8	Bolt&nut	SS400	SS400	SS400	SS400
9	Gasket	Non-asbestos/ PTFE	Non-asbestos/ PTFE	Non-asbestos/ PTFE	Non-asbestos/ PTFE

"H" dimension will be extended by 130mm if a cooling fin is provided

\*1 "H" dimension will be extended by 30mm with pneumatic transmitter without fin.

\*2 STPG 370 for Medium press. 300 lbs (20K) class.

Other special metallic material available on request.

● Type AM-1□□3-DU (Flow direction : Bottom side-Top side, with damper) For gases

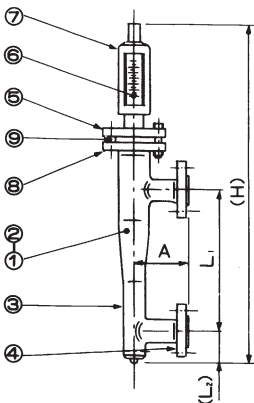


Fig. 20

● Table 11

Meter size	Qair m <sup>3</sup> /h(nor)	Pressure Loss (kPa)	Size(mm)				Mass (approx.) (kg) JIS 10K
			(H)	L	(L2)	A	
15	2.92 to 17.1	2.8	730	250	40	100	8
20	39.3	4.0	730	250	40	100	8
25	77.7	2.7	730	250	45	100	10
40	129.9	2.9	730	250	55	100	12
50	254.7	3.4	760	250	65	100	15
65	440.8	2.6	880	350	75	150	22
80	630.6	4.0	910	350	90	150	25
100	1233.8	5.5	960*1	350	100	150	43

● Table 12

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SGP*2	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Upper flange	SS400	SS400	SS400	SS400
6	Lead pipe	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12
8	Bolt&nut	SS400	SS400	SS400	SS400
9	Gasket	Non-asbestos/ PTFE	Non-asbestos/ PTFE	Non-asbestos/ PTFE	Non-asbestos/ PTFE

\*1 "H" dimension will be extended by 30mm with pneumatic transmitter without fin.

\*2 STPG 370 for Medium press. 300 lbs (20K) class.

Other special metallic material available on request.

● Type AM-1□□3-D For gases and steam  
(Flow direction : Bottom side-Top side, with damper)

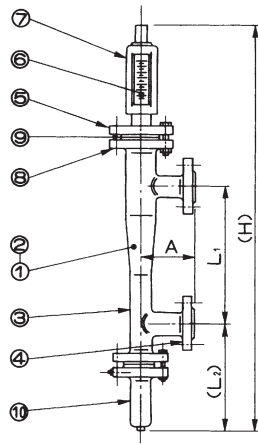


Fig. 21

● Type AM-1□□6, AM-1□□7  
(Flow direction : Left-Right, Right-Left)  
For liquids

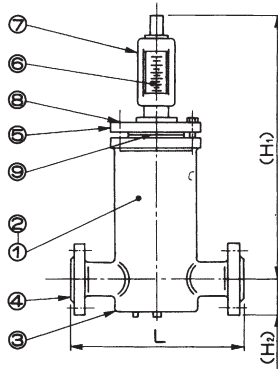


Fig. 22

● Type AM-1□□6-D, AM-1□□7-D  
(Flow direction : Left-Right, Right-Left, with damper) For gases and steam

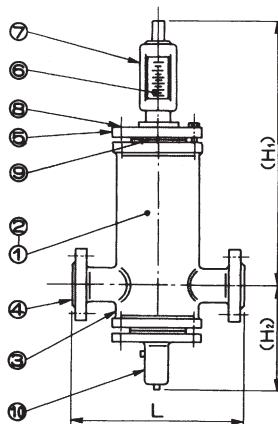


Fig. 23

■ Table 13

Meter size	Q		Pressure Loss (kPa)	10K Class AM-1□□□□				20K Class AM-1□□□□-M					
	Water (m³/h)	Air m³/h(nor)		(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Mass (approx.)(kg)	(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Mass (approx.)(kg)
15	0.1 to 0.69 (0.69)	3.1 to 21.3 (21.3)	10.0	800	220	190	100	11	830	220	210	100	13
20	1.6 (1.6)	53 (53)	12.2	810	220	190	100	11	850	220	220	100	13
25	4.19 (3.6)	129.4 (124)	17.7	830	220	210	100	14	880	220	240	100	17
40	7.73 (5.9)	238 (206)	11.0	860	220	220	100	18	930	220	280	100	22
50	15.1 (12.4)	466 (431)	15.8	960	220	310	100	21	1050	220	370	100	28
65	29.3 (25.0)	904 (831)	19.5	1080	350	300	150	29	1180	350	370	150	38
80	40.8 (34.3)	1260 (1160)	18.0	1130	350	310	150	35	1220*1	350	380	180	46
100	70.8 (55.0)	2186 (1934)	19.5	1160*1	350	320	150	53	1280*1	350	400	180	70
125	110 (-)	3300 (-)	22.0	1220*1	370	360	250	68	-	-	-	-	-
150	150 (-)	4500 (-)	27.0	1330*1	480	360	250	90	-	-	-	-	-

Figures in ( ) are those of 20K class.

