

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Horiba / Stec SEC-4400MC* at our website: *Click HERE*



Piezo Actuator Type Mass Flow Controllers

Purifying the process gas is an extremely important part of forming the thin films that are required in today's semiconductor manufacturing. Improving the purity of the gas involves increasing the effectiveness of purifiers and filters, as well as using ultra-clean gas flow systems. Conventional wisdom indicates that to make a gas supply system ultra clean, the areas that come in contact with the gas must be extremely well polished, and the entire system should be metal.

In the mass flow controller field, where the structure of gas supply systems is necessarily extremely complex, the above were considered difficult conditions to meet. Yet HORIBA STEC succeeded in developing a method for mass-producing metal diaphragm valves, and in 1984, the company released its SEC-4000 series of all-metal mass flow controllers, which came to be known as the ultra clean mass flow controllers. Research and development have continued, and now HORIBA STEC offers a variety of mass flow controllers that surpass the needs of the market—including the SEC-7300 series, which has become the de facto standard in compact mass flow controllers.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SEC-7300 series

Compact mass flow controllers

The series that became the de facto standard in compact mass flow controllers

- Compact: With just 106 mm between surfaces, can perform flow rate control at up to 30 SLM (N_2) (up to 50 SLM (N_2) is available with this series).
- Flow rate control at extremely low flow rates: The SEC-7320 F.S. 1 SCCM model offers flow rate control for flow rates as low as 0.02 SCCM.
- Compatible with SDS (Safe Delivery Source Model): The SEC-734 OLD model offers differential pressure control from 1.33 kPa.
  Conforming gases: SDS cylinders packed with ASH_3, BF_3, SiF_4, GeF_4, etc.
  (SDS is a registered trademark of Matheson Tri-Gas, Semi-Gas, Semi-Gas Division, and ATMI, Inc.)
- Ultra clean: All metal construction (SEC-7300M type)
- Auto-close function is standard.



SEC-4400 series

Mass flow controllers

The best-selling series that showed the world what ultra-clean means

- Ultra clean: All metal construction (SEC-4000M type)
- Compatible with a wide variety of flow rate control needs: Flow rate control between 0.1 SCCM and 100 SLM (N_2) available in a single series.
- Models that prevent thermal siphoning: Mass flow controllers that are not affected by the installation orientation (SEC-4400MF/4500MF types). Feature a new sensor (patent pending) that prevents thermal siphoning through the very principles of its construction.
- Conforming gases: C_2F_6, C_3F_8, C_4F_8, SF_6, SiF_4, etc,
- Ultra clean: All metal construction (SEC-4000M type)
- Auto-close function is standard.
- Model with purge mode: SEC-4400SP type
- Wide range model: SEC-4400SR type



SEC-4401/4501

Mass flow controllers

The ultimate in analog mass flow controllers

- High reliability: New sensor design, stable zero point: achieve ±20 mV/y (typical)
- High precision: ±0.8 F.S. (SEC-4401 type)
- Fast response: Feature an ultra-quick start function and offer response times under a second over the entire flow rate range.
- Models that prevent thermal siphoning: Mass flow controllers that are not affected by the installation orientation (SEC-4000MF type). Feature a new sensor (patent pending) that prevents thermal siphoning through the very principles of its construction.
  Conforming gases: C_3F_6, C_3F_8, C_4F_8, SF_6, SiF_4, etc,
- Ultra clean: All metal construction (SEC-4001M type)
- Auto-close function is standard.



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SEC-7300 series

Model	SEC- (mass flow controller)	7320	7330	7340	7350	7355	7340LD	——
	SEF- (mass flow meter)	——	7330	——	7350	7355	——	7140
Materials used in gas contact area		M: type, SUS316L, R: type, SUS316L, Viton®						
Valve type		Open at power-off: O Close at power-off: C						——
Standard flow rate range (N_2 equivalent F.S.) (for SEC series)		1/2/3 SCCM	5/10/20/50/100 200/500 SCCM 1/2 SLM	3/5/10 SLM	20/30 SLM	50 SLM (H_2:100 SLM)	2/3/5/10 SCCM 20 SCCM 2kPa 30 SCCM 2.7kPa	——
Standard flow rate range (N_2 equivalent F.S.) (for SEF series)		——	5/10/20/50/100 200/500 SCCM 1/2/3/5/10 SLM	——	20/30 SLM	50/100 SLM	——	5/10/20/50/100 200/500 SCCM 1/2/3/5/10 SLM
Flow rate control range		2 to 100% F.S.						0 to 100% F.S.
Response speed		Less than 1 sec (T98)						
Accuracy		± 1% F.S.						
Linearity		± 1% F.S.	± 0.5% F.S.					
Repeatability		± 0.2% F.S.						
Operating differential pressure (for SEC series)		1 SCCM to 5 SLM: 50 to 300 kPa (d) 10 SLM: 100 to 300 kPa (d)			20 SLM: 100 to 300 kPa (d) 30 SLM: 150 to 300 kPa (d)	150 to 300 kPa (d)	1.33 to 101.3 kPa (d)	——
Maximum operating pressure		300 kPa (G)						
Pressure Resistance		1 MPa (G)						
Leak Integrity		M: 5 x 10^{-12} Pa·m^3/s (He) R: 1 x 10^{-8} Pa·m /s (He)						
Operating temperature		5 to 50°C (accuracy guaranteed between 15 and 35°C)						
Flow rate setting signal		0.1 to 5VDC (Input impedance : more then 1MΩ)						
Flow rate output signal		0 to 5VDC (Minimun load resistance 2kΩ)						
Drive power source		+15VDC ± 5%, 60 mA; -15 VDC ± 5%, 60 mA, 2.7 VA						+15 VDC ± 5%, 60 mA -15 VDC ± 5%, 60 mA, 1.8 VA
Standard Fitting*1		1/4 VCR type or IGS				3/8 VCR type	1/4 VCR type or IGS	

