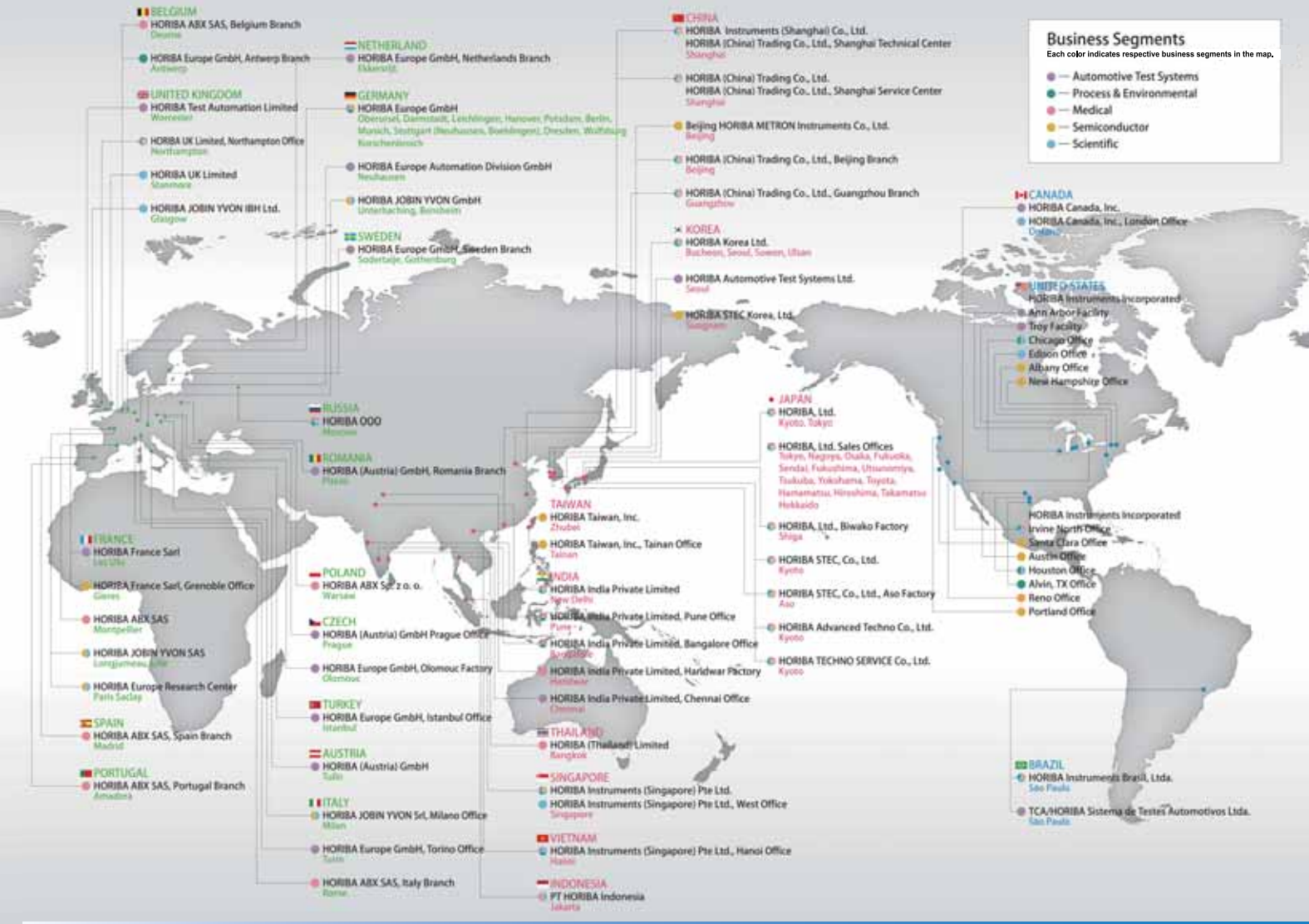


# HORIBA Global Network



## HORIBA METRON S600/S48 Series Catalog

### Industrial Mass Flow Controller



### HORIBA ASIA Sales Network

**JAPAN**  
HORIBA STEC Co., Ltd.  
Address: 11-5, Hokodate-cho Kamitoba, Minami-ku Kyoto, Japan  
Phone: 81-75-693-2350

**CHINA**  
HORIBA(China)Trading Co., Ltd., Shanghai Office  
Address: Unit D, 1F, Building A, Synnex International Park, 1068 West Tianshan Road, Shanghai, China  
Phone: 86-21-6289-6060

**TAIWAN**  
HORIBA Taiwan, Inc.  
Address: 8F-3, No. 38, Taiyuan St. Zhubei City, Hsinchu County, Taiwan  
Phone: 886-3-560-0606

**KOREA**  
HORIBA STEC KOREA, Ltd.  
Address: 98, Digital valley-ro Suji-gu, Yongin-si Gyeonggi-do, Korea  
Phone: 82-31-8025-6500

**SINGAPORE**  
HORIBA INSTRUMENTS(SINGAPORE)Pte.Ltd.  
Address: 3 Changi Business Park Vista#01-01, Akzonobel House, Singapore  
Phone: 65-6-745-8300

**HORIBA METRON**  
BEIJING HORIBA METRON INSTRUMENTS CO., LTD.  
Address: No.40 Beiyuan Road Chaoyang District, Beijing China  
Phone: 86-10-8492-9402





## Company introduction

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 market. Setting the global standard for semiconductor, offers a wide range of products to suit a variety of different industries.



