TECHNICAL GUIDANCE

ISO 9001 Certified
JQA-2172

TO COVER ALL POSSIBLE APPLICATIONS

METAL TUBE

AM-1000 Series

COMPACT FLOWMETER

■ 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 material and full line up of lined material 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 material 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			-		-		-		
Construction											Water proof (IP54)
	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 + 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 (Horizonal)
				7	-						Right-Left (Horizonal)
Additional function1						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")
On request Larger sizes than 150 mm (6")

● MATERIAL

Standard Carbon steel, 304SS, 316SS, 316LSS
Rubber lining, ETFE lining, PVC lining and Glass lining
On request Other metallic material

● PRESSURE RATING

Standard 150lbs (10Kgf/cm^{2}G) class
300lbs (20Kgf/cm^{2}G) class
On request High pressure upto 2000kg/cm^{2}G
(Consult factory for details)
*Only 150 lbs (10Kgf/cm^{2}G) 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	kgf/cm^{2}G	14	12	10	34	31	29	26	23
	psiG	199	171	142	484	441	413	370	327

● 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	150	400*2
	°F	392	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	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 Teflon float

● ACCURACY (LOCAL INDICATION)

Standard ±1.5%F.S.*
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 water proof (IP54 equ.)
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**

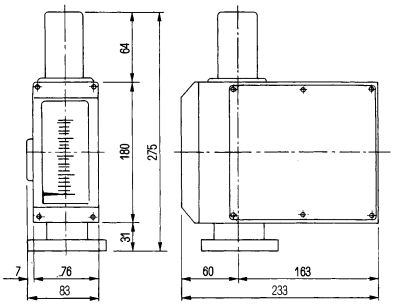


Fig.1

■ 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	: 1.4 ± 0.1Kgf/cm²G	
Outputs	: Standard	0.2~1.0Kgf/cm²G
	On request	3~15psiG
		0.2~10barG
Air consumption	: 14Nl/min	
Connection	: Standard	Rc 1/4 (=PT1/4)
	On request	NPT 1/4
Output accuracy	: ±1.0%F.S.	
Construction	: Dust and water proof (IP 54 equ.) IP65 available as option.	
Ambient Temp	: -20~80°C Provide heat insulation if required.	
Accessory	: Air set (On request)	

● **Dimension of indicator/transmitter**

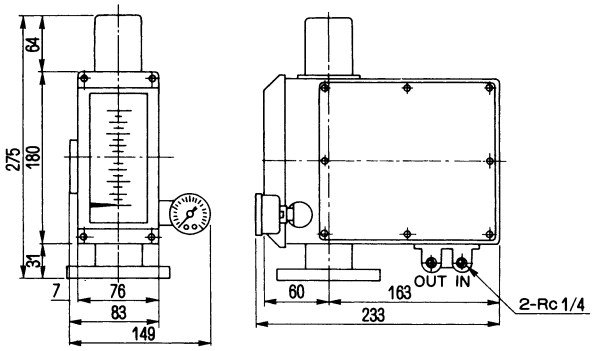


Fig.2

■ AM-1520 SERIES LOCAL INDICATOR WITH ELECTRIC TRANSMITTER

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

● DIMENSION OF INDICATOR/TRANSMITTER

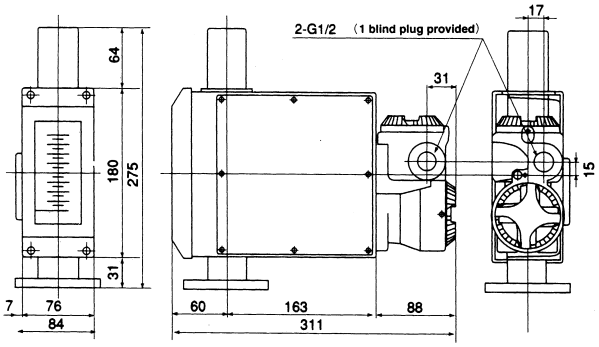


Fig.3:Weather proof AM-152□ and Exd EP-AM-152□

● TERMINAL AND WIRING

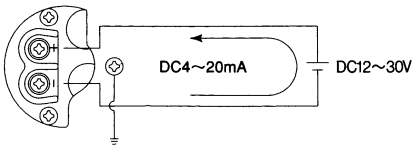


Fig.4:Weather proof AM-152□ and Exd EP-AM-152□

● 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 Exd 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 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 AM-152□ -30 ~ +70°C
  Pressure tight EP-AM-152□ -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. Water tight 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 : ±2.0%F.S.

Power supply : AC 100V, 50/60Hz
other voltage on request

Power consumption : Max. 5VA

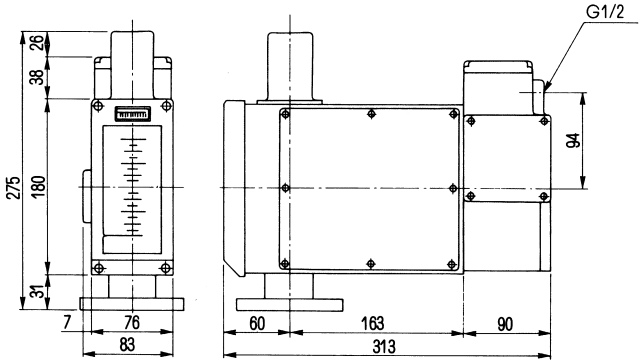
Cable entry:
Standard : G1/2 (=PF1/2) with female screw
Cable gland with flame proof gasket available on request

On request : NPT1/2

Enclosure : Weather proof (IP 54 equ) 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

