

## MA-900 series

### MICRO FLOWMETER

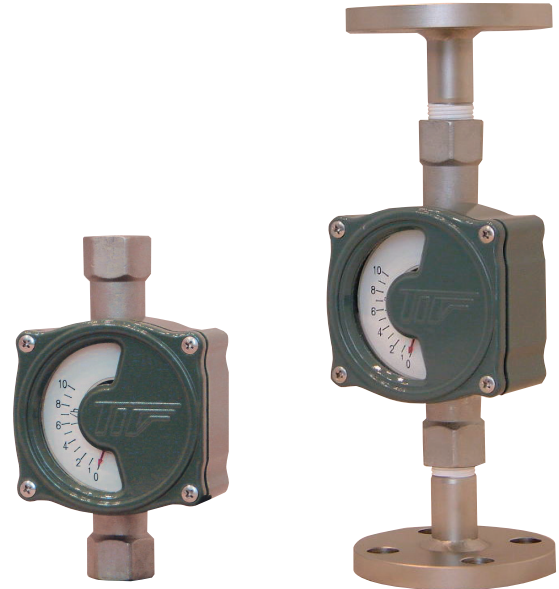
#### OUTLINE

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 some 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. No damping suppression mechanism is required even for low pressure gas application.
- 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

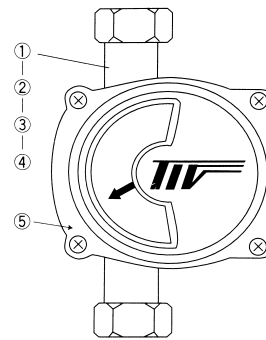
**STANDARD SPECIFICATION**

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.	2~20	m <sup>3</sup> /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.	STD. Max. 100°C		
	In case of versions with full scale smaller than 3L/h (Water) or 100L/h (nor) (Air), a glass tube is inserted and allowable thermal shock will be 80°C.		
OP. PRESS.	STD.	2.94MPa	
	High press.	19.6MPa (Subject to flange standard)	
INDICATION ACCURACY	±3.0%F.S.		
	The accuracy of glass tube inserted type is ±5%.		
PAINTING	Munsell 7.5BG4/1.5 (Indicator part only)		
ALARM CONTACT	1 point (Low or High)		
AVAILABILITY	Adjustable by moving setting pointer (within graduation range)		
SETTING			
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)		

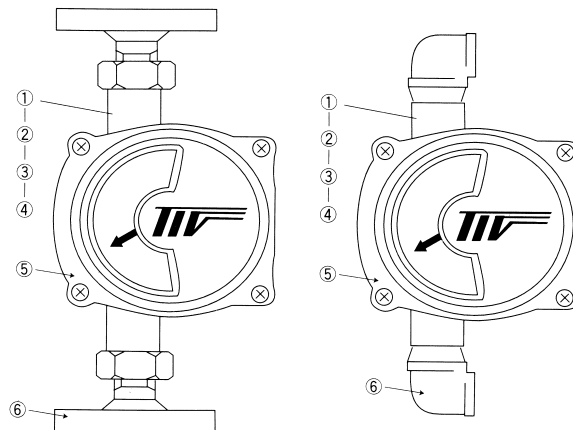
**PROCESS CONNECTION**

STD.	Rc1/4, 3/8, 1/2, 1 or 3/4, 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

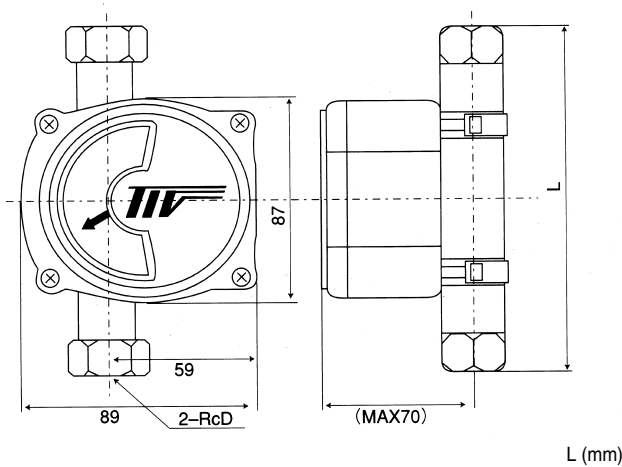
Elbow connection

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**

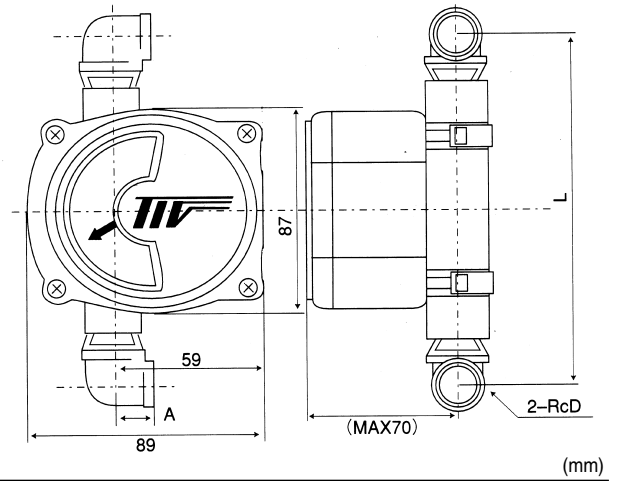
● Flow direction : BOTTOM TO TOP, Screw connection



Meter size	Max. possible full scale		Connection screw size (D)					L (mm)
	Water L/h	Air L/h(nor)	1/4	3/8	1/2	3/4	1	
3/8	3	100	180*	160	210*	230*	230*	
1/2	30	600	180*	180*	160	230*	230*	
3/4	300	5000	180*	180*	180*	160	230*	
1	600	20000	200*	180*	180*	180*	160	

\*: Thread adaptor provided

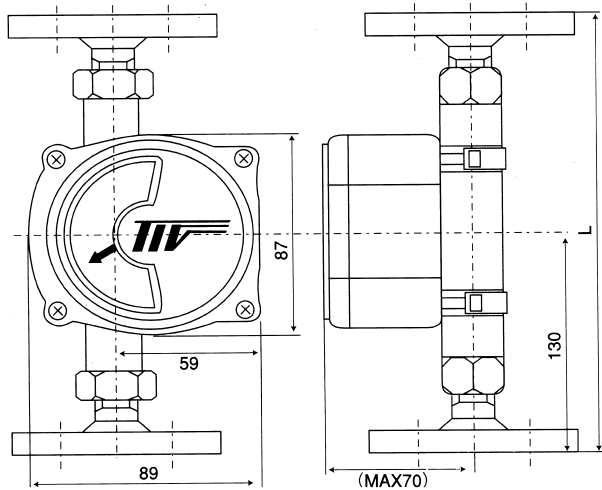
● Flow direction : BOTTOM SIDE (or REAR) TO TOP SIDE (or REAR), Screw connection



Meter size	Max. possible full scale		Connection screw size (D)										L (mm)
	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	3	100	225	19	215	23	270	27	300	32	310	38	
1/2	30	600	225	19	235	23	220	27	300	32	310	38	
3/4	300	5000	225	19	235	23	240	27	230	32	310	38	
1	600	20000	245	19	235	23	240	27	250	32	240	38	

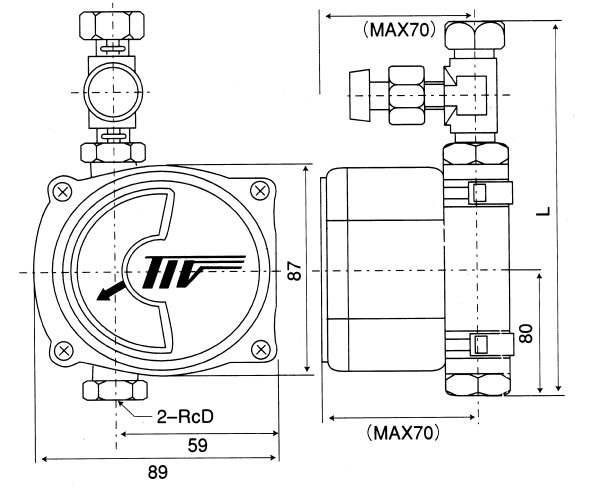
A will be 100mm for flange connection version.

● Flow direction : BOTTOM TO TOP, Flange connection



Meter size	Max. possible full scale		L (mm)
	Water L/h	Air L/h(nor)	
3/8	3	100	260
1/2	30	600	
3/4	300	5000	
1	600	20000	

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



Meter size	Max. possible full scale		Connection screw size (D)					L (mm)
	Water L/h	Air L/h(nor)	1/4	3/8	1/2	3/4	1	
3/8	3	100	240	220	275	290	290	
1/2	30	600	245	225	250	295	295	
3/4	300	5000	245	225	250	260	295	
1	600	20000	265	225	250	260	260	
			280	260	240	275	275	
			290	270	270	250	285	

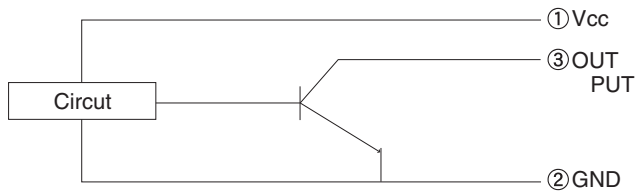
\*1: Up to Air 9000L/h (nor)

\*2: Up to Water 400L/h, Air 12000L/h (nor)

\*3: Up to Water 600L/h, Air 20000L/h (nor)

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

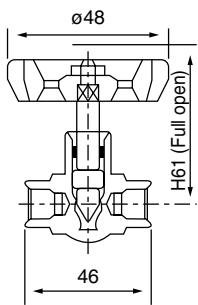
WIRING FOR MA-95□



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

OPTIONS

● Needle valve

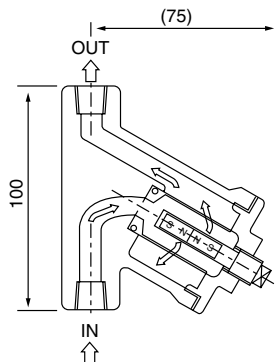


Size	Maximum operating pressure (MPa)	Temperature range of fluid (°C)
3/8	2.94	-20 to +150

● Magnet Strainer

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 : SUS304, 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

Contact  High  Low

Setting point \_\_\_\_\_ □ L/h  L/h (nor)  \_\_\_\_\_

SPECIAL INSTRUCTION IF ANY; \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\*Specification is subject to change without notice.

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