■ Table 14

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SGP*2	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Upper flange	SS400	SS400	SS400	SS400
6	Lead pipe	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12
8	Bolt&nut	SS400	SS400	SS400	SS400
9	Gasket	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE
10	Damper	SUS304	SUS304	SUS316	SUS316L

"H" dimension will be extended by 130mm if a cooling fin is provided

\*1 "H" dimension will be extended by 30mm with pneumatic transmitter without fin.

\*2 STPG 370 for Medium press. 300 lbs (20K) class.

Other special metallic material available on request.

■ Table 15

Meter size	Qwater (m³/h)	Pressure Loss (kPa)	10K Class AM-1□□□□				20K Class AM-1□□□□-M			
			(H1) (mm)	(H2) (mm)	L (mm)	Mass (approx.)(kg)	(H1) (mm)	(H2) (mm)	L (mm)	Mass (approx.)(kg)
15	0.1 to 0.6	11.0	440	80	160	12	440	100	160	14
20	1.4	12.0	470	70	160	12	500	120	160	14
25	3.1	10.0	480	90	180	15	500	120	180	17
40	6.1	15.0	510	80	240	18	520*1	120	240	21
50	14	11.5	540	80	260	24	550*1	100	260	28
65	24	10.0	570	80	340	35	580*1	100	340	42
80	35	16.0	610	80	360	40	620*1	110	360	50
100	60	18.0	650*1	90	360	60	660*1	130	360	75
125	90	20.0	670*1	110	440	90	-	-	-	-
150	155	25.0	720*1	130	440	110	-	-	-	-

■ Table 16

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SGP*2	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Upper flange	SS400	SS400	SS400	SS400
6	Lead pipe	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12
8	Bolt&nut	SS400	SS400	SS400	SS400
9	Gasket	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE

"H" dimension will be extended by 130mm if a cooling fin is provided

\*1 "H" dimension will be extended by 30mm with pneumatic transmitter without fin.

\*2 STPG 370 for Medium press. 300 lbs (20K) class.

Other special metallic material available on request.

■ Table 17

Meter size	Q		Pressure Loss (kPa)	10K Class AM-1□□□□				20K Class AM-1□□□□-M			
	Water (m³/h)	Air m³/h(nor)		(H1) (mm)	(H2) (mm)	L (mm)	Mass (approx.)(kg)	(H1) (mm)	(H2) (mm)	L (mm)	Mass (approx.)(kg)
15	0.1 to 0.7	3.1 to 18	12.0	440	200	160	15	440	210	160	17
20	1.6	50	14.8	470	200	160	15	500	210	160	17
25	3.5	100	21.0	480	210	180	19	500	230	180	22
40	6.5	200	15.5	510	200	240	24	520*1	240	240	28
50	13	400	19.0	540	270	260	30	550*1	290	260	36
65	25	750	22.1	570	280	340	42	580*1	320	340	52
80	35	1100	21.0	610	290	360	50	620*1	330	360	62
100	60	1800	24.0	650*1	300	360	70	660*1	340	360	90
125	90	2800	26.0	670*1	320	440	105	-	-	-	-
150	155	4800	31.5	720*1	340	440	125	-	-	-	-

■ Table 18

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SGP*2	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Upper flange	SS400	SS400	SS400	SS400
6	Lead pipe	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12
8	Bolt&nut	SS400	SS400	SS400	SS400
9	Gasket	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE
10	Damper	SUS304	SUS304	SUS316	SUS316L

"H" dimension will be extended by 130mm if a cooling fin is provided

\*1 "H" dimension will be extended by 30mm with pneumatic transmitter without fin.

\*2 STPG 370 for Medium press. 300 lbs (20K) class.

Other special metallic material available on request.

● Type AM-1□□1-JS, AM-1□□1-JF For liquids  
(Flow direction : Bottom-Top, with heating Jacket)

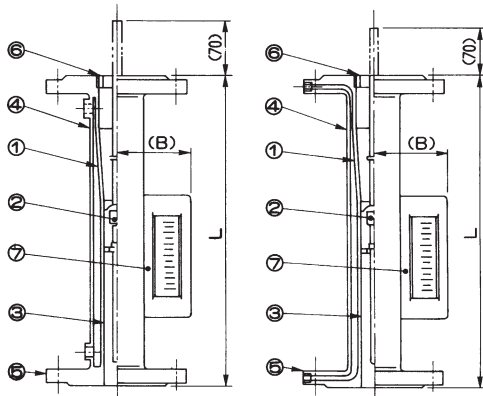


Fig. 24

Fig. 25

NB) Float rod comes out by 70mm during operation in meter sizes 20-100

■ Table 19

Meter size	Qwater (m³/h)	Pressure Loss (kPa)	10K Class AM-1□□□□□			20K Class AM-1□□□□□-M		
			L (mm)	(B) (mm)	Mass (approx.)(kg)	L (mm)	(B) (mm)	Mass (approx.)(kg)
15	0.1 to 0.7	6.5	350	93	6	350	93	6
20	1.5	6.0	400	93	6	400	93	7
25	3.8	7.3	400	96	7	400	96	8
40	7.15	9.0	400	103	10	400	103	11
50	15.1	6.3	450	113	12	450	113	14
65	26.5	7.8	500	120	16	500	120	21
80	39.5	9.1	500	126	18	500	126	23
100	67.5	12.0	500	145	25	500	145	33
125	110	14.0	500	158	38	-	-	-
150	150	18.0	500	171	60	-	-	-

■ Table 20

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SUS304	SUS304	SUS316	SUS316L
4	Jacket pipe	SUS304	SUS304	SUS304	SUS304
5	Flange	SS400	SUS304	SUS316	SUS316L
6	Float guide	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12

Other special metallic material available on request.