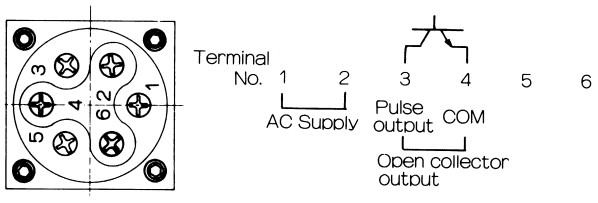


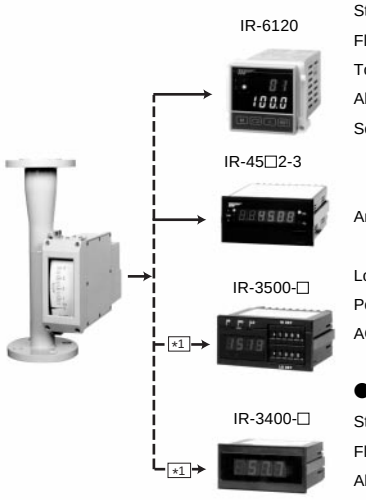
Fig.6

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 flowrate. Indication, Totalization, Alarm, DC4~20mA and Pulse re-output by one unit.

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



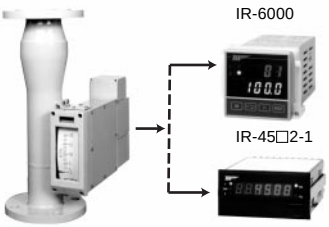
● IR-6120 / IR-45□2-3

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 : DC-4-20mA
(Max. load 500Ω)
Loop power supply : DC24V (integrated)
Power supply : AC100/200V ±15%
AC115/230V ±15%

● IR-3400 / 3500

Standard specification
Flowrate indication : 3-1/2 digit LED, 0~1999
Alarm output : 2 points (H + L) IR-3500 only
Power supply : AC 85~134V
AC185~264V

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



● IR-6000/IR-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.

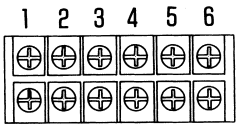
■ AM-1740 SERIES LOCAL INDICATOR WITH ALARM

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

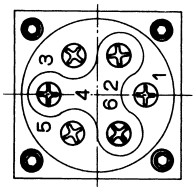
● Specification of transmitter

Alarm point : 1 point high alarm or
1 point low alarm or
2 point high and low
Switch : Micro switch SPDT
Rating :
Standard : AC 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 (=PF1/2) with female screw
Cable gland with flame proof gasket available on request
On request : NPT 1/2
Enclosure :
Weather proof (IP54 equ.) type AM-174□
Explosion proof (JISd2G4) type EP-AM 174□
Intrinsically safe (JIS i3nG5) type IS-AM-174□*
*Supplied with safety barrier
Ambient temp : -25~80ºC for type AM-174□
: -10 ~60ºC for type EP-AM-174□
IS-AM-174□
Provide heat insulation if required

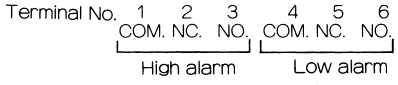
● Wiring diagram



AM-174□ and IS-AM-174□



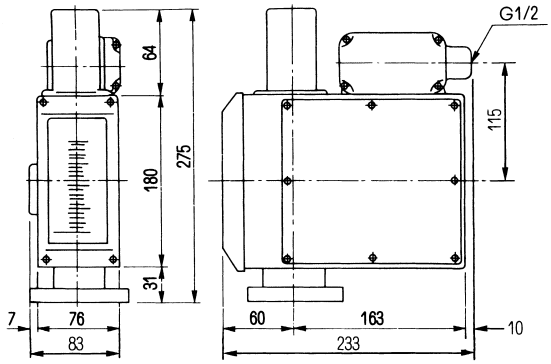
EP-AM-174□



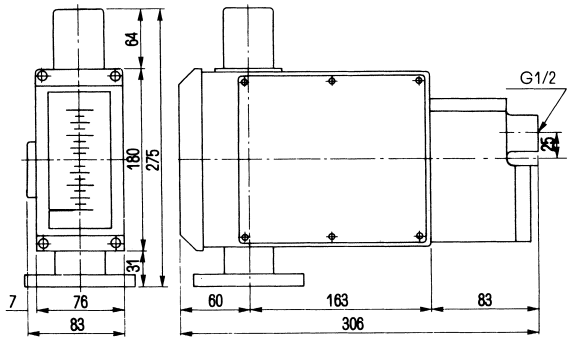
* Terminals 4, 5, 6 (1, 2, 3) are not used in case of one point alarm of high (Low).

Fig.9

● Dimension of indicator / transmitter



AM-174□ and IS-AM-174□
Fig.7



EP-AM-174□
Fig.8

● Safety Relay

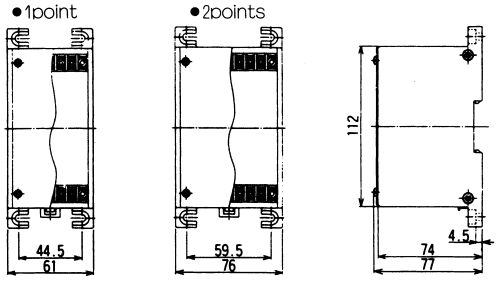


Fig.10

Another brand safety relay also available.

■ 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)

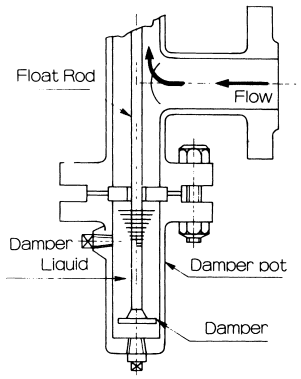


Fig.11

● Cooling fin (typeAM-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)

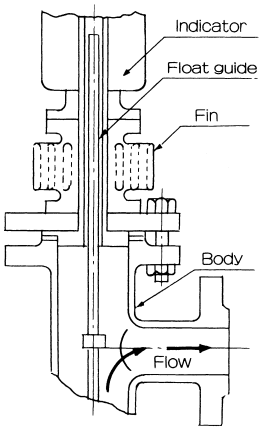


Fig.12

● 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).