*1 Can be made compatible with an integrated unit flange. * A model that has a signal cable connector on the side is available for use with integrated gas panels (for SEC-7340/7350/7355 series).
* The standard flow rate range and operating differential pressure are different in the mass flow controllers (SEC series) versus the mass flow meters (SEF series).
* SCCM and SLM are symbols indicating gas flow rate (mL/min, L/min at 0°C, 101.3 kPa).
* Viton® is registered trademark of E. I. DuPont de Nemours.

SEC-4400 series

Model	SEC- (mass flow controller)	4400(MK3)	4500(MK3)	4550	4600	4400SP	4400SR	4400MF	4500MF
	SEF- (mass flow meter)	4400	4500	4550	4600	——	——	——	——
Materials used in gas contact area		M: type, SUS316L, R: type, SUS316L, Viton®						SUS316L	
Valve type		Open at power-off: O Close at power-off: C				Open at power-off: O	Open at power-off: O	Open at power-off: O Close at power-off: C	
Standard flow rate range (N_2 equivalent F.S.)		5/10/20/30/50/100 200/300/500 SCCM 1/2/3/5 SLM	10 SLM 20 SLM	30 SLM 50 SLM	50 SLM 100 SLM	5/10/20/50 100/200 SCCM	500 SCCM 1/2/3/5 SLM	5/10/20/30/50/100 200/300/500 SCCM 1/2/3/5 SLM	10 SLM 20 SLM
Flow rate control range		2 to 100% F.S.					0.5 to 100% F.S.	2 to 100% F.S.	
Response speed		Less than 1 sec (T98)							
Accuracy		± 1% F.S. (MK3: ± 2% F.S.)				± 1% F.S.	± 1% F.S. (10 to 100%) ± 0.2% F.S. (0.5 to 10%)	± 1% F.S.	
Linearity		± 0.5% F.S. (MK3: ± 1% F.S.)							
Repeatability		± 0.2% F.S.							
Operating differential pressure (for SEC series)		50 to 300kPa (d)	100 to 300kPa (d)	*1 150 to 300kPa (d)	*1 100 to 300kPa (d)	*1 150 to 300kPa (d)	50 to 300kPa (d)		100 to 300kPa (d)
Maximum operating pressure		300 kPa (G)							
Pressure Resistance		1 MPa (G)							
Leak Integrity		M: 1 x 10^{-11}Pa·m^3/s (He) R: 1 x 10^{-8}Pa·m^3/s (He)							
Operating temperature		5 to 50°C (accuracy guaranteed between 15 and 35°C)							
Flow rate setting signal		0.1 to 5VDC (Input impedance : more then 1MΩ)							
Flow rate output signal		0 to 5VDC (Minimun load resistance 2kΩ)							
Drive power source		+15VDC ± 5% 60mA -15VDC ± 5% 60mA 1.8VA						+15VDC ± 5% 80mA -15VDC ± 5% 80mA 2.4VA	
Standard Fitting		1/4 VCR type			3/8 VCR type	1/4 VCR type			

*1 Operating pressure under atmospheric pressure conditions on the secondary side. * SCCM and SLM are symbols indicating gas flow rate (mL/min, L/min at 0°C, 101.3 kPa).
* Gases used by the SEC-400MK3: N_2, H_2, O_2, He, Ar. Gases used by the SEC-4500MK3: N_2, H_2, O_2.
* Viton® is registered trademark of E. I. DuPont de Nemours.

SEC-4001 series

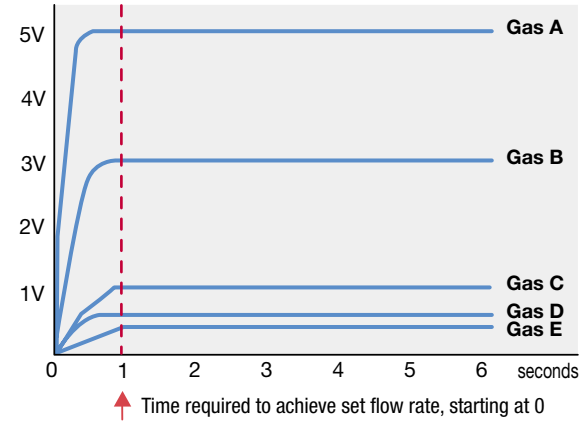
Model	SEC- (mass flow controller)	4401	4501
	SEF- (mass flow meter)	4401	4501
Materials used in gas contact area		M: type, SUS316L, R: type, SUS316L, Viton®	
Valve type		Open at power-off: O Close at power-off: C	
Standard flow rate range (N_2 equivalent F.S.)*1		5/10/20/30/50/100/200/300/500 SCCM 1/2/3/5 SLM	10 SLM 20 SLM
Flow rate control range		2 to 100% F.S.	
Response speed*2		Less than 1 sec across the entire flow rate control range (T98)	
Accuracy		± 0.8% F.S.	± 1% F.S.
Linearity		± 0.5% F.S.	
Repeatability		± 0.2% F.S.	
Operating differential pressure (for SEC series)		50 to 300kPa (d)	100 to 300kPa (d)
Maximum operating pressure		300 kPa (G)	
Pressure Resistance		1MPa (G)	
Leak Integrity		M: 5 x 10^{-12} Pa·m^3/s (He), R: 1 x 10^{-8} Pa·m^3/s (He)	
Operating temperature		5 to 50°C (accuracy guaranteed between 15 and 45°C)	
Flow rate setting signal		0.1 to 5VDC (Input impedance : more then 1MΩ)	
Flow rate output signal		0 to 5VDC (Minimun load resistance 2kΩ)	
Drive power source		+15 VDC ± 5%, 60 mA; -15 VDC ± 5%, 60 mA, 1.8 VA	
Standard Fitting		1/4 VCR type	
Long-term zero point stability*3		20 mV/y typical	
Standard functions		Auto-close (AC), ultra-quick start function standard	
Options		Mount-free sensor (precision ± 1% F.S.) *4	

