

■ 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

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

Especially, pressure tight Ex d construction ex-proof is newly available to analog output version which covers Hydrogen atmosphere without safety barriers.

■ MODEL CODE

MODEL CODE							DESCRIPTION
	AM-1	-	-	-	-	-	Weather proof (IP54)
Construction	EP-						Pressure tight explosion proof
	IS-						Intrinsically safe
Function	40						Local indication
	31						Local indication + Pneumatic transmission
	52						Local indication + Electric transmission
	69						Local indication + Local integration + Pulse output
	74						Local indication + Alarm 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 AM-1700(Alarm output) version.

*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 15mm (1/2") ~150mm (6")
- **MATERIAL** Standard Carbon steel, SUS304, SUS316, SUS316L
Rubber lining, ETFE 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 details
*Only 150 lbs (10K) class is available for full jacketed flowmeters (AM-1□□□-JF) and lining material flowmeters.

● OPERATING 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.Op.Press	MPa	1.4	1.2	1.0	3.4	3.1	2.9	2.6	2.3

● CONNECTION

- Standard Flange Connection (JIS, ANSI, DIN, other)
Only RF (Raised Faced) flange is available for Glass, PVC and ETFE lined Flowmeters.
Only FF (Flat Faced) flange is available for Rubber lined flowmeters.
- On request Screw Connection (Consult factory)

● FLUID TEMPERATURE

a) Metallic material

Type		AM-1□□1	AM-1□□2/3/6/7	AM-1□□2/3/6/7-F
Max.Op.Temp	°C	200 ^{*1}	149	400 ^{*2}
	°F	392	302	752

*1: Up to 250°C possible on request.

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

b) Lining Material

Lining Material		Rubber Lining	ETFE 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 PTFE float

- **ACCURACY** Standard $\pm 1.5\% \text{F.S.}^*$
(LOCAL INDICATION) On request $\pm 1.0\% \text{F.S.}$, Consult factory
* $\pm 2.0\% \text{F.S.}$ for resin material float version
- **STANDARD SCALE LENGTH** 75mm
- **RANGEABILITY** 10 : 1
- **INDICATOR CONSTRUCTION** Weather proof (Equ. to IP54)
IP65 also available as option.

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

■ AM-1400 SERIES LOCAL INDICATOR

● Dimension of indicator

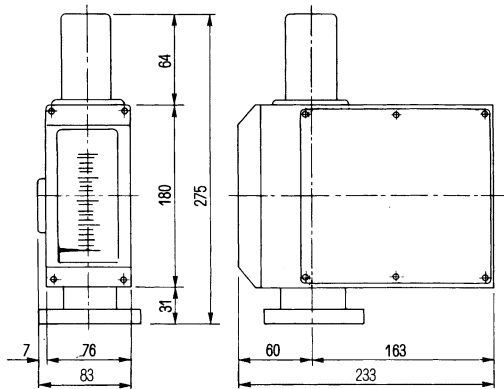


Fig. 1

Ambient Temp / $-30\sim 80^{\circ}\text{C}$



■ AM-1310 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.



● Specification of transmitter

- Air supply : $0.14 \pm 0.01 \text{ MPa}$
- Outputs : Standard 20~100kPa (with output gauge)
- Air consumption : 14L/min(nor)
- Connection : Standard Rc 1/4
- On request NPT 1/4
- Output accuracy : $\pm 1.0\% \text{ F.S.}$
- Construction : Weather proof (Equ. to IP54)
- IP65 available as option.
- Ambient Temp : $-20\sim 80^{\circ}\text{C}$
- Provide heat insulation if required.
- Accessory : Air set (On request)

● Dimension of indicator/transmitter

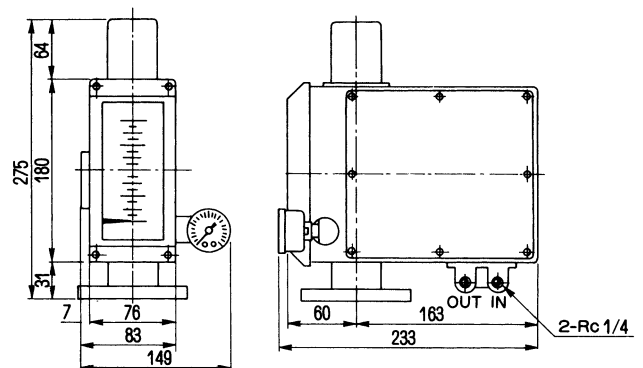


Fig. 2

■ AM-1520 SERIES LOCAL INDICATOR WITH ELECTRIC TRANSMITTER

AM-1520 indicates flow rate by pointer and scale plate and outputs electric (DC4~20mA) signal which is proportional to flow rate. Watertight, pressure tight explosion proof versions are ready.

● DIMENSION OF INDICATOR/TRANSMITTER

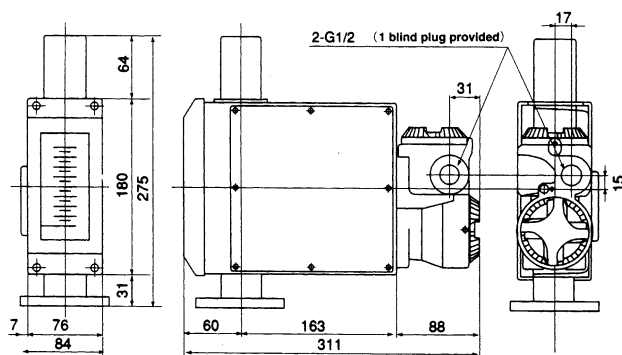
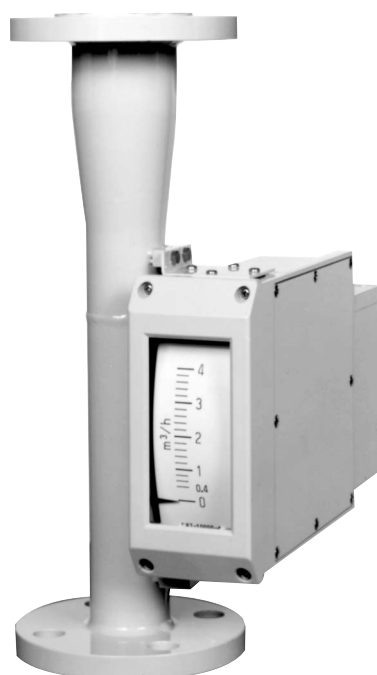