### HORIBA METRON

HORIBA METRON is joint venture of HORIBA STEC and Beijing METRON, established in Beijing China in January, 2011. HORIBA METRON develop and manufacture Mass Flow Controller S600 series and S48 series.

## Product features

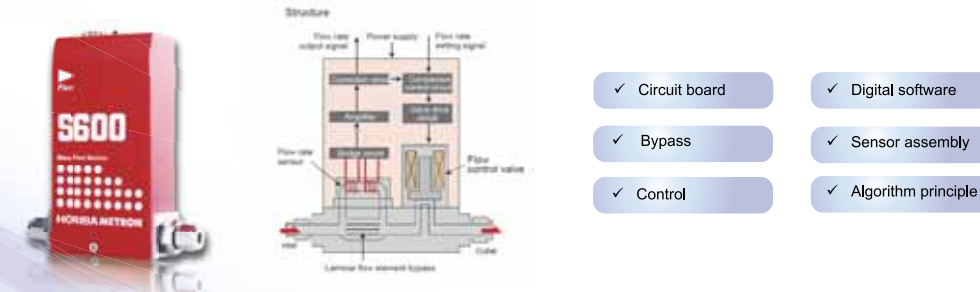
S600 series / S48 series are hybrid Mass Flow Controller of HORIBA STEC (Japan) technology and HORIBA METRON (China) production.

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.

- ◆ High accuracy/Fast response
- ◆ Various communication (Analog/RS485/PROFIBUS)
- ◆ Designed by HORIBA STEC
- ◆ Core parts are made in Japan

### ✚ HORIBA Flow Control

All important parts and technology are imported from HORIBA STEC






## Applications

- PV: process gases for Diffusion / PECVD / Ion implanter.
- Fiber: burner gases for MCVD / VAD / OVD processes.
- Bioreactor / Pharmaceutical: process control of reactor gases for fermentation, bioreactor gas management.
- Food & Beverage: blending, process control in bottling, drying, mixing, cooling, protective gases for packaging.
- Furnaces: flame / burner control, gas mixing and blending.
- Vacuum coating: process gases for thin film deposition processes.
- Analytical / Gas Analyzers: analytical sampling, gas sample preparation and measurement, verifying flow and pressure for multiple gases flowing to and from gas chromatographs.
- Automotive: emissions testing, emissions monitoring, measuring compressed air.
- Heat treatment: burner control, welding.



## Multiple Configuration Options

- Communication options include Analog, Digital(RS485) and PROFIBUS
- Power supply options include DC24V and ±15V.
- Seal options include Rubber and Metal.

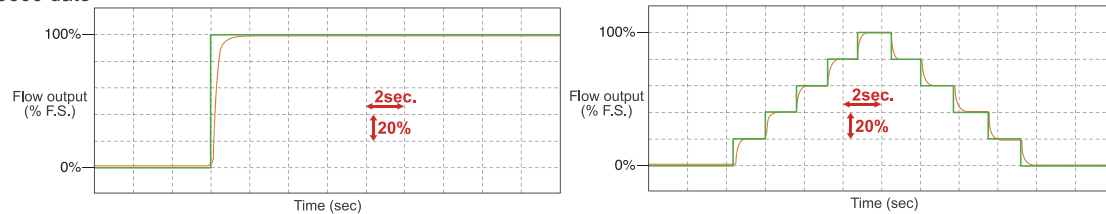
| Communication | Model  | Flow rate/Power supply/Seal |            |            |            |            |       |            |       |
|---------------|--|-----------------------------|------------|------------|------------|------------|-------|------------|-------|
|               |  | 10SCCM-50SLM                |            |            |            | 100-200SLM |       |            |       |
|               |  | DC24V                       |            | ±15V       |            | DC24V      |       | ±15V       |       |
|               |  | Rubber                      | Metal      | Rubber     | Metal      | Rubber     | Metal | Rubber     | Metal |
| RS485         | S600  | S600-BR222                  | S600-BM222 | S600-BR212 | S600-BM212 | S600-CR222 | -     | S600-CR212 | -     |
| PROFIBUS      | S600  | S600-BR226                  | S600-BM226 | -          | -          | S600-CR226 | -     | -          | -     |
| Analog        | S48   | S48-32                      | S48-32     | S48-32     | S48-32     | S48-28     | -     | S48-28     | -     |

- √ S600 series analog output is selectable from 4-20mA or 0-5V.
- √ S48 series analog output is selectable from 4-20mA or 0-5V or 1-5V or 0-10V.

