TECHNICAL GUIDANCE

For measurement of very minute flow
Alarm contact available

MA-900 Series

MICRO FLOWMETER

OUTLINE

MA-900 MICRO FLOWMETER is a metal tube variable area flowmeter which designed for the measurement of minute, small flow of liquids and gases.
In addition to local indication version, alarm contact is optionally available.

FEATURES

- Very minute flow measurement is possible
  Full scale of 0.5L/h (water) is possible. Very suitable for small quantity injection process and other test processes.
- Compact and light weight
  Offers easy assembling onto various equipment
- High accuracy
  Thanks to newly designed magnet following mechanism, higher accuracy compared to existing version has been achieved. The scale plate is also designed for easy observation.
- Covering high temperature and pressure
  Max.250°C, 20MPa can be covered.
  (Except for very minute flow ranges)
- Anti corrosive capability
  Besides standard material of stainless steel, special metallic materials are also available to cover very corrosive fluids.
- Low pressure loss
  Newly designed float reduces pressure loss during operation.
- Adjustable flow alarm contact
  Field adjustable, Hall element type alarm contact can be optionally provided.

MODEL CODE

MA-9			–			–		–		Description
Function	0									Local indication
	5									1 point alarm added
Flow direction		1								Bottom to Top
		2								Bottom to Top side
		3								Bottom side to Top side
		5								Bottom rear to Top rear
Material			–	1						Standard material
			–	5						Special material
Connection					1					Rc 1/4
					2					Rc 3/8
					3					Rc 1/2
					4					Rc 3/4
					5					Rc 1
					8					10AJIS10KFF
					9					15AJIS10KFF
					A					20AJIS10KFF
					B					25AJIS10KFF
					X					Other thread connection
					Y					Other flange connection
					Z					Other special connection
Additional Function						–	VU			Needle valve at outlet
						–	VL			Needle valve at inlet
Alarm Action*								–	L	Low alarm
								–	H	High alarm

* : Specify only for Alarm version

STANDARD SPECIFICATION

MEASURING OBJECT: Liquids and Gases

Viscosity limit for liquid flow measurement

Meter size	Viscosity (Max.)
3/8	1.0 mPa•s
1/2	2.0 mPa•s
3/4, 1	5.0 mPa•s

(Free from solids and particles)

MEASURING RANGE

Liquid measurement (Water): Min. 0.1~0.5 L/h; Max. 60~600 L/h

Measurement range may differ depending on the viscosity of liquid.

Gas measurement (Air, 0°C,1atm): Min. 3~ 15 L/h (nor); Max. 2.2~22 m^3/h (nor)

Measurement range may differ depending on the pressure or viscosity of liquid.

RANGEABILITY: 10 : 1

10 : 2 for versions with full scale smaller than 5L/h (Water) or 100L/h (nor) (Air).

It may differ depending on the viscosity of liquid.

FLUID TEMP.: 0 to 100°C as standard

TOKYO KEISO will comply with your requirement up to 250°C generally as an option. The maximum temperature of gas service in the case float is made of PPS is 150°C, and the maximum temperature of MA-950 is 85°C. Consult our factory about your requirement.

Please be reminded that the Heat-resistant glass used for the service less than or equal to 3 L/h water and 100 L/h (nor) air service has the maximum allowable thermal shock of 80°C.

OP. PRESS.: STD. 2.94MPa

High press. 19.6MPa

(Subject to flange rating)

INDICATION ACCURACY: ±3.0%F.S.

The accuracy of glass tube inserted type is ±5%F.S.