*1 SCCM and SLM are symbols indicating gas flow rate (mL/min, L/min at 0°C, 101.3 kPa). *2 Responsiveness from 0% setting (fully closed setting) until entire flow range is reached.
*3 Value under set conditions (ambient temperature change within ± 2°C). *4 Models with mount-free sensor: Mass flow controllers: SEC-4401MF, SEC-4501MF; Mass flow meters: SEF-4401MF, SEF-4501MF
* Viton® is registered trademark of E. I. DuPont de Nemours.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

High-speed response with ultra quick start (within one second for the entire flow control range)

Ultra quick start function's responsiveness during startup of each line



Remarkable improvement in responsiveness during startup

Mass flow controller valve control has traditionally been carried out through PID control, in which the sensor output signal is compared with the flow rate settings signal from the exterior of the unit. With this method, control is applied starting when the valve is still closed and continuing until an extremely low flow rate (2% F.S.) is achieved, so it takes time until the valve is able to begin controlling the gas flow rate effectively, and responsiveness within one second of start up is extremely difficult to achieve while meeting all the specified conditions. The ultra quick start function opens the valve for a brief moment, until the sensor output reaches a fixed value, after which the unit is transferred to PID control. This results in a dramatic improvement in the start-up response speed from the time when the valve is still closed until a low flow rate is achieved, and enables responsiveness across the entire flow rate control range within one second. The processes developed in recent years require low flow rate control and almost full scale flow rate control within a very short time, and since the mass flow range that a single unit can cover is quite large, a mass flow controller with ultra quick start can significantly increase both quality and throughput.

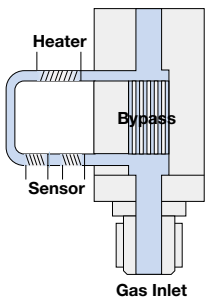
Characteristics of the mount-free sensor (MF sensor)

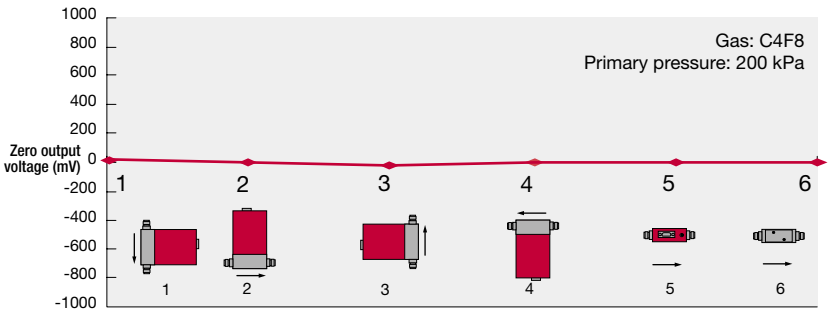
What is thermal siphoning?

Thermal siphoning is a kind of convection that can occur within the flow rate sensor as the sensor is heated up. This convection can result in the output of a flow rate signal that resembles zero point drift, even when the flow rate is not being controlled. Thermal siphoning is more likely to be affected if the mass flow controller is installed vertically. The effect created varies in proportion with the molecular weight and pressure.

The design of the mount-free sensor (MF sensor)

The mount-free sensor is a newly designed sensor (patent pending) that prevents the orientation of the unit from being a factor through the very principles of its construction. The equivalent heater is constructed to prevent convection. It is suitable for use with C_3F_8, C_4F_8, SF_6, SiF_4, and other similar gases.