Fig. 3: Weather proof AM-152□ and Exd EP-AM-152□



● TERMINAL AND WIRING

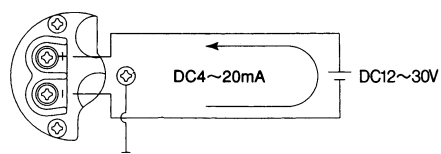


Fig. 4: Weather proof AM-152□ and Exd EP-AM-152□

● SPECIFICATION OF TRANSMITTER

Power supply voltage	: Weather proof AM-152□ and Exd EP-AM-152□ DC12~30V
Output	: DC4~20mA
Max load	: Weather proof AM-152□ and Explosion proof EP-AM-152□ 600Ω (At DC24V)
Cable entry	: G1/2 (1/2NPT as option) Specified cable gland (Type SXC-16B, Shimada Electric Co.) to be used.
Output accuracy	: ±1.0%F.S. (Against indication)
Construction	: Weather proof ; Equ. to IP54 AM-152□ IP65 available as option Pressure tight (std.) ; Exd II BT4 EP-AM-152□ On request ; Exd II CT4 EP-AM-152□
Amb. temp.	: Weather proof ; -30 ~ +70°C Pressure tight ExdIIBT4i ; -20 ~ +55°C ExdIICT4i ; -20 ~ +55°C

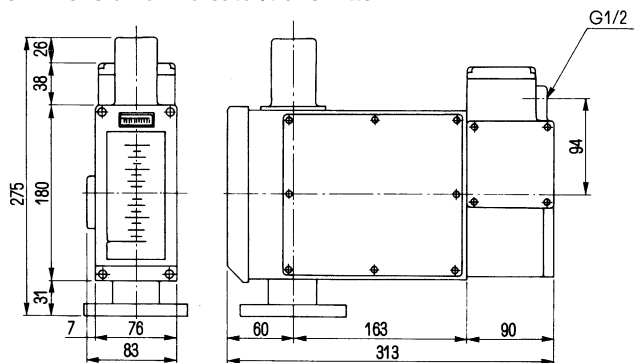
■ AM-1690 SERIES LOCAL INDICATOR WITH LOCAL INTEGRATOR AND PULSE TRANSMITTER

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 pressure tight explosion proof are ready.

● Specification of transmitter

Integration	: 6 digit with reset
Count rate	: 50~2000c/h
Pulse output	: Open collector output Pulse width 100ms, Rating DC35V, 50mA (Signal circuit and power supply circuit are isolated.)
Integration accuracy	: $\pm 2.0\%$ F.S.
Power supply	: AC 100V, 50/60Hz other voltage on request
Power consumption	: Max. 5VA
Cable entry :	
Standard	: G1/2 with female screw Cable gland with flameproof gasket available on request
On request	: NPT1/2
Enclosure	: Weather proof (Equ. to IP54) type AM-169□ Explosion 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

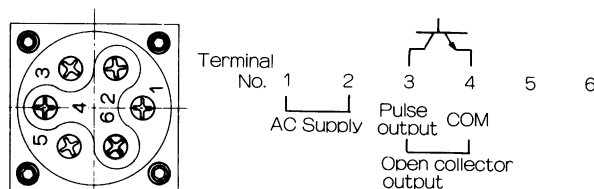


Fig. 6



OPTIONAL UNITS

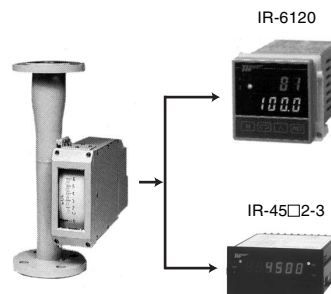
IR series universal totalizer

IR universal totalizer is an Indicator and Totalizer which is used in combination with AM series flowmeters having DC4~20mA or Pulse output for flow rate. Indication, Totalization, Alarm, DC4~20mA and Pulse re-output by one unit.

■ Combination with AM-152□ / DC4~20mA output, 2 wire

● IR-6120 / IR-45□2-3

Standard specification	
Flowrate indication	: 4 digit, 0~9999
Totalizing indication	: 5 digit, 0~36000c/h
Alarm output	: 2 points (H+L)
Scaled pulse output	: Open collector (IR-6000 : DC30V, 20mA) (IR-4500 : DC30V, 20mA)

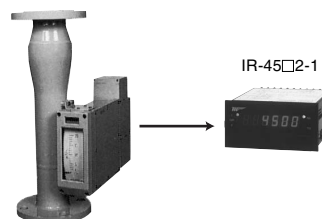


Analog output	: DC4~20mA (Max. load 500Ω)
Loop power supply	: DC24V (integrated)
Power supply	: AC100/200V $\pm 15\%$ AC115/230V $\pm 15\%$

■ Combination with AM-169□ / Open collector pulse output

● R-45□2-1

Standard specification	
Input signal	: Open collector pulse
Input pulse rate	: More than 360 c/h (F.S.)



Refer to Technical guidance of IR series for the details.