● Type AM-1□□2-JS, AM-1□□2-JF For liquids  
(Flow direction : Bottom-Top side, with heating Jacket)

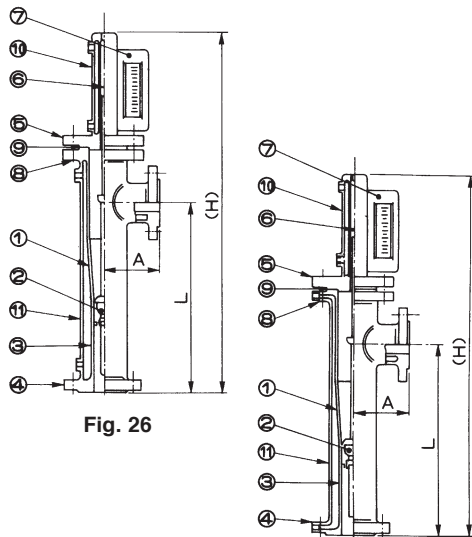


Fig. 26

Fig. 27

■ Table 21

Meter size	Qwater (m³/h)	Pressure Loss (kPa)	10K Class AM-1□□□□□				20K Class AM-1□□□□□-M			
			(H) (mm)	L (mm)	A (mm)	Mass (approx.)(kg)	(H) (mm)	L (mm)	A (mm)	Mass (approx.)(kg)
15	0.1 to 0.69	8.5	660	250	100	12	660	250	100	14
20	1.6	9.1	680	250	100	12	680	250	100	14
25	3.6	6.0	670	250	100	15	670	250	100	17
40	5.9	5.0	680	250	130	18	690	250	130	21
50	12.4	8.0	710	250	130	22	750	250	130	27
65	25	6.5	820	350	150	30	850	350	150	36
80	34.3	12.7	850	350	180	35	870	350	180	55
100	55.0	13.6	900	350	180	58	940	350	180	70
125	110	16.0	940	370	250	72	-	-	-	-
150	150	21.0	1050	480	250	95	-	-	-	-

■ Table 22

No.	Description	Class 1	Class 2	Class 3	Class 4
1	Tapered tube	SUS304	SUS304	SUS316	SUS316L
2	Float ass'y	SUS304	SUS304	SUS316	SUS316L
3	Body	SGP*	SUS304	SUS316	SUS316L
4	Flange	SS400	SUS304	SUS316	SUS316L
5	Upper flange	SS400	SUS304	SUS316	SUS316L
6	Lead pipe	SUS304	SUS304	SUS316	SUS316L
7	Indicator	ADC12	ADC12	ADC12	ADC12
8	Bolt&nut	SS400	SS400	SS400	SS400
9	Gasket	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE	Non-asbestos/PTFE
10	Upper jacket pipe	SUS304	SUS304	SUS304	SUS304
11	Jacket pipe	SGP or STPG 370 (Depending on jacket medium press.)			

Only General purpose 150 lbs (10K) class is available for full Jacketed version (AM-1□□□-JF)

\*STPG 370 for Medium press. 300 lbs (20K) class.

Other special metallic material available on request.

[RUBBER LINED AND ETFE LINED MATERIAL]

● Type AM-1□□1 (Flow direction : Bottom-Top) For liquids

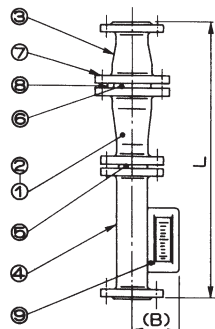


Fig. 28

■ Table 23

Meter size	Qwater (m³/h)	Pressure Loss (kPa)	L (mm)	(B) (mm)	Mass (approx.)(kg)
15	0.1 to 0.65	5.0	550	89	16
20	1.2	6.0	550	89	18
25	2.8	6.0	550	92	22
40	6.5	9.0	600	99	28
50	11.5	6.0	650	105	35
65	17.0	8.0	700	113	45
80	34.0	9.0	750	120	55
100	60.0	11.0	750	132	70
125	90.0	13.0	750	145	85
150	140.0	17.0	800	158	120

■ Table 24

No.	Description	Class 5	Class 6	Class 7
1	Tapered tube	Rubber Lined	Rubber Lined	F.C.R. Lined
2	Float ass'y	PVC*1	F.C.R.*2	F.C.R.*2
		Other metallic material on request		
3	Lower body	Rubber Lined	Rubber Lined	F.C.R. Lined
4	Upper body	Rubber Lined	Rubber Lined	F.C.R. Lined
5	Float guide(L)	PVC	PVDF	PVDF
6	Float guide(U)	PVC	PVDF	PVDF
7	Bolt&nut	SS400	SS400	SS400
8	Gasket	EPDM	EPDM	PTFE
9	Indicator	ADC12	ADC12	ADC12

\*1 :Float rod material is ETFE lined SUS304 for meter size 15 and 20.  
\*2 :Float rod material is ETFE lined SUS304 for meter size 15, 20, 25 and 40.

