



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		
Func-tion	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	
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 Min. 0.1 to 0.5 L/h
 (Water) Max. 60 to 600 L/h
 Measurement range may differ depending on the viscosity of liquid.

Gas measurement Min. 3 to 15 L/h (nor)
 (Air, 0°C, 1atm) Max. 2.2 to 22 m³/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.
 Heat-resistant glass is used for up to 2.9 L/h water or up to 100 L/h (nor) air. In this case, the maximum fluid temperature is 120°C and the maximum allowable thermal shock is 80°C.

FLUID PRESS. Max. 2.94 MPa
 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. (Against flow calibration)
 DETECTION Hall element IC
 OUTPUT Open collector output
 RATING 18 V DC, Max. 15mA
 RESET SPAN Less than 15%F.S. (Against flow calibration)
 CONNECTION M3 screw terminal
 CABLE ENTRY G1/2 thread
 METER ENCLOSURE Watertight (Equip. 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

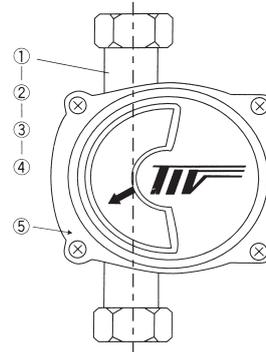
FLOW DIRECTION Bottom→Top, Bottom→Top side, Bottom side→Top side, Bottom rear→Top rear

INSTALLATION Supported by piping

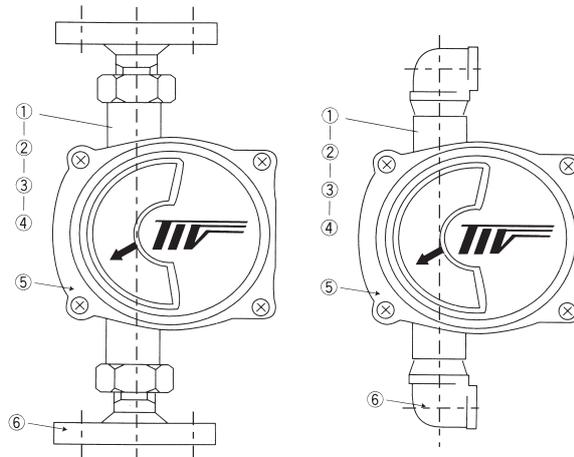
MATERIAL Refer to MATERIAL CONSTRUCTION

APPROX. MASS 1 kg (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 2.9L/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 2.9L/h (Water) or 100L/h (nor) (Air). Allowable thermal shock will be 80°C

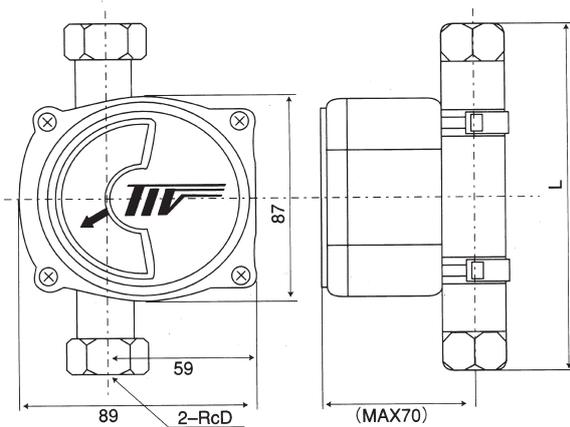
*3: PPS resin / Titanium will be used for 1/2" meter size, and PPS resin / SUS316 will be used for 3/4 and 1" meter sizes in gas measurement applications.

*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

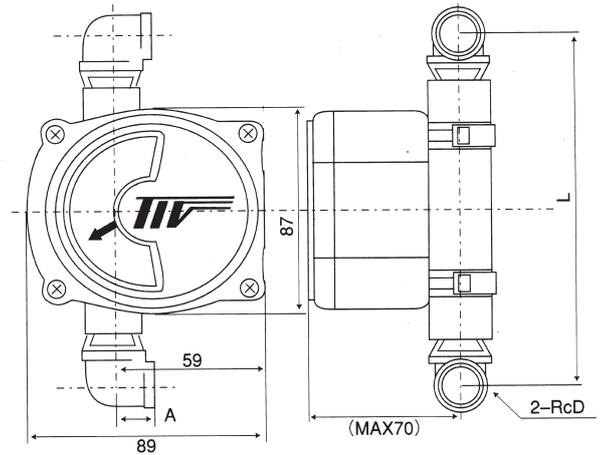


L (mm)