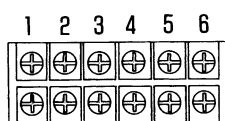
■ AM-1740 SERIES LOCAL INDICATOR WITH ALARM

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

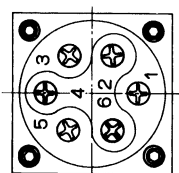
● Specification of transmitter

- Alarm point : 1 point high alarm or
1 point low alarm or
2 points high and low
- Switch : Micro switch SPDT
- Rating :
 - Standard : AC 125/250V, 5A
 - On request : DC 30V, 0.1A
- Reset span : Weather proof and Intrinsically safe within 20% (F.S.)
Pressure tight EP-AM-174□ within 30% (F.S.)
- Cable entry :
 - Standard : G1/2 with female screw
Cable gland with flameproof gasket available on request
 - On request : NPT 1/2
- Enclosure : Weather proof (Equ. to IP54) type AM-174□
Explosion proof (JISd2G4) type EP-AM 174□
Intrinsically safe (ExiallCT6) type IS-AM-174□*
* Supplied with safety barrier
- 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

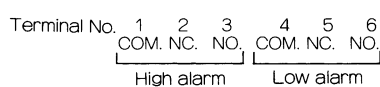
● Wiring diagram



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

• 1 point

• 2 points

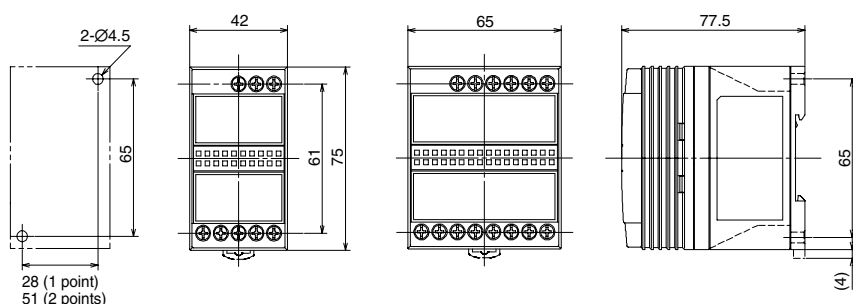
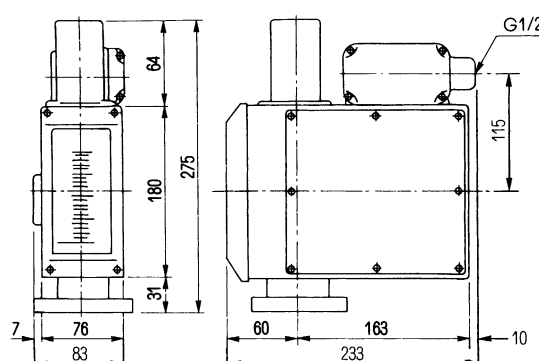


Fig. 10

Another brand safety relay also available.

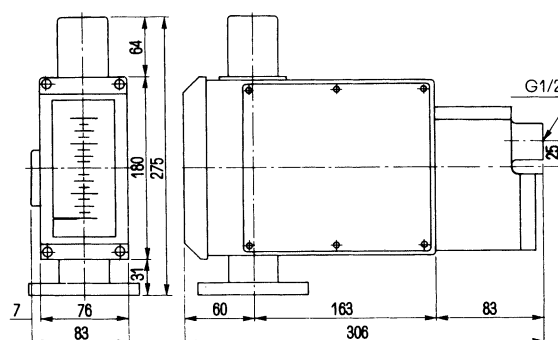


● Dimension of indicator / transmitter



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)

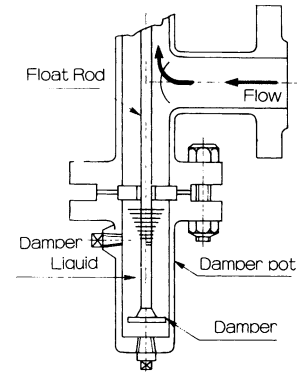


Fig. 11

● 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)

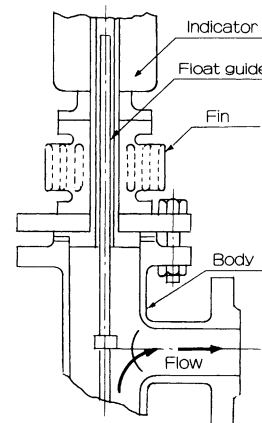


Fig. 12

● 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).

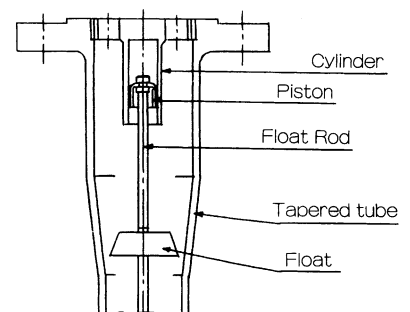


Fig. 13

● 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).

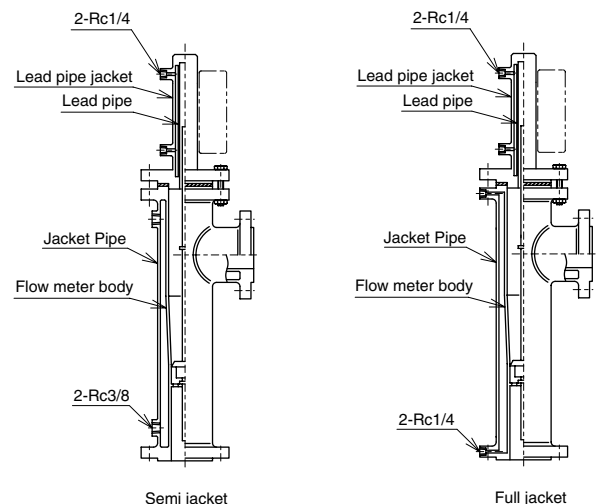


Fig. 14

■ 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)

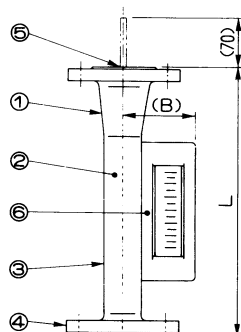


Fig. 15

* Float rod comes out 70mm during operation in meter size 20mm~150mm. 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 (mm) (inch)	Q _{water} (m ³ /h)	Pressure Loss (KPa)	10K Class AM-1□□□□			20K Class AM-1□□□□-M		
			L (mm)	(B) (mm)	Mass (kg)	L (mm)	(B) (mm)	Mass (kg)
15	1/2	0.1~0.75	350	89	5	350	89	5
20	3/4	1.5	350	89	5	400	89	6
25	1	4.06	350	92	6	400	92	7
40	1-1/2	7.15	400	99	8	400	99	9
50	2	15.1	400	105	10	450	105	12
65	2-1/2	27.5	450	113	13	500	113	18
80	3	40.5	450	120	15	500	120	20
100	4	71.9	450	132	20	500	132	28
125	5	110	500	145	32	-	-	-
150	6	150	500	158	50	-	-	-