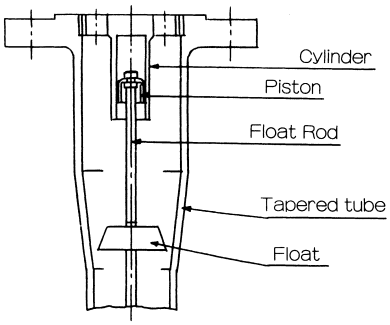


Fig.13

● Steam jacket (typeAM-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).

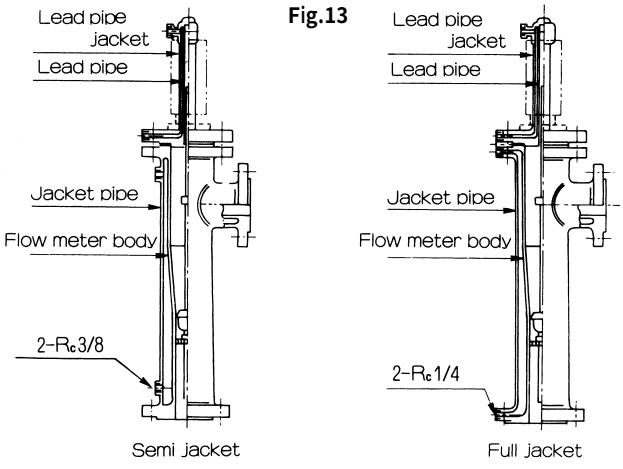


Fig.14

■ 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)

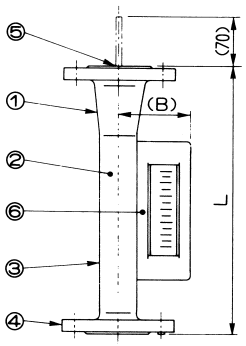


Fig.15

*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		Qwater	△P	10K Class AM-1□□□-□			20K Class AM-1□□□-M		
(mm)	(inch)	(m^3/h)	(mmH_2O)	L (mm)	(B) (mm)	Weight (kg)	L (mm)	(B) (mm)	Weight (kg)
15	1/2	0.1～0.75	650	350	89	5	350	89	5
20	3/4	1.5	600	350	89	5	400	89	6
25	1	4.06	730	350	92	6	400	92	7
40	1-1/2	7.15	900	400	99	8	400	99	9
50	2	15.1	630	400	105	10	450	105	12
65	2-1/2	27.5	780	450	113	13	500	113	18
80	3	40.5	910	450	120	15	500	120	20
100	4	71.9	1200	450	132	20	500	132	28
125	5	110	1400	500	145	32	-	-	-
150	6	150	1800	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 (Flow direction:Bottom-Top with damper) For gases

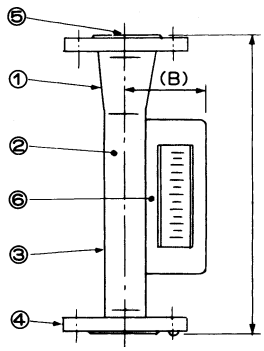


Fig.16

■ **Table 3**

Meter size		Qair	△P	Size (mm)		Weight (kg)
(mm)	(inch)	(Nm^3/h)	(mmH_2O)	L	(B)	JIS 10k
20	3/4	16～50	1000	500	89	5
25	1	120	1000	500	92	6
40	1-1/2	210	1200	500	99	8
50	2	420	1000	500	105	10
65	2-1/2	820	1650	600	113	13
80	3	1200	2300	600	120	15
100	4	2050	2400	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

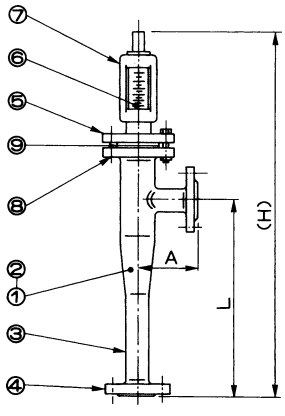


Fig.17

■ **Table 5**

Meter size		Qwater	△P	10K Class AM-1□□□-□				20K Class AM-1□□□-M			
(mm)	(inch)	(m^3/h)	(mmH_2O)	(H) (mm)	L (mm)	A (mm)	Weight (kg)	(H) (mm)	L (mm)	A (mm)	Weight (kg)
15	1/2	0.1～0.69	850	650	250	100	8	650	250	100	10
20	3/4	1.6	910	650	250	100	8	660	250	100	10
25	1	4.19	600	650	250	100	10	670	250	100	12
40	1-1/2	7.73	500	670	250	100	12	680	250	100	15
50	2	15.1	800	680	250	100	15	720	250	100	20
65	2-1/2	29.3	650	780	350	150	22	810	350	150	28
80	3	40.8	1270	820	350	150	25	840*	350	180	35
100	4	70.8	1360	840*	350	150	43	880*	350	180	55
125	5	110	1600	860*	370	250	55	-	-	-	-
150	6	150	2100	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 side-Top side, with damper) For gases