PAINTING: Munsell 7.5BG4/1.5

(Indicator part only)

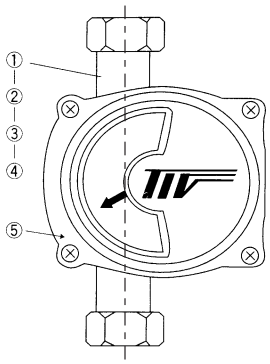
ALARM CONTACT

- AVAILABILITY: 1 point (Low or High)
- SETTING: Adjustable by moving setting pointer (within graduation range)
- SETTING ACCURACY: ±3.0%F.S.
- DETECTION: Hall element IC
- OUTPUT: Open collector output
- RATING: DC18V, Max. 15mA
- RESET SPAN: Max. 15%F.S.
- CONNECTION: M3 screw terminal
- CABLE ENTRY: G1/2 thread
- ENCLOSURE: Watertight (Equiv. to IP65)

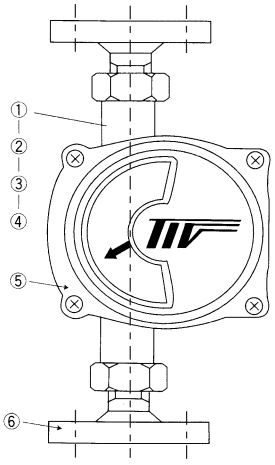
PROCESS CONNECTION

- STD.: Rc1/4, 3/8, 1/2, 3/4 or 1, 10A, 15A, 20A or 25AJIS10KFF flange
- OPTION: NPT and other threads, flange other than JIS10KFF
- FLOW DIRECTION: Bottom→Top, Bottom→Top side, Bottom side→Top side, Bottom rear→Top rear
- INSTALLATION: Supported by piping
- MATERIAL: Refer to MATERIAL CONSTRUCTION
- MASS: Approx. 1kg (Rc1/4 thread)

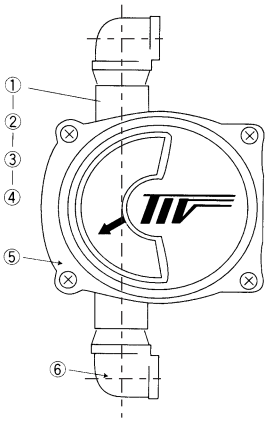
MATERIAL CONSTRUCTION



Straight through, Screw connection



Flange connection



Elbow connection

No.	Part Name	Material
①	Body	SCS14 or SUS316 *1
②	Tapered tube	SUS316 *2
③	Float	SUS316 *3
④	Packing	PTFE *4
⑤	Indicator	ADC12
⑥	Fittings	SUS304 (STD.) or SUS316 *5

*1: SUS 316 for 3/8" meter size in case of versions with full scale smaller than 3L/h (Water) or 100L/h (nor) (Air).

*2: Glass tapered tube will be inserted for 3/8" meter size in case of versions with full scale smaller than 3L/h (Water) or 100L/h (nor) (Air) . Allowable thermal shock will be 80°C

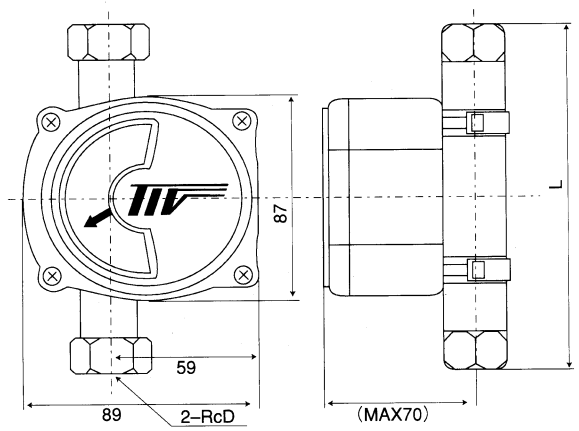
*3: PPS resin / Titanium will be used for 1/2" meter size, and PPS resin / SUS316 will be used for 3/4 and 1" meter sizes in gas measurement applications.

*4: Packing is not an external pressure part.

*5: Connection fitting material can be selected for flange or elbow. Specify requirement when ordering.