■ 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

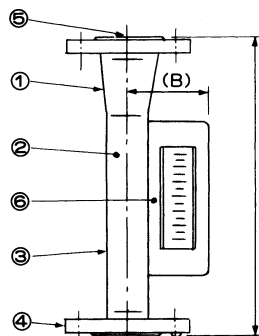


Fig. 16

■ Table 3

Meter size (mm) (inch)	Q _{air} m ³ /h(nor)	Pressure Loss (KPa)	Size (mm)		Mass (kg) JIS 10K
			L	(B)	
20	3/4	16~50	500	89	5
25	1	120	500	92	6
40	1-1/2	210	500	99	8
50	2	420	500	105	10
65	2-1/2	820	600	113	13
80	3	1200	600	120	15
100	4	2050	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

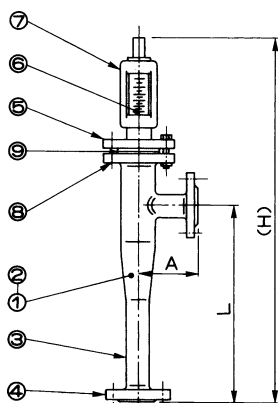


Fig. 17

■ Table 5

Meter size (mm) (inch)	Q _{water} (m ³ /h)	Pressure Loss (KPa)	10K Class AM-1□□□□				20K Class AM-1□□□□-M			
			(H) (mm)	L (mm)	A (mm)	Mass (kg)	(H) (mm)	L (mm)	A (mm)	Mass (kg)
15	1/2	0.1~0.69	650	250	100	8	650	250	100	10
20	3/4	1.6	650	250	100	8	660	250	100	10
25	1	4.19	650	250	100	10	670	250	100	12
40	1-1/2	7.73	670	250	100	12	680	250	100	15
50	2	15.1	680	250	100	15	720	250	100	20
65	2-1/2	29.3	780	350	150	22	810	350	150	28
80	3	40.8	820	350	150	25	840*	350	180	35
100	4	70.8	840*	350	150	43	880*	350	180	55
125	5	110	860*	370	250	55	-	-	-	-
150	6	150	970*	480	250	75	-	-	-	-

■ 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*	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

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

*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

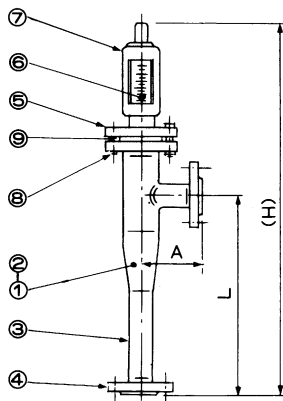


Fig. 18

■ Table 7

Meter size (mm) (inch)	Qair m³/h(nor)	Pressure Loss (KPa)	Size(mm)			Mass (kg) JIS 10K
			(H)	L	A	
15 1/2	2.92 ~ 17.1	2.8	690	250	100	8
20 3/4	39.3	4.0	690	250	100	8
25 1	77.7	2.7	690	250	100	10
40 1-1/2	129.9	2.9	690	250	100	12
50 2	254.7	3.4	700	250	100	15
65 2-1/2	440.8	2.6	800	350	150	22
80 3	630.6	4.0	820	350	150	25
100 4	1233.8	5.5	860*	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*	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 30mm with pneumatic transmitter without fin.

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

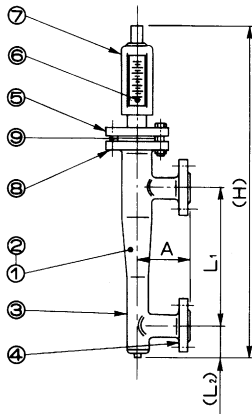


Fig. 19

● Table 9

Meter size (mm) (inch)	Qwater (m³/h)	Pressure Loss (KPa)	10K Class AM-1□□□□					20K Class AM-1□□□□-M				
			(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Weight (kg)	(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Mass (kg)
15 1/2	0.1 ~ 0.69	8.5	690	250	40	100	8	690	250	40	100	10
20 3/4	1.6	9.1	690	250	40	100	8	700	250	40	100	10
25 1	4.19	6.0	690	250	45	100	10	720	250	50	100	12
40 1-1/2	7.73	5.0	720	250	55	100	12	740	250	60	100	16
50 2	15.1	8.0	740	250	65	100	16	790	250	70	100	21
65 2-1/2	29.3	6.5	860	350	75	150	23	900	350	90	150	30
80 3	40.8	12.7	910	350	90	150	26	950*	350	110	180	37
100 4	70.8	13.6	940*	350	100	150	44	1000*	350	120	180	58
125 5	110	16.0	980*	370	120	250	57	-	-	-	-	-
150 6	150	21.0	1110*	480	140	250	77	-	-	-	-	-

● 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*	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

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

*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

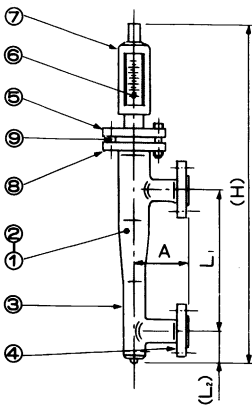


Fig. 20

● Table 11

Meter size (mm) (inch)	Qair m³/h(nor)	Pressure Loss (KPa)	Size(mm)				Mass (kg) JIS 10K
			(H)	L	(L2)	A	
15 1/2	2.92 ~ 17.1	2.8	730	250	40	100	8
20 3/4	39.3	4.0	730	250	40	100	8
25 1	77.7	2.7	730	250	45	100	10
40 1-1/2	129.9	2.9	730	250	55	100	12
50 2	254.7	3.4	760	250	65	100	15
65 2-1/2	440.8	2.6	880	350	75	150	22
80 3	630.6	4.0	910	350	90	150	25
100 4	1233.8	5.5	960*	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*	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 30mm with pneumatic transmitter without fin.