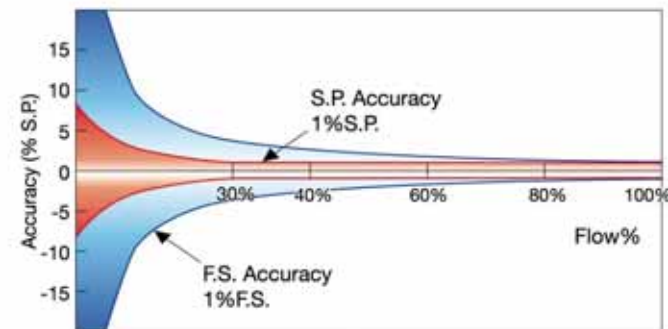
## Performance data

S600 series have less than 1.5 seconds response and S48 series have less than 2 seconds response.

S600 date



S600 series have S.P. accuracy and S48 series have F.S. accuracy.



## Specification S600 series

| Model  | S600 series Rubber seal model / Metal seal model   |               |               | S600 series Rubber seal model   |               |               |
|--|--|---------------|---------------|---|---------------|---------------|
| [RS485]<br>Product Model Type No                 | S600-BR212 (Rubber seal, ±15VDC power)<br>S600-BR222 (Rubber seal, +24VDC power)<br>S600-BM212 (Metal seal, ±15VDC power)<br>S600-BM222 (Metal seal, +24VDC power) |               |               | S600-CR212 (Rubber seal, ±15VDC power)<br>S600-CR222 (Rubber seal, +24VDC power)  |               |               |
| [PROFIBUS]<br>Product Model Type No              | S600-BR226 (Rubber seal, +24VDC power)<br>S600-BM226 (Metal seal, +24VDC power)  |               |               | S600-CR226 (Rubber seal, +24VDC power)  |               |               |
| Full scale flow range                            | 10/20/30/50/100/200/300/500 SCCM<br>1/2/3/5 SLM  | 10/20/30 SLM  | 50 SLM        | 100 SLM   | 150 SLM       | 200 SLM       |
| Valve type                                       | Normally closed  |               |               | Normally closed   |               |               |
| Valve actuator                                   | Solenoid valve   |               |               | Solenoid valve  |               |               |
| Flow rate control range                          | 2~100% of F.S.   |               |               | 2~100% of F.S.  |               |               |
| Response   | ≤1.5sec  |               |               | ≤1.5sec   |               |               |
| Accuracy   | ±1.0% S.P. (Flow rate >30% F.S.)<br>±0.3% F.S. (Flow rate ≤30% F.S.)   |               |               | ±1.0% S.P. (Flow rate >30% F.S.)<br>±0.3% F.S. (Flow rate ≤30% F.S.)  |               |               |
| Linearity  | ±0.5% F.S.   |               |               | ±0.5% F.S.  |               |               |
| Repeatability                                    | ±0.2% F.S.   |               |               | ±0.2% F.S.  |               |               |
| Operating differential pressure                  | 50~300kPa(D)   | 100~300kPa(D) | 200~300kPa(D) | 100~300kPa(D)   | 150~300kPa(D) | 200~300kPa(D) |
| MAX.Operating pressure                           | 450kPa(G)  |               |               | 300kPa(G)   |               |               |
| Pressure resistance                              | 1MPa(G)  |               |               | 1MPa(G)   |               |               |
| Digital Communication                            | PROFIBUS or RS485 (F-Net protocol)   |               |               | PROFIBUS or RS485 (F-Net protocol)  |               |               |
| Analog Communication;<br>Flow rate set signal    | 0.1~5VDC (2~100% F.S.)   |               |               | 0.1~5VDC (2~100% F.S.)  |               |               |
| Analog Communication;<br>Flow rate output signal | 0~5VDC (0~100% F.S.)   |               |               | 0~5VDC (0~100% F.S.)  |               |               |
| Power supply                                     | RS485[BR212,BM212]: +15VDC±5% 250mA, -15VDC±5% 150mA<br>RS485[BR222,BM222]: +24VDC±4V 6.9VA<br>PROFIBUS[BR226,BM226]: +24VDC±4V 6.9VA                              |               |               | RS485[BR212,BM212]: +15VDC±5% 250mA, -15VDC±5% 200mA<br>RS485[BR222,BM222]: +24VDC±4V 7.5VA<br>PROFIBUS[BR226,BM226]: +24VDC±4V 7.5VA |               |               |
| Operating temperature                            | 5~45°C (recommended temperature range: 15~35°C)  |               |               | 5~45°C (recommended temperature range: 15~35°C)   |               |               |
| Leak integrity                                   | Rubber seal model: 1×10 <sup