■ Table 7

Meter size		Qair	△P	Size(mm)			Weight (kg)
(mm)	(inch)	(Nm^3/h)	(mmH_2O)	(H)	L	A	JIS 10k
15	1/2	2.92 ～ 17.1	280	690	250	100	8
20	3/4	39.3	400	690	250	100	8
25	1	77.7	270	690	250	100	10
40	1-1/2	129.9	290	690	250	100	12
50	2	254.7	340	700	250	100	15
65	2-1/2	440.8	260	800	350	150	22
80	3	630.6	400	820	350	150	25
100	4	1233.8	550	860*	350	150	43

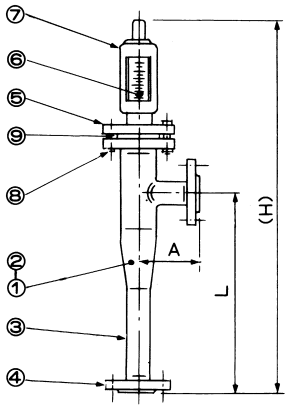


Fig.18

■ 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

● Table 9

Meter size		Qwater	△P	10K Class AM-1□□□-□					20K Class AM-1□□□-M				
(mm)	(inch)	(m^3/h)	(mmH_2O)	(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Weight (kg)	(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Weight (kg)
15	1/2	0.1 ～0.69	850	690	250	40	100	8	690	250	40	100	10
20	3/4	1.6	910	690	250	40	100	8	700	250	40	100	10
25	1	4.19	600	690	250	45	100	10	720	250	50	100	12
40	1-1/2	7.73	500	720	250	55	100	12	740	250	60	100	16
50	2	15.1	800	740	250	65	100	16	790	250	70	100	21
65	2-1/2	29.3	650	860	350	75	150	23	900	350	90	150	30
80	3	40.8	1270	910	350	90	150	26	950*	350	110	180	37
100	4	70.8	1360	940*	350	100	150	44	1000*	350	120	180	58
125	5	110	1600	980*	370	120	250	57	-	-	-	-	-
150	6	150	2100	1110*	480	140	250	77	-	-	-	-	-

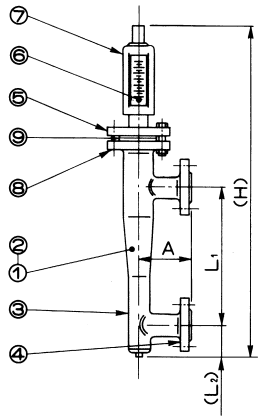


Fig.19

● 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

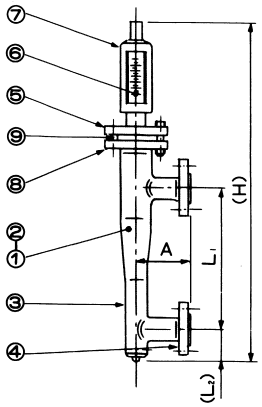


Fig.20

● Table 11

Meter size		Qair	△P	Size(mm)				Weight (kg)
(mm)	(inch)	(Nm^3/h)	(mmH_2O)	(H)	L	(L2)	A	JIS 10k
15	1/2	2.92～17.1	280	730	250	40	100	8
20	3/4	39.3	400	730	250	40	100	8
25	1	77.7	270	730	250	45	100	10
40	1-1/2	129.9	290	730	250	55	100	12
50	2	254.7	340	760	250	65	100	15
65	2-1/2	440.8	260	880	350	75	150	22
80	3	630.6	400	910	350	90	150	25
100	4	1233.8	550	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)

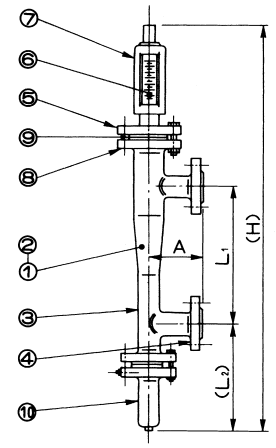


Fig.21

■ Table 13

Meter size		Q		△P	10K Class AM-1□□□-□					20K Class AM-1□□□-M				
(mm)	(inch)	Water (m^3/h)	Air (Nm^3/h)	(mmH2O)	(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Weight (kg)	(H) (mm)	L1 (mm)	L2 (mm)	A (mm)	Weight (kg)
15	1/2	0.1～0.69	3.1～21.3	1000	800	220	190	100	11	830	220	210	100	13
20	3/4	1.6	53	1220	810	220	190	100	11	850	220	220	100	13
25	1	4.19	129.4	1770	830	220	210	100	14	880	220	240	100	17
40	1-1/2	7.73	238	1100	860	220	220	100	18	930	220	280	100	22
50	2	15.1	466	1580	960	220	310	100	21	1050	220	370	100	28
65	2-1/2	29.3	904	1950	1080	350	300	150	29	1180	350	370	150	38
80	3	40.8	1260	1800	1130	350	310	150	35	1220*	350	380	180	46
100	4	70.8	2186	1950	1160*	350	320	150	53	1280*	350	400	180	70
125	5	110	3300	2200	1220*	370	360	250	68	-	-	-	-	-
150	6	150	4500	2700	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.

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

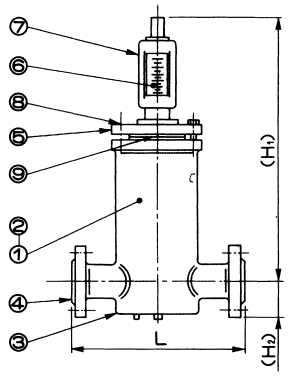


Fig.22

■ Table 15

Meter size		Qwater	△P	10K Class AM-1□□□-□				20K Class AM-1□□□-M			
(mm)	(inch)	(m^3/h)	(mmH2O)	(H1) (mm)	(H2) (mm)	L (mm)	Weight (kg)	(H1) (mm)	(H2) (mm)	L (mm)	Weight (kg)
15	1/2	0.1～0.6	1100	440	80	160	12	440	100	160	14
20	3/4	1.4	1200	470	70	160	12	500	120	160	14
25	1	3.1	1000	480	90	180	15	500	120	180	17
40	1-1/2	6.1	1500	510	80	240	18	520*	120	240	21
50	2	14	1150	540	80	260	24	550*	100	260	28
65	2-1/2	24	1000	570	80	340	35	580	100	340	42
80	3	35	1600	610	80	360	40	620	110*	360	50
100	4	60	1800	650*	90	360	60	660*	130*	360	75
125	5	90	2000	670*	110	440	90	-	-	-	-
150	6	155	2500	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.