*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)

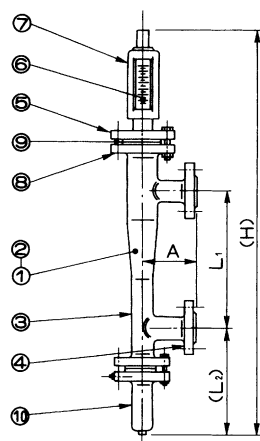


Fig. 21

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

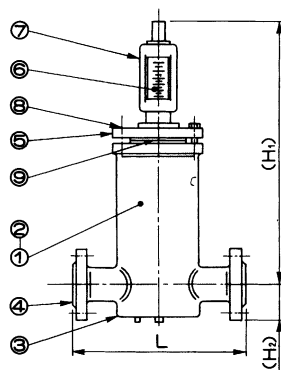


Fig. 22

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

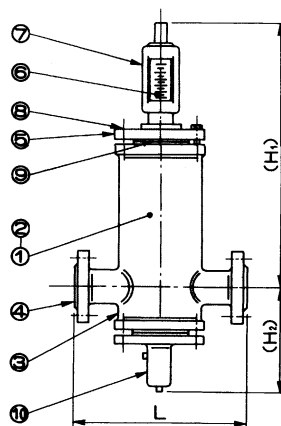


Fig. 23

■ Table 13

Meter size		Q		Pressure Loss (KPa)	10K Class AM-1□□□□					20K Class AM-1□□□□-M				
(mm)	(inch)	Water (m³/h)	Air m³/h(nor)		(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Weight (kg)	(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Mass (kg)
15	1/2	0.1~0.69	3.1~21.3	10.0	800	220	190	100	11	830	220	210	100	13
20	3/4	1.6	53	12.2	810	220	190	100	11	850	220	220	100	13
25	1	4.19	129.4	17.7	830	220	210	100	14	880	220	240	100	17
40	1-1/2	7.73	238	11.0	860	220	220	100	18	930	220	280	100	22
50	2	15.1	466	15.8	960	220	310	100	21	1050	220	370	100	28
65	2-1/2	29.3	904	19.5	1080	350	300	150	29	1180	350	370	150	38
80	3	40.8	1260	18.0	1130	350	310	150	35	1220*	350	380	180	46
100	4	70.8	2186	19.5	1160*	350	320	150	53	1280*	350	400	180	70
125	5	110	3300	22.0	1220*	370	360	250	68	-	-	-	-	-
150	6	150	4500	27.0	1330*	480	360	250	90	-	-	-	-	-

■ 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*	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

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

*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			
(mm)	(inch)			(H1) (mm)	(H2) (mm)	L (mm)	Weight (kg)	(H1) (mm)	(H2) (mm)	L (mm)	Mass (kg)
15	1/2	0.1~0.6	11.0	440	80	160	12	440	100	160	14
20	3/4	1.4	12.0	470	70	160	12	500	120	160	14
25	1	3.1	10.0	480	90	180	15	500	120	180	17
40	1-1/2	6.1	15.0	510	80	240	18	520*	120	240	21
50	2	14	11.5	540	80	260	24	550*	100	260	28
65	2-1/2	24	10.0	570	80	340	35	580	100	340	42
80	3	35	16.0	610	80	360	40	620	110*	360	50
100	4	60	18.0	650*	90	360	60	660*	130*	360	75
125	5	90	20.0	670*	110	440	90	-	-	-	-
150	6	155	25.0	720*	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*	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

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

*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			
(mm)	(inch)	Water (m³/h)	Air m³/h(nor)		(H1) (mm)	(H2) (mm)	L (mm)	Weight (kg)	(H1) (mm)	(H2) (mm)	L (mm)	Mass (kg)
15	1/2	0.1~0.7	3.1~18	12.0	440	200	160	15	440	210	160	17
20	3/4	1.6	50	14.8	470	200	160	15	500	210	160	17
25	1	3.5	100	21.0	480	210	180	19	500	230	180	22
40	1-1/2	6.5	200	15.5	510	200	240	24	520*	240	240	28
50	2	13	400	19.0	540	270	260	30	550*	290	260	36
65	2-1/2	25	750	22.1	570	280	340	42	580	320	340	52
80	3	35	1100	21.0	610	290	360	50	620	330	360	62
100	4	60	1800	24.0	650*	300	360	70	660*	340	360	90
125	5	90	2800	26.0	670*	320	440	105	-	-	-	-
150	6	155	4800	31.5	720*	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*	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

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

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

Other special metallic material available on request.

● Type AM-1□□1-JS, AM-1□□7-JF For liquids
(Flow direction : Bottom-Top, with heating Jacket)

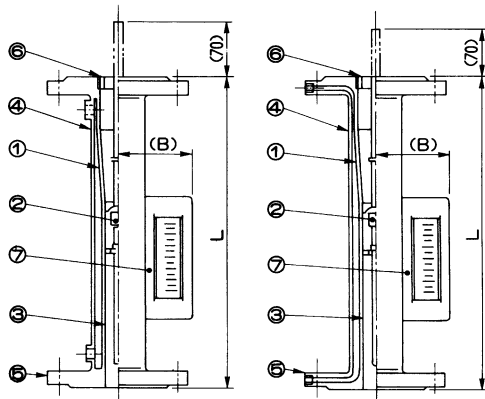


Fig. 24

Fig. 25

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

■ Table 19

Meter size (mm) (inch)	Qwater (m³/h)	Pressure Loss (KPa)	10K Class AM-1□□□□			20K Class AM-1□□□□-M		
			L (mm)	(B) (mm)	Weight (kg)	L (mm)	(B) (mm)	Mass (kg)
15	1/2	0.1 ~ 0.7	6.5	350	93	6	350	93
20	3/4	1.5	6.0	400	93	6	400	93
25	1	3.8	7.3	400	96	7	400	96
40	1-1/2	7.15	9.0	400	103	10	400	103
50	2	15.1	6.3	450	113	12	450	113
65	2-1/2	26.5	7.8	500	120	16	500	120
80	3	39.5	9.1	500	126	18	500	126
100	4	67.5	12.0	500	145	25	500	145
125	5	110	14.0	500	158	38	-	-
150	6	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)

