

SP.NO.

Yamatake Corporation

SPECIFICATIONS

1. Scope

This specification covers **Massflow Sensor MCS100A104**.


2. Specification

2.1. General Specification

- (1) Applicable gas
Air and Nitrogen.
Gas must be dry not containing any corrosive components (chlorine, sulfur, acid) and must also be free of any dust or oil mist.
- (2) Flow Rate Range
0 to +3L/min (Volume flow converted to the conditions of 20°C and 1 atm)
- (3) Operating Temperature
0 to 50°C (for both ambient temperature and gas temperature)
- (4) Operating Humidity
10 to 85%RH (no condensation allowed)
- (5) Storage Temperature
-10 to +60°C
- (6) External Dimensions
33.5(L) x 17(H) x 10.5(W)
- (7) Mass (Weight)
Approx. 9g
- (8) Mounting Position
Free
- (9) Mounting Conditions
When using the mounting holes of body, use M3 screws and tighten with 0.6N·m max. torque.
- (10) Vibration Resistance
10 to 55Hz, 1.5mm peak-to-peak amplitude, 2 hours each in XYZ directions.

2.2. Construction Specification

- (1) Material
Parts exposed to gas : PPS resin, ceramic(printed wiring board) and brass(connecting part)
Cover: PC (Polycarbonate) resin
- (2) Connection Type
M5 female (brass insertion), tightening torque 2.5N·m max.
- (3) Operating Pressure Range
-100 to +200kPa (Range for assured pressure characteristics -70 to +200kPa)
- (4) Pressure Resistance
300kPa
- (5) Installation
Install a filter in upstream side of this device to trap the dust or oil mist of 10 μm or larger.

6	00					作成 DR. I.Harada		尺度 SCALE ~	記入のない公差 TOL.UNLESS NOTED ~
5	00					検閲 CHK T.Watanabe	形番 MODEL	MCS100A104	
4	02					認可 APPD S.Aoshima	名称 NAME	Massflow Sensor	
3	01	02	JEO04-0692	9-22-'04	K.Matsu Watanabe	日付 DATE 6-30-'04	図番 NO.	AD13706E	改番 REV 02
2	00	01	JEO04-0583	9-8-'04	Yamazaki Watanabe				1/6
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2.3 Characteristics

(1) Accuracy (Environmental condition for measurement: 20°C, 1 atm [101,325Pa])
 $\pm 5\%$ FS max.

Output voltage 4V (5 to 1V) for full scale

Measurement conditions: Recorder, average of values in 2 seconds

Typical characteristics of output voltage

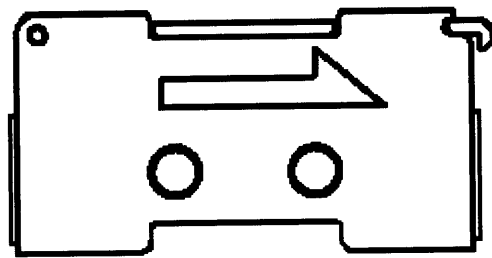
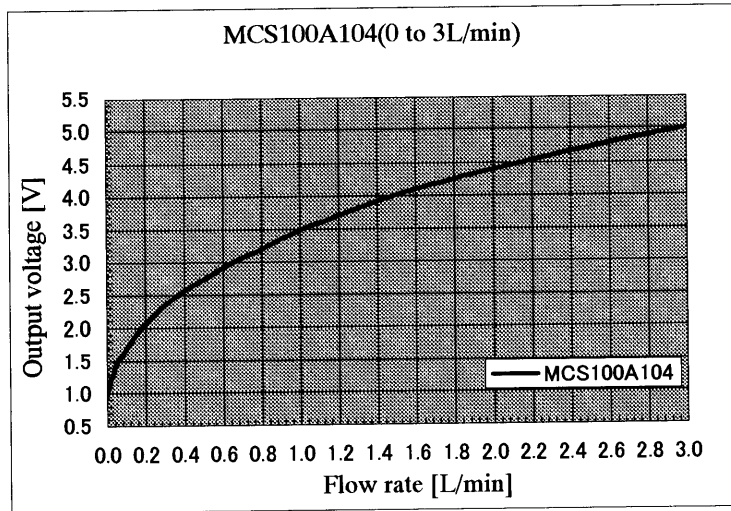
Flow rate 0L/min: $1.00 \pm 0.20V$ ($0 \pm 0.02L/min$)

Flow rate 0.5L/min: $2.75 \pm 0.15V$ ($0.5 \pm 0.08L/min$)

Flow rate 1.5L/min: $3.96 \pm 0.24V$ ($1.5 \pm 0.32L/min$)

Flow rate 3L/min: $5.00 \pm 0.20V$ ($3.0 \pm 0.38L/min$)

(Value to the flow rate converted to the conditions of 20°C and 1 atmosphere [101,325Pa])



→
Increasing output value (>1V)

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検図 CHK T.Watanabe	形番 MODEL	MCS100A104	
認可 APPD S.Aoshima	名称 NAME	Massflow Sensor	
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- (2) Temperature Characteristics
 - 0L/min: $\pm 0.1\%FS/^\circ C$
 - 1.5L/min: $\pm 0.15\%FS/^\circ C$
- (3) Pressure Characteristics
 - $\pm 0.02\%FS/kPa$ (Pressure range -70 to +200kPa)
- (4) Repeatability
 - $\pm 7\%FS$ max. (Under the same temperature and pressure conditions)
 - Output voltage 4V (5 to 1V) for full scale

2.4 Electrical Specification

- (1) Signal Output Range
 - Voltage output range : 1.0 to 5.0V
(non-linear characteristics, refer to the standard output characteristics graph)
 - Allowable load resistance: 10k Ω or more
- (2) Power Supply
 - Rated voltage: 12/24Vdc
 - Operating voltage: 11.4 to 26.4Vdc
 - Ripple voltage: 5% max. (at 12Vdc), 10% max. (at 24Vdc)
- (3) Consumption Current:
 - 12mA max.
- (4) Dielectric strength
 - 500Vac 1min or 600Vac 1s between each external connector terminals and body.
 - Leak Current: 5mA max.
- (5) Insulation Resistance
 - 50M Ω (500Vdc megger) between each external connector terminals and body.
- (6) Power fluctuation range
 - Under the power supply voltage 11.4Vdc, -2%FS max. compared with the output voltage at 12Vdc
 - Under the power supply voltage 13.2Vdc, +2%FS max. compared with the output voltage at 12Vdc
 - Under the power supply voltage 21.6Vdc, -2%FS max. compared with the output voltage at 24Vdc
 - Under the power supply voltage 26.4Vdc, +2%FS max. compared with the output voltage at 24Vdc

2.5 Warm-up Time

Allow at least 30 minutes for the device to warm up before use from power supply ON under application condition.

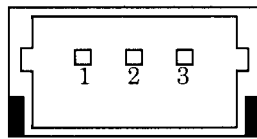
Approx. 10 minutes is required for the output to stabilize. The device will not be damaged if it is set into operation without sufficient time for it to warm up.

2.6 Response Time

5ms max. (95% response to a step state flow rate changing)

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3. Connection Terminal Layout

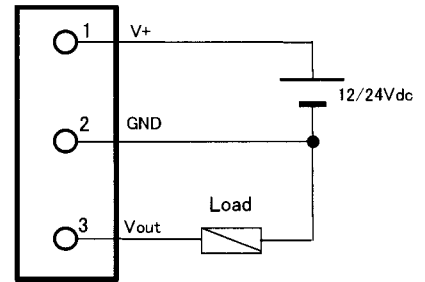


View from connector terminal side

Post with base used for body : SM03B-SRSS-G-TB manufactured by J.S.T. Mfg Co. Ltd.
 Applicable connector : -Housing: SHR-03V-S-B manufactured by J.S.T. Mfg Co. Ltd.
 -Contact pin: SSH-003GA-P0.2 manufactured by J.S.T. Mfg Co. Ltd.

Pin No.	Signal name	Description
1	V+	Power supply +
2	GND	GND
3	Vout	Sensor output


Not insulated between inputs and outputs.



Allowable load resistance 10kΩ or more

4. Handling Precautions

- 4.1. This device is a precision instrument. Do not drop it nor subject it to shock. Doing so might damage the device.
- 4.2. Use this device ensuring that there is no problem for safety.
- 4.3. If foreign matter flows into the intake passage, this sensor might be damaged. Provide a filter capable of eliminating 10μm dust mist on the upstream side so that foreign matter does not flow into the intake passage. If there is a possibility of rust, water droplets, or oil mist entering the device, provide a strainer or mist trap, and periodically check and replace it. Notice, too, that foreign matter might enter this device from the outlet side due to reverse flow. If reverse flow is a possibility, provide a reverse flow protection unit or a filter on the outlet side which is equivalent to the one provided on the upstream side. When installing an upstream or downstream filter, or when replacing a filter, be sure to prevent foreign matter from entering the sensor.
- 4.4. Do not use this device outside of the operating pressure range. Also, do not subject this device to pressure above the pressure resistance. Doing so might damage this device.
- 4.5. When connecting piping, support the body section of the pipe connector port, and turn the pipe side to connect. Also do not grip the top cover. Doing so might damage the top cover.
- 4.6. Firmly fix the device at the mounting so as not to cause any vibration.

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4.7. Installation site

Avoid mounting this device in the following locations:

- (1) Locations whose operating temperature falls below 0°C and rises above 50°C
- (2) Locations whose operating humidity exceeds 85% RH
- (3) Locations subject to sudden changes in temperature and condensation
- (4) Locations subject to corrosive gases and flammable gases
- (5) Locations where there are lots of conductive substances (e.g. dust, salt or iron dust), water droplets, oil mist or organic solvents
- (6) Locations subject to vibration or shock
- (7) Locations subject to direct sunlight
- (8) Locations splashed by water or rain
- (9) Locations subject to splashing by fluids (e.g. oil, chemicals.)
- (10) Locations where strong magnetic or electrical fields are generated

4.8. Wiring

Be sure to check that the wiring is correct before you turn the power ON.
Incorrect wiring might cause damage or malfunction.

4.9. Do not remove the case and disassemble inside of this device.

Doing so might cause malfunction.

5. Troubleshooting

Phenomena	Countermeasure
Flowrate deviates	<ul style="list-style-type: none"> • Check the piping for any gas leaks. • Check the piping and connection ports for dirt, oil or other foreign matter. If oil is adhering to these parts, contact Yamatake. • Check the flowrate to see that it does not deviate considerably within several seconds, or that it does not greatly exceed the measurement range
Signal not changes even though the flowrate should vary	<p>Sensor error Contact Yamatake Corporation and ask for repair. Three possibilities of output pattern are supposed when the device is damaged.</p> <ul style="list-style-type: none"> • Output voltage sticks at 5.0Vdc • Output voltage sticks under 1.0Vdc • Output voltage is indefinite and not change when the flowrate varies

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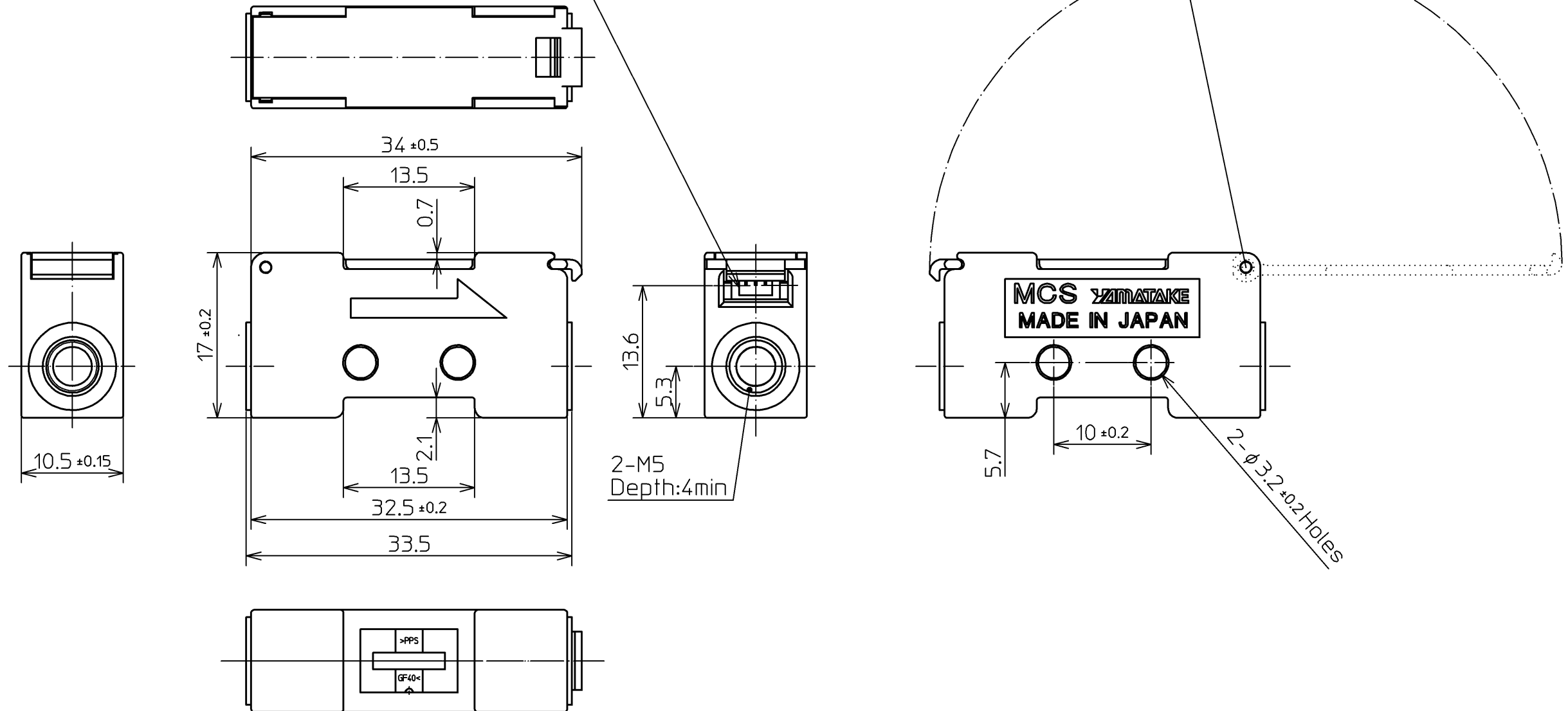
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製品仕様書
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Manufactured by J.S.T. Mfg Co., Ltd.
SM03B-SRSS-G-TB(Connector)

Applicable connector: Manufactured by J.S.T. Mfg Co., Ltd.
SHR-03V-S-B(Housing)
SSH-003GA-P0.2(Contact Pin)



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作成DR. I.Harada 6-30-04	検図CHK. S.Miura 6-30-04	認可APPD. H.Inagaki 6-30-04	日付DATE 6-30-'04	尺度SCALE 2:1	記入のない公差 TOL. UNLESS NOTED ± 0.3
形番 MODEL		MCS100A104			
名称 NAME		Massflow Sensor			
図番 NO.		AD13706E		改番REV. 00	6/6

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製品仕様書
SPECIFICATIONS

“RESTRICTIONS ON USE”

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment.

Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

1	00	00	First issue	12-2-02	Harada	Miura
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