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

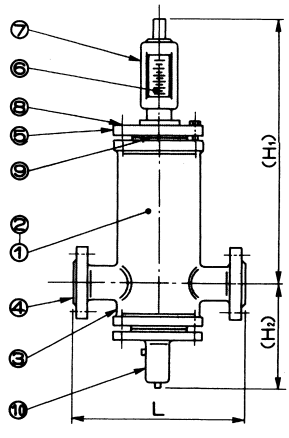


Fig.15

■ Table 17

Meter size		Q		△P	10K Class AM-1□□□-□				20K Class AM-1□□□-M			
(mm)	(inch)	Water (m^3/h)	Air (Nm^3/h)	(mmH2O)	(H1) (mm)	(H2) (mm)	L (mm)	Weight (kg)	(H1) (mm)	(H2) (mm)	L (mm)	Weight (kg)
15	1/2	0.1～0.7	3.1～18	1200	440	200	160	15	440	210	160	17
20	3/4	1.6	50	1480	470	200	160	15	500	210	160	17
25	1	3.5	100	2100	480	210	180	19	500	240	180	22
40	1-1/2	6.5	200	1550	510	200	240	24	520*	240	240	28
50	2	13	400	1900	540	270	260	30	550*	280	260	36
65	2-1/2	25	750	2210	570	280	340	42	580	290	340	52
80	3	35	1100	2100	610	290	360	50	620	310	360	62
100	4	60	1800	2400	650*	300	360	70	660*	310	360	90
125	5	90	2800	2600	670*	320	440	105	-	-	-	-
150	6	155	4800	3150	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 Teflon	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)

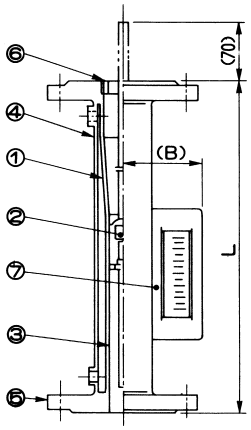


Fig.24

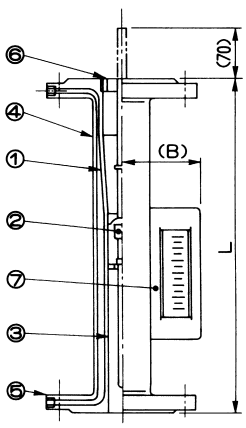


Fig.25

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

■ **Table 19**

Meter size (mm)	Meter size (inch)	Qwater (m^3/h)	△P (mmH_2O)	10K Class AM-1□□□-□ L (mm)	10K Class AM-1□□□-□ (B) (mm)	10K Class AM-1□□□-□ Weight (kg)	20K Class AM-1□□□-M L (mm)	20K Class AM-1□□□-M (B) (mm)	20K Class AM-1□□□-M Weight (kg)
15	1/2	0.1 ~ 0.7	650	350	93	6	350	93	6
20	3/4	1.5	600	400	93	6	400	93	7
25	1	3.8	730	400	96	7	400	96	8
40	1-1/2	7.15	900	400	103	10	400	103	11
50	2	15.1	630	450	113	12	450	113	14
65	2-1/2	26.5	780	500	120	16	500	120	21
80	3	39.5	910	500	126	18	500	126	23
100	4	67.5	1200	500	145	25	500	145	33
125	5	110	1400	500	158	38	-	-	-
150	6	150	1800	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)

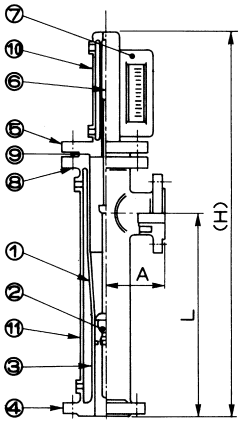


Fig.26

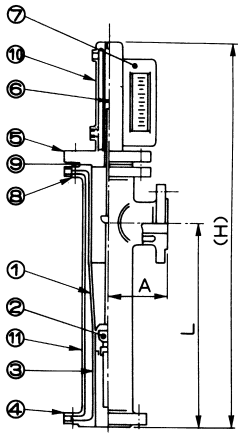


Fig.27

■ **Table 21**

Meter size (mm)	Meter size (inch)	Qwater (m^3/h)	△P (mmH_2O)	10K Class AM-1□□□-□ (H) (mm)	10K Class AM-1□□□-□ L (mm)	10K Class AM-1□□□-□ A (mm)	10K Class AM-1□□□-□ Weight (kg)	20K Class AM-1□□□-M (H) (mm)	20K Class AM-1□□□-M L (mm)	20K Class AM-1□□□-M A (mm)	20K Class AM-1□□□-M Weight (kg)
15	1/2	0.1~ 0.69	850	660	250	100	12	660	250	100	14
20	3/4	1.6	910	680	250	100	12	680	250	100	14
25	1	3.6	600	670	250	100	15	670	250	100	17
40	1-1/2	5.9	500	680	250	130	18	690	250	130	21
50	2	12.4	800	710	250	130	22	750	250	130	27
65	2-1/2	25	650	820	350	150	30	850	350	150	36
80	3	34.3	1270	850	350	180	35	870	350	180	55
100	4	55.0	1360	900	350	180	58	940	350	180	70
125	5	110	1600	940	370	250	72	-	-	-	-
150	6	150	2100	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