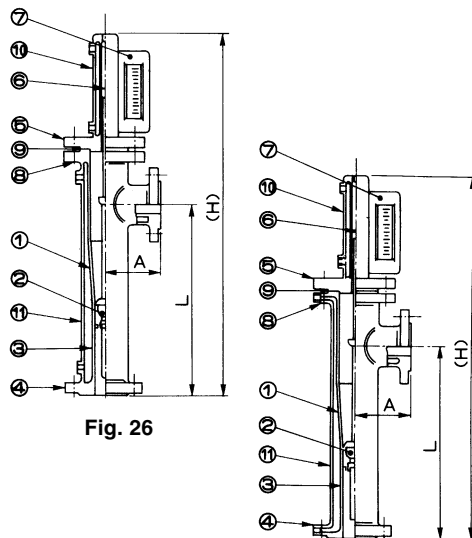


Fig. 26

Fig. 27

■ Table 21

Meter size (mm) (inch)	Qwater (m³/h)	Pressure Loss (KPa)	10K Class AM-1□□□□				20K Class AM-1□□□□-M			
			(H) (mm)	L (mm)	A (mm)	Weight (kg)	(H) (mm)	L (mm)	A (mm)	Mass (kg)
15	1/2	0.1 ~ 0.69	8.5	660	250	100	12	660	250	100
20	3/4	1.6	9.1	680	250	100	12	680	250	100
25	1	3.6	6.0	670	250	100	15	670	250	100
40	1-1/2	5.9	5.0	680	250	130	18	690	250	130
50	2	12.4	8.0	710	250	130	22	750	250	130
65	2-1/2	25	6.5	820	350	150	30	850	350	150
80	3	34.3	12.7	850	350	180	35	870	350	180
100	4	55.0	13.6	900	350	180	58	940	350	180
125	5	110	16.0	940	370	250	72	-	-	-
150	6	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	SUS304L
11.	Jacket pipe	SGP or STPG 370 (Depending no jacket midium 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

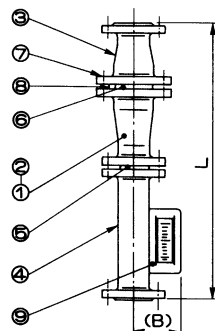


Fig. 28

■ Table 23

Meter size (mm) (inch)	Qwater (m³/h)	Pressure Loss (KPa)	L (mm)	(B) (mm)	Mass (kg)
15	1/2	0.1 ~ 0.65	5.0	550	89
20	3/4	1.2	6.0	550	89
25	1	2.8	6.0	550	92
40	1-1/2	6.5	9.0	600	99
50	2	11.5	6.0	650	105
65	2-1/2	17.0	8.0	700	113
80	3	34.0	9.0	750	120
100	4	60.0	11.0	750	132
125	5	90.0	13.0	750	145
150	6	140.0	17.0	800	158

■ Table 24

No.	Description	Class 4	Class 5	Class 6
1.	Tapered tube	Rubber Lined	Rubber Lined	ETFE Lined
2.	Float ass'y	PVC*1	PTFE*2	PTFE*2
3.	Lower body	Other metallic material on request		
4.	Upper body	Rubber Lined	Rubber Lined	ETFE 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 2F coated SUS304 for meter size 15 and 20mm.

*2 : Float rod material is 2F coated SUS304 for meter size 15, 20, 25 and 40mm.

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

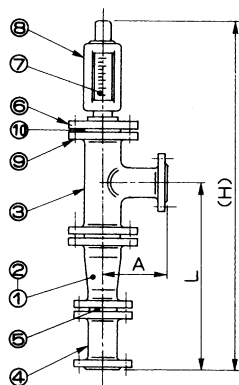


Fig. 29

■ Table 25

Meter size (mm) (inch)	Qwater (m³/h)	Pressure Loss (KPa)	H (mm)	L (mm)	(B) (mm)	Mass (kg)
15 1/2	Not available					
20 3/4	Not available					
25 1	0.8~2.7	5.5	700	320	120	17
40 1-1/2	4.8	4.3	730	350	130	22
50 2	11.4	7.0	780	380	130	24
65 2-1/2	20.2	5.4	810	400	150	28
80 3	33.0	10.0	870	440	150	34
100 4	54.0	10.0	1000	500	200	52
125 5	88.0	14.0	1020	500	200	65
150 6	140.0	20.0	1150	600	220	95

■ Table 26

No.	Description	Class 4	Class 5	Class 6
1.	Tapered tube	Rubber Lined	Rubber Lined	ETFE Lined
2.	Float ass'y	PVC*	PTFE*	PTFE*
		Other metallic material on request		
3.	Upper body	Rubber Lined	Rubber Lined	ETFE Lined
4.	Lower body	Rubber Lined	Rubber Lined	ETFE 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 2F coated SUS304 for meter size 15,20 and 25mm.

[PVC LINED MATERIAL]

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

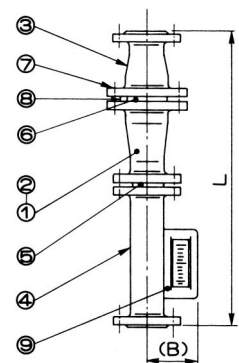


Fig. 30

■ Table 27

Meter size (mm) (inch)	Qwater (m³/h)	Pressure Loss (KPa)	L (mm)	(B) (mm)	Mass (kg)
15 1/2	0.1~0.65	5.0	550	89	16
20 3/4	1.1	5.0	700	89	20
25 1	2.1	5.5	750	96	25
40 1-1/2	2.7	8.0	800	99	32
50 2	6.5	5.5	850	105	40
65 2-1/2	12	7.0	900	113	50
80 3	17	8.0	900	126	62
100 4	35	10.0	950	132	78
125 5	48	12.0	950	145	94
150 6	66	16.0	1000	158	130

■ Table 28

No.	Description	Class 7
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 2F coated SUS304 for meter size 15 and 20mm.