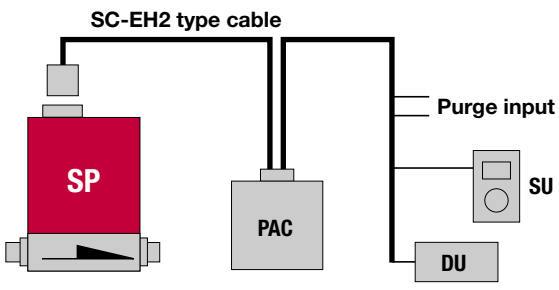




Connecting the SEC-4400SP/SR

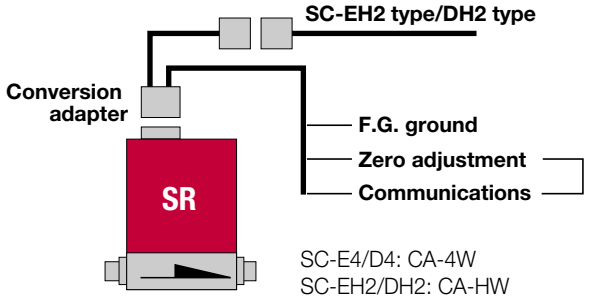
SEC-4400SP

This model offers improved purge efficiency.
Signal cable: When the valve open signal is input to the valve open/close signal input pin through an SC-EH2 type cable, it is possible to achieve a purge flow rate several times higher than that of ordinary models.



SEC-4400SR

This model offers improved purge efficiency.
Signal cable: When the valve open signal is input to the valve open/close signal input pin through an SC-EH2 type cable, it is possible to achieve a purge flow rate several times higher than that of ordinary models.



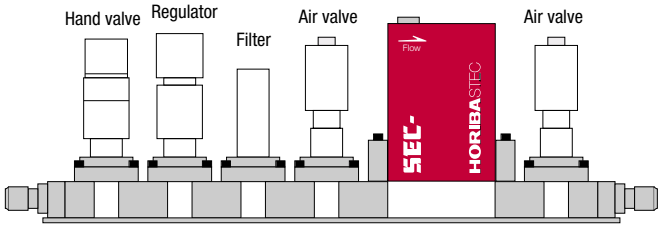
SC-E4/D4: CA-4W
SC-EH2/DH2: CA-HW

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Mass flow controllers for integrated gas panels

Integrated gas panels are made up of separate modules, including mass flow controllers, valves, regulators, filters, and so on, that perform the functions that were traditionally performed by parts in gas supply systems. Integrated gas panels can be manufactured without welding joints and piping since individual modules are used, and they are smaller and easier to maintain than traditional gas supply systems.

Sample integrated gas panel design



Advantages

- **Compatible with a wide variety of fittings**
  Compatible with every type of fitting, including C seals, CS seals, and W seals.
- **Easier to maintain**
  Unidirectional desorption makes it easier to desorb the mass flow controller.
- **Less dead volume**
  The amount of useless volume at the joint area is greatly reduced.

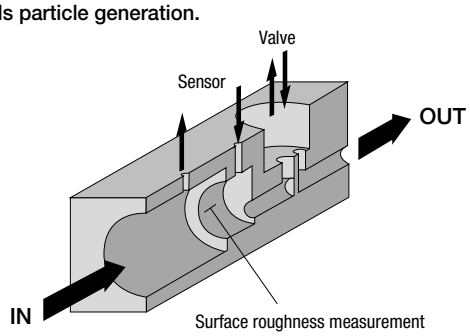
Pitch size	Compatible model series
1.125 inch	SEC-Z512 series
	SEC-Z10D series (DeviceNet™ compatible mass flow controllers)
	SEC-7300 series
1.5 inch	SEC-Z512/522 series
	SEC-Z10DW series (DeviceNet™ compatible mass flow controllers)
	SEC-F700 series
	SEC-F400 series
	SEC-V100D series
	SEC-7300 series

SUC processing

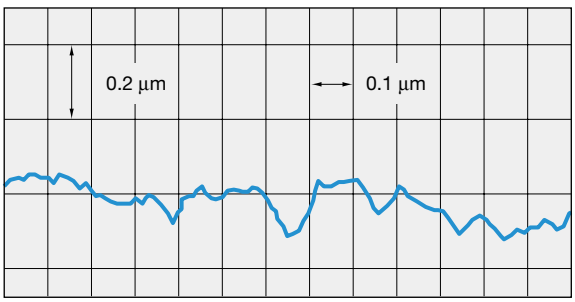
After machining, the surface of the stainless steel (SUS316L) that makes up the unit is polished until its roughness is at the sub-micron level.

Advantages

- **Improves gas emission characteristics.**
- **Controls particle generation.**



Results of surface roughness measurement



Ra	0.035	µm
RMS	0.035	µm
Rt	0.120	µm
Ro	0.06	µm
Rv	0.06	µm
Rz	0.090	µm
Sm	0.113	µm
SC	13	TL
Slope	0.003	
Rmax	0.31	µm

Measurement conditions	Results
Measurement scaling factor	5000
Drive speed	0.3 mm/s
Cutoff	0.8 mm
Measurement length	2.5 mm

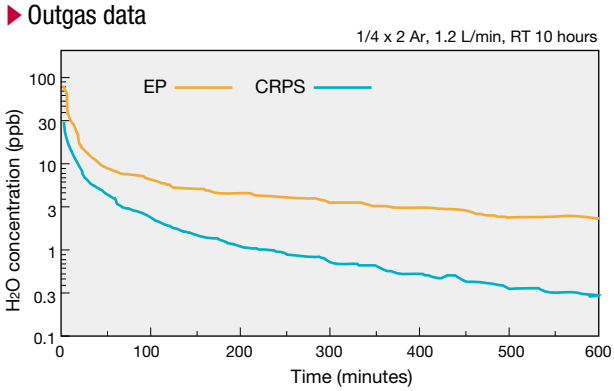
CRP processing

After machining, the surface of the stainless steel (SUS316L) that makes up the unit is subjected to composite electrolytic polishing, and then a 100% Cr_2O_3 oxidation film is formed on the surface.