DIMENSIONS

● Flow direction : BOTTOM TO TOP, Screw connection

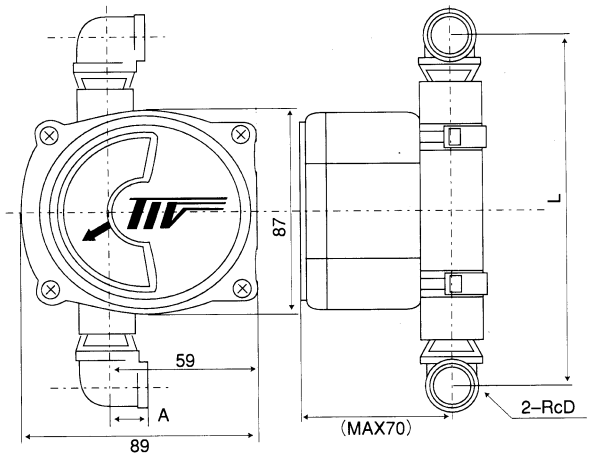


L (mm)

Meter size	Max.possible full scale		Connection screw size (D)				
	Water L/h	Air L/h(nor)	1/4	3/8	1/2	3/4	1
3/8	2.9	100	180	160	210	230	230
1/2	29.9	630	180	180	160	230	230
3/4	300	4900	180	180	180	160	230
1	600	22000	200	180	180	180	160

The male and female socket are attached except the types of L160mm.

● Flow direction : BOTTOM SIDE (or REAR) TO TOP SIDE (or REAR), Screw connection

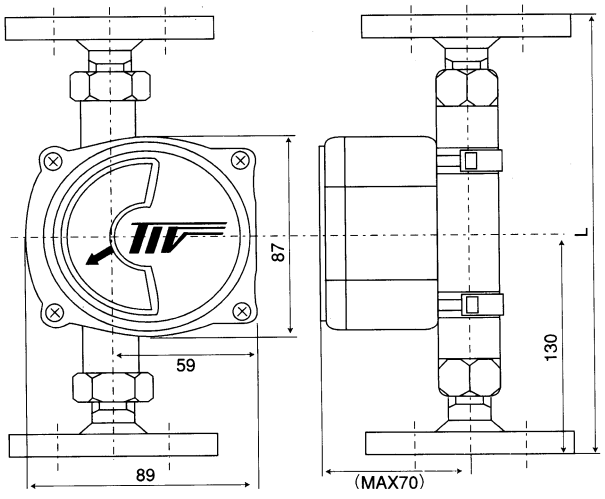


L (mm)

Meter size	Max.possible full scale		Connection screw size (D)									
	Water L/h	Air L/h(nor)	1/4		3/8		1/2		3/4		1	
			L	A	L	A	L	A	L	A	L	A
3/8	2.9	100	225	19	215	23	270	27	300	32	310	38
1/2	29.9	630	225	19	235	23	220	27	300	32	310	38
3/4	300	4900	225	19	235	23	240	27	230	32	310	38
1	600	22000	245	19	235	23	240	27	250	32	240	38

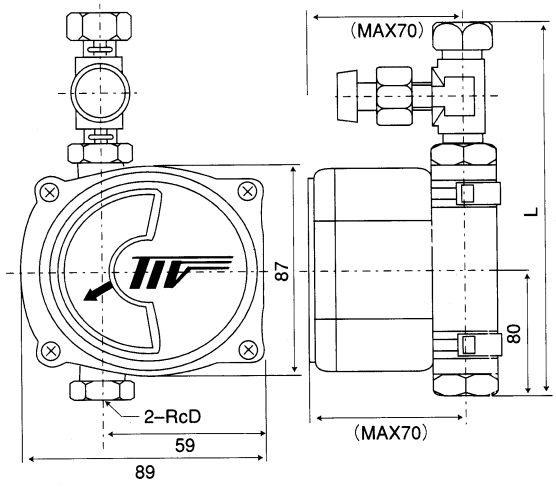
A will be 100mm for flange connection version.