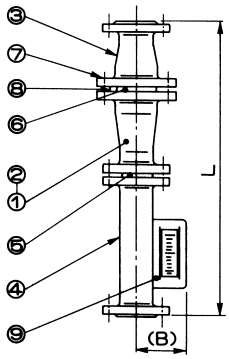


Fig.28

■ **Table 23**

Meter size (mm)	Meter size (inch)	Qwater (m^3/h)	△P (mmH_2O)	L (mm)	(B) (mm)	Weight (kg)
15	1/2	0.1~0.65	500	550	89	16
20	3/4	1.2	600	550	89	18
25	1	2.8	600	550	92	22
40	1-1/2	6.5	900	600	99	28
50	2	11.5	600	650	105	35
65	2-1/2	17.0	800	700	113	45
80	3	34.0	900	750	120	55
100	4	60.0	1100	750	132	70
125	5	90.0	1300	750	145	85
150	6	140.0	1700	800	158	120

*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.

■ **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	Teflon*2	Teflon
		Other metalic material on reauest		
3.	Lower body	Rubber Lined	Rubber Lined	ETFE Lined
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	Teflon
9.	Indicator	ADC12	ADC12	ADC12

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

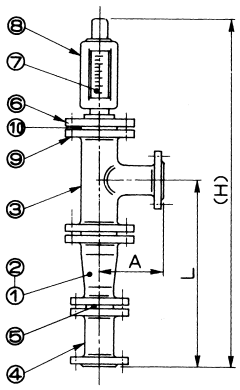


Fig.29

■ **Table 25**

Meter size (mm)	Meter size (inch)	Qwater (m^3/h)	△P (mmH_2O)	H (mm)	L (mm)	(B) (mm)	Weight (kg)
15	1/2	Not available					
20	3/4	Not available					
25	1	0.8～2.7	550	700	320	120	17
40	1-1/2	4.8	430	730	350	130	22
50	2	11.4	700	780	380	130	24
65	2-1/2	20.2	540	810	400	150	28
80	3	33.0	1000	870	440	150	34
100	4	54.0	1000	1000	500	200	52
125	5	88.0	1400	1020	500	200	65
150	6	140.0	2000	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	Teflon*	Teflon
		Other metalic material on reauest		
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**

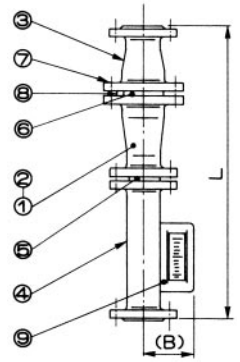


Fig.30

■ **Table 27**

Meter size (mm)	Meter size (inch)	Qwater (m^3/h)	△P (mmH_2O)	L (mm)	(B) (mm)	Weight (kg)
15	1/2	0.1～0.65	500	550	89	16
20	3/4	1.1	500	700	89	20
25	1	2.1	550	750	96	25
40	1-1/2	2.7	800	800	99	32
50	2	6.5	550	850	105	40
65	2-1/2	12	700	900	113	50
80	3	17	800	900	126	62
100	4	35	1000	950	132	78
125	5	48	1200	950	145	94
150	6	66	1600	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 guide (L)	PVC
6.	Float guide (U)	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**

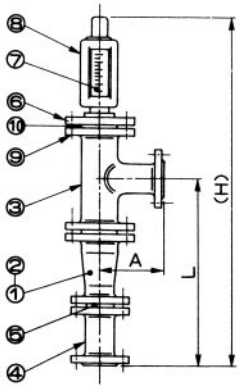


Fig.31

■ **Table 29**

Meter size (mm)	Meter size (inch)	Qwater (m^3/h)	△P (mmH_2O)	Conn Size	(H) (mm)	L (mm)	A (mm)	Weight (kg)
15	1/2	Not available						
20	3/4	Not available						
25	1	0.6～1.9	500	20	830	420	41	18
				25	820	400	49	
				40			62	
40	1-1/2	2.6	380	25	880	420	54	22
				40			63	
				50		440	67	
50	2	5.8	600	40	940	480	71	25
				50			74	
				65			83	
65	2-1/2	11	480	50	990	520	80	30
				65			87	
				80			90	
80	3	18	850	65	1020	530	100	46
				80			104	
				100			110	
100	4	29.5	850	80	1050	550	130	53
				100			136	
				125			143	
125	5	45	1200	100	1100	600	136	65
				125			143	
				150			180	
150	6	76	1700	125	1060	640	200	95
				150		650	210	
				200			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

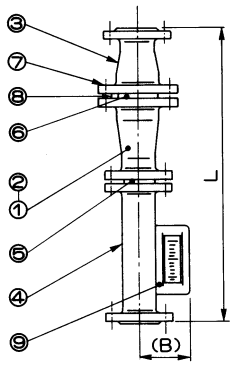


Fig.32

■ Table 31

Meter size (mm)	TEFLON FLOAT Qwater (m^3/h)	TEFLON FLOAT △P (mmH_2O)	HASTELLOY FLOAT Q (m^3/h)	HASTELLOY FLOAT △P (mmH_2O)	Conn Size	L (mm)	(B) (mm)	Weight (kg)
15	0.1～0.4	500	0.1～0.6	600	20	570	92	18
					25	564		
20	Not available							
25	0.8	500	1.0	600	20	768	92	26
					25	710		
					40	806		
	1.3	500	1.6	600	20	781	92	25
					25	688		
					40	840		
40	1.7	600	2.5	800	25	875	99	35
					40	803		
					50	867		
	3.2	600	4.5	800	40	750	99	33
					50	903		
50	6.5	480	8	550	50	790	105	40
					80	943		
65	Not available							
80	17	650	20	750	80	835	120	55
					100	987		
100	35	800	45	1000	100	870	132	70
					150	1024		
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*	Hastelloy C
3.	Upper body	Glass Lined	Glass Lined
4.	Lower body	Glass Lined	Glass Lined
5.	Float guide(L)	PVDF	Hastelloy C
6.	Float guide(U)	PVDF	Hastelloy C
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