Meter size	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

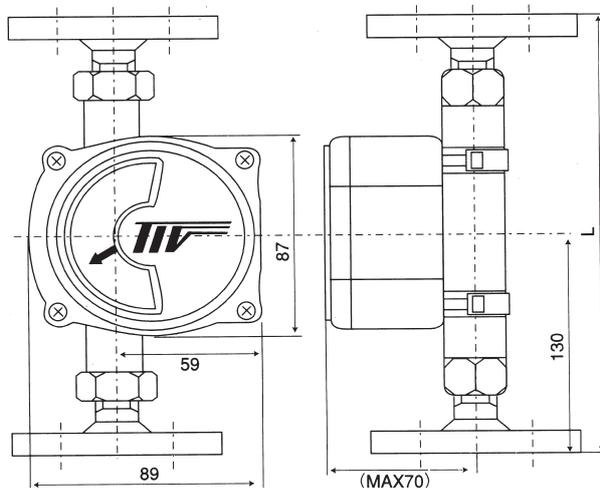


L (mm)

Meter size	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

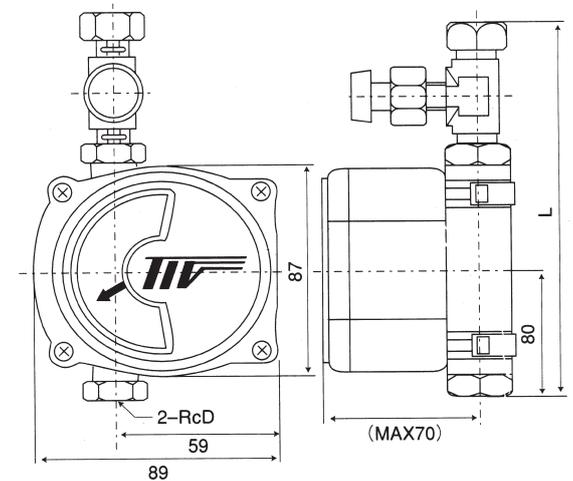
A will be 100mm for flange connection version.

● Flow direction : BOTTOM TO TOP, Flange connection



Meter size	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	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
			280	260	240	275	275
			290	270	270	250	285

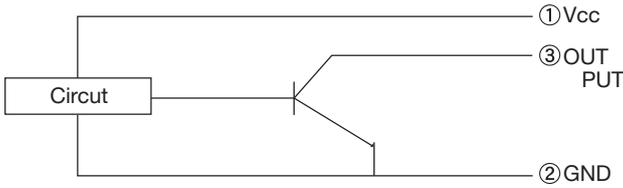
*1: Up to Air 8300L/h (nor)

*2: Up to Water 400L/h, Air 11000L/h (nor)

*3: Up to Water 600L/h, Air 22000L/h (nor)

L (mm) may change. According to the pressure difference before and behind the valve.

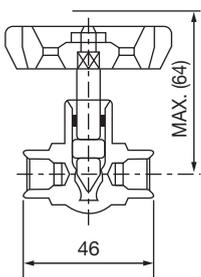
■ WIRING FOR MA-95



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

■ OPTIONS

● Needle valve



Specification

Size	Maximum fluid pressure (MPa)	Fluid temperature (°C)
3/8	3	-15 to +150

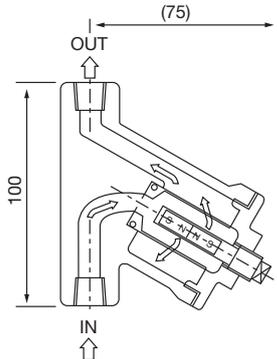
● Magnet Strainer

The strainer installed at upstream 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.



Fluid pressure	: Max. 1.5 MPa
Fluid temperature	: Max. 200°C
Nominal size	: Rc1/4", 3/8", 1/2"
Filter	: 100 mesh/inch (Option : Up to 200 mesh/inch)
Material	: Body : 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 □ _____

MEASURING RANGE _____ □ L/h □ L/h (nor) □ _____

CONNECTION SIZE _____ □ mm □ _____

CONNECTION STANDARD Rc JIS10KFF _____

MATERIAL Standard Special (Specify)

FOR ALARM VERSION

Contact High Low

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

SPECIAL INSTRUCTION IF ANY: _____

* Specification is subject to change without notice.



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