HORIBA

STEC Fluid Control Technology

Digital Mass Flow Controller

SEC-N100 Series

NEW

EtherCAT® model EtherCAT

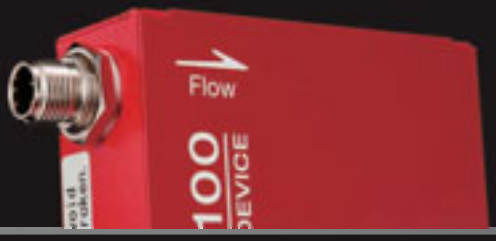
SEC-N107 Fitting to fitting 124mm–

PROFIBUS™ model
24 V DC, 4 - 20 mA PROFIBUS

SEC-N106 Fitting to fitting 124mm–

CC-Link™ model CC-Link

SEC-N105 Fitting to fitting 124mm–



DeviceNet™ model ODVA CONFORMANT

SEC-N104 Fitting to fitting 124mm– **SEC-N104W** Fitting to fitting 106mm–

Digital/Analog model

SEC-N102 Fitting to fitting 124mm– **SEC-N102W** Fitting to fitting 106mm–

A variety of communication, fitting-to-fitting dimensions and flow control ranges to suit customer needs.

HORIBA STEC has built an enviable reputation in markets throughout the world by delivering products with superior performance specifications and excellent reliability.

The SEC-N100 Series of mass flow controllers from HORIBA STEC is designed for use in a wide range of applications ranging from the controlled delivery of process gases for solar cell manufacturing to high accuracy bench-top gas blending. Our considerable experience and expertise in the measurement and control of gases for all applications is reflected in the development of our industry-leading-edge SEC-N100 Series which is available in with digital/analog, DeviceNet™, CC-Link™, PROFIBUS™, and EtherCAT® communication as well as a variety of fittings, sizes and flow rate control ranges.

Multiple Configulation Options

Communication options include digital/analog, DeviceNet™, CC-Link™, and PROFIBUS™.
A choice of two fitting-to-fitting dimensions is provided: 124 mm – and 106 mm – (W Type)*.
The flow rate control range extends from 10 SCCM to 1000 SLM. SEC-N100 Series is suitable for a wide variety of applications where gas control is required.

*W Type are appl icable SEC-N102 (Digital/Analog communication model) and SEC-N104 (DeviceNet™ communication model).
*Fittings is 1/4" VCR equivalent.

		Flow rate control range (Full-scale flow rate)				
		10 SCCM 10 SLM	50 SLM	100 SLM	200 SLM	1000 SLM
Digital communication ▶RS485 F-Net Protocol Analog communication ▶0 – 5 V DC ▶Power supply ±15 V DC (±5%) ▶Dedicated power supply PE Series are aveirable.	SEC-N102 Fitting to fitting 124mm– 	SEC-N112	SEC-N122	SEC-N132 Fitting to fitting : 132 mm	SEC-N142 Fitting to fitting : 132 mm	SEC-N172
	SEC-N102W Fitting to fitting 106mm– 	SEC-N112W	SEC-N122W	—	—	—
DeviceNet™ communication ODVA CONFORMANT ▶Conforming to ODVA standard	SEC-N104 Fitting to fitting 124mm– 	SEC-N114	SEC-N124	SEC-N134 Fitting to fitting : 132 mm	SEC-N144 Fitting to fitting : 132 mm	SEC-N174
	SEC-N104W Fitting to fitting 106mm– 	SEC-N114W	SEC-N124W	—	—	—
CC-Link™ communication CC-Link Analog communication ▶0 – 5 V DC, 0 – 10 V DC, 4 – 20 mA ▶Power supply 24 V DC (13 – 32 V DC)	SEC-N105 Fitting to fitting 124mm– 	SEC-N115	SEC-N125	SEC-N135 Fitting to fitting : 132 mm	SEC-N145 Fitting to fitting : 132 mm	SEC-N175
PROFIBUS™ communication PROFIBUS Analog communication ▶0 – 5 V DC, 0 – 10 V DC, 4 – 20 mA ▶Power supply 24 V DC (13 – 32 V DC)	SEC-N106 Fitting to fitting 124mm– 	SEC-N116	SEC-N126	SEC-N136 Fitting to fitting : 132 mm	SEC-N146 Fitting to fitting : 132 mm	SEC-N176
EtherCAT® communication EtherCAT ▶Power supply 24 V DC	SEC-N107 Fitting to fitting 124mm– 	SEC-N117	SEC-N127	—	—	SEC-N177

• Standard fitting of SEC-N11×(R) and SEC-N12×(R) is 1/4" VCR equivalent. • Standard fitting of SEC-N13× and SEC-N14× is 1/2" VCR equivalent.
• Flow rate control: available from 2% of full scale flow rate. (SEC-N17×: from 5%)

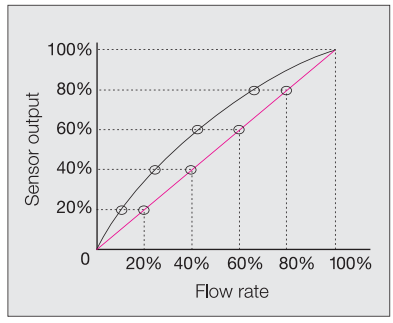
【High accuracy】

High S.P. accuracy

MFC's linearity is compensated using a polynomial approximated curve. This achieves high accuracy for all flow control ranges. Each process gas is individually characterized in the HORIBA STEC standard gas measurement system using the actual gas - not a reference or surrogate gas.

Accuracy	±1.0% S.P. : 30–100% F.S. ±0.3% F.S. : ≤30% F.S.

(SEC-N11X(W)/N12X(W))

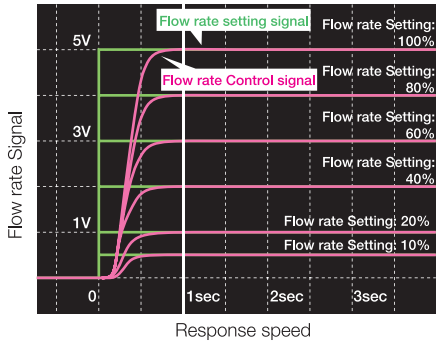


$y=ax^5+bx^4+cx^3+dx^2+ex+f$

【High-speed response throughout the flow rate range】

New variable PID algorithm: 1 second high-speed response

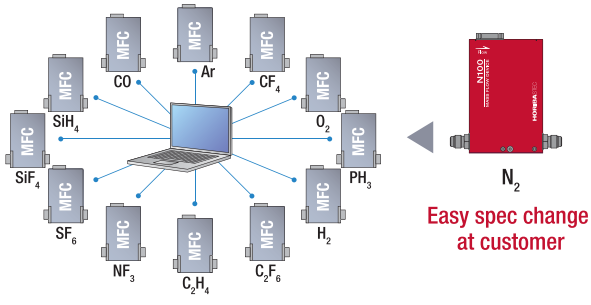
SEC-N100 Series uses the latest "Variable PID system", which enables 1 second response to all set-points. This system changes the PID continuously for optimum response to flow setting changes, ensuring fast response even when the full scale range or specified gas is changed using the SEC-Z500X Software.



【Multi-range, multi-gas solution】

Exclusive software allows users to easily alter MFC configuration

Users can modify the full-scale range or gas type using a simple PC connection.



Suitable for multiple type of gas

Easily change a type of gas

Example : SEC-N100 MR•MG-02 — N_2 100 SCCM ▶ Ar 110 SCCM

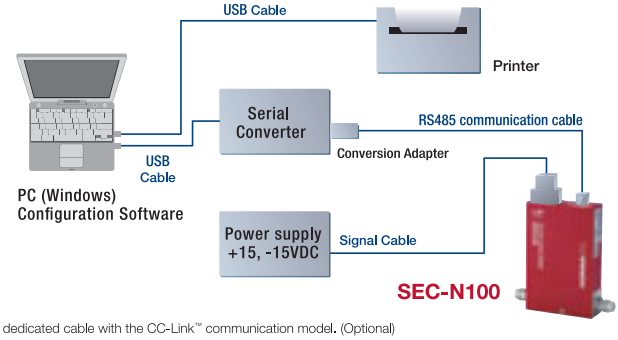
Suitable of multiple ranges

Easily change a full-scale flow rate control range.

Example : SEC-N100 MR•MG-04 — N_2 1000 SCCM (Flow rate control range 20–1000 SCCM) ▶ N_2 250 SCCM (Flow rate control range 5–250 SCCM)

Exclusive software: Configuration Software

This software makes it possible to select MR & MG numbers simply by entering the type of gas being used and the flow rate range, and also features a handy N_2 gas conversion feature for flow rate measurements using N_2 gas during receipt inspections.



*Use a dedicated cable with the CC-Link™ communication model. (Optional)

To ensure that the software is used without error, HORIBA STEC offers software operation seminars, please contact your HORIBA STEC representative.

Product specifications

▶Common specifications

Mass Flow controller model	SEC-N112MGM	SEC-N112MGR(W)	SEC-N122MGM	SEC-N122MGR(W)
	SEC-N114MGM	SEC-N114MGR(W)	SEC-N124MGM	SEC-N124MGR(W)
	SEC-N115MGM	SEC-N115MGR	SEC-N125MGM	SEC-N125MGR
	SEC-N116MGM	SEC-N116MGR	SEC-N126MGM	SEC-N126MGR
	SEC-N117MGM	SEC-N117MGR	SEC-N127MGM	SEC-N127MGR
Mass Flow meter mode	SEF-N112MGM	SEF-N112MGR(W)	SEF-N122MGM	SEF-N122MGR(W)
	SEF-N114MGM	SEF-N114MGR(W)	SEF-N124MGM	SEF-N124MGR(W)
	SEF-N115MGM	SEF-N115MGR	SEF-N125MGM	SEF-N125MGR
	SEF-N116MGM	SEF-N116MGR	SEF-N126MGM	SEF-N126MGR
	SEF-N117MGM	SEF-N117MGR	SEF-N127MGM	SEF-N127MGR
Full-scale flow rate (N_2 conversion flow rate) Full scale flow ranges are distinguished by BIN number except SEC(F)-N17xR	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	6.5: 22 SLM 07 : 30 SLM 08 : 50 SLM	
Valve type	C: Normally close			
Flow rate at fully closed control valve	≤2% F.S.			
Flow rate control range	2-100% of F.S.			
Flow rate measuring range (SEF)	0-100% of F.S.			
Accuracy *1	±1.0% S.P. (Flow rate > 30% F.S.) ±0.3% F.S. (Flow rate ≤ 30% F.S.)			
Operating temperature	5 to 50°C (recommended temperature range: 15 to 45°C)			
Response	≤1 second: over full flow rate range			
Linearity	≤±0.5% F.S.			
Repeatability	≤±0.2% F.S.			
Operating differential pressure	50 to 300 kPa (d) MR.MG-5.5, 06: 100 to 300 kPa (d)		200 to 300 kPa (d)	
Operating differential pressure (SEF)		≤300 kPa (d)		
MAX. Operating pressure		450 kPa (g)		
Pressure resistance		1000 kPa (g)		
Leak integrity	≤5x10^{-12}Pa•m^3/s (He)	≤1x10^{-10}Pa•m^3/s (He)	≤5x10^{-12}Pa•m^3/s (He)	≤1x10^{-10}Pa•m^3/s (He)
Wetted materials	SUS316L PTFE magnetic stainless *2	SUS316L PTFE magnetic stainless *2 Elastomer	SUS316L PTFE magnetic stainless *2	SUS316L PTFE magnetic stainless *2 Elastomer
Standard fitting	1/4 inch VCR equivalent, 1/4 inch Swagelok equivalent *3			
Mounting orientation	Free			

*1 The precision is that associated with the full-scale MR and MG number values. The flow rate precision guaranteed temperatures conform to SEMI standards. For details, please contact HORIBA STEC.
*2 Neither PTFE nor magnestic stainless steel are used for mass flow mater. *3 1/4" Swagelok equivalent is applicable with SEC-N1××RW Series.
*4 3/8" Swagelok equivalent is applicable with SEC-N13×R, SEC-N14×R. *5 Outlet pressure is required 0 kPa (g) or higher.

▶Communication/power supply

Digital/Analog communication model
SEC-N102(W)

Mass Flow controller model	SEC-N112MGM	SEC-N112MGR(W)	SEC-N122MGM	SEC-N122MGR(W)	SEC-N132MGM	SEC-N132MGR	SEC-N142MGM	SEC-N142MGR	SEC-N172R
Mass Flow meter model	SEF-N112MGM	SEF-N112MGR(W)	SEF-N122MGM	SEF-N122MGR(W)	SEF-N132MGM	SEF-N132MGR	SEF-N142MGM	SEF-N142MGR	SEF-N172R
Flow rate setting signal	0.1 to 5 V DC (2% to F.S.); input impedance 1MΩ or higher								
Flow rate output signal	0 to 5 V DC (0% to F.S.); minimum load resistance 2kΩ								
Digital interface	With address function: RS-485 (transmission speed 38400bps) F-NET Protocol								
Power supply	+15 V ±5% 150 mA -15 V ±5% 200 mA		+15 V ±5% 150 mA -15 V ±5% 250 mA		+15 V ±5% 150 mA -15 V ±5% 150 mA				+15 V ±5% 150 mA -15 V ±5% 200 mA

DeviceNet™ communication model
SEC-N104(W)

Mass Flow controller model	SEC-N114MGM	SEC-N114MGR(W)	SEC-N124MGM	SEC-N124MGR(W)	SEC-N134MGM	SEC-N134MGR	SEC-N144MGM	SEC-N144MGR	SEC-N174R
Mass Flow meter model	SEF-N114MGM	SEF-N114MGR(W)	SEF-N124MGM	SEF-N124MGR(W)	SEF-N134MGM	SEF-N134MGR	SEF-N144MGM	SEF-N144MGR	SEF-N174R
Digital interface	DeviceNet™ Protocol								
Power supply	Comforming to ODVA standards, 24 V DC								
	7.0 VA				4.0 VA				7.0 VA

CC-Link™ communication/Analog communication
SEC-N105

Mass Flow controller model	SEC-N115MGM	SEC-N115MGR	SEC-N125MGM	SEC-N125MGR	SEC-N135MGM	SEC-N135MGR	SEC-N145MGM	SEC-N145MGR	SEC-N175R
Mass Flow meter model	SEF-N115MGM	SEF-N115MGR	SEF-N125MGM	SEF-N125MGR	SEF-N135MGM	SEF-N135MGR	SEF-N145MGM	SEF-N145MGR	SEF-N175R
Flow rate setting signal	0.1 to 5 V DC/0.2 to 10 V DC/4.32 to 20 mA (2% to F.S.)								
Flow rate output signal	0 to 5 V DC/0 to 10 V DC/4 to 20 mA (0% to F.S.)								
Digital interface	By CC-Link™ Protocol station type: Remote device station; Occupied station: 1 occupied station; CC-Link™ version: Ver. 1.10								
Power supply	24 V DC (13 to 32 V DC)								
	7.5 VA				4.5 VA				7.5 VA

SEC-N132MGM	SEC-N132MGR	SEC-N142MGM	SEC-N142MGR	SEC-N172R	Mass Flow controller model
SEC-N134MGM	SEC-N134MGR	SEC-N144MGM	SEC-N144MGR	SEC-N174R	
SEC-N135MGM	SEC-N135MGR	SEC-N145MGM	SEC-N145MGR	SEC-N175R	
SEC-N136MGM	SEC-N136MGR	SEC-N146MGM	SEC-N146MGR	SEC-N176R	
–	–	–	–	SEC-N177R	
SEF-N132MGM	SEF-N132MGR	SEF-N142MGM	SEF-N142MGR	SEF-N172R	Mass Flow meter model
SEF-N134MGM	SEF-N134MGR	SEF-N144MGM	SEF-N144MGR	SEF-N174R	
SEF-N135MGM	SEF-N135MGR	SEF-N145MGM	SEF-N145MGR	SEF-N175R	
SEF-N136MGM	SEF-N136MGR	SEF-N146MGM	SEF-N146MGR	SEF-N176R	
–	–	–	–	SEF-N177R	
09: 100 SLM		10 : 200 SLM		300/500/1000SLM	Full-scale flow rate (N_2 conversion flow rate) Full scale flow ranges are distinguished by BIN number except SEC(F)-N17xR
C: Normally close/O: Normally open				Normally close	Valve type
≤2% F.S.				≤5% F.S.	Flow rate at fully closed control valve
2-100% of F.S.				5-100% of F.S.	Flow rate control range
0-100% of F.S.					Flow rate measuring range (SEF)
±1.0% S.P. (Flow rate > 35% F.S.) ±0.35% F.S. (Flow rate ≤ 35% F.S.)				±2.0% F.S.	Accuracy *1
5 to 50°C (recommended temperature range: 15 to 45°C)					Operating temperature
≤1 second: over full flow rate range				≤2 second (T98)Typical	Response
≤±0.5% F.S.				≤1.0% F.S.	Linearity
≤±0.2% F.S.				≤1.0% F.S.	Repeatability
100 to 300 kPa (d)		200 to 300 kPa (d)		150 to 300 kPa (d) (300/500 SLM)*5 250 to 350 kPa (d) (1000 SLM)	Operating differential pressure
≤300 kPa (d)				≤350 kPa (d)	Operating differential pressure (SEF)
450 kPa (g)				350 kPa (g)	MAX. Operating pressure
1000 kPa (g)					Pressure resistance
≤5x10^{-12}Pa•m^3/s (He)	≤1x10^{-10}Pa•m^3/s (He)	≤5x10^{-12}Pa•m^3/s (He)	≤1x10^{-10}Pa•m^3/s (He)	≤1x10^{-7}Pa•m^3/s (He)	Leak integrity
SUS316L	SUS316L Elastomer	SUS316L	SUS316L Elastomer	SUS316/SUS304 PTFE magnetic stainless *2 Elastomer	Wetted materials
1/2 inch VCR equivalent, 3/8 inch Swagelok equivalent *4				1/2 inch VCR equivalent, 1/2 inch Swagelok equivalent	Standard fitting
Free					Mounting orientation

• SCCM, SLM are numbers that represents flow rate (mL/min, L/min, at 0°C101.3 kPa).
• Note that components or production methods may be modified for productivity reasons at any time without notice provided that such modification does not alter the product specifications.

PROFIBUS™ communication/Analog communication

SEC-N106

Mass Flow controller model	SEC-N116MGM	SEC-N116MGR	SEC-N126MGM	SEC-N126MGR	SEC-N136MGM	SEC-N136MGR	SEC-N146MGM	SEC-N146MGR	SEC-N176R
Mass Flow meter model	SEF-N116MGM	SEF-N116MGR	SEF-N126MGM	SEF-N126MGR	SEF-N136MGM	SEF-N136MGR	SEF-N146MGM	SEF-N146MGR	SEF-N176R
Flow rate setting signal	0.1 to 5 V DC/0.2 to 10 V DC/4.32 to 20 mA (2% to F.S.)								
Flow rate output signal	0 to 5 V DC/0 to 10 V DC/4 to 20 mA (0% to F.S.)								
Digital interface	PROFIBUS™-DP Protocol								
Power supply	24 V DC (13 to 32 V DC)								
	7.5 VA				4.5 VA				7.5 VA

EtherCAT® communication mode

SEC-N107

Mass Flow controller model	SEC-N117MGM	SEC-N117MGR	SEC-N127MGM	SEC-N127MGR	SEC-N177R
Mass Flow meter model	SEF-N117MGM	SEF-N117MGR	SEF-N127MGM	SEF-N127MGR	SEF-N177R
Digital interface	EtherCAT® Protocol				
Power supply	24VDC±4V				
	7.5VA				7.2VA

Selecting a model

SEC-N100

❶ Model
SEC-N1: Mass flow controller
SEF-N1: Mass flow meter

❷ Full-scale flow rate
1: 10 SLM (N_2 equivalent flow rate)
2: 50 SLM (N_2 equivalent flow rate)
3: 100 SLM (N_2 equivalent flow rate)
4: 200 SLM (N_2 equivalent flow rate)
7: 300/500/1000 SLM (N_2 equivalent flow rate)

❸ Communication mode
2: Digital communication (RS-485 F-net Protocol), Analog communication (voltage signal)
4: DeviceNet™ communication
5: CC-Link™ communication
6: PROFIBUS™ communication, Analog communication (voltage signal/current signal)
7 : EtherCAT® communication

❹ Seal
M : Metal seal (except SEC-N17x)
R : Elastomer seal

❺ Width dimensions
Blank : 1.125inch

❻ Valve type
Blank : for SEF
C : normally close
O : normally open; applicable with SEC-N13x, SEC-N14x

❼ Connector position
T : Top of case (applicable with SEC-N102, SEC-N104, SEC-N105, SEC-N106)
S : Side of case (applicable with SEC-N104, SEC-N107)

❽ Calibration curve
1 : Standard
5 : EtherCAT® model

❾ DeviceNet™ output range
Blank : Except DeviceNET™ model
1 : Full-scale flow rate output 100% F.S.
3 : Full-scale flow rate output 133% F.S.
5 : Full-scale flow rate output 133.329% F.S.

model						specification										
❶	❷	❸	MG	❹	❺	❻	❼	❽	❾	❿	MR	⓫	⓬	⓭	⓮	⓯
(ex.)SEC-N1	1	2	MG	M	–	C	T	1	–	–	MR	MG-04	1SLM	4CR	B	N_2

• In case of SEC(F)-N17xR : blank

❿ CC-Link™ • PROFIBUS™ communication: voltage/current select
Blank : SEC-N102, SEC-N104, SEC-N107
A : setting/output signal 0-5 V DC
B : setting/output signal 0-10 V DC
C : setting/output signal 4-20 mA

⓫ Multi-range, multi-gas (MR & MG) numbers
Please specify MR & MG numbers.
For details, please see the specifications below.

⓬ Full-scale flow rate
Please specify full-scale flow rate.

⓭ Joint
4CR: 1/4" VCR male type fitting
(applicable with SEC-N11× and SEC-N12×)
8CR: 1/2" VCR male type fitting
(applicable with SEC-N13×, SEC-N14× and SEC-N17×)
4IS : 1/4" Swagelok male type fitting
(applicable with SEC-N100R)
6IS : 3/8" Swagelok male type fitting
(applicable with SEC-N100R)
8IS : 1/2" Swagelok male type fitting
(applicable with SEC-N17×)

⓮ Fitting to fitting dimensions
L : 124mm (1/4" VCR male type fitting. Applicable with SEC-N11× and SEC-N12×)
S : 132mm (1/2" VCR male type fitting. Applicable with SEC-N13× and SEC-N14×, 1/4" Swagelok male type fitting. Applicable with SEC-N11×R and SEC-N12×R)
J : 150.4mm (1/2" VCR male type fitting. Applicable with SEC-N13× and SEC-N14X, 3/8" Swagelok male type fitting. Applicable with SEC-N13×R and SEC-N14×R)
G : 177mm (1/2" VCR male type fitting. Applicable with SEC-N13× and SEC-N14×)
H : 179mm (3/8" Swagelok male type fitting. Applicable with SEC-N13×R and SEC-N14×R)
I : 203mm (1/2" VCR male type fitting. Applicable with SEC-N17×R)
R : 209.4mm (1/2" Swagelok male type fitting. Applicable with SEC-N17×R)
P : 159mm (1/2" VCR male type fitting. Applicable with SEF-N17×R)
C : 165.5mm (1/2" Swagelok male type fitting. Applicable with SEF-N17×R)

⓯ Types of gas
Blank : type of gas is not specified by MR & MG compatibility gas name.
ex.N_2 : gas being used

• For polished surface model, we recommend the SEC-Z500X Series.

Gas and full-scale flow rate table (e.g.)

type of gas / MR.MG number	N_2	Ar	H_2	He	CO_2	CH_4
SEC-N112(W), SEC-N114(W), SEC-N115, SEC-N116, SEC-N117						
R01	3-10	4-11	3-10	4-12	3-8	2-7
R1.5						
01	8-30	11-35	8-30	10-38	7-25	6-22
1.5						
02	25-100	35-110	25-100	33-120	21-83	19-75
2.5						
03	75-300	110-350	75-300	99-380	64-250	57-220
3.5						
04	250-1000	350-1100	250-1000	330-1300	210-830	190-750
4.5						
05	750-3000	1100-3500	750-3000	1100-4100	610-2400	590-2300
5.5						
06	2500-10000	3500-11000	2500-10000	3900-13000	2000-8000	2000-7800

• Gases shown above are for reference only. Software includes data for gases/mixtures other than those listed above.

Unit:SCCM

SEC-N100W

❶ Model
SEC-N1: Mass flow controller
SEF-N1: Mass flow meter

❷ Full-scale flow rate
1: 10 SLM (N_2 equivalent flow rate)
2: 50 SLM (N_2 equivalent flow rate)

❸ Communication mode
2: Digital communication (RS-485/F-net Protocol), Analog communication (voltage signal)
4: DeviceNet™ communication

❹ Seal
M : Metal seal
R : Elastomer seal

❺ Width dimensions
W : 1.5inch

❻ Valve type
Blank : for SEF
C : normally close
O : normally open; applicable with SEC-N13x, SEC-N14x

❼ Connector position
T : Top of case (applicable with SEC-N102W, SEC-N104W)
S : Side of case (applicable with SEC-N104W)

❽ DeviceNet™ output range
Blank : Except DeviceNET™ model
1 : Full-scale flow rate output 100% F.S.
3 : Full-scale flow rate output 133% F.S.
5 : Full-scale flow rate output 133.329% F.S.

model							specification									
❶	❷	❸	MG	❹	W	❺	❻	❼	1	❽	MR	❾	❿	⓫	⓬	⓭
(ex.)SEC-N1	1	2	MG	M	W	–	C	T	1	–	MR	MG-04	1SLM	4CR	B	N_2

❾ Multi-range, multi-gas (MR & MG) numbers
Please specify MR & MG numbers.
For details, please see the specifications below.

