



# MASS FLOW MODULE

## SEC-Z702MGX

HORIBA STEC, Co., Ltd.

### 1. SPECIFICATIONS

MODEL	SEC-Z712MGX	SEC-Z722MGX	SEC-Z732MGX	SEC-Z742MGX
Full Scale Flow (N2 Equivalent)	#R01: 10 SCCM #R1.5: 17.5 SCCM #01: 30 SCCM #1.5: 55 SCCM #02: 100 SCCM #2.5: 175 SCCM #03: 300 SCCM #3.5: 550 SCCM #04: 1 SLM #4.5: 1.75 SLM #05: 3 SLM #5.5: 5.5 SLM #06: 10 SLM	#6.5: 22SLM #07: 30SLM #08: 50SLM	#09:100SLM	#10:200SLM
Valve Type (under no electricity)	Normally Closed : NC Normally Open : NO			
Flow Rate @ fully closed control valve	Less than 2 % of setting F.S.			
Dynamic Range (Control)	2 – 100% of setting F.S.			
Flow Accuracy *1) *2)	± 1.0 %S.P. (Flow rate > 25 %F.S.) ± 0.25 %F.S. (Flow rate ≤ 25 %F.S.)		± 1.0 %S.P. (Flow rate > 35 %F.S.) ± 0.35 %F.S. (Flow rate ≤ 35 %F.S.)	
Operating Temperature	5 – 50 deg.C (Recommended temperature range : 15 – 45 deg.C)			
Response Time *3)	1 sec. or less (All flow rate control range)			
Linearity *1)	Within ± 0.5 % of F.S.			
Repeatability *1)	Within ± 0.2 % of F.S.			
Pressure Transient Sensitivity (@ 5 – 100 %F.S. (per SEMI F64-0701))	#R01 – #1.5 : ± (5.0 %S.P. + 1.5 %F.S. max.) [7 kPa / sec.] #02 – #10 : ± (1.0 %S.P. + 1.0 %F.S. max.) [14 kPa / sec.]			
Temperature Accuracy *6)	± 2 deg.C (5 – 50 deg.C)			
Pressure Accuracy *4) *7)	± 1 %F.S. (Range : 0 – 700 kPa(A))			
Operating Differential Pressure *4) *5)	#R01– #05: 50 – 300 kPa(D) #5.5, #06: 100 – 300 kPa(D)	200 – 300 kPa(D)	100 – 300 kPa(D)	200 – 300 kPa(D)
Max. Operating Pressure *4)	450 kPa(G)			
Proof Pressure *4)	1000 kPa(G)			
Leak Integrity	5×10 <sup>-12</sup> Pa·m <sup>3</sup> /s(He) or less			
Digital Interface	RS-485 (F-Net Protocol)			
Power Supply	+ 15 V ± 5 % 165 mA - 15 V ± 5 % 165 mA			
Wetted Materials	316L Stainless Steel, Co-Ni Alloy (polished surface)			
Standard Fittings	1/4 inch VCR compatible 1.125 inch C-seal Type 1.125 inch W-seal Type		1/2 inch VCR compatible 1.5 inch C-seal Type	
Mounting Orientation	Free			
Gas and Flow Rate Change Operation on a User Side	Possible			

- Notes: \*1) Accuracy, response time, linearity and repeatability are guaranteed only for calibration gas and full scale in the case of digital controlling.  
\*2) Temperature range in which "flow accuracy" is guaranteed is in accordance with SEMI: E56-0309.  
\*3) Response time is the time required to increase flow up to 98% F.S. (F.S.±2%)  
\*4) (D) : Differential Pressure, (G) : Gauge Pressure, (A) : Absolute Pressure  
\*5) Operating differential pressure varies depending on other operating parameters.  
\*6) When flow output is between 0% and 100%, Temperature display meets accuracy.  
\*7) The accuracy of the analog output of pressure is ± 1.5 %F.S.

### 2. ELECTRICAL CONNECTION

Connector to be used D-subminiature 9 contact pin in connector with M3 screw type.

Pin No.	Signal Name
1	Valve override open / close signal (Input impedance : 139 kΩ) Open signal : +15 VDC Close signal : -15 VDC
2	Analog flow rate output signal [0 – 5 VDC] (Min. load resistance : 2 kΩ) 0 – 5 VDC (0 % – F.S.)
3	Power supply input (+15 VDC, capacity : 165 mA)
4	Power common *1
5	Power supply input (-15 VDC, capacity : 165 mA)
6	Analog flow rate setting signal [0 – 5 VDC] (Input impedance : 1 MΩ and over) 0.1 – 5 VDC (2 % – F.S.)
7	Signal common *1
8	Signal common *1 *2
9	Analog pressure sensor output signal [0 – 5 VDC] (Min. load resistance : 2 kΩ) 0 – 5 VDC (0 – 700 kPa(A))

- Notes: \*1: In order to prevent the common voltage change by valve drive current, Power common (Pin No.4) and Signal common (Pin No.7) have the necessity of connecting by the GND side of a power supply. Power common (Pin No.4) and Signal common (Pin No.7) are not connected inside this model, please wire separately and connect to become common by the power supply side.  
Pin No.7 (Signal common) and Pin No.8 (Signal common) are connected inside the body.  
\*2: The options that output the analog signal from Pin No.8 are prepared, and please contact our company separately when their details are necessary.

Connector to be used for digital communication: RJ45

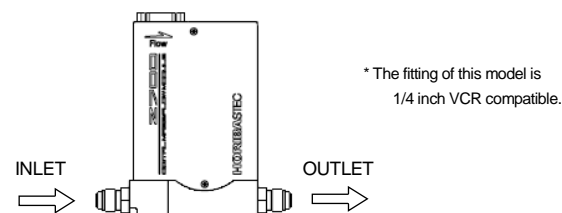
Pin No.	Signal Name
1	Digital signal common
2	Digital signal common
3	N.C. *1
4	Serial output (–)
5	Serial output (+)
6	N.C. *1
7	N.C. *1
8	N.C. *1

- Notes: \*1: N.C. means No Connection.  
\*2: Be sure to use shield cable to minimize the effect of electrical noise. Please use our company appointment cable SC-EBR-\*\*M for digital communication. If you use other kinds of cable on the market selling, it may not connect depending on the shape of a plug and hood.

### 3. HOW TO OPERATE

#### 1) Connection to Gas System

This model case is labeled with a flow direction arrow. Please make sure that this model is mounted in the corrected direction with respect to flow.



Please make sure that process connections are as leak tight as possible. Confirm leak integrity of the installed model at the gas system connections using a helium mass spectrometer leak detector with sufficient sensitivity

#### 2) Connection to Electrical System

Electrical connection is in accordance with the electrical pin assignments table. Power requirements for direct current are :  
+ 15 V ± 5 % 165 mA or more  
- 15 V ± 5 % 165 mA or more

#### 3) Warming Up Operation

The power is to be supplied more than 30 minutes without gas flowing, as warming-up operation. Without warming-up operation, flow rate accuracy may have variations.

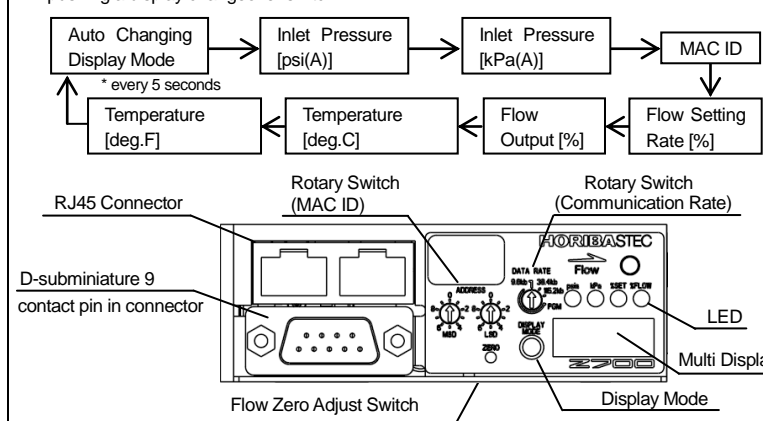
### 4. DIGITAL INTERFACE

Interface Specification	
Signal level	RS-485
Signal line	Three wire connection, Asynchronous serial transmission
Baud rate	115.2 kbps, 38400 bps, 9600bps
Start bit	1 bit
Character bit	7 bit
Parity	ODD
Stop bit	1 bit

The manual (I031121500) is separately prepared, and please contact our company when details of the communication protocol and the command are necessary.

### 5. DISPLAY AND SWITCH

SEC-Z700\*X series carry multi display. The indication is replaced in order of the following by pushing a display changeover switch.



### 6. CAUTION AND REMINDERS

- Please make sure that process piping system is as leak tight as possible. It is important to purge the entire gas line. If the purge is not sufficient, it might invite troubles such as particle generation, clogging, decrease in throughput, etc.
- Please install gas filter on inlet side of this model for eliminating particles and impurities which flow from upstream of gas line.
- Preservation temperature of this model is 0 to 80 deg.C. Please avoid the temperature out of range for preservation. Please do not dewing it, or make it to failure.
- Analog output signal may be output transitionally within the range of the power supply voltage. When the analog output signal is used, please take care of the input voltage resistance of the system.
- Please do not turn on and off the power repeatedly in a short period. More than three(3) seconds should be kept before turning on the power again. Each ±15V power source should be turned on / off simultaneously. Partial power supply or signal input, and plugging / unplugging while power is supplied, may cause trouble.
- Please make sure of sufficient capacity of power supply source.
- When utilizing Flow Zero-Adjust function, do not pressurize inside this model. If pressurized gas is inside this model, the function does not work correctly. After gas flow is suspended, waiting more than 1 minute is recommended to make the sensor output steadier. It needs 30 minutes for this model becoming steady after power is turned on. If using the pressure adjustment function, refer to the reference manual (I031121500).
- Please do not apply any excessive force and pressure on the main body of the model and the cable.
- The flow rate of this model at shipment is calibrated at 25 deg.C under 1013 hPa (1atm) or 0 deg.C under 1013 hPa (1atm). The following notations are used for gas flow rate units for convenience;  
CCM, LM : ml/min, l/min at 25 deg.C under 1013 hPa (1atm)  
SCCM, SLM : ml/min, l/min at 0 deg.C under 1013 hPa (1atm)
- Please consult HORIBA STEC first prior to using this model with a gas other than the nameplate or calibration gas.
- Never remove the model case, since there is a high voltage portion built inside the model. Removing the model case might invite to receive an electric shock, or to result in failure of the model.
- Please keep in mind that the control valve used in the model cannot provide positive shut-off capability. Where positive shut-off is required, a separate isolation valve should be installed for this purpose.
- When the control valve in the model is fully open or when it's out of control, the flow rate of gas exceeds the indicated F.S. value.
- Please do not search and / or run non-disclosed commands, or there is a possibility to change or ruin the important inner data, and to invite troubles having adverse effect on the model performance.
- If nonvolatile memory is rewritten 100,000 times or more, a defect of operation may arise.  
\* Details of the nonvolatile memory are separately described to the manual (I031121500), and please contact our company when it is necessary.

\* This instruction manual is subject to alteration without notice.

### 7. PRODUCT WARRANTY

- Period:  
This product is warranted for one (1) year (parts and labor) from date of shipment. Repair will be provided free of charge during this period if the product is returned to HORIBA STEC or authorized service representative with a description of the problem. HORIBA STEC is not responsible for damage due to customer neglect or improper operation of this product.
- Scope:  
Warranty coverage is restricted to this product only. HORIBA STEC is not responsible for damage to other components due to improper operation of this product.
- Warranty:  
Replacement parts are warranted for ninety (90) days or the remainder of the warranty period (whichever is longer).
- HORIBA STEC is not responsible for damage due to:  
a) Natural disasters  
b) Miss-operation or abuse of this product  
c) Operation or storage in an unsuitable environment  
d) Operation outside of the rated specifications  
e) Unauthorized alterations or retrofits to this product  
Examples for out of scope of responsibility by HORIBA STEC;  
\* In case of use of high reaction gas, clogging due to incomplete purge or leakage, etc. in gas line.  
\* Contamination or clogging by dust or mist, etc.  
Repair expense with / without charge is to be determined as examination and / or disassembly of the returned products.

### 产品中有害物质的名称及含量

Name and amount of hazardous substance used in a product

部件名称 Unit name	有害物质 Hazardous substance					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent chromium (Cr (VI))	多溴联苯 Polybromobiphenyl (PBB)	多溴二苯醚 Polybromodiphenyl ether (PBDE)
印刷电路板 Printed board	×	○	○	○	○	○
箱 Case	○	○	○	○	○	○
机械零件部 Machine parts	×	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。  
This form is prepared in accordance with SJ / T 11364.  
○: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。  
Denotes that the amount of the hazardous substance contained in all of the homogeneous materials used in the component is below the limit on the acceptable amount stipulated in the GB/T 26572.  
×: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。  
Denotes that the amount of the hazardous substance contained in any of the homogeneous materials used in the component is above the limit on the acceptable amount stipulated in the GB/T 26572.

标记的意义  
Meaning of Marking

本标记适用在中华人民共和国售电器电子产品，标记中央的数字表示环境保护使用期限的年限。(不是表示产品质量保证期间。)  
只要遵守这个产品有关的安全和使用注意事项，从制造日开始算起在这个年限内，不会给环境污染、人体和财产带来严重的影响。请不要随意废弃本电器电子产品。

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