F.C.R. means Fluorocarbon Resin

● Type AM-1□□2 (Flow direction : Bottom-Top side) For liquids

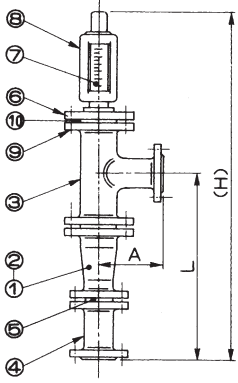


Fig. 29

■ Table 25

Meter size	Qwater (m <sup>3</sup> /h)	Pressure Loss (kPa)	H (mm)	L (mm)	(B) (mm)	Mass (approx.)(kg)
15	Not available					
20	Not available					
25	0.8 to 2.7	5.5	700	320	120	17
40	4.8	4.3	730	350	130	22
50	11.4	7.0	780	380	130	24
65	20.2	5.4	810	400	150	28
80	33.0	10.0	870	440	150	34
100	54.0	10.0	1000	500	200	52
125	88.0	14.0	1020	500	200	65 *1
150	140.0	20.0	1140	550	220	70 *2

\*1 : For material class 5,6  
\*2 : For material class 7

■ Table 26

No.	Description	Class 5	Class 6	Class 7
1	Tapered tube	Rubber Lined	Rubber Lined	F.C.R. Lined
2	Float ass'y	PVC*	F.C.R.*	F.C.R.*
Other metallic material on request				
3	Upper body	Rubber Lined	Rubber Lined	F.C.R. Lined
4	Lower body	Rubber Lined	Rubber Lined	F.C.R. Lined
5	Float guide	PVC	PVDF	PVDF
6	Upper flange	SS400	SS400	SS400
7	Lead pipe	PVC	FEP tubed SUS 304	
8	Indicator	ADC12	ADC12	ADC12
9	Bolt&nut	SS400	SS400	SS400
10	Gasket	EPDM	EPDM	PTFE

\*: Float rod material is ETFE lined SUS304 for meter size 15,20 and 25.  
F.C.R. means Fluorocarbon Resin

[PVC LINED MATERIAL]

■ Type AM-1□□1 (Flow direction : Bottom-Top) For liquids

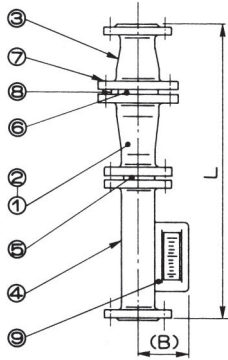


Fig. 30

■ Table 27

Meter size	Qwater (m <sup>3</sup> /h)	Pressure Loss (kPa)	L (mm)	(B) (mm)	Mass (approx.)(kg)
15	0.1 to 0.65	5.0	550	89	16
20	1.1	5.0	700	89	20
25	2.1	5.5	750	96	25
40	2.7	8.0	800	99	32
50	6.5	5.5	850	105	40
65	12	7.0	900	113	50
80	17	8.0	900	126	62
100	35	10.0	950	132	78
125	48	12.0	950	145	94
150	66	16.0	1000	158	130

■ Table 28

No.	Description	Class 8
1	Tapered tube	PVC Lined
2	Float ass'y	PVC*
3	Upper body	PVC Lined
4	Lower body	PVC Lined
5	Float receiver	PVC
6	Float guide	PVC
7	Bolt&nut	SS400
8	Gasket	EPDM
9	Indicator	ADC12

\*: Float rod material is ETFE lined SUS304 for meter size 15 and 20.

● Type AM-1□□2 (Flow direction : Bottom-Top side) For liquids

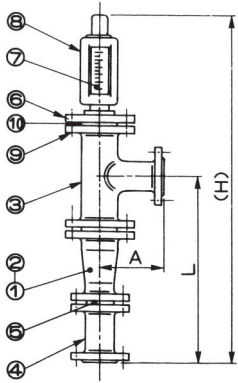


Fig. 31

■ Table 29

Meter size	Qwater (m <sup>3</sup> /h)	Pressure Loss (kPa)	Conn Size (mm)	(H) (mm)	L (mm)	A (mm)	Mass (approx.)(kg)
15	Not available						
20	Not available						
25	0.6 to 1.9	5.0	20	850	420	70	18
			25	830	400	49	
40	2.6	3.8	40	830	400	61	22
			25	850	420	54	
			40	850	420	64	
50	5.8	6.0	40	930	480	70	25
			50	930	480	74	
			65	930	480	80	
65	11	4.8	50	980	520	80	30
			65	980	520	86	
			80	980	520	90	
80	18	8.5	65	1010	530	99	46
			80	1010	530	103	
			100	1010	530	110	
100	29.5	8.5	80	1050	553	128	53
			100	1050	553	135	
			125	1050	553	141	
125	45	12.0	100	1100	600	135	65
			125	1100	600	141	
			150	1100	600	190	
150	76	17.0	125	1140	641	167	95
			150	1150	650	210	
			200	1150	650	220	