● Flow direction : BOTTOM TO TOP, Flange connection



Meter size	Max.possible full scale		L (mm)
	Water L/h	Air L/h(nor)	
3/8	2.9	100	260
1/2	29.9	630	
3/4	300	4900	
1	600	22000	

● Flow direction : BOTTOM TO TOP, Screw connection, Needle valve provided at outlet



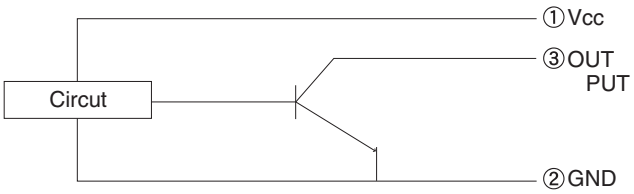
L (mm)

Meter size	Max.possible full scale		Connection screw size (D)					
	Water L/h	Air L/h(nor)	1/4	3/8	1/2	3/4	1	
3/8	2.9	100	240	220	275	290	290	
1/2	29.9	630	245	225	250	295	295	
3/4	300	4900	245	225	250	260	295	
1	600	22000	265	225	250	260	260	*1
			280	260	240	275	275	*2
			290	270	270	250	285	*3

*1: Up to Air 8300L/h (nor)
*2: Up to Water 400L/h, Air 11000L/h (nor)
*3: Up to Water 600L/h, Air 22000L/h (nor)

These figures may change according to the pressure difference before and behind the valve.

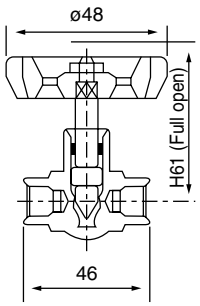
WIRING FOR MA-95□



Rating voltage	Vcc	18V
Open voltage	Vo (off)	18V
Output inflow current	Isink	15mA
AMB. Temp.	Ta	–30~+85°C

OPTIONS

● Needle valve

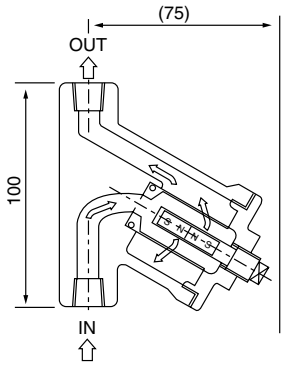


Specification

Size	Maximum operating pressure (MPa)	Temperature range of fluid (˚C)
3/8	2.94	-20 to +150

● Magnet Strainer

The strainer installed at up-stream eliminates particles in the fluid.
Select a proper mesh of the filter adequate for the size of particles.
A magnet is molded in the float and in case ferrous powder are involved in the fluid, smooth movement of float will not be obtained.



It is recommended to install a Magnet Strainer in upstream of the line to eliminate the ferrous contents.

Operating pressure (Max.)	: 1.5MPa (Standard)
Operating temperature (Max.)	: 200˚C
Nominal size	: Rc1/4", 3/8", 1/2" (Female thread)
Filter	: 100 mesh/inch (Option : Up to 200 mesh/inch)
Material	: Body : SCS 13, SCS14 Filter : SUS 304, SUS316

ORDERING FORM

Specify the following for order / inquiry ;

MODEL CODE MA-9☐☐-☐☐-☐☐-☐

FLUID NAME _____

DENSITY _____

VISCOSITY _____ ☐ mPa•s ☐ _____

PRESS. _____ ☐ MPa ☐ _____

TEMP. _____ ☐ ˚C ☐ _____

SCALE RANGE _____ ☐ L/h ☐ L/h (nor) ☐ _____

CONNECTION SIZE _____ ☐ mm ☐ _____

CONNECTION STANDARD ☐ Rc thread ☐ JIS10KFF ☐ _____

MATERIAL ☐ Standard ☐ Special (Specify)

FOR ALARM VERSION

Contacrt ☐ High ☐ Low

Setting point _____ ☐ L/h ☐ L/h (nor) ☐ _____

SPECIAL INSTRUCTION IF ANY; _____

_____

_____

* Specification is subject to change without notice.

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