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

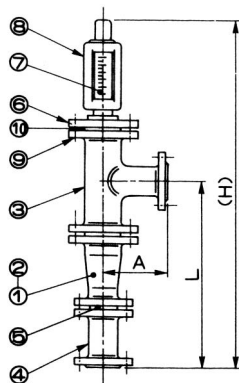


Fig. 31

■ Table 29

Meter size (mm) (inch)	Qwater (m³/h)	Pressure Loss (KPa)	Conn Size	(H) (mm)	L (mm)	A (mm)	Mass (kg)
15 1/2	Not available						
20 3/4	Not available						
25 1	0.6~1.9	5.0	20	850	420	70	18
			25	830	400	49	
			40	830	400	61	
40 1-1/2	2.6	3.8	25	850	420	54	22
			40	850	420	64	
			50	850	420	67	
50 2	5.8	6.0	40	930	480	70	25
			50	930	480	74	
			65	930	480	80	
65 2-1/2	11	4.8	50	980	520	80	30
			65	980	520	86	
			80	980	520	90	
80 3	18	8.5	65	1010	530	99	46
			80	1010	530	103	
			100	1010	530	110	
100 4	29.5	8.5	80	1050	553	128	53
			100	1050	553	135	
			125	1050	553	141	
125 5	45	12.0	100	1100	600	135	65
			125	1100	600	141	
			150	1100	600	190	
150 6	76	17.0	125	1140	641	167	95
			150	1150	650	210	
			200	1150	650	220	

■ Table 30

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 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

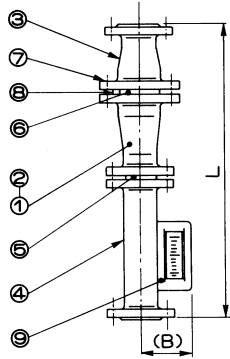


Fig. 32

■ Table 31

Meter size (mm)		TEFLON FLOAT		HASTELLOY FLOAT		Conn Size	L (mm)	(B) (mm)	Mas (kg)
		Qwater (m³/h)	Pressure Loss	Q (m³/h)	Pressure Loss (KPa)				
15		0.1~0.4	6.0	0.1~0.6	10.0	20 25	570 552	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	688	99	35
						40	840		
	2	3.2	6.0	4.5	8.0	25	875	99	33
						40	803		
50		6.5	6.0	8	8.0	50	867	105	40
65		Not available							
80		17	9.0	20	10.5	40	750	120	55
100		35	9.0	45	11.5	50	790		
125		Not available							
150		Not available							

■ Table 32

No.	Description	Class 8	Class 9
1.	Tapered tube	Glass Lined	Glass Lined
2.	Float ass'y	Teflon*	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 2F coated SUS304 for meter size 15, 20, 25 and 40mm.

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

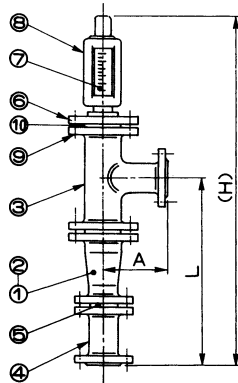


Fig. 33

■ Table 34

No.	Description	Class 8	Class 9
1.	Tapered tube	Glass Lined	Glass Lined
2.	Float ass'y	Teflon*	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 2F coated SUS304 for meter size 15, 20, and 25mm.

■ Table 33

Meter size (mm)		TEFLON FLOAT		HASTELLOY FLOAT		Conn Size	(H) (mm)	L (mm)	A (mm)	Mass (kg)
		Q _{water} (m³/h)	Pressure Loss (KPa)	Q (m³/h)	Pressure Loss					
15		Not available								
20		Not available								
25	1	0.3~0.79	8.0	0.4 ~ 1.0	10.0	20	740	362	78	27
						25	850	470		
						40	760	380		
	2	1.3	6.0	1.6	8.0	20	780	378	95	30
						25	890	486		
40						800	398			
40	1	2.1	7.0	2.7	9.0	25	830	422	95	33
						40	920	512		
						50	820	418		
	2	2.8	6.0	3.6	8.0	25	840	418	102	37
						40	920	508		
50						820	414			
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

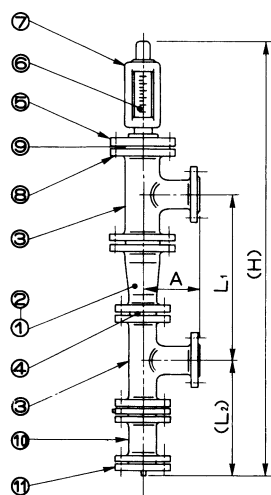


Fig. 34

■ Table 36

No.	Description	Class 8	Class 9
1.	Tapered tube	Glass Lined	Glass Lined
2.	Float ass'y	PTFE*	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 2F coated
SUS304 for meter size 15, 20 and 25mm.

■ Table 35

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

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

Where Qw : Water converted flow rate (m³/h)

Q : Flow rate of actual fluid (m³/h)

γ : Density of actual fluid (g/cm³)

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

$$\begin{aligned} QW &= 50 \times (2.59 / \sqrt{(7.7/0.8) - 1}) \\ &= 50 \times 0.882 \\ &= 44.1 (\text{m}^3/\text{h}) \end{aligned}$$

Referring to table 1 on p. 8, the required meter size is 100mm. 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

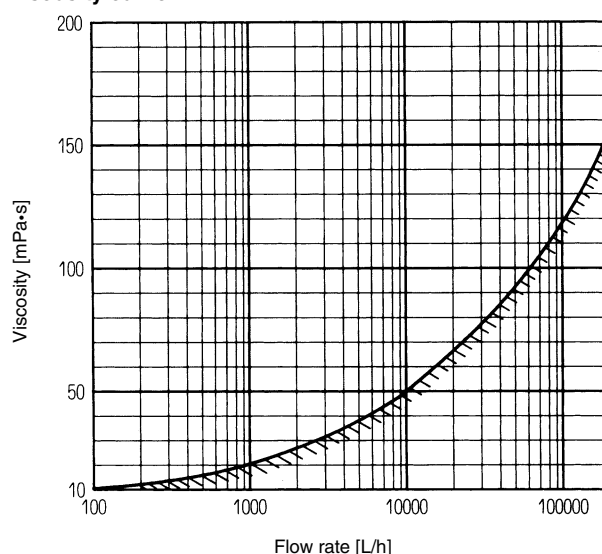


Fig. 35

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:

$$QA = Q \times 0.0169 \times \sqrt{\gamma \times (273+t) / (0.1013+p)}$$

Where QA : Converted flow rate in air 0°C, 1atm (m³/h(nor))
Q : Flow rate of gas to be measured (m³/h(nor))
γ : Density of gas to be measured (kg/m³(nor))
t : Operating temperature (°C)
p : Operating pressure (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

$$\begin{aligned} QA &= 300 \times 0.0169 \times \sqrt{1.251 \times (273+20) / (0.1013+0.6)} \\ &= 300 \times 0.0169 \times 22.86 \\ &= 115.9 \text{ [m}^3\text{/h(nor)]} \end{aligned}$$

Referring to Table 13 on p. 10 the suitable meter size is 25mm. 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 : Specific weight 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, specific weight (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:

$$\begin{aligned} 1\text{t/h} &= 1000\text{kg/h} \\ Qs &= 1000\text{kg/h} / 5.1\text{kg/m}^3 \\ &= 196\text{m}^3\text{/h} \end{aligned}$$

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

$$\begin{aligned} Qw &= 196 \times 0.03 \times \sqrt{5.1} \\ &= 13.3\text{m}^3\text{/h} \end{aligned}$$

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

■ Density of saturated Steam

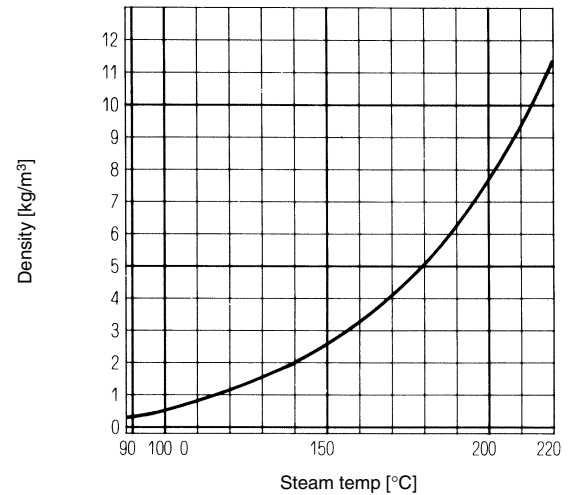


Fig. 36

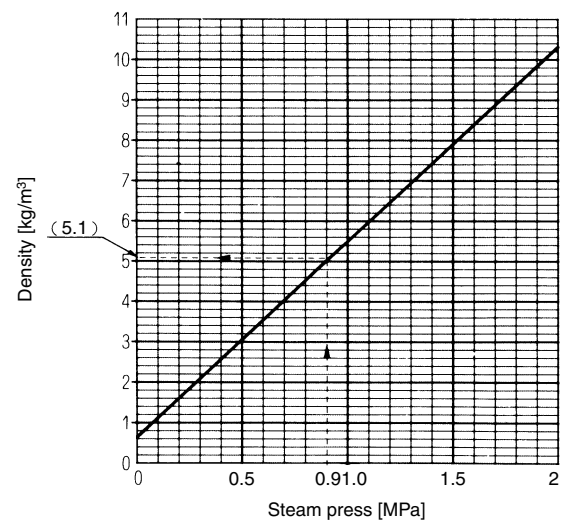


Fig. 37

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		
		-1size	±0 size	+1 size
AM-1□□1	B-T	X	○	○
AM-1□□1-JS/JF	B-T	X	X	○
AM-1□□2	B-TS	○	○	○
AM-1□□2-JS/JF	B-TS	X	○	○
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 35-350m³/h(nor), the graduation on the flowmeter will be 3.5-35×10m³/h(nor)

● Standard scale graduation

1-10	1.2-12	1.5-15	1.6-16	2-20	2.5-25
10 2DIV-2DIV 8 6 4 2 1 0.5/DIV 3-30	12 2DIV-2DIV 10 8 6 4 2 1.2 0.5/DIV 3.5-35	15 5DIV-2DIV 10 8 6 5 7DIV 1.5 0.5/DIV 4-40	16 5DIV 15 10 5 6.8DIV 1.6 1.0/DIV 4.5-45	20 5DIV 15 10 5 3DIV 2 1.0/DIV 5-50	25 5DIV 20 15 10 5 2.5DIV 1.0/DIV 6-60
30 2DIV-5DIV 20 10 7DIV 3 1.0/DIV	35 2DIV 30 20 10 3.25DIV 2.0/DIV	40 5DIV 30 20 10 3DIV 2.0/DIV	45 2.5DIV 40 5DIV 30 20 10 2.5DIV 2.0/DIV	50 5DIV 40 30 20 10 2.5DIV 2.0/DIV	60 5DIV 50 40 30 20 10 2DIV 2.0/DIV

7-70	7.5-75	8-80	9-90
70 2DIV 60 2DIV-2DIV 40 20 7 5.0/DIV	75 3DIV 60 2DIV-2DIV 40 20 7.5 5.0/DIV	80 2DIV-2DIV 60 40 20 8 5.0/DIV	90 2DIV 80 2DIV-2DIV 60 40 20 9 5.0/DIV

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				
	Scale range				
	Connection size				
	Flange rating				
Material class					
For Jacketed versions (AM-1□□□-JS/JF)		Jacket fluid	☐ Hot water ☐ Steam		
		Temp.	_____°C	Press.	_____MPa
		Connection	☐ Std. (Rc. 1/4, 3/8) ☐ Others _____		
TRANSMITTERS		AM-131□	AM-152□	AM-169□	AM-174□
	Connection	☐ Std. Rc. 1/4 ☐ Others _____	☐ Std. G1/2 ☐ Others _____	☐ Std. G1/2 ☐ Others _____	☐ Std. G1/2 ☐ Others _____
	Enclosure	☐ Weather proof	☐ Weather proof ☐ Press.tight ex-proof	☐ Weather proof ☐ Press.tight ex-proof	☐ Weather proof ☐ Press.tight ex-proof ☐ Intrinsically safe
	Power supply	-	☐ DC24V -	AC _____V _____HZ	-
	Alarm point	-	-	-	☐ 1 ☐ 2
	Alarm setting	-	-	-	H _____ L _____
	Count	-	-	_____c/h	-
	Accessory	☐ Air set	☐ Cable gland	☐ Cable gland	☐ Cable gland ☐ Safety relay

* Specification is subject to change without notice.

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