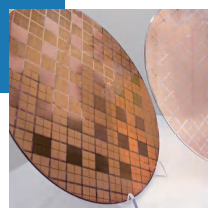
HORIBA Precision Instruments

S48 Analog Series



- Solar cell
- Analytical instruments
- Enviroment monitoring

Mounting orientation free / High accuracy and fast response/ Auto zero

Full scale flow rate	（10,20,30,50,100,200,300,500）mL/min （1,2,3,5,10,20,30,50）L/min （100, 150, 200, 300, 400, 500) L/min

About Our Company

HORIBA is a long established and reliable provider of high end analytical and control solutions.

The HORIBA Group of worldwide companies provides an extensive array of instruments and systems for applications ranging from automotive R&D, process and environmental monitoring, in-vitro medical diagnostics, semiconductor manufacturing and metrology to a broad range of scientific R&D and QC measurements. Proven quality and trustworthy performance have established widespread confidence in the HORIBA brand.

HORIBA has many branches worldwide offering support to our customers when and wherever they need it. Most of HORIBA's support centers have clean rooms, which is something HORIBA is proud of. With our global network HORIBA is able to offer a fast and tailored aftercare service for all our customers whenever they need it and in an appropriate environment. Take a look at our Global Support Network pages to see where our support centers are.

HORIBA STEC

HORIBA STEC renowned in the semiconductor industry. Setting the global standard for semiconductor, offers a wide range of products to suit a variety of different industries.

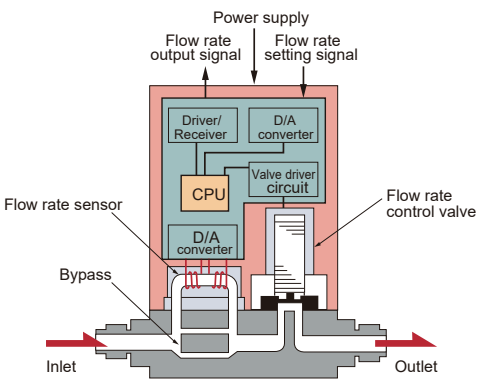
HORIBA Precision Instruments

HORIBA Precision Instruments is a subsidiary of HORIBA STEC, established in Beijing China in January 2011. HORIBA Precision Instruments develop and manufacture Mass Flow Controller.

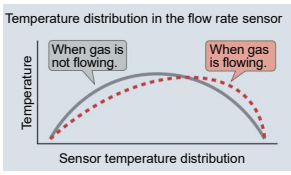
What's Mass Flow Controller?

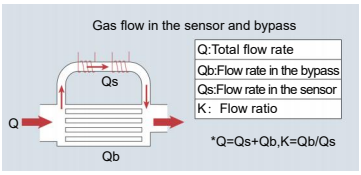
A mass flow controller automatically controls the flow rate of gas according to a set flow rate sent as an electric signal, without being affected by use conditions or changes in gas pressure. Flow rates can be roughly classified into two types : volumetric flow and mass flow. A volumetric flow measurement is affected by ambient temperature and pressure. To see the true flow, the pressure and temperature conditions need to be measured and include in a calculation. Mass flow, on the other hand, measures the mass of a fluid so is influenced much less by temperature and pressure conditions, therefore providing much more accurate and stable flow measurement and control. Our mass flow controllers are used in a wide range of industrial fields as indispensable equipment when accurate control of flow rates is required or an automated production line is built.

Structure



Operating principles





1.The gas, which enters from the inlet, first splits to flow past the sensor or through the bypass.
2. At the senor, the mass flow rate is detected as a proportional change in temperature and converted by the bridge circuits to an electrical signal.
3. This signal passes through the amplification and correction circuits, and is output as a linear voltage between 0 to 5V. At the same time, it is also sent to the comparison control circuits.
4.The comparison control circuit compares the flow rate setting signal and and the actual flow rate setting signal from the sensor and sends a difference signal to the valve driving circuit.
5.The flow rate control valve moves as appropriate to make the difference between the reguired flow set point and flow output signals approach zero. In other words, the unit controls the flow so that it is always at the set flow rate.

Product Features

S48 series are hybrid Mass Flow Controller of HORIBA STEC (Japan) technology and HORIBA Precision Instruments (China) production. The S48 Mass Flow Controller adopts HORIBA STEC (Japan) technology and is manufactured by HORIBA Precision Instruments (China). These MFC follow fluid technology and quality that HORIBA STEC has developed for half century, which are able to support full customer satisfaction and reliability in a wide range of industries.

- ♦ Mounting orientation free

  Can be installed at any angle, the flow rate of S48 analog series products chan ges little, breaking the traditional MFC installation conditions and giving users convenience.

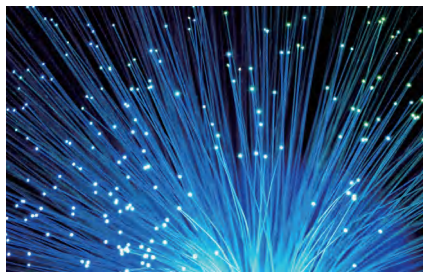
- ♦ High accuracy and fast response

  S48 analog series products use advanced multi-segment linear adjustment technology, make the flow control accuracy higher and turndown ratio better. Response time less than 2s improving the level and accuracy of users' process and experiment.

- ♦ Auto zero

  Zero point of MFC (MFM) may change, due to the changes of environments and prolonged use. In order to get higher flow control accuracy, the zero point should be corrected. S48 analog series has automatic zero adjustment function.

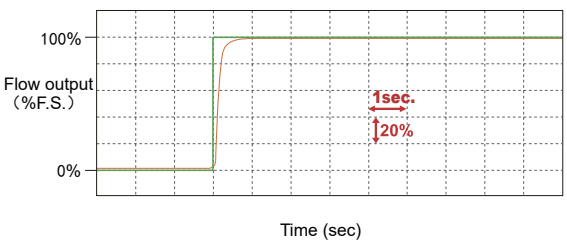
Product Application

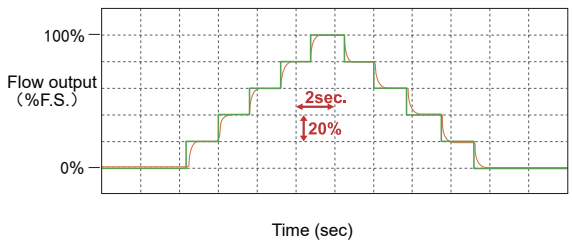


- Solar: precisely controlling gas flow during gas deposition / diffusion / crystal growth and other processes.
- Vacuum coating: process control for thin film deposition.
- Enviroment monitoring: : dynamic dilution / PM2. 5 particulate matter monitoring / VOCs
- Fiber: MCVD/VAD/OVD
- Analytical instruments: gas flow rate control during gas combustion, carrying and sampling.
- Furnace: flame/burner control/gas mixing and blending.

Performance data

The response time of the S48-BR/BM/CR/CM series is less than 1 second and the S48-DR series is less than 2 seconds.





Performance Data

Series	S48		
Model	BR111 / BM111 BR121 / BM121	BR211 / BM211 BR221 / BM221	
Full-scale of flow rate	10SCCM ≤ x ≤ 5SLM	5SLM < x ≤ 30SLM	30SLM < x ≤ 50SLM
Valve model	NC		
Flow rate control range	2～100% of F.S.		
Response	≦1.0sec(T98)		
Accuracy	±1.0%F.S.		
Linearity	±0.5%F.S.		
Repeatability	±0.2%F.S.		
Operating differential pressure	50～300kPa(D)	100～300kPa(D)	150～300kPa(D)
Max. operating pressure	300kPa(G)		
Pressure resistance	1MPa(G)		
Operating temperature	5~50℃ (recommended temperature range: 15～35℃)		
External leak rate	BR： 1×10^{-10} Pa•m ^{3}/s (He) or less BM： 1×10^{-11} Pa•m ^{3}/s (He) or less		
Flow rate setting signal	Bx111： 0.1～5VDC (2～100% F.S.) Bx121： 4.32～20mA, 0.1～5VDC, 1.08～5VDC or 0.2～10VDC (2～100% F.S.)	Bx211： 0.1～5VDC (2～100% F.S.) Bx221： 4.32～20mA, 0.1～5VDC, 1.08～5VDC or 0.2～10VDC (2～100% F.S.)	
Flow rate output signal	Bx111 : 0～5VDC (0～100% F.S.) Bx121 : 4～20mA, 0～5VDC, 1～5VDC or 0～10VDC (0～100% F.S.)	Bx211 : 0～5VDC (0～100% F.S.) Bx221 : 4～20mA, 0～5VDC, 1～5VDC or 0～10VDC (0～100% F.S.)	
Power supply	Bx111 : +15VDC±5% 140mA, -15VDC±5% 140mA Bx121 : 13～32VDC, 4.2VA	Bx211 : +15VDC±5% 140mA, -15VDC±5% 140mA Bx221 : 13～32VDC, 4.2VA	
Electrical connector	DB15Pin	DB9Pin	
Wetted materials	BR：SUS316L，PTFE，Magnetic stainless steel，Fluoro rubber BM：SUS316L，PTFE，Magnetic stainless steel		
Fittings	1/4inch SWL equivalent：127mm；1/4inch VCR equivalent： 124mm		

Series	S48		
Model	CR111/CM111 CR121/CM121	CR211/CM211 CR221/CM221	
Full-scale of flow rate	100SLM	150SLM	200SLM
Valve model	NC		
Flow rate control range	2～100% of F.S.		
Response	≦1.0sec(T98)		
Accuracy	±1.0%F.S.		
Linearity	±0.5%F.S.		
Repeatability	±0.2%F.S.		
Operating differential pressure	100～300kPa(D)	150～300kPa(D)	200～300kPa(D)
Max. operating pressure	300kPa(G)		
Pressure resistance	1MPa(G)		
Operating temperature	5~50℃ (recommended temperature range: 15～35℃)		
External leak rate	CR： 1×10^{-8} Pa•m ^{3}/s (He) or less CM： 1×10^{-11} Pa•m ^{3}/s (He) or less		
Flow rate setting signal	Cx111： 0.1～5VDC (2～100% F.S.) Cx121： 4.32～20mA, 0.1～5VDC, 1.08～5VDC or 0.2～10VDC (2～100% F.S.)	Cx211： 0.1～5VDC (2～100% F.S.) Cx221： 4.32～20mA, 0.1～5VDC, 1.08～5VDC or 0.2～10VDC (2～100% F.S.)	
Flow rate output signal	Cx111 : 0～5VDC (0～100% F.S.) Cx121 : 4～20mA, 0～5VDC, 1～5VDC or 0～10VDC (0～100% F.S.)	Cx211 : 0～5VDC (0～100% F.S.) Cx221 : 4～20mA, 0～5VDC, 1～5VDC or 0～10VDC (0～100% F.S.)	
Power supply	Cx111 : +15VDC±5% 150mA, -15VDC±5% 140mA Cx121 : 13～32VDC, 4.7VA	Cx211 : +15VDC±5% 150mA, -15VDC±5% 140mA Cx221 : 13～32VDC, 4.7VA	
Electrical connector	DB15Pin	DB9Pin	
Wetted materials	CR：SUS316L，PTFE，Magnetic stainless steel，Fluoro rubber CM：SUS316L，PTFE，Magnetic stainless steel		
Fittings	3/8inch SWL equivalent：181mm；1/2inch VCR equivalent：180mm		

Product Features

系列	S48		
Model	DR111 DR121		DR211 DR221
Full-scale of flow rate	300SLM	400SLM	500SLM
Valve model	NC		
Flow rate control range	2～100% of F.S.		
Response	≦2.0sec(T98)		
Accuracy	±1.5%F.S.		
Linearity	±0.5%F.S.		
Repeatability	±0.2%F.S.		
Operating differential pressure	150～300kPa(D)		
Max. operating pressure	300kPa(G)		
Pressure resistance	1MPa(G)		
Operating temperature	5~50℃ (recommended temperature range: 15～35℃)		
External leak rate	1×10^{-8} Pa•m ^{3}/s (He) or less		
Flow rate setting signal	DR111： 0.1～5VDC (2～100% F.S.) DR121： 4.32～20mA, 0.1～5VDC, 1.08～5VDC 或0.2～10VDC (2～100% F.S.)		DR211： 0.1～5VDC (2～100% F.S.) DR221： 4.32～20mA, 0.1～5VDC, 1.08～5VDC 或 0.2～10VDC (2～100% F.S.)
Flow rate output signal	DR111 : 0～5VDC (0～100% F.S.) DR121 : 4～20mA, 0～5VDC, 1～5VDC 或 0～10VDC (0～100% F.S.)		DR211 : 0～5VDC (0～100% F.S.) DR221 : 4～20mA, 0～5VDC, 1～5VDC 或 0～10VDC (0～100% F.S.)
Power supply	DR111 : +15VDC±5% 250mA, -15VDC±5% 250mA DR121: 13～32VDC， 7.5VA		DR211 : +15VDC±5% 250mA, -15VDC±5% 250mA DR221 : 13～32VDC， 7.5VA
Electrical connector	DB15Pin		DB9Pin
Wetted materials	SUS316L，PTFE，Magnetic stainless steel，Fluoro rubber		
Fittings	3/8inch SWL equivalent：183mm；1/2inch VCR equivalent：182mm		

S48 Series

Model Selection

1	2	3	4	5	6
Model	Flow rate（N2）	Wetted materials	Electrical connector	Power supply	Signal
S48: MFC S48M: MFM	B:10SCCM～50SLM C:100SLM～200SLM D:300SLM～500SLM	R:Rubber M:Metal	1:Dsub15Pin Male 2:Dsub9Pin Male	1:±15V 2:24V	1（111/211）: 0-5V 1（121/221）: 4-20mA/0-5V/1-5V/0-10V

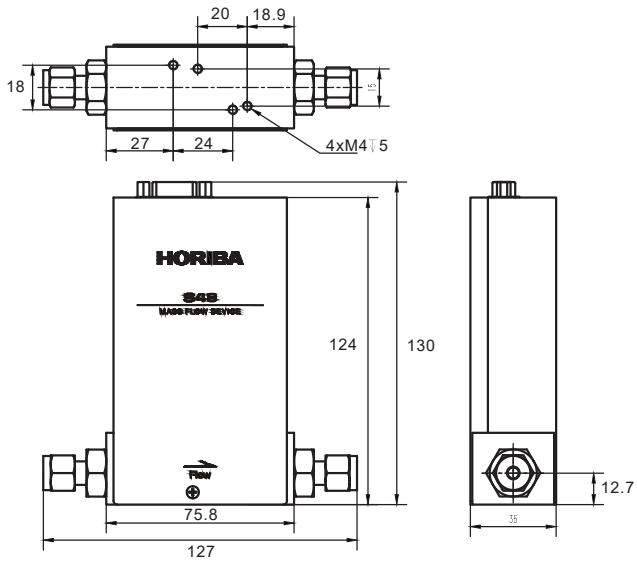
7	8	9
Gas	Full scale flow rate	Fittings
N2 O2 NH3 ……	(10,20,30,50,100,200,300,500)SCCM (1,2,3,5,10,20,30,50)SLM (100,150,200)SLM (300,400,500)SLM	4IS: 1/4"SWL 4CR: 1/4"VCR 6IS: 3/8"SWL 8CR: 1/2"VCR

Parameters matching

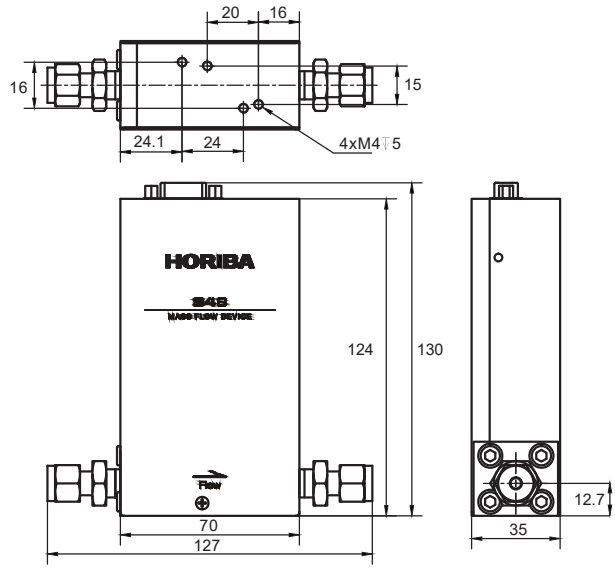
1	2	3	4	5	6	7	8	9
S48	B	R	221			N_2	100SCCM	4CR

External dimensions

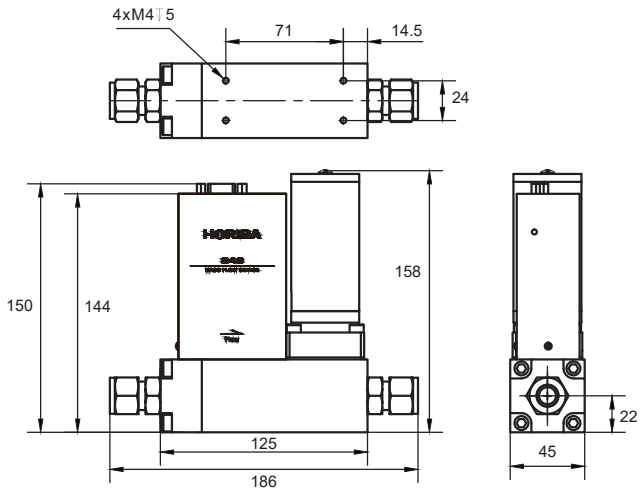
BR111/121/211/221



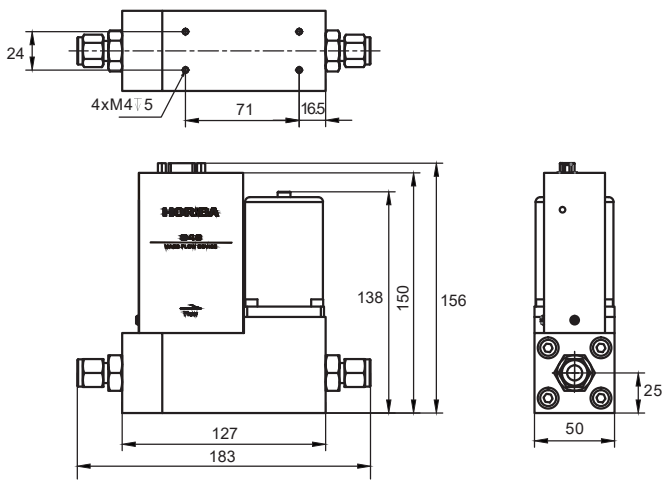
BM111/121/211/221



CR/CM 111/121/211/221



DR111/121/211/221



Fittings

Product	Fitting	L	W	T	H	D
S48-BR111/121/211/221	4IS: 1/4 inch Swagelok	127	75.8	35	124	12.7
	4CR: 1/4 inch VCR	124	75.8	35	124	12.7
S48-BM111/121/211/221	4IS: 1/4 inch Swagelok	127	70	35	124	12.7
	4CR: 1/4 inch VCR	124	70	35	124	12.7
S48-CR111/121/211/221	6IS: 3/8 inch Swagelok	188	125	45	158	22
	8CR: 1/2 inch VCR	180	125	45	158	22
S48-CM111/121/211/221	6IS: 3/8 inch Swagelok	188	125	45	157	22
	8CR: 1/2 inch VCR	180	125	45	157	22
S48-DR111/121/211/221	6IS: 3/8 inch Swagelok	183	127	50	150	25
	8CR: 1/2 inch VCR	182	127	50	150	25

S48 Electrical connection

DB15/M Electric connectors' definition of ±15VDC power supply

Pin	Signal Name
1	Power/Signal COM
2	Flow signal output
3	NC *1
4	NC *1
5	+15V Power
6	-15V Power
7	NC *1
8	Flow signal input
9	Power COM
10	Signal COM
11	NC *1
12	Valve override (N.C.→control,+15V →open,-15V →close)
13	NC *1
14	Chassis(Earth)
15	NC *1

*1: Non connection

DB15/M Electric connectors' definition of 24VDC power supply

Pin	Signal Name
1	Signal COM
2	Flow signal output (4~20mA)
3	Flow signal output (0~5VDC，1~5VDC or 0~10VDC)
4	Valve override (N.C.→control; 0V→ close;+24V→open)
5	+24V Power
6	NC *1
7	NC *1
8	Flow signal input
9	Power COM
10	Signal COM
11	NC *1
12	NC *1
13	NC *1
14	Chassis(Earth)
15	NC *1

*1: Non connection

DB9/M Electric connectors' definition of ±15VDC power supply

Pin	Signal Name
1	Valve override
2	Flow signal output
3	+15V Power
4	Power COM
5	-15V Power
6	Flow signal input
7	Signal COM
8	Signal COM
9	NC *1

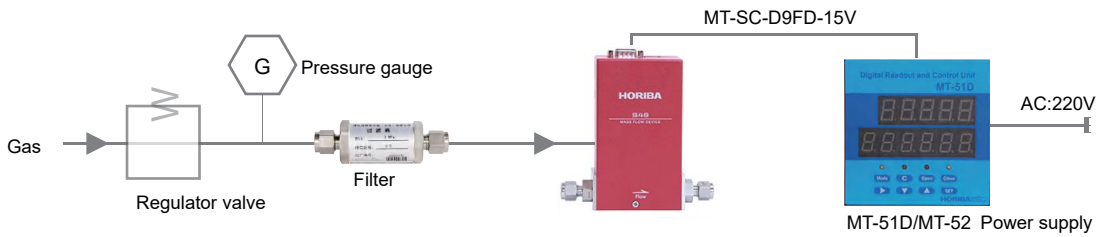
*1: Non connection

DB9/M Electric connectors' definition of 24VDC power supply

Pin	Signal Name
1	Valve override (N.C.→control; 0V→ close;+24V→open)
2	Flow signal output
3	+24V Power
4	Power COM
5	NC *1
6	Flow signal input
7	Signal COM
8	Signal COM
9	NC *1

*1: Non connection

S48 Connection



S48 Accessories

Power supply

MT-51D

Setting flow rate
Display flow rate
Valve override (control / open / close switch)
Accumulation flow rate
Digital communication
DIN standard, size 96*96（mm）

Power supply

MT-52

Setting flow rate
Display flow rate
Valve override (control / open / close switch)
DIN standard, size 96*96（mm）

Cable

MT-SC-D15F-15V-XXM
24V 2M
24C 3M
10M

MT-SC-D9F-15V-XXM
24V 2M
24C 3M
10M

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