❿ Full-scale flow rate
Please specify full-scale flow rate.

⓫ Joint
4CR : 1/4" VCR male type fitting (applicable with SEC-N11× and SEC-N12×)
4IS : 1/4" Swagelok male type fitting (applicable with SEC-N100RW Series)

⓬ Fitting to fitting dimensions
B : 106mm
(1/4" VCR male type fitting. Applicable with SEC-N11×W and SEC-N12×W)
M: 127mm
(1/4" Swagelok male type fitting. Applicable with SEC-N11×RW and SEC-N12×RW)

⓭ Types of gas
Blank : type of gas is not specified by MR & MG compatibility gas name.
ex.N_2 : gas being used

- For polished surface model, we recommend the SEC-Z500X Series.

type of gas / MR.MG number	N_2	Ar	H_2	He	CO_2	CH_4
SEC-N122(W), SEC-N124(W), SEC-N125, SEC-N126, SEC-N127						
6.5						
07	10000-30000	10000-30000	10000-30000	12000-30000	7300-21000	5800-22000
08	30000-50000	30000-50000	30000-50000	30000-50000	21000-35000	22000-38000
SEC-N132, SEC-N134, SEC-N135, SEC-N136						
09	50000-100000	50000-95000	50000-100000	50000-108000	35000-75000	38000-76000
SEC-N142, SEC-N144, SEC-N145, SEC-N146						
10	100000-200000	95000-176000	100000-200000	108000-200000	75000-158000	76000-152000

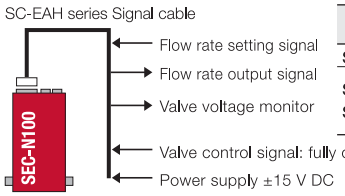
• Gases shown above are for reference only. Software includes data for gases/mixtures other than those listed above.

Unit:SCCM

Connector examples

Analog communication

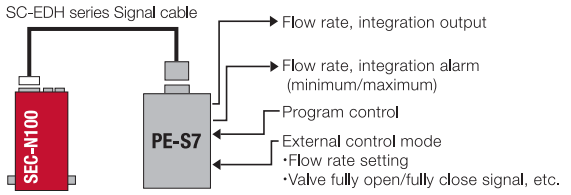
Using an external power source and control signal



model	flow rate signal	flow rate output signal
SEC-N102	0.1 to 5 V DC	0 to 5 V DC
SEC-N105 SEC-N106	0.1 to 5 V DC	0 to 5 V DC
	0.2 to 10 V DC	0 to 10 V DC
	4.32 to 20 mA	4 to 20 mA

Signal cable SC-EAH Series is applicable with SEC-N102(W)

Using various functional power control unit, PE-S7



Signal cable SC-EDH Series is applicable with SEC-N102(W)

SEC-N102(W) Analog connector

Pin No.	name of signnal	
1	Compulsory valve open/close signal	*1
2	Flow rate output signal 0 to 5 V DC (minimum load resistance 2kΩ)	
3	Power supply : +15 V DC	
4	Power supply : common	*2
5	Power supply : -15 V DC	
6	Flow rate setting signal : 0 to 5 V DC (input impedance 1MΩ or higher)	*1
7	Signal : common	*2
8	Signal : common	*2
9	Valve position monitoring	*1

Connector used: D-subminiature 9-contact-pin (with M3 fastening screws)

*1 Mass Flow meter is N.C.

*2 The pin No.4 common power source and pin No.7 common signal should be connected at the GND side of power supply for preventing change of common voltage by valve power supply.
No.7 and No.8 common signal are connected inside.

SEC-N105, SEC-N106 Analog connector

Pin No.	name of signnal	
1	Compulsory valve open/close signal	*1
2	Flow rate output signal	
3	Power supply (13 to 32 V DC)	*2
4	Signal : common	
5	Power supply : common (0 V DC)	*2
6	Flow rate setting signal	*1
7	Flow rate output signal :common	
8	Flow rate setting signal :common	
9	Valve position monitoring	*1

Connector used: D-subminiature 9-contact-pin (with #4-40 UNC inch screws)

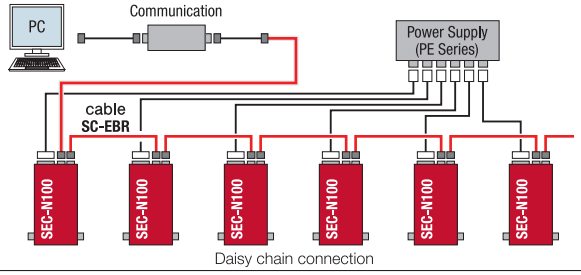
*1 Mass Flow meter is N.C.

*2 Power circuit and input-output adapter are isolated.

* Impedance of flow rate setting signal input
0 to 5 V DC, 0 to10 V DC: 1MΩ, 4 to 20 mA: 250Ω

Load resistance of flow rate output signal
0 to 5 V DC : Minimum load resistance 2kΩ, 0 to10 V DC: minimum load resistance: 5kΩ
4 to 20 mA : Maximum load resistance 250Ω

Digital communication

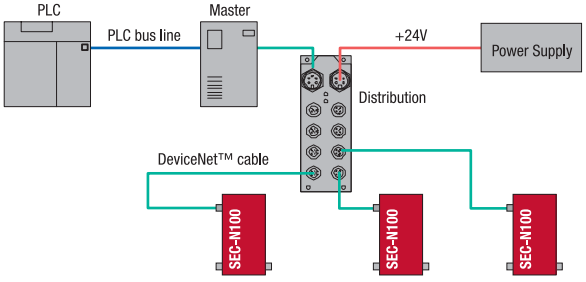


RS485 digital communication

Pin No.	name of signnal
1	Digital signal : common
2	Digital signal : common
3	N.C.
4	Serial output (-)
5	Serial output (+)
6	N.C.
7	N.C.
8	N.C.

Connector used: RJ45 connector

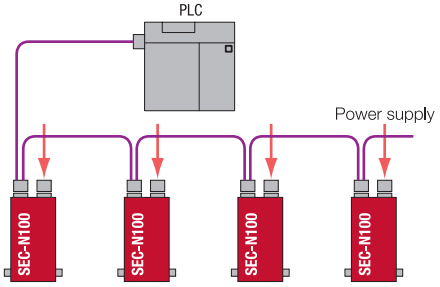
DeviceNet™ communication



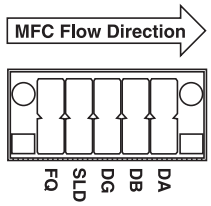
DeviceNet™ communication

DeviceNet™ is an open and global field network that was developed by the ODVA (Open DeviceNet™ Vendors Association, Inc.) as a unique means for supporting standardization worldwide. The ODVA offers EDS (Electronic Data Sheet) specifications, which are designed to allow shared operability and programming on a multi-vendor environment. The ODVA also carries out conformance testing. Device that have passed the ODVA's conformance testing can display the ODVA logo.

CC-Link™ communication



CC-Link™ communication



MFC main unit connector:
DMC, 5/5-G1F3, 5-LR P20THR 5 stations* two stage type

Electrical supply connector

Pin No.	name of signal
1	N.C.
2	N.C.
3	Power supply +24V DC (13-32V DC)
4	N.C.
5	Power supply return 0 V DC
6	N.C.
7	N.C.
8	N.C.
9	N.C.

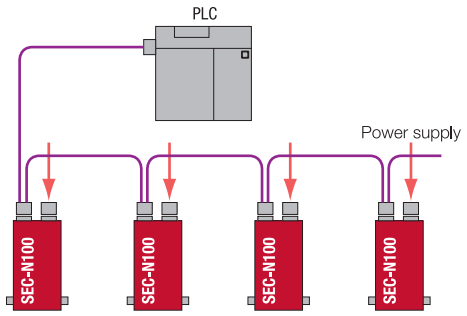
Connector used:
D-subminiature 9 pin Male type
(#4-40 UNC inch screws)

CC-Link™ communication

CC-Link™ communication is an open high-speed field network that processes both control and information at the same time. As responsiveness at high speeds of up to 10 Mbps has been achieved, CC-Link™ ensures communication reliability. Because the link scan time obtained in an actual CC-Link™ system is almost equal to the calculated value, communication with sensor inputs that require high-speed response or intelligent devices that require high-bandwidth data communications can be flexibly supported. Based in Japan, the CC-Link™ Partner Association has operational sites in six world regions, including Asia, and is a global leader in promoting CC-Link™, an open-architecture industrial network.

N.C. : Non connection

PROFIBUS™ communication



PROFIBUS™ communication connector

Pin No.	name of signal
1	N.C.
2	N.C.
3	RXD/TXD-P
4	CNTR-P
5	Digital ground
6	V.P.
7	N.C.
8	RXD/TXD-N
9	N.C.

Connector used:
D-subminiature 9-contact-socket connector
(with #4-40 UNC inch screws)

Electrical supply connector

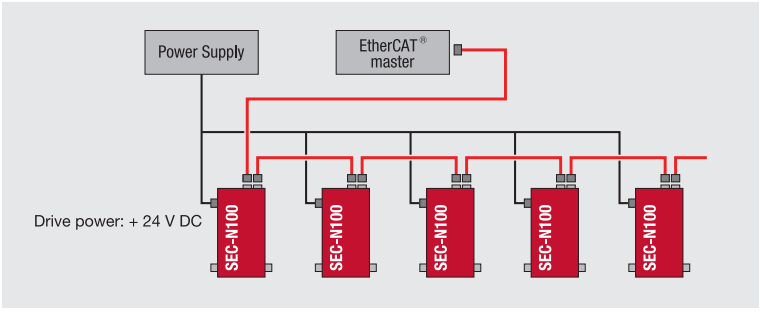
Pin No.	name of signal
1	N.C.
2	N.C.
3	Power supply +24V DC (13-32V DC)
4	N.C.
5	Power supply return 0 V DC
6	N.C.
7	N.C.
8	N.C.
9	N.C.

Connector used:
D-subminiature 9 pin Male type
(#4-40 UNC inch screws)

PROFIBUS™ communication

PROFIBUS™ is an open field bus that is certified IEC61158. It is composed of PROFIBUS™-DP for factory automation and PROFIBUS™ PA for process automation. PROFIBUS™ Organization supports standardization worldwide.

EtherCAT® communication



What is EtherCAT® communication?

Open field bus system based on Ethernet. ETG (EtherCAT® Technology Group) has been established as an international forum to promote support and diffusion of EtherCAT®, and maintain mutual compatibility. ETG specifies functional requirements, conformance tests and its certification procedure, and permits only devices which satisfy conditions specified by ETG to use the EtherCAT logo.

Power connector

Pin No.	Signal name
1	V+
2	N.C.
3	Power Common
4	N.C.
5	N.C.

Connector used: M8 5pin male connector

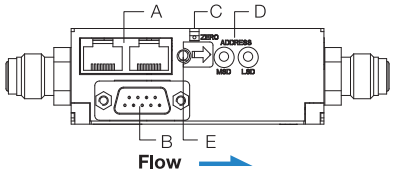
* Use connectors that conform to the EtherCAT® Technology Group standard: ETG5003.2020.

Features

- High bus efficiency and high-speed data scan is realized by simultaneously communicating with many devices.
- The master can use the standard Ethernet interface when connecting to devices, and does not require expensive dedicated hardware.

Digital/Analog model

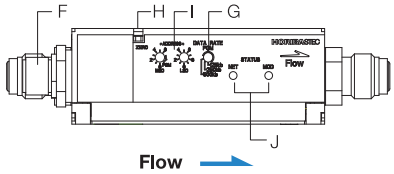
SEC-N102(W)



Code	Name	Account
A	Digital transmission connector	RS-485 communication. Daisy chain connection is available
B	Analog connector	Provision of power supply. For analog transmission
C	ZERO adjust switch	Switch for correcting ZERO-point
D	Address setting switch	It is possible to set in the range of 0×01 to 0×99
E	Indicator LED	While analog communication, green lights turns on. (When alarm and incorrect ZERO-point, red lights turn on)

DeviceNet™ model

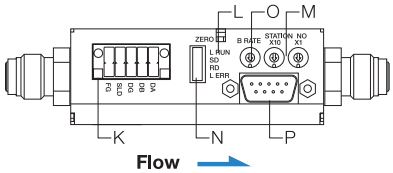
SEC-N104(W)



Code	Name	Account
F	DeviceNet™connector	For DeviceNet™ communication. Shield Micro-connector
G	Transmission setting switch	Transmission speed setting
H	ZERO adjust switch	Switch for correcting ZERO-point
I	Address setting switch	It is possible to set in the range of 00 to 63
J	Indicator LED	NET: it represents condition of network. MOD: it represents conditon of node.

CC-Link™ model

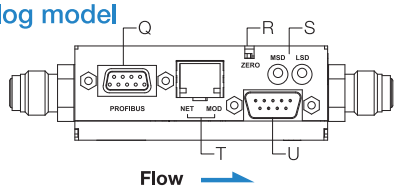
SEC-N105



Code	Name	Account
K	CC-Link™ connector	For CC-Link™ communication
L	ZERO adjust switch	Switch for correcting zero-point
M	Rotary switch for setting station number	It is possible to set in the range of 1 to 64
N	LED for communication status	Indicates CC-Link™ communication status
O	Rotary switch for setting communication speed	It is possible to set in the range of 0 to 4
P	Connector for power supply/ analog communication	Provision of power supply for analog communication.

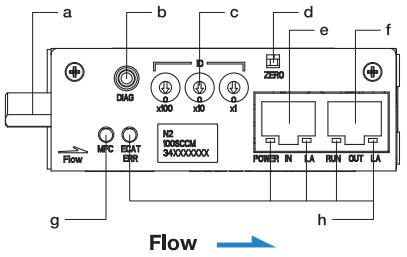
PROFIBUS™/Analog model

SEC-N106



Code	Name	Account
Q	PROFIBUS™ Connector	For PROFIBUS™ communication
R	ZERO adjust switch	Switch for correcting ZERO-point
S	Address setting switch	It is possible to set in the range of 0×01 to 0×7D
T	Indicator LED	NET: it represents condition of network. MOD: it represents conditon of node.
U	Analog connector	Provision of power supply. For analog communication

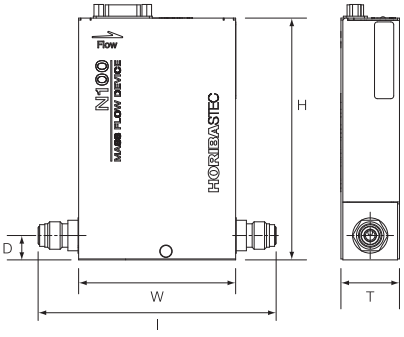
EtherCAT® communication model

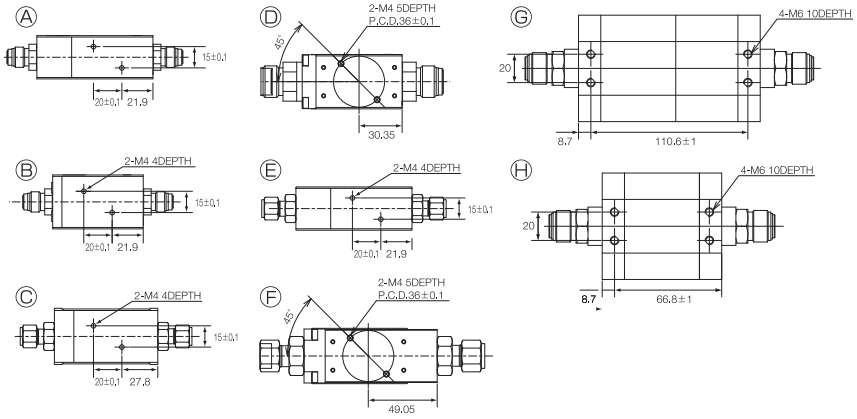


Flow

Symbol	Name	Explanation
a	Power connector	Drive power supply connector
b	DIAG communication port	Service communication port
c	EtherCAT® ID selector	Settable in a range from 0x0000 to 0x0FFF * If this ID is used for EtherCAT® communication, it is required to perform a predetermined initial setting. If you have any question about how to set up, please contact us.
d	ZERO adjust switch	Zero adjust switch
e	EtherCAT® IN port	For EtherCAT® communication. Connection on IN side
f	EtherCAT® OUT port	For EtherCAT® communication. Connection on OUT side
g	MFC indicator LED	Indicates MFC state. Normal: Turns on in green Abnormal: Turns on in red or flashes in red/green depending on abnormal cause.
h	EtherCAT® indicator LED	ECAT ERR: Indicates error state of EtherCAT® communication. POWER: Turns on in green when power is supplied. LA: Indicates link/active state of each port. RUN: Indicates state of EtherCAT® state machine.