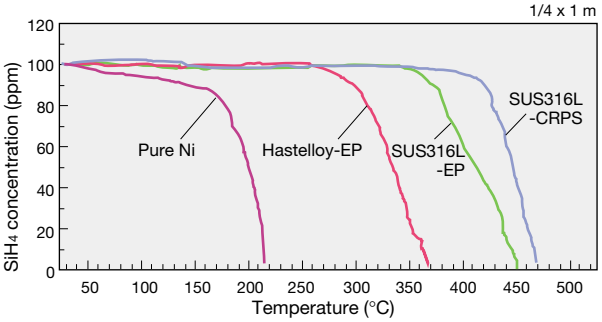
Advantages

- **Reduces outgassing of moisture and hydrocarbon gases.**
- **Increases resistance to corrosion by chlorine gases (highly corrosive gases).**
- **Has a non-catalytic effect on the spontaneous decomposition of SiH_4/B_2He and other similar chemicals.**
- **Suppresses contamination by particles from certain corrosive gases.**

Outgas data



Non-catalytic data

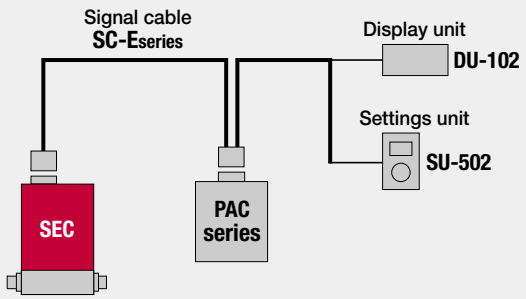


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Connecting analog mass flow controllers (examples)

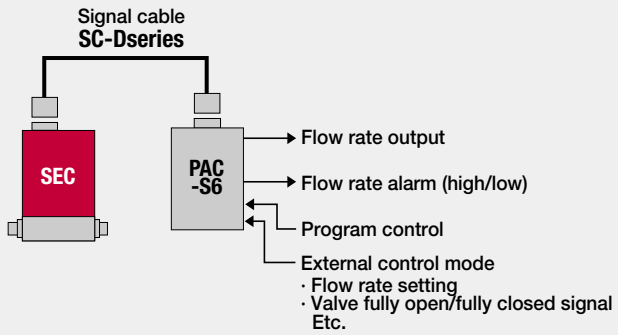
▶ Connecting to a digital power source, display unit, and settings unit

Basic connections

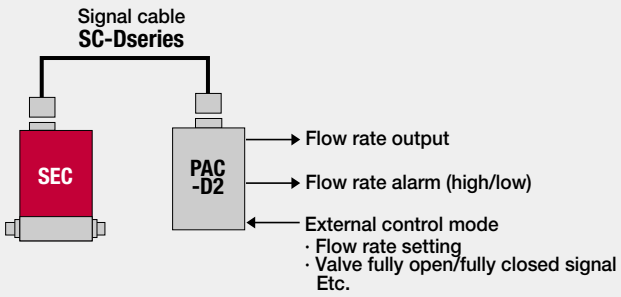


▶ Connecting to a dedicated controller

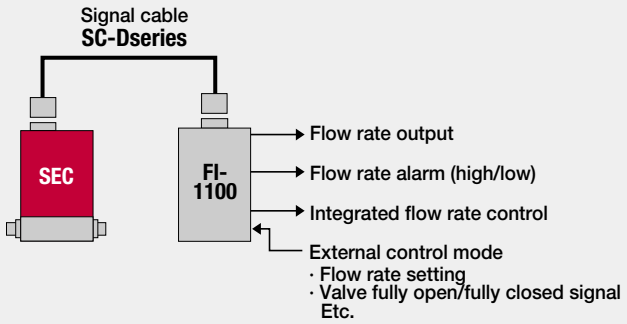
Control using PAC-S6



Control using PAC-D2

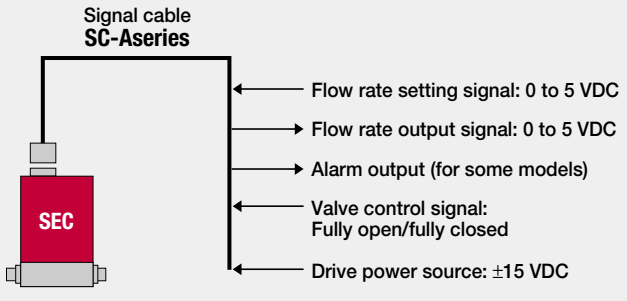


Control using an FI-1100 integrator/control unit



▶ Connecting to an external controller

Basic connections



Connector connections

Pin no.	Signal name
1	Valve forced open/close signal
2	Analog flow rate output signal (0 to 5 VDC)
3	Power source input (+15 VDC)
4	COMMON power source
5	Power source input (-15 VDC)
6	Analog flow rate setting signal (0 to 5 VDC)
7	COMMON signal
8	Alarm (option)
9	Valve voltage monitor (option)

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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Choosing the appropriate mass flow controller model and specifications

SEC series

SEC-7330	M	O	SUC	Ar	100SCCM	1/4VCR	Individual specifications
Model	*1 Seal material	*2 Valve structure	*3 Gas contact area surface processing	*4 Gas types	*5 Full-scale flow rate and unit	*6 Fitting	*7

*1 Select the seal material.
M: Metal seal R: Rubber seal
If you are using poisonous or corrosive gases, we recommend using M (metal) as the seal material.
(Examples: AsH_3, B_2H_6, PH_3, GeH_4, H_2Se, BCl_3, BF_3, Cl_2, F_2, HBr, HF, $SiCl_4$, $TiCl_4$, CiF_3, HCI, WF_6, etc.)