■ Table 30

No.	Description	Class 9
1	Tapered tube	PVC Lined
2	Float ass'y	PVC
3	Upper body	PVC Lined
4	Lower body	PVC Lined
5	Float guide	PVC
6	Upper flange	SS400
7	Lead pipe	PVC
8	Indicator	ADC12
9	Bolt&nut	SS400
10	Gasket	EPDM

[GLASS LINED MATERIAL]

● Type AM-1□□1 (Flow direction : Bottom-Top) For liquids

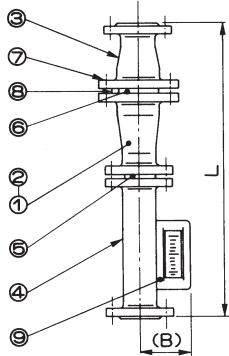


Fig. 32

■ Table 31

Meter size	F.C.R. FLOAT		MA276 FLOAT		Conn Size	L (mm)	(B) (mm)	Mass (approx.) (kg)	
	Q <sub>water</sub> (m <sup>3</sup> /h)	Pressure Loss (kPa)	Q (m <sup>3</sup> /h)	Pressure Loss (kPa)					
15	0.1 to 0.4	6.0	0.1 to 0.6	10.0	20	570	92	18	
20	Not available								
25	1	0.8	8.0	1.0	10.0	20	768	92	26
						25	710		
	2	1.3	6.0	1.6	8.0	40	806	92	25
						20	781		
40	1	1.7	6.0	2.5	8.0	25	875	99	35
						40	803		
	2	3.2	6.0	4.5	8.0	50	867	99	33
						40	750		
						50	903		
50	6.5	6.0	8	8.0	50	790	105	40	
					80	943			
65	Not available								
80	17	9.0	20	10.5	80	835	120	55	
					100	987			
100	35	9.0	45	11.5	100	870	132	70	
					150	1024			
125	Not available								
150	Not available								

■ Table 32

No.	Description	Class 10	Class 11
1	Tapered tube	Glass Lined	Glass Lined
2	Float ass'y	F.C.R.*	MA276
3	Upper body	Glass Lined	Glass Lined
4	Lower body	Glass Lined	Glass Lined
5	Float receiver	PVDF	MA276
6	Float guide	PVDF	MA276
7	Bolt&nut	SS400	SS400
8	Gasket	PTFE	PTFE
9	Indicator	ADC12	ADC12

\*: Float rod material is ETFE lined SUS304 for meter size 15, 20, 25 and 40 (1).

F.C.R. means Fluorocarbon Resin

● Type AM-1□□2 (Flow direction : Bottom-Top side) For liquids

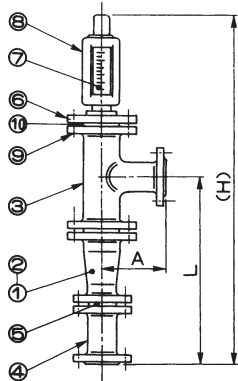


Fig. 33

■ Table 34

No.	Description	Class 10	Class 11
1	Tapered tube	Glass Lined	Glass Lined
2	Float ass'y	F.C.R.*	MA276
3	Upper body	Glass Lined	Glass Lined
4	Lower body	Glass Lined	Glass Lined
5	Float guide	PVDF	MA276
6	Upper flange	SS400	SS400
7	Lead pipe	FEP tubed SUS 304	
8	Indicator	ADC12	ADC12
9	Bolt&nut	SS400	SS400
10	Gasket	PTFE	PTFE

\*: Float rod material is ETFE lined SUS304 for meter size 15, 20, and 25.

F.C.R. means Fluorocarbon Resin

■ Table 33

Meter size	F.C.R. FLOAT		MA276 FLOAT		Conn Size	(H) (mm)	L (mm)	A (mm)	Mass (approx.) (kg)	
	Q <sub>water</sub> (m <sup>3</sup> /h)	Pressure Loss (kPa)	Q (m <sup>3</sup> /h)	Pressure Loss (kPa)						
15	Not available									
20	Not available									
25	1	0.3 to 0.79	8.0	0.4 to 1.0	10.0	20	740	362	78	27
						25	850	470		
	2	1.3	6.0	1.6	8.0	40	760	380	190	30
						20	780	378		
40	1	2.1	7.0	2.7	9.0	25	830	422	95	33
						40	920	512		
	2	2.8	6.0	3.6	8.0	50	820	418	203	37
						25	840	418		
						40	920	508		
50	7.8	7.0	10	8.5	40	900	450	126	47	
					50	980	544			
					80	910	474			
65	Not available									
80	15	9.0	19	10.5	50	980	526	143	60	
					80	1050	596			
					100	980	526			
100	34	9.0	44	11.5	80	1210	580	173	82	
					100	1280	650			
					150	1220	590			
125	Not available									
150	Not available									

● Type AM-1□□3-D (Flow direction : Bottom side-Top side, with damper) For gases

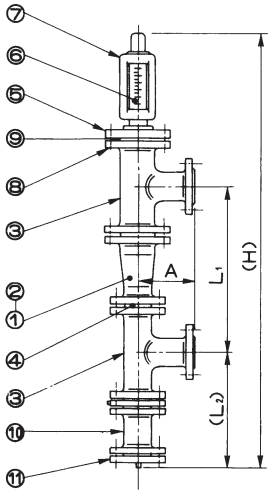


Fig. 34

■ Table 36

No.	Description	Class 10	Class 11
1	Tapered tube	Glass Lined	Glass Lined
2	Float ass'y	F.C.R.*	MA276
3	Body	Glass Lined	Glass Lined
4	Float guide	PVDF	MA276
5	Upper flange	SS400	SS400
6	Lead pipe	FEP tubed SUS 304	
7	Indicator	ADC12	ADC12
8	Bolt&nut	SS400	SS400
9	Gasket	PTFE	PTFE
10	Damper	Glass Lined	Glass Lined
11	Blind flange	SS400/PTFE	SS400/PTFE

\*: Float rod material is ETFE lined  
 SUS304 for meter size 15, 20 and 25.  
 F.C.R. means Fluorocarbon Resin

■ Table 35

Meter size	F.C.R. FLOAT		MA276 FLOAT		Conn Size	(H) (mm)	L1 (mm)	(L2) (mm)	A1 (mm)	A2 (mm)	Mass (approx.) (kg)	
	Qwater (m³/h)	Pressure Loss (kPa)	Q (m³/h)	Pressure Loss (kPa)								
15	Not available											
20	Not available											
25	1	10 to 26	9.0	12 to 33	11.0	20	1010	348	280	78	78	33
						40				190	190	
	2	42	7.0	54	9.5	20	1050	365	280	78	78	37
						40				190	190	
40	1	70	7.5	90	10	25	1110	406	300	95	95	40
						50				203	203	
	2	90	6.5	115	9.0	25	1120	404	300	102	95	45
						50				203	203	
50	240	8.0	300	9.0	40	1190	446	310	126	102	60	
					80					234	234	
65	Not available											
80	510	10.0	650	11.5	50	1300	521	330	143	126	75	
					80					259	259	
					100					143	143	
100	1140	12.0	1460	14.0	80	1560	592	350	173	143	100	
					150					285		285
125	Not available											
150	Not available											

SELECTION OF FLOWMETER

1. Liquid application

a. Selection of meter size

Maximum possible flow rate for each meter size is shown in dimension tables from p. 8 to 14. These figures are based on water flow (Density 1.0g/cm³ and Viscosity 1.0mPa·s). If actual fluid condition is different from such figures, a conversion calculation is required as following formula:

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

Where Qw : Water converted flow rate (m³/h)  
 Q : Flow rate of measuring fluid (m³/h)  
 ρ : Density of measuring fluid (g/cm³)

Example Fluid : Alcohol  
 Density : 0.8g/cm³  
 Flow rate : 50m³/h  
 Flow meter to be used:AM-1□□1

$$QW = 50 \times (2.59/\sqrt{(7.7/0.8) - 1})$$

$$= 50 \times 0.882$$

$$= 44.1(m³/h)$$

Referring to table 1 on p. 8, the required meter size is 100. For possible connection flange sizes, refer to Table 37.

b. Viscosity limit

In case the Viscosity of fluid is more than 1mPa·s, confirm the suitability by Fig. 35 below. Trace viscosity and flow rate and confirm the crossing point is below the curve. If the crossing point is above the curve, consult factory for detailed calculation by computer.

■ Viscosity curve

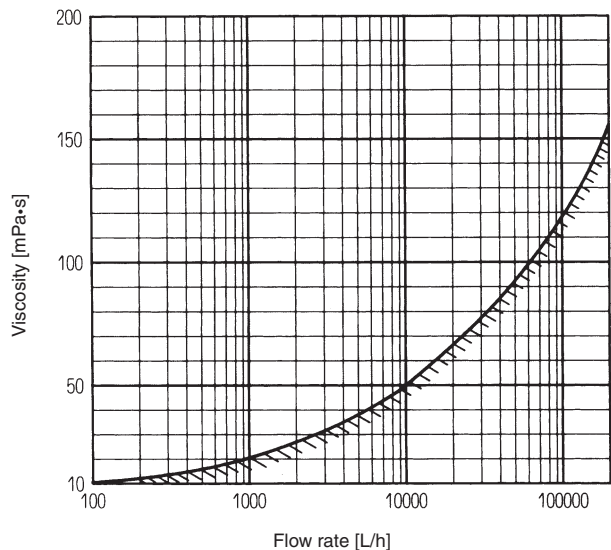


Fig. 35



**c. Slurry application**

Consult factory if contaminations, sand, dirt and other solid particles are expected in fluid. AS-1000 series slurry flowmeter is available.

**2. Gas application**

Generally, flowmeters with damper (type AM-1□□1-DU, AM-1□□2-Du, AM-1□□3-DU, AM-1□□3-D, AM-1□□6-D and AM-1□□7-D) are recommended for gas application to prevent float vibration.

**a. Selection of meter size**

Maximum possible flow rate for each meter size is shown in dimension tables of AM-1□□1-DU, AM-1□□2-DU, AM-1□□3-DU, AM-1□□3-D, AM-1□□6-D and AM-1□□7-D flowmeters. If actual fluid condition is different from such figures, a conversion calculation is to be performed by the following formula:

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

Where QA : Converted flow rate in air 0°C, 1atm (m³/h(nor))  
 Q : Flow rate of measuring gas (m³/h(nor))  
 γ : Density of measuring gas (kg/m³(nor))  
 t : Pressure of measuring gas (°C)  
 p : Temperature of measuring gas (MPa)

Example Gas to be measured Nitrogen (N₂)  
 Specific weight (γ) 1.251kg/m³(nor)  
 Operating pressure (p) 0.6MPa  
 Operating temperature (t) 20°C  
 Flowmeter to be used AM-1□□3-D

$$QA = 300 \times 0.01635 \times \sqrt{1.251 \times (273+20) / (0.1013+0.6)}$$

$$= 300 \times 0.01635 \times 22.86$$

$$= 112.1$$

[m³/h(nor)]

Referring to Table 13 on p. 10 the suitable meter size is 25. For possible connection flange sizes, refer to Table 37.

**3. Steam application**

Flowmeters with liquid damper (type AM-1□□3-D, AM-1□□6-D and AM-1□□7-D) are recommended for steam application to prevent float vibration. Also a cooling fin is normally needed because of high temperature.

**a. Selection of meter size**

Steam flow rate is to be converted into water flow rate by the following formula for size determination;

$$Qw = Qs \times 0.03 \times \sqrt{\gamma}$$

Where Qw : Water converted flow rate (m³/h)  
 Qs : Steam flow rate (m³/h)  
 γ : Density of steam (kg/m³)

Example Fluid Saturated Steam  
 Pressure 0.9MPa  
 Flow rate 1t/h  
 Flowmeter to be used AM-1□□6-D

First, density of the steam is to be obtained from "Steam graph" etc. In this application, density (γ) of 0.9MPa steam is 5.1kg/m³. Saturated steam curve (by temperature) is shown on Fig. 36 and Saturated steam curve (by pressure) is on Fig. 37 for reference. Normally, flow rate of steam is described in weight unit, which is to be converted to volume unit (Qs) as follows:

$$1t/h = 1000kg/h$$

$$Qs = 1000kg/h / 5.1kg/m³$$

$$= 196m³/h$$

Then, all these figures are to be put into the formula:

$$Qw = 196 \times 0.03 \times \sqrt{5.1}$$

$$= 13.3m³/h$$

Referring to Table 17 on p. 10, the suitable meter size is 65. For possible connection flange sizes, refer to Table 37.

**■ Density of saturated Steam**

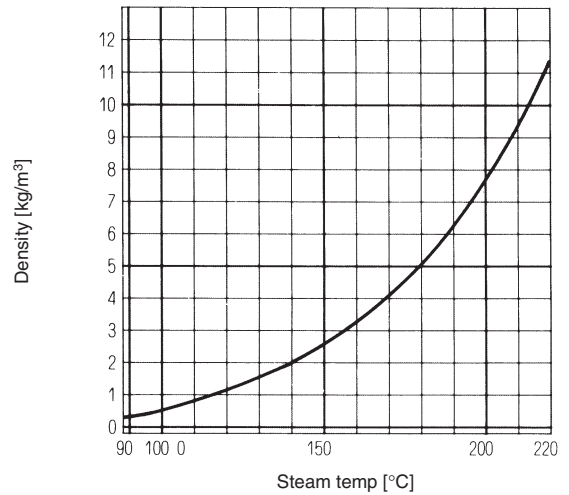


Fig. 36

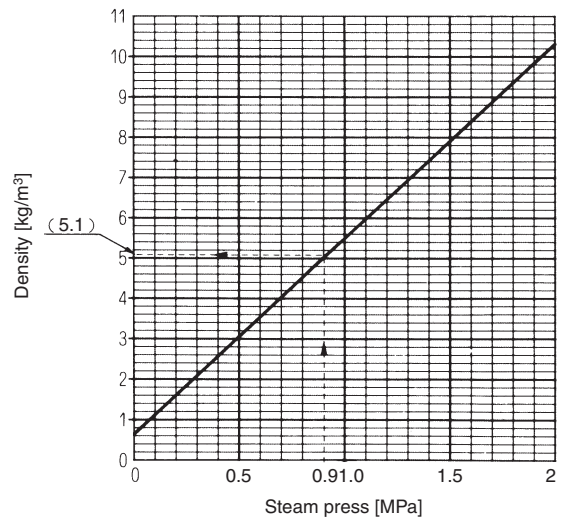


Fig. 37

**4. Connection flanges**

Table 37 shows possible connection flange sizes against selected meter sizes. The table is applicable for flowmeters with Metallic materials, Rubber lining, ETFE lining. Only listed connection sizes in dimension tables are available for flowmeters with PVC lining and Glass lining.

**■ Table 37**

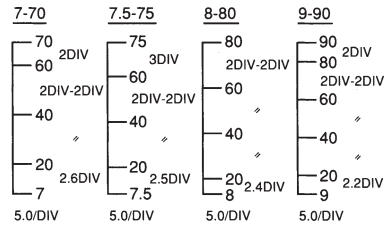
Type	Flow direction	Against meter size		
		-1 size	±0 size	+1 size
AM-1□□1	B-T	×	○	○
AM-1□□1-JS/JF	B-T	×	×	○
AM-1□□2	B-TS	○	○	○
AM-1□□2-JS/JF	B-TS	×	○	○
AM-1□□3	BS-TS	○	○	○
AM-1□□6	L-R	○	○	○
AM-1□□7	R-L	○	○	○

**5. Scale graduation**

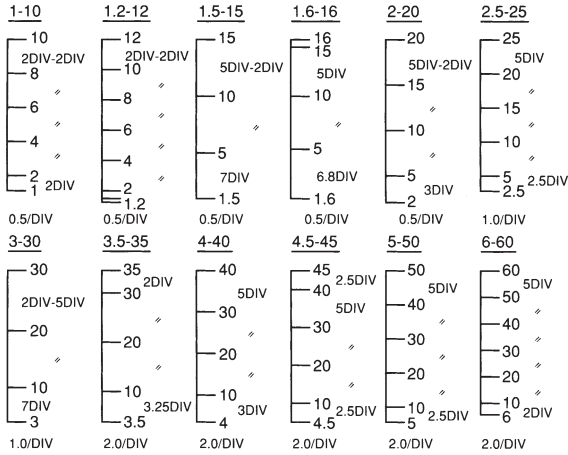
Customer can select any one of the following 16 standard scale graduations if meter size and connection flange meet the specification.

Rangeability is 10:1.

Example If required scale range is 150~1500m<sup>3</sup>/h(nor), the graduation on the flowmeter will be 15~150×10m<sup>3</sup>/h(nor)



● **Standard scale graduation**



**5. Special orders**

**a. Low pressure drop version**

If standard pressure drop does not meet the requirement, "Low pressure drop version" is available on request. Consult factory for further details.

**b. Low temperature application**

If the fluid temperature is very low (i. e. liquified gas etc), Special arrangement to prevent frost is available. Consult factory for further details.

**c. High pressure application**

Up to 196MPa possible with experience. Consult factory for further details.

**ORDERING FORM**

COMMON	Model				
	Fluid name				
	Density				
	Viscosity				
	Pressure				
	Temperature				
	Measuring range				
	Connection size				
	Flange rating				
	Material class				
For Jacketed versions (AM-1□□□-JS/JF)	Jacket fluid	<input type="checkbox"/> Hot water <input type="checkbox"/> Steam			
	Temp.	_____ °C	Press. _____ MPa		
	Connection	<input type="checkbox"/> Std. (Rc.1/4,3/8) <input type="checkbox"/> Others _____			
TRANSMITTERS		AM-131□	AM-152□	AM-169□	AM-174□
	Connection	<input type="checkbox"/> Std. Rc.1/4 <input type="checkbox"/> Others _____	<input type="checkbox"/> Std. G1/2 <input type="checkbox"/> Others _____	<input type="checkbox"/> Std. G1/2 <input type="checkbox"/> Others _____	<input type="checkbox"/> Std. G1/2 <input type="checkbox"/> Others _____
	Enclosure	<input type="checkbox"/> Dust- and splash-proof	<input type="checkbox"/> Dust- and splash-proof <input type="checkbox"/> Flame proof	<input type="checkbox"/> Dust- and splash-proof <input type="checkbox"/> Flame proof	<input type="checkbox"/> Dust- and splash-proof <input type="checkbox"/> Flame proof <input type="checkbox"/> Intrinsically safe
	Power supply	-	<input type="checkbox"/> 24 V DC	_____ V AC _____ Hz	-
	Alarm point	-	-	-	<input type="checkbox"/> 1 <input type="checkbox"/> 2
	Alarm setting	-	-	-	H _____ L _____
	Count	-	-	_____ c/h	-
Accessory	<input type="checkbox"/> Air set	<input type="checkbox"/> Cable gland	<input type="checkbox"/> Cable gland	<input type="checkbox"/> Cable gland <input type="checkbox"/> Safety relay	

\* Specification is subject to change without notice.



Head Office : Shiba Toho Building, 1-7-24 Shibakoen, Minato-ku, Tokyo 105-8558  
 Tel : +81-3-3431-1625 (KEY) ; Fax : +81-3-3433-4922  
 e-mail : overseas.sales@tokyokeiso.co.jp ; URL : https://www.tokyokeiso.co.jp