

MA-920 series

INTELLIGENT, PURE ELECTRONICS
MICRO FLOWMETER

OUTLINE

MA-920 MICRO FLOWMETER is a metal tube variable area flowmeter which aims measurement and output of minute/small flow of liquids and gases.

TOKYO KEISO's long time production know-how and recent electronics technology have been successfully combined.

The existing micro flowmeters generally need a signal linearizer due to mechanical problem of very minute sensing part. In **MA-920**, integrated microprocessor takes care of these automatic compensation based on individual stored calibration data and achieves high accuracy even for small flow rate.

The wiring is conducted by 2-wire system for easy wiring in field.



FEATURES

- Very minute flow measurement is possible
Full scale of 3L/h (water) is possible.
- Compact and light weight
Offers easy assembling onto various equipment
- 2-wire DC4~20mA output
For easy wiring
- No magnetic coupling construction
Eliminates mechanical friction that achieves high accuracy and repeatability
- LCD digital indication
- Low pressure loss
No liquid dampers are needed even for gas measurement applications
- ExdIICT6 pressure-tight flameproof
Construction suitable even for Hydrogen atmosphere

MAIN APPLICATIONS

- Chemical/Gas injection process especially in hazardous area
- Test plants
- Assembling onto various devices/equipment
- Other remote indication/control process for minute/small flow rate

MODEL CODE

Model code				Description
MA-92	-	-	-	
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
	- 9			Special material
Process Connection	1			Rc1/4
	2			Rc3/8
	3			Rc1/2
	4			Rc3/4
	5			Rc1
	8			10AJIS10KFF
	9			15AJIS10KFF
	A			20AJIS10KFF
	B			25AJIS10KFF
	X			Other thread connection
Y			Other flange connection	
Z			Other special connection	
Valve	- 00			Not provided
	- VU			Needle valve at outlet (Upper)
	- VL			Needle valve at inlet (Lower)

STANDARD SPECIFICATION

MEASURING OBJECT Liquids and Gases

Viscosity limit for liquid flow measurement

Full scale	Viscosity (Max.)
up to 30L/h	2.0 mPa•s
up to 600L/h	5.0 mPa•s

(Free from solids and particles)

MEASURING RANGE

Liquid measurement (Water)	Min.	0.6~3	L/h*
	Max.	60~600	L/h
Gas measurement (Air, 0°C, 1atm)	Min.	10~100	L/h (nor)
	Max.	2~20	m³/h (nor)

RANGEABILITY 10:1
(Accuracy guaranteed range) *(10:2 for versions with full scale less than 5L/h)

FLUID TEMP Max. 120°C

OP.PRESS Std. 2.94MPa
High press. 19.6MPa*
(Subject to flange standard)
* Body material will be SUS316.

PROCESS CONNECTION

Std. Rc thread (1/4, 3/8, 1/2, 3/4 or 1")
JIS10KFF flange (10A, 15A, 20A, or 25A)

Opt. NPT or other threads
Other flanges than JIS10KFF

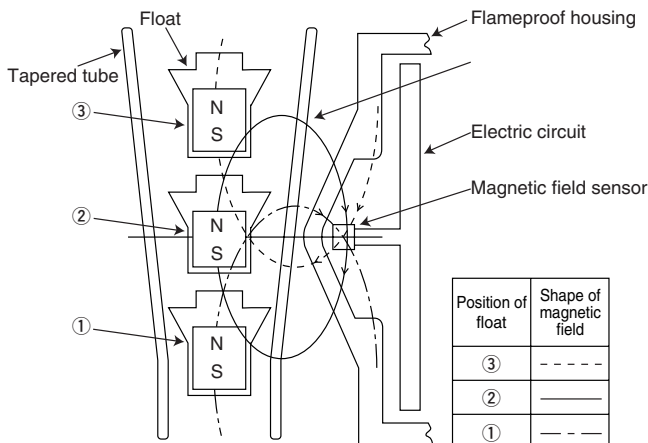
FLOW DIRECTION
Bottom to Top, Bottom to Top side, Bottom side to Top side, or Bottom rear to Top rear

INSTALLATION Supported by process piping

OPERATING PRINCIPLE

As shown in figure below a magnet with vertical polarity is molded in the float. Float moves vertically in response to the flow rate of fluid.

An oval shaped magnetic field exists between N pole and S pole of the magnet. Two magnetic field sensors whose sensitivities are designed equal are located at 90° angle, close to the tapered tube. These 2 sensors generate output signal which corresponds to the strength of magnetic field and its angle. By differential data processing of these outputs from 2 sensors, the angle of magnetic field which represents the position of float is obtained. Thus, the flow rate of fluid can be calculated from the position of float.



INDICATION 3½ digit LCD indication
By industrial unit or % of full scale

ACCURACY (Indication and output)
For full scale 10L/h or more (Water) ±2%F.S.
For full scale less than 10L/h (Water) ±3%F.S.
For full scale 300L/h (nor) or more (Air) ±2%F.S.
For full scale less than 300L/h (nor)(Air) ±3%F.S.

REPEATABILITY 0.5%F.S.

OUTPUT SIGNAL DC4 to 20mA (2-wire system)
Max.Load 500Ω

RESPONSE TIME Within 0.4sec.

POWER SOURCE DC12 to 33V

AMB.TEMP. -20~55°C

TEMP.EFFECT 0.02% (F.S.) /°C

ENCLOSURE Pressure-tight Flameproof
ExdIICT6
RIIS (Japan) certification No.TC14769

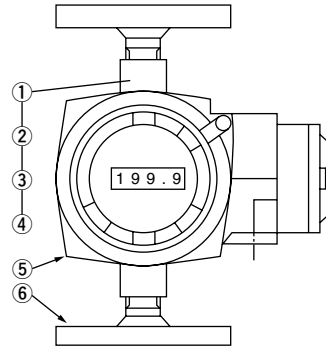
CABLE ENTRY G1/2
Exclusive cable fitting attached
Possible cable out diameter 8 to 12mm
(Gasket for 10mm dia.cable provided as standard)

CABLE TERMINATION By M4 screw

MATERIAL To be referred to MATERIAL CONSTRUCTION below.

MASS Approx. 2kg
(Rc1/4 thread connection type)

MATERIAL CONSTRUCTION



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

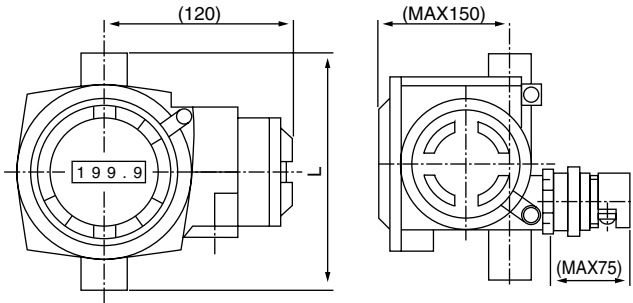
*1: PPS resin / Titanium will be used for 1/2" meter size, and PPS resin / SUS316 will be used for 3/4 and 1" meter sizes in gas measurement applications.

*2: Packing is not an external pressure part.

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

DIMENSIONS

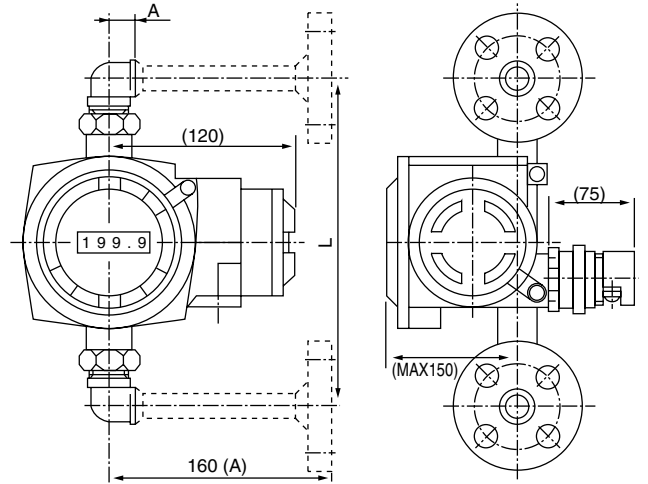
● Flow direction: BOTTOM TO TOP, Screw connection



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	
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

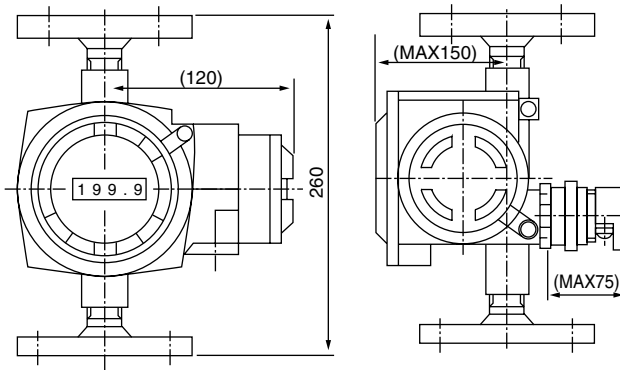
● Flow direction: BOTTOM SIDE (or REAR) TO TOP SIDE (or REAR), Screw (Flange) connection



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	
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	

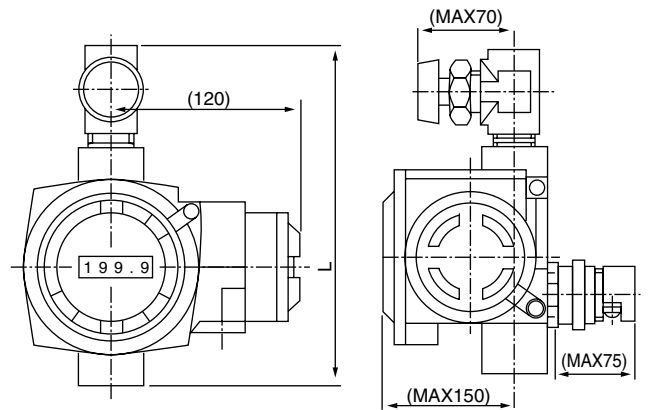
A dimension for flange connection is 160mm

● Flow direction: BOTTOM TO TOP, Flange connection



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

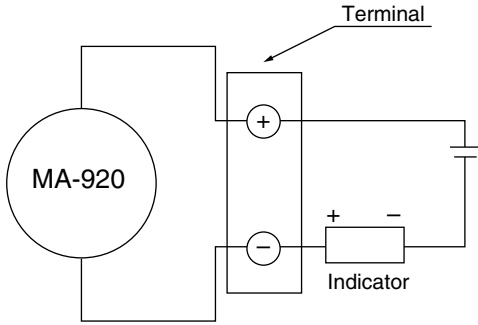
*1: Up to Air 9000L/h (nor)

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

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

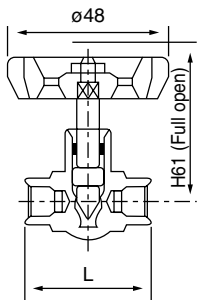
These figures may change according to the pressure difference before and after the valve.

WIRING



OPTIONS

● Needle valve



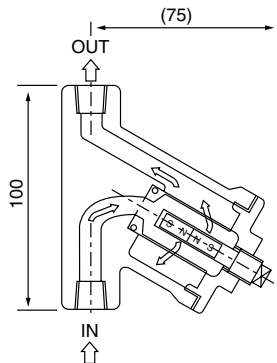
Specification

Size	Maximum operating pressure (MPa)	Temperature range of fluid (°C)	L (mm)
3/8	2.94	-20 to +150	46

● 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-92 □ - □ □ - □ □

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)

SPECIAL INSTRUCTION IF ANY;

*Specification is subject to change without notice.

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