



# TECHNICAL GUIDANCE

For measurement and output of very minute flow,  
Pressure tight explosion proof

## MA-920 series INTELLIGENT, PURE ELECTRONICS MICRO FLOWMETER (PAT.PEND)

### GENERAL

MA-920 MICRO FLOWMETER is a metal tube variable area flow meter 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 machining 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 equipments
- 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 explosion proof  
Construction suitable even for Hydrogen atmosphere

### MAIN APPLICATIONS

- Chemical/Gas injection process especially in hazardous area
- Test plants
- Assembling onto various devices/equipments
- 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**

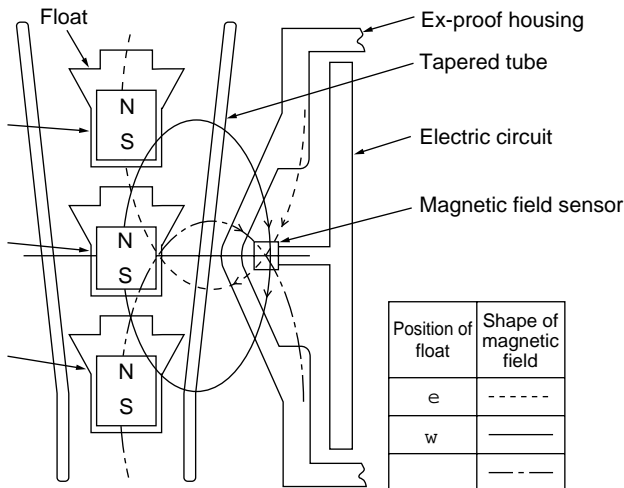
MEASURING OBJECT	Liquids and Gases		
MEASURING RANGE			
Liquid measurement	Min.	0.3~3	L/h
(Water)	Max.	60~600	L/h
Gas measurement	Min.	10~100	NL/h
(Air, 0°C, 1atm)	Max.	2~20	Nm³/h
RANGE ABILITY	10:1		
(Accuracy guaranteed range)			
FLUID TEMP	Max. 120°C		
OP. PRESS	Std.	30kgf/cm²G	(2.94MPa)
	High press.	200kgf/cm²G	(19.6MPa)*
	(Subject to flange standard)		
	* Body material will be SUS316 instead of SCS14		
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		

CABLE ENTRY	G1/2
	Exclusive cable fitting attached
	Possible cable out diameter 8~12mm
	(Gasket for 10mm dia. cable provided as standard)
CABLE TERMINATION	By M4 screw
INDICATION	3 1/2 digit LCD indication
	By industrial unit or % of full scale
ACCURACY (Indication and output)	
	For full scale more than 10L/h (Water) 2%F.S.
	For full scale less than 10L/h (Water) 3%F.S.
REPEATABILITY	0.5%F.S.
OUTPUT SIGNAL	DC4~20mA (2wire system)
	Max. Load 600Ω
RESPONSE TIME	Within 0.4sec.
POWER SOURCE	DC11~45V
AMB. TEMP.	-20~60°C
TEMP. EFFECT	0.02% (F.S.) /°C
ENCLOSURE	Pressure tight Explosion proof
	ExdIICT6
	RIIS (Japan) certification No.C12024
PAINTING	Mansell 7.5BG4/1.5
	(Indicator part only)
MATERIAL	To be referred to MATERIAL CONSTRUCTION below.
WEIGHT	Approx. 2kg
	(Rc1/4thread connection type)

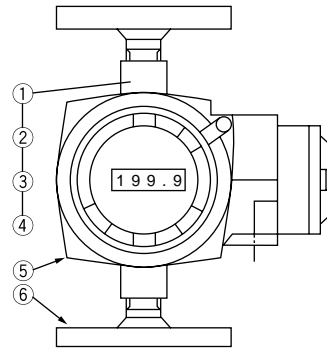
**OPERATING PRINCIPLE**

As shown in figure below, a magnet with vertical polarity is moulded 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.



**MATERIAL CONSTRUCTION**

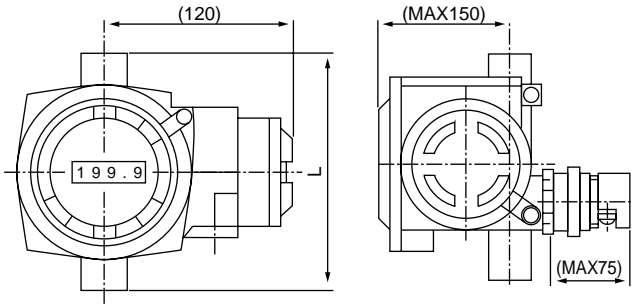


No.	Part Name	Material
q	Body	SCS14
w	Tapred tube	SUS316
e	Float	SUS316 *1
r	Gasket	TEFLON
t	Indicator/Transmitter	ADC12
y	Process conn, fittings	SUS304 or SUS316 *2

\*1: PPS resin made float will be used for Gas measurement application.  
 \*2: Connection fitting material can be selected for Flange connection version and Elbow connection version. Specify when order.

**DIMENSION**

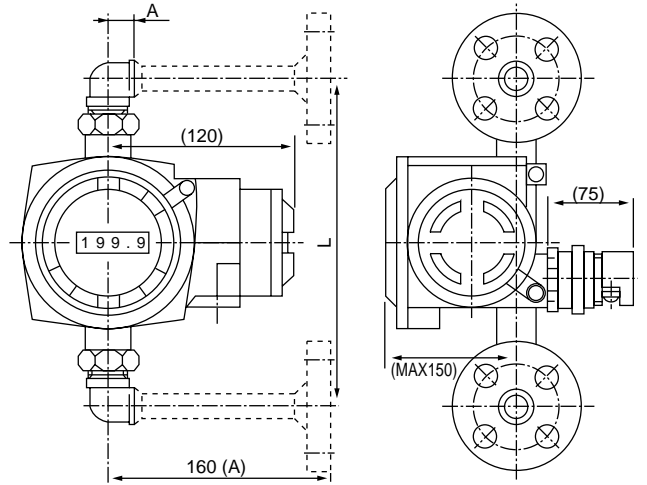
● Flow direction: BOTTOM TO TOP, Screw connection



Meter size	Max. possible full scale		Connection screw size (D)				
	Water (L/h)	Air (NL/h)	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

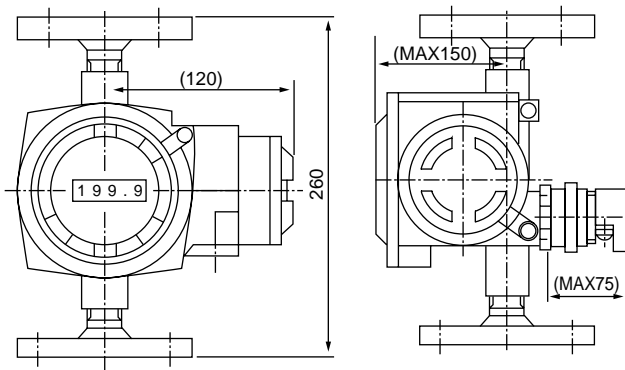
● Flow direction: BOTTOM SIDE (or REAR) TO TOPSIDE (or REAR), Screw (Flange) connection



Meter size	Max. possible full scale		Connection screw size (D)									
	Water (L/h)	Air (NL/h)	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

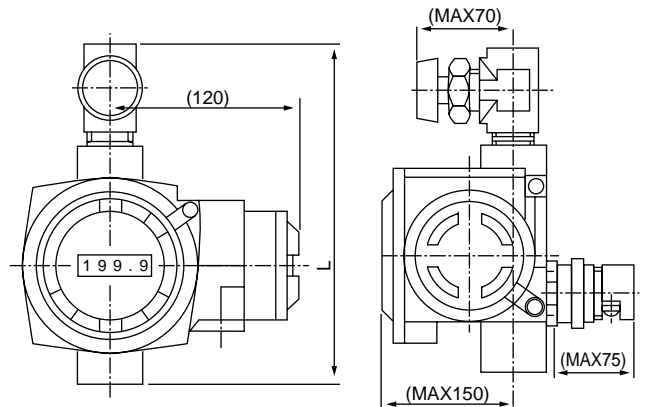
A dimension for flange connection is 160mm

● Flow direction: BOTTOM TO TOP, Flange connection



Meter size	Max. possible full scale		L (mm)
	Water (L/h)	Air (NL/h)	
1/2	30	600	260
3/4	300	5000	
1	600	20000	

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

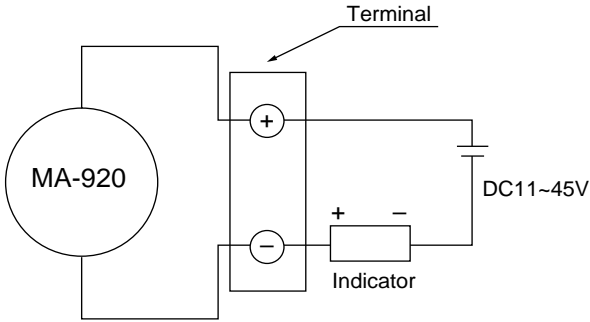


Meter size	Max. possible full scale		Connection screw size (D)				
	Water (L/h)	Air (NL/h)	1/4	3/8	1/2	3/4	1
1/2	30	600	245	225	250	295	295
3/4	300	5000	245	225	250	260	295
1	600	20000	280 290	260 270	240 270	275 250	275 <sup>*1</sup> 285 <sup>*2</sup>

\*1: Upto Water 500L/h, Air 1500NL/h

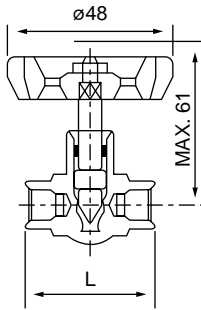
\*2: Larger than above

**WIRING**



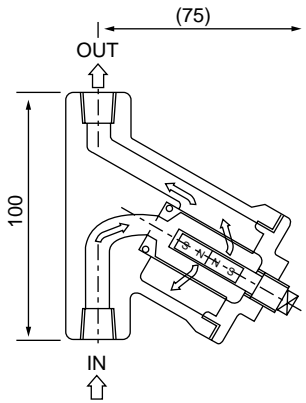
**OPTIONS**

- Needle valve



Size	L (mm)
3/8	46
1/2	60
3/4	70

- Magnet Strainer



**ORDERING FORM**

Specify the following for order / inquiry ;

MODEL CODE MA-92 □ - □ □ - □ □

FLUID NAME \_\_\_\_\_

SP.GR. \_\_\_\_\_

VISCOSITY \_\_\_\_\_ □ cP □ \_\_\_\_\_

PRESS. \_\_\_\_\_ □ kgf/cm<sup>2</sup>G □ \_\_\_\_\_

TEMP. \_\_\_\_\_ □ °C □ \_\_\_\_\_

SCALE RENG E \_\_\_\_\_ □ L/h □ NL/h □ \_\_\_\_\_

CONNECTION SIZE \_\_\_\_\_ □ mm □ \_\_\_\_\_

CONNECTION STANDARD □ Rc thread □ JIS10KFF □ \_\_\_\_\_

MATERIAL □ Standard □ Special (Specify)

SPECIAL INSTRUCTION IF ANY;

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\* Specification subject to change without notice

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