*2 Select the desired valve state for when there is no electricity. (Select the desired normal valve state.)
O: Open C: Closed (This option is not available for flow meters.)

*3 Gas contact area surface processing
The gas contact area can be processed to ultra clean levels (option).
SUC: Surfaces are polished until the roughness is at the sub-micron level.
CRP: A CRP film (passivation film) is formed on the gas contact surfaces (stainless steel).

*4 Select the types of gas you wish to use.

*5 Select the full scale flow rate and flow rate unit. The flow rate unit is usually noted at 0°C or 25°C (101.3 kPa). See Chart 1 for more information.

*6 Fitting
A variety of contact joints other than 1/4 VCR type fitting can be used. Units can also be made compatible with integrated gas panels. Please contact HORIBA STEC for more information.

*7 Units can be adjusted to meet non-standard specifications. Please contact HORIBA STEC for more information.

Chart 1

Flow rate unit	0°C display	25°C display
L/min	SLM	LM
mL/min	SCCM	CCM

Digital interface

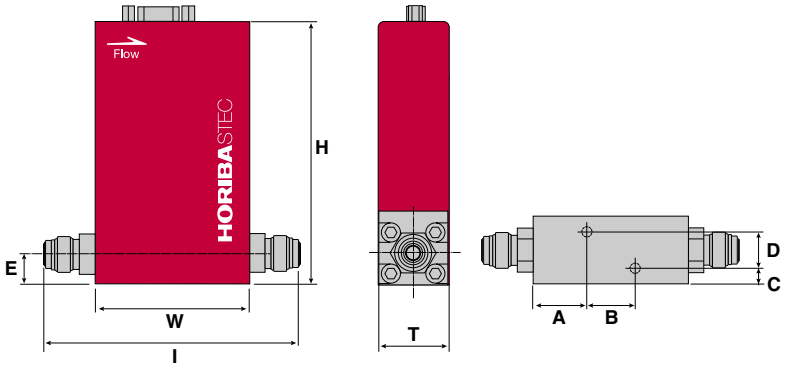
RS-485.F-Net protocol : SEC-Z512MG/Z522MG
RS-422A.F-Net protocol : SEC-F700series SEC-V100Dseries
DeviceNet™ : SEC-Z514MG/Z524MG
SEC-Z10D/Z10DWseries

Series	Standard Flow Range (N_2 Equivalent F.S.)	Operating temparture		Seal material		Internal surface polishing	Interface				Fitting			
		Normal temp model	High temp model	Metal	Rubber		Analog	Digital (F-Net)		Digital	VCR Type	Swagelok type	IGS	
								RS-422A	RS-485	DeviceNet™			1.125inch	1.5inch
SEC-Z500	5SCCM to 50SLM	○		○		Standard	○		○	○	○		○	○
SEC-Z10D/DW	5SCCM to 100SLM	○		○		Standard				○	○		○	○
SEC-F700	5SCCM to 30SLM	○		○		Option	○	○			○			○
SEC-V100D	10SCCM to 50SLM	○		○		Option	○	○			○			○
SEC-7300	1SCCM to 100SLM	○		○	○	Option	○				○	○	○	○
SEC-4400	5SCCM to 100SLM	○		○	○	Option	○				○	○		
SEC-4001	5SCCM to 20SLM	○		○	○	Option	○				○	○		
SEC-G100A	10SCCM to 5SLM	○		○		Standard	○				○			○
SEC-E400J	10SCCM to 30SLM	○		○		Option	○				○	○		
SEC-E40	10SCCM to 500SLM	○		○	○	—	○				○	○		
SEC-8000	5SCCM to 100SLM	○	○	○		Option	○				○	○		
SEC-2000	10SCCM to 100SLM		○	○	○	—	○				○	○		
SEC-400	5SCCM to 200SLM	○			○	—	○				○	○		

Mass flow meters: For the SEF series, please start by deciding without valve structure and then consider the other options.

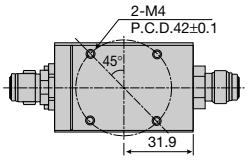
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Dimensions

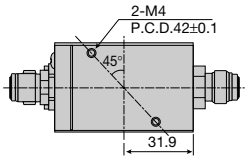


*Please contact HORIBA STEC for information on details not shown here.

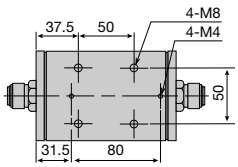
<1>
SEC-Z522



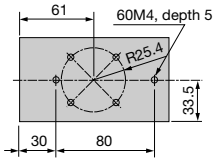
<2>
SEC-V100 series
SEC-Z10D series



<3>
SEC-4600
SEC-Z13DW



<4>
SEC-600



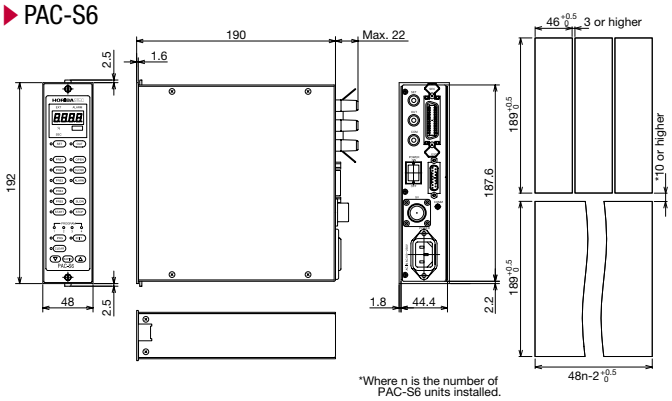
Model	H	T	W	I (1/4 VCR)	I (1/4 Swagelok)	I (3/8 VCR)	I (3/8 Swagelok)	A	B	C	D	E
SEC-Z512	126	28	63.8	106				21.9	20	6.5	15	12.7
SEC-Z522	143	38.5	63.8	106				See <1>				12.7
SEC-Z11D	127	28.5	81.8	124				See <2>				12.7
SEC-Z12D	127	28.5	81.8	124				See <2>				12.7
SEC-Z13D	151.3	38.6	63.8			150.4		21.9	20	4.8	29	15.6
SEC-Z11DW	140	38.6	63.8	106				See <2>				12.7
SEC-Z12DW	140	38.6	63.8	106				See <2>				12.7
SEC-Z13DW	172	80	125			177		See <3>				20
SEC-F730	106	35	64.2	106 *2				22.1	20	10	15	12.7
SEC-F740	126	35	64.2	106 *2				22.1	20	10	15	12.7
SEC-F750	140	40	64.2	106 *2		118		19.4	25	7.5	25	12.7
SEC-F440	112	38	76.2	124	127			19.1	38.1	9.75	18.5	12.7
SEC-F450	112	38	76.2	124	127			19.1	38.1	9.75	18.5	12.7
SEC/SEF-V110DM	116.5	37.6	63.8	106 *2				See <2>				12.7
SEC/SEF-V120DM	116.5	37.6	63.8	106 *2				See <2>				12.7
SEC-7320	106	28	63.8	106 *2	110			21.9	20	6.5	15	12.7
SEC/SEF-7330	106	28	63.8	106 *2	127			21.9	20	6.5	15	12.7
SEC-7340(LD)	126	28	63.8	106 *2	127			21.9	20	6.5	15	12.7
SEC/SEF-7350	140	34	63.5	106 *2	127			19.2	25	4.5	25	12.7
SEC/SEF-7355	145	49	80.8	124		132	135	20.4	40	12	25	20
SEF-7140	106	32	47	87				27.6	0	9	14	12.7
SEC/SEF-4400(MF)	126	32	76	124	127			19	38.1	6.75	18.5	12.7
SEC/SEF-4500(MF)	132	32	108	156	159			20.2	67.7	3.7	24.6	14.6 inner ; 12 outer
SEC/SEF-4550	150	50	108	156	159	160	163	20.1	67.7	12.7	24.6	14.6 inner ; 12 outer
SEC/SEF-4600	150	80	125			177	179	See <3>				20
SEC-4400SP/SR	126	32	76	124				19	38.1	6.75	18.5	12.7
SEC-4401(MF)	126	32	76	124				19	38.1	6.75	18.5	12.7
SEC-4501(MF)	132	32	108	156		164		20.2	67.7	3.7	24.6	14.6 inner ; 12 outer
SEC-E440J	112	38	76.2	124	127			19.1	38.1	9.75	18.5	12.7
SEC-E450J	112	38	76.2	124	127			19.1	38.1	9.75	18.5	12.7
SEC-E40(MK3)	126	32	76		127			3.5	69	6.75	18.5	12.75
SEC-E50(MK3)	126	32	76		127			3.5	69	6.75	18.5	12.75
SEC-E60	159	44	95				150.8	3.5	50	8	28	22
SEC-E70	159	44	95				150.8	3.5	50	8	28	22
SEC/SEF-6470 *1	147	40	150					—	45	—	20	35
SEC/SEF-6480 *1	152.5	108	204					—	—	—	—	50
SEC-8340	130.5	48	76	124	127			19	38.1	6.75	18.5	22.7
SEC/SEF-8440	120.5	32	76	124	127			19	38.1	6.75	18.5	12.7
SEC/SEF-8450	127	32	108	156	159			20.2	67.7	3.7	24.6	14.6 inner ; 12 outer
SEC/SEF-8455	150	50	108	156	159	160	163	20.1	67.7	12.7	24.6	14.6 inner ; 12 outer
SEC/SEF-8460	150	80	125	172	172	177	179	31.5	80	15	50	20
SEC/SEF-2410	122	25.5	76	124		131		3.5	69	3.5	18.5	12.7
SEC/SEF-2510	131.5	32	108	156		163		17.2	101.6	9.3	25.4	14.6 inner ; 12 outer
SEC/SEF-2551	137	44	136	184		191		30	80	33.5	—	14.6 inner ; 12 outer
SEC/SEF-310	80	20	60	106	110			20	20	10	—	10
SEC/SEF-320	80	20	60	106	110			20	20	10	—	10
SEC/SEF-400	122	25.5	76	124	127	131	131	3.5	69	3.5	18.5	12.7
SEC/SEF-500	131.5	32	108	156	160	163	163	9	80	3.7	24.6	14.6 inner ; 12 outer
SEC/SEF-550	137	44	136	184	188	191	190	17.2	101.6	9.3	25.4	14.9
SEC/SEF-600 *1	140	67	122	170	173	177	175	See <4>				20
SEC-400MK2-3	115.5	25.5	76	124	127		131	3.5	69	3.5	18.5	12.7
SEC-500MK2-3	125	32	108	156	160	163	163	9	90	3.7	24.6	14.6 inner ; 12 outer

*1 Please contact HORIBA STEC for details on the dimensions of the SEC/SEF-6470/6480.
*2 Surface dimensions: 124 mm models can also be produced.
* Please contact HORIBA STEC to request a copy of the dimension drawing.
* Equivalent products are sometimes used in place of the joints listed here.

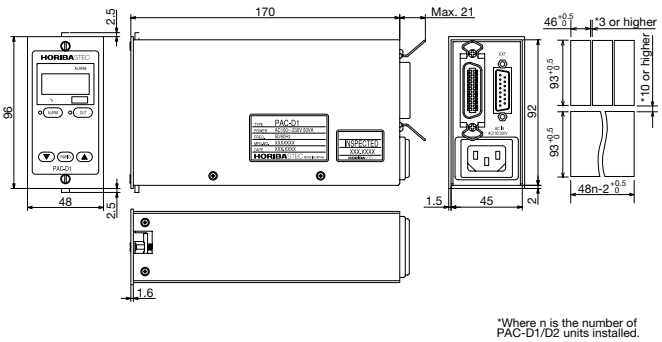
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Accessory dimensions

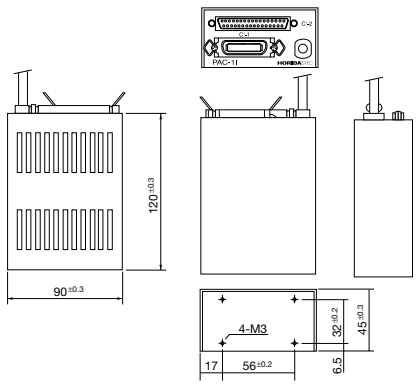
PAC-S6



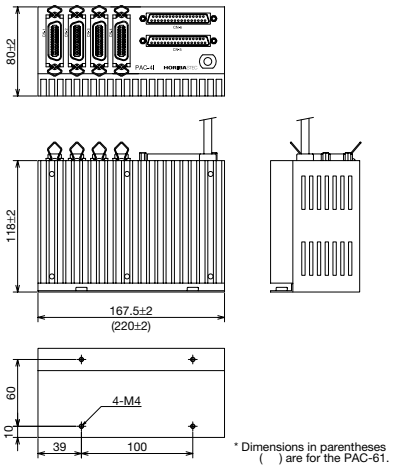
PAC-D1/D2



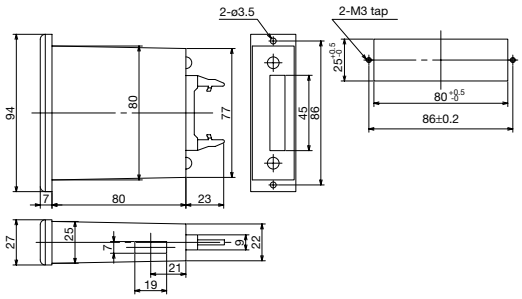
PAC-1I



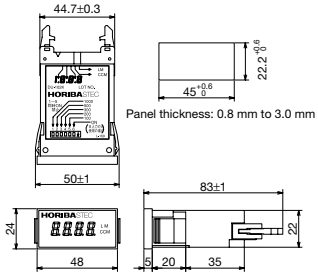
PAC-4I/6I



DU-102E

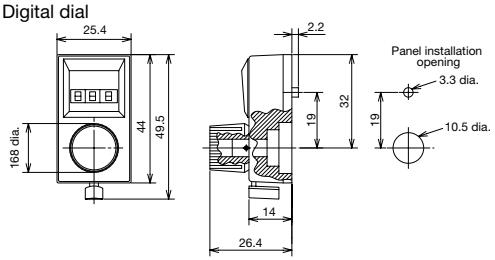


DU-102K



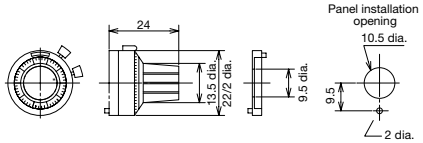
SU-502ED

Digital dial

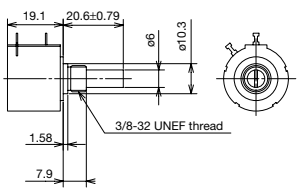


SU-502EA

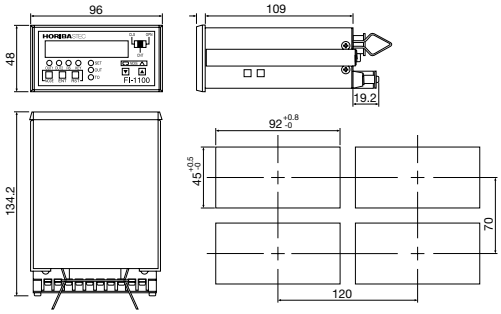
Analog dial



Settings unit



FI-1100



Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP