

CODE: I031156100A
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型式	SEC(F)-N112MGMA	SEC(F)-N112MGRA
フルスケール流量 (N2 換算流量) *1)	#R01: 10SCCM #R1.5: 17.5SCCM #01: 30SCCM #1.5: 55SCCM #02: 100SCCM #2.5: 175SCCM #03: 300SCCM #3.5: 550SCCM #04: 1SLM #4.5: 1.75SLM #05: 3SLM #5.5: 5.5SLM #06: 10SLM	
バルブ型式	非通電時 閉(クローズ) : C	
空圧弁タイプ	NC : ノーマルクローズ	
コントロールバルブ 全閉時流量	設定フルスケールの 2%未満	
流量制御範囲	設定フルスケールの 2 ~ 100%	
流量測定範囲(SEF)	設定フルスケールの 0 ~ 100%	
流量精度 *2) *3)	± 1.0% S.P. (設定流量 > 30% F.S.) ± 0.3% F.S. (設定流量 30% F.S.)	
使用可能周囲温度	15 ~ 45	
応答性 (空圧弁は“開”の状態) *4)	1 秒以内 (全流量制御範囲)	
直線性 *2)	± 0.5% F.S.	
繰り返し性 *2)	± 0.2% F.S.	
動作差圧 *5) *6)	#01 ~ #05: 100 ~ 300kPa (D) #5.5, #06: 200 ~ 300kPa (D)	
使用圧力(SEF) *5) *7)	~ 300kPa (D)	
空圧弁操作圧力 *5)	0.45 ~ 0.6MPa (G)	
最大動作(使用)圧力 *5)	450kPa (G)	
耐圧 *5)	550kPa (G)	
外部リークレート	2×10^{-10} Pa・m ³ /s (He) 以下	
空圧弁シートリーク	1×10^{-10} Pa・m ³ /s (He) 以下	
流量設定信号	0.1 ~ 5VDC (2% ~ 設定フルスケール)	
流量出力信号	0 ~ 5VDC (0% ~ 設定フルスケール)	
デジタルインターフェイス	RS-485 (F-Net プロトコル)	
駆動電源	+15VDC ± 5% 150mA -15VDC ± 5% 200mA	
接ガス部材質 *8)	SUS316L, PTFE、 磁性ステンレス、Co 合金、 PCTFE	SUS316L, PTFE、 磁性ステンレス、Co 合金、 PCTFE、フッ素ゴム
標準継手	1/4inch VCR 相当	
取付姿勢	自由	
ユーザーサイドでの ガス種・流量変更操作	可	

Pin No.	信号
1	パルス強制開閉信号(入力インピーダンス:139k) 開信号(+15VDC) , 閉信号(-15VDC) *1)
2	流量出力信号(最小負荷抵抗は 2k) 0 - 5 VDC (0% - 設定フルスケール)
3	電源入力(+15VDC 容量:150mA)
4	電源コモン *2)
5	電源入力(-15VDC 容量:200mA)
6	流量設定信号(入力インピーダンスは 1M 以上) 0.1 - 5 VDC (2% - 設定フルスケール) *1)
7	シグナルコモン *2)
8	シグナルコモン 2)
9	パルス電圧モニタ

Pin No.	信号
1	デジタル信号コモン
2	デジタル信号コモン
3	N.C. *1)
4	シリアル出力(-)
5	シリアル出力(+)
6	N.C. *1)
7	N.C. *1)
8	N.C. *1)

Diagram illustrating the rear panel components of the device:

- RJ45 Connector
- LED
- Zero Adjust Switch
- Rotary Switch (MAC ID) (Default MAC ID : 00)
- D-subminiature 9 pin connector

The diagram shows a side view of the IN1000 pump assembly. It is a rectangular unit with two large ports on the front face. The left port is labeled 'INLET' with an arrow pointing into it. The right port is labeled 'OUTLET' with an arrow pointing out of it. The top of the unit has a 'FLOW' indicator with an arrow pointing upwards. The text 'IN1000' and 'DUPONT/ELASTEC' are visible on the top surface.

4) 暖機運転
電源投入後ガスの供給を止めた状態で30分間以上暖機を行って下さい。
暖機無しでは流量精度の悪化等、動作に支障をきたす場合があります。

信号レベル	RS-485
信号ライン	3 線式非同期シリアル
ボーレート	38400bps
スタートビット	1bit
キャラクタービット	7bit
パリティ	ODD(奇数)
ストップビット	1bit

1) 保証期間
弊社発送後 1 年間とし、この期間内に発生し弊社に送付された下記 4) 項以外の故障品については無償で修理いたします。

2) 保証範囲
弊社の製品本体に限定し、本体故障によって生じた損害の保証は行いません。

3) 交換部品の保証
交換後 90 日または 1) 項保証期間までのどちらか長い期間。


4) 免責事項
以下の場合には保証期間内であっても保証の対象にはなりません。
天災など不可抗力によって生じた故障。
取り扱いを誤ったために生じた故障、(コマンドの誤った使用によって生じた結果を含む)
不適切な環境での使用、或いは保管された場合。
定格仕様の範囲を超えて使用したり、改造を加えられたりした場合。
その他、弊社の責任範囲外と判断された場合。

< 具体例 >

a. 反応性の強いガスを使用した場合、バージが不完全であったり、ガスラインリークにより詰まりが生じた場合。

b. ダストやミストにより汚染又は詰まりを生じた場合。
返品されたものを分解点検し、有償、無償を判断いたします。

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 Polybromo- biphenyl (PBB)	多溴二苯醚 Polybromo- diphenyl ether (PBDE)
印刷电路板 Printed board	×					
箱 Case						
机械零件部 Machine parts	×					

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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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MASS FLOW CONTROLLER / METER
SEC(F)-N102MGM(R)A

CODE: I031156100A
June 2016 ©2013-2016 HORIBA STEC, CO., Ltd.

1.SPECIFICATIONS

MODEL	SEC(F)-N112MGMA	SEC(F)-N112MGRA
Full scale (Flow rate converted to N2) *1)	#R01: 10SCCM #R1.5: 17.5SCCM #01: 30SCCM #1.5: 55SCCM #02: 100SCCM #2.5: 175SCCM #03: 300SCCM #3.5: 550SCCM #04: 1SLM #4.5: 1.75SLM #05: 3SLM #5.5: 5.5SLM #06: 10SLM	
Valve Type	Normally Closed under no electricity: C	
Pneumatic valve Type	NC : Normally Closed	
Flow rate at fully closed control valve	Less than 2% of Setting F.S.	
Flow rate control range	2% ~ 100% of Setting F.S.	
Flow rate measuring range(SEF)	0% ~ 100% of Setting F.S.	
Accuracy *2) *3)	± 1.0%S.P. (Flow rate > 30%F.S.) ± 0.3%F.S. (Flow rate 30%F.S.)	
Operating temperature	15 ~ 45	
Response (Pneumatic valve is "open".) *4)	1sec or less (All flow rate control range)	
Linearity *2)	Within ± 0.5% of F.S.	
Repeatability *2)	Within ± 0.2% of F.S.	
Operating pressure *5) *6)	#01 ~ #05: 100 ~ 300kPa(D) #5.5,#06: 200 ~ 300kPa(D)	
Operating pressure (SEF) *5)*7)	~ 300kPa (D)	
Operating pressure of pneumatic valve *5)	0.45 ~ 0.6MPa (G)	
The maximum operating pressure *5)	450kPa (G)	
Pressure resistance *5)	550kPa (G)	
External leak rate	2 × 10 ⁻¹⁰ Pa・m ³ /s (He) or less	
Seat leak rate of pneumatic valve	1 × 10 ⁻¹⁰ Pa・m ³ /s (He) or less	
Flow rate set signal	0.1 ~ 5VDC (2% ~ F.S.)	
Flow rate output signal	0 ~ 5VDC (0% ~ F.S.)	
Digital Interface	RS-485 (F-Net protocol)	
Power supply	+15VDC ± 5% 150mA -15VDC ± 5% 200mA	
Wetted materials *8)	316L Stainless Steel, PTFE, Magnetic Stainless Steel, Alloy of Co, PCTFE	316L Stainless Steel, PTFE, Magnetic Stainless Steel, Alloy of Co, PCTFE, Rubber
Standard fittings	1/4inch VCR or equivalent	
Mounting orientation	Free	
Gas and Flow rate change operation on a user side	Possible	

Notes: *1) SCCM and SLM denote gas flow rate in ml/min and l/min, respectively.
*2) Accuracy, linearity and repeatability are guaranteed for calibration gas and flow rate of full scale.
*3) Temperature range in which "accuracy" is guaranteed is in accordance with SEMI: E56-0309.
*4) Response time is the time required to increase flow up to setting ±2% of full scale.
*5) (D): Differential Pressure, (G): Gauge Pressure
*6) Operating differential pressure varies depending on other operating parameters.
*7) The lower limit of operating pressure(SEF) varies according to specifications.
*8) Neither PTFE nor Magnetic stainless steel are used for SEF-N112MGM(R)A.

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: 139k) Open signal : +15VDC , Close signal : -15VDC *1)
2	Analog flow rate output signal [0 ~ 5VDC] (Minimum resistance: 2K) 0 - 5 VDC (0% - F.S.)
3	Power supply input (+15VDC, capacity: 150mA)
4	Power common *2)
5	Power supply input (-15VDC, capacity: 200mA)
6	Analog flow rate setting signal [0 ~ 5VDC] (Input impedance: 1M and over) 0.1 - 5 VDC (2% - F.S.) *1)
7	Signal common *2)
8	Signal common *2)
9	Valve voltage monitor

Notes: *1):No connection for SEF series.

*2):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 the product, please wire separately and connect to become common by the power supply side.

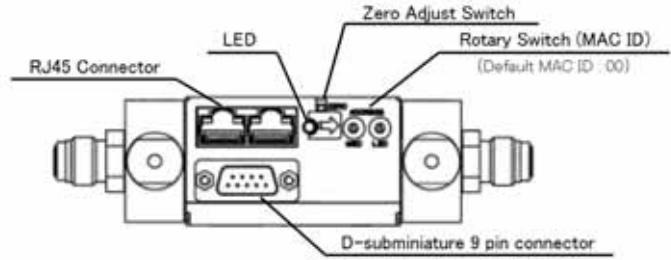
Pin No.7(Signal common) and Pin No.8(Signal common) are connected inside the product.

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.

* 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

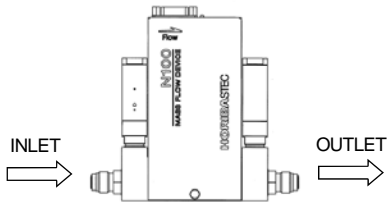
1) Connection to Gas System

The case is labeled with a flow direction arrow. Please make sure that the product is mounted in the corrected direction with respect to flow.

Gas inlet and outlet of the product fittings are 1/4inch VCR or equivalent with male screw fitting as standard.

These product can be mounted in any orientation, in most applications, without degradation of performance. Please make sure that process connections are as leak tight as possible.

Confirm leak integrity of the installed product at the gas system connections using a helium mass spectrometer leak detector with sufficient sensitivity.



2) Supply of the operation gas to the pneumatic valve

Please connect the air fitting to the top of the pneumatic valve, and supply operation gas.

Conection screw : M5, depth 4mm

*Please use air or nitrogen gas for operation gas.

3) Connection to Electrical System

Electrical connection is in accordance with the electrical pin assignments table.

Power requirements for direct current are: more than +15VDC ± 5% 150mA
more than -15VDC ± 5% 200mA

4) Warning Up Operation

The power is to be supplied more than 30 minutes without gas flowing, as warning-up operation. Without warming-up operation, The device may cause malfunction such as the aggravation of the flow quantity precision.

4.DIGITAL INTERFACE

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

ASCII(7bit) code

*Please ask the details of a communications protocol and a command to our company.

5.CAUTION AND REMINDERS

1) 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.

2) The particles becomes the cause of the seat leak of the pneumatic valve, please use gas filter to remove particles and the impurities which flow into this device from upstream of gas line.

Recommended filter size : 1 μ m or less

3) About the use of SEF, please warn because the lower limit of the use pressure varies according to the specifications such as flow quantity, the pneumatic valve type.

4) Because it is thought that show the abnormal movement such as overshots depending on a timing of the opening and shutting of the pneumatic valve, please open the pneumatic valve before inputting the setting signal of the mass flow controller.

5) Preservation temperature of product is 0 to 50 . Please avoid the temperature out of range for preservation. Please do not dewing it, or make it to failure.

6) Never remove the case, since there is a high voltage portion built inside the product. Removing the case might invite to receive an electric shock, or to result in failure of the product.

7) Analog flow rate signal may be output transitionally within the range of the power supply voltage. When the analog flow rate signal is used, please take care of the input voltage resistance of the system.

8) 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.

9) When utilizing Zero-Adjust function, do not pressurize inside the product. If pressurized gas is inside product , 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 the product becoming steady after power is turned on.

10) Please make sure of sufficient capacity of power supply source.

11) Please do not apply any excessive force and pressure on the main body of the product and the cable.
12) The flow rate of product at shipment is calibrated at 25 under 1013hPa(1atm) or 0 under 1013hPa(1atm).

The following notations are used for gas flow rate units for convenience;
CCM, LM : ml/min, l/min at 25 under 1013hPa(1atm)
SCCM, SLM : ml/min, l/min at 0 under 1013hPa(1atm)

13) Please consult HORIBA STEC first prior to using this model with a gas other than the nameplate or calibration gas.

14) Please keep in mind that the control valve used in the product cannot provide positive shut-off capability.

15) When the control valve in the product is fully open or when it's out of control, the flow rate of gas exceeds the indicated F.S. value.

16) 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 product performance.

17) If nonvolatile memory is rewritten 100,000 times or more, a defect of operation may arise.

*This instruction manual is subject to alteration without notice.

6.PRODUCT WARRANTY

1) 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 products 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.

2) 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.

3) Warranty:

Replacement parts are warranted for ninety (90) days or the remainder of the warranty period (whichever is longer).

4) 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 Polybromo- biphenyl (PBB)	多溴二苯醚 Polybromo- diphenyl 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数。（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。						

*For questions or service please contact:

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