External dimensions





model	H	T	W	l					D	position of fastened screws
				1/4" VCR type	1/4" SWL type	1/2" VCR type	3/8" SWL type	1/2"SWL type		
SEC(F)-N112 SEC(F)-N122	126±1	30.5±0.5	81.8	124±1(4CRL)	132	—	—	—	12.7	See above diagram Ⓐ
SEC(F)-N112W SEC(F)-N122W	126±1	38±0.5	63.8	106±1	127	—	—	—	12.7	See above diagram Ⓑ See above diagram Ⓒ
SEC(F)-N132 SEC(F)-N142	139±1	38.3±0.5	70.4(1/2" VCR type) 94.4(3/8" SWL type)	—	—	132(8CRS) 150.4(8CRJ) 177(8CRG)	150.4(6ISJ) 179(6ISH)	—	18.5(1/2" VCR type) 22(3/8" SWL type)	See above diagram Ⓓ See above diagram Ⓕ
SEC(F)-N114 SEC(F)-N124	126±1	30.5±0.5	81.8	124±1(4CRL)	132	—	—	—	12.7	See above diagram Ⓐ
SEC(F)-N114W SEC(F)-N124W	126±1	38±0.5	63.8	106±1	127	—	—	—	12.7	See above diagram Ⓑ See above diagram Ⓒ
SEC(F)-N134 SEC(F)-N144	150±1	38.3±0.5	70.4(1/2" VCR type) 94.4(3/8" SWL type)	—	—	132(8CRS) 150.4(8CRJ) 177(8CRG)	150.4(6ISJ) 179(6ISH)	—	18.5(1/2" VCR type) 22(3/8" SWL type)	See above diagram Ⓓ See above diagram Ⓕ
SEC(F)-N115 SEC(F)-N125	132±1	30.5±0.5	81.8	124±1(4CRL)	132	—	—	—	12.7	See above diagram Ⓐ See above diagram Ⓔ
SEC(F)-N135 SEC(F)-N145	139±1	38.3±0.5	70.4(1/2" VCR type) 94.4(3/8" SWL type)	—	—	132(8CRS) 150.4(8CRJ) 177(8CRG)	150.4(6ISJ) 179(6ISH)	—	18.5(1/2" VCR type) 22(3/8" SWL type)	See above diagram Ⓓ See above diagram Ⓕ
SEC(F)-N116 SEC(F)-N126	132±1	30.5±0.5	81.8	124±1(4CRL)	132	—	—	—	12.7	See above diagram Ⓐ
SEC(F)-N136 SEC(F)-N146	139±1	38.3±0.5	70.4(1/2" VCR type) 94.4(3/8" SWL type)	—	—	132(8CRS) 150.4(8CRJ) 177(8CRG)	150.4(6ISJ) 179(6ISH)	—	18.5(1/2" VCR type) 22(3/8" SWL type)	See above diagram Ⓓ See above diagram Ⓕ
SEC(F)-N117 SEC(F)-N127	132±1	30.5±0.5	81.8	124±1(4CRL)	—	—	—	—	12.7	See above diagram Ⓐ
SEC-N172R SEC-N174R	171±1	75	128±2	—	—	203±2(8CRI)	—	209.4(8ISR)	37.5	See above diagram Ⓖ
SEC-N175R SEC-N176R	177±1									
SEC-N177R	180±1	75	128±2	—	—	203±2(8CRI)	—	209.4(8ISR)	37.5	See above diagram Ⓖ
SEF-N172R SEF-N174R	171±1	75	84±2	—	—	159±2(8CRP)	—	165.6(8ISC)	37.5	See above diagram Ⓗ
SEF-N175R SEF-N176R	177±1									
SEF-N177R	180±1	75	84±2	—	—	159±2(8CRP)	—	165.6(8ISC)	37.5	See above diagram Ⓗ

(Unit:mm)

Multifunctional controller

PE-S7

The PE-S7, which comes with a program setting function, a preset function, and an integration function, is a RoHS-compliant multifunctional controller. Its front control panel offers improved ease of use.

■Specifications

● Multi-range solution ● flow rate setting function/6 presets ● program control function ● flow rate display ● integration flow rate alarm function, external output: open connector ● soft-start function, soft-start: ≤60 second, slow-start: ≤1200 second ● flow rate output signal: 0 to 5 V DC external control function, flow rate setting signal input, flow rate control valve signal input: fully open/fully closed ● power supply input: 100 V AC to 240 V, 50/60Hz 30 VA MAX ● dimensions: 48(W)x192(H)x190(D) mm (except projection portion) ● conforming to CE marking, EMC, FCC, and PSE. RoHS compliant ● conforming to digital/analog transmission model

Dedicated power supply

PE Series

The PE series provides a power supply to drive mass flow controllers/meters and auto pressure regulator with a reference voltage of 5 V DC for analog control. A model supporting current control (4–20 mA), a model with a flow rate alarm output, and a model that can drive more than one unit (4 or 6 units) are also available. All the models comply with the CE marking safety standard, the EMC Directive, the FCC, the Electrical Appliance and Material Safety Act, and the RoHS Directive so as to protect the environment.

▶Standard model PE-20 Series

Conforming to digital/analog transmission

Power supply input:100-240 V AC 50/60Hz
1 unit drive PE-21 (30 VA MAX)
4 units drive PE-24 (90 VA MAX)
9 units drive PE-26 (140 VA MAX)

▶Alarm model PE-30A Series

- High/low flow rate alarms
- Digital/analog solution.

Power source: 100-240 V AC 50/60Hz

1 unit driving	PE-31A (30 VA MAX)
4 units driving	PE-34A (90 VA MAX)
6 units driving	PE-36A (140 VA MAX)

▶Current control model PE-30S Series

- Current control: 4 to 20 mA. Analog signal enable to long-distance control.
- High/low flow rate alarms
- Digital/analog solution.

Power source: 100-240 V AC 50/60Hz

1 unit driving	PE-31S (30 VA MAX)
4 units driving	PE-34S (90 VA MAX)

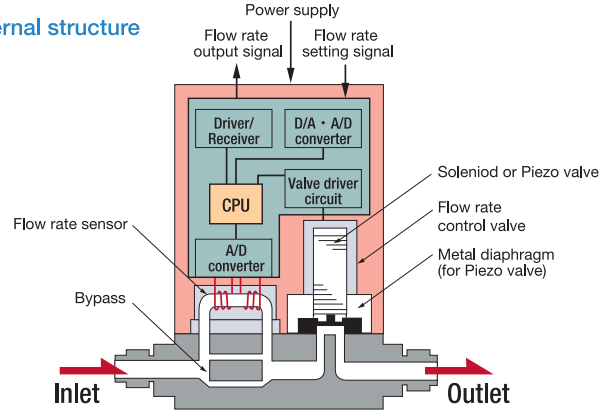
▶Structure and operating principles of digital mass flow controller

The general structure of the SEC-N100 Series of mass flow controller is shown in the diagram to the right. These mass flow controllers have flow rate measurement section that includes a sensor, bypass, flow rate control valve, and special circuitry. A CPU is part of the circuitry, which makes it both multi-functional and highly efficient.

The gas is input from an inlet joint, and is divided so that it flows over both the flow rate sensor and a bypass. The sensor measures the mass flow rate of the gas, and the flow rate control valve modifies the flow rate so that the difference between the measured flow rate and the flow rate received from the external flow rate setting signal is 0 (zero).

The units feature a loop circuit, so even if there is a secondary pressure change or ambient temperature change that could affect the supply pressure of the introduced gas, the flow rate is instantaneously corrected, which ensures stable flow rate control.

Internal structure



IMS

The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System OHSAS18001.
We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.

RoHS COMPLIANT

Applying to the EU RoHS Directive : This products is compliant with the restriction of the designated 6 hazardous substances(*).
(*) lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

Using lead-free soldering : Lead-free soldering is used for mounting components of printed circuit boards.
- Many countries consider the reinforcement of regulations concerning the risk caused by lead to human body and the environment

HORIBA STEC

HORIBA STEC, Co., Ltd. http://www.horiba.com/horiba-stec/

Please read the operation manual before using this product to ensure safe and proper handling of the product.

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