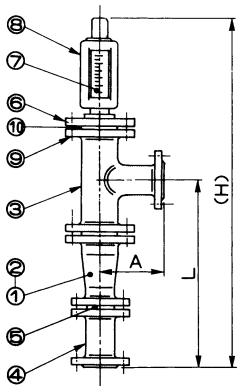


Fig.33

■ Table 34

No.	Description	Class 8	Class 9
1.	Tapered tube	Glass Lined	Glass Lined
2.	Float ass'y	Teflon*	Hastelloy C
3.	Upper body	Glass Lined	Glass Lined
4.	Lower body	Glass Lined	Glass Lined
5.	Float guide	PVDF	Hastelloy C
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 Qwater (m^3/h)	TEFLON FLOAT △P (mmH_2O)	HASTELLOY FLOAT Q (m^3/h)	HASTELLOY FLOAT △P (mmH_2O)	Conn Size	(H) (mm)	L (mm)	A (mm)	Weight (kg)
15		Not available								
20		Not available								
25	1	0.3～0.79	400	0.4～1.0	500	20	740	362	78	27
						25	850	470		
						40	760	380	190	
	2	1.3	350	1.6	430	20	780	378	95	30
						25	890	486		
						40	800	398		
40	1	2.1	350	2.7	430	25	830	422	95	33
						40	920	512		
						50	820	418	203	
	2	2.8	600	3.6	430	25	840	418	102	37
						40	920	508		
						50	820	414		
50		7.8	600	10	700	40	900	450	126	47
						50	980	544		
						80	910	474		
65		Not available								
80		15	720	19	850	50	980	526	143	60
						80	1050	596		
						100	980	526		
100		34	880	44	1000	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**

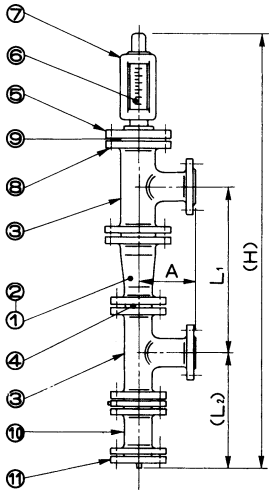


Fig.34

■ **Table 36**

No.	Description	Class 8	Class 9
1.	Tapered tube	Glass Lined	Glass Lined
2.	Float ass'y	Teflon*	Hastelloy C
3.	Body	Glass Lined	Glass Lined
4.	Float guide	PVDF	Hastelloy C
5.	Upper flange	SS400	SS400
6.	Lead pipe	FEP tubed SUS 304	
7.	Indicator	ADC12	ADC12
8.	Bolt&nut	SS400	SS400
9.	Gasket	Teflon	Teflon
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 Qwater (m³/h)	TEFLON FLOAT △P (mmH₂O)	HASTELLOY FLOAT Q (m³/h)	HASTELLOY FLOAT △P (mmH₂O)	Conn Size	(H) (mm)	L1 (mm)	(L2) (mm)	A1 (mm)	A2 (mm)	Weight (kg)
15		Not available										
20		Not available										
25	1	10～26	580	12～33	790	20	1010	348	280	78	78	33
						25						
						40				190	190	
	2	42	580	54	790	20	1050	365	280	95	78	37
						25						
						40					190	
40	1	70	520	90	600	25	1110	406	300	95	95	40
						40						
						50				203	203	
	2	90	520	115	900	25	1110	404	300	102	95	45
						40						
						50					203	
50		240	800	300	900	40	1190	446	310	126	102	60
						50						
						80					234	
65		Not available										
80		510	1000	650	1150	50	1300	521	330	143	126	75
						80						
						100					259	
100		1140	1200	1460	1400	80	1560	592	350	173	143	100
						100						
						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 13. These figures are based on water flow (Sp. Gr. 1.0 and Viscosity 1.0 cP). 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 : Specific gravity of actual fluid (no dimension)

Example
Fluid : Alcohol
Sp. Gr. : 0.8
Flow rate : 50m³/h
Flow meter to be used:AM-1□□1

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

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 1cP, 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**

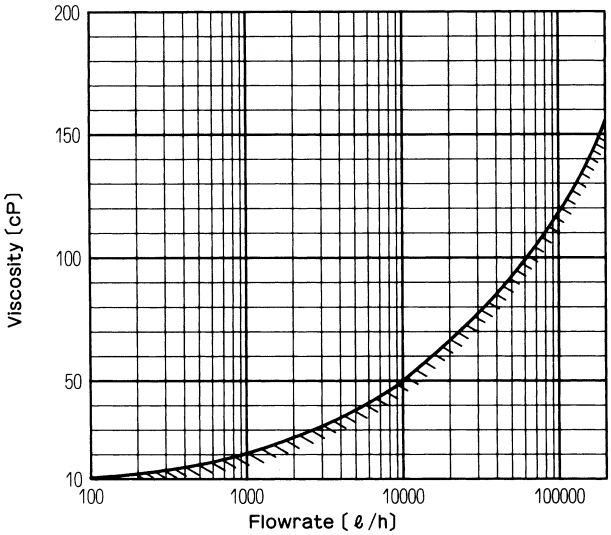


Fig.35

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:

$QA = Q \times 0.0541 \times \sqrt{\gamma \times (273+t) / (1.033+p)}$

Where QA : Converted flow rate in air 0°C, 1 atm(Nm^3/h)
Q : Flow rate of gas to be measured (Nm^3/h)
γ : Specific weight of gas to be measured (Kgf/Nm^3)
t : Operating temperature (°C)
p : Operating pressure (Kgf/cm^2G)

Example		
	Gas to be measured	Nitrogen (N_2)
	Specific weight (γ)	1.251Kg/Nm^3
	Operating pressure (p)	6Kg/cm^2G
	Operating temperature (t)	20°C
	Flowmeter to be used	AM-1□□3-D

$QA = 300 \times 0.0541 \times \sqrt{1.251(273+20)/(1.033+6)}$
$= 300 \times 0.0541 \times 7.219$
$= 117.2(Nm^3/h)$

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 (m^3/h)
Qs : Steam flow rate (m^3/h)
γ : Specific weight of steam (Kg/m^3)

Example		
	Fluid Saturated	Steam
	Pressure	9Kgf/cm^2G
	Flow rate	1t/h
	Flowmeter to be used	AM-1□□6-D

First, specific weight of the steam is to be obtained from"Steam graph" etc. In this application, specific weight (γ) of 9Kgf/cm^2G steam is 5.05Kg/m^3. 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 = 1000 (Kg/h) /5.05Kg/m^3
= 198 (m^3/h)

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

$QW = 198 \times 0.03 \times \sqrt{5.05}$
$= 13.3 m^3/h$

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

■ **Specific weight of saturated Steam.**

Fig.36

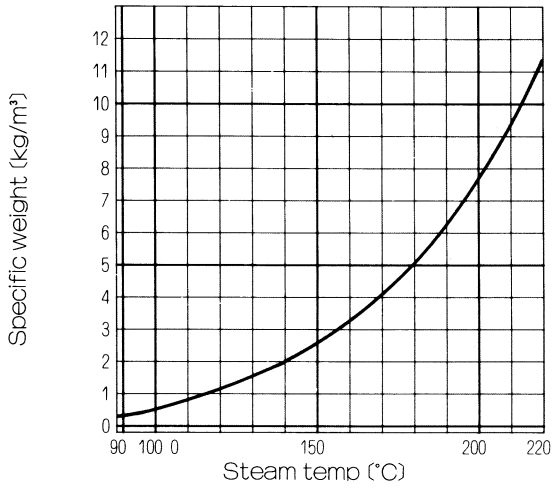
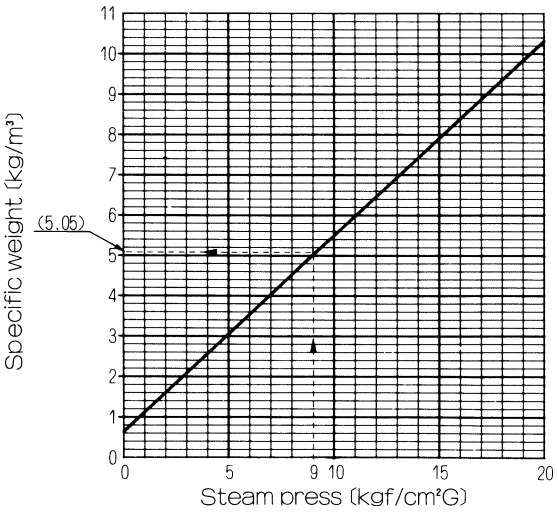


Fig.37



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	×	○	○
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	○	○	○

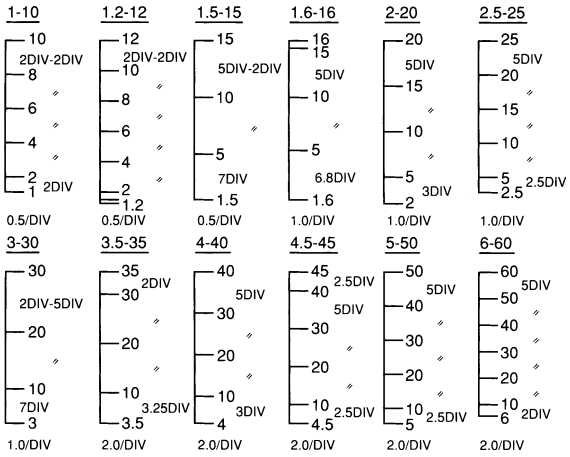
5. Scale graduation

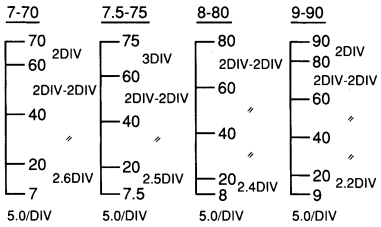
Customer can select any one of the following 16 standard scale graduations if meter size and connection flange meet the specification.

Range ability is 10:1.

Example If required scale range is 35-350 Nm³/h, the graduation on the flowmeter will be 3.5-35×10Nm³/h

● 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

Upto 2000Kg/cm²G possible with experience.
Consult factory for further details.

■ ORDERING FORM

COMMON	Model				
	Fluid name				
	Sp.Gr				
	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.	_____kgf/cm²G	
	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. G.1/2 ☐Others _____	☐Std. G.1/4 ☐Others
	Enclosure	☐ Weather proof	☐ Weather proof ☐ Press.tight x-proof	☐ Weather proof ☐ Press.tight x-proof	☐ Weather proof ☐ Press.tight x-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 subject to change without notice

TOKYO KEISO CO., LTD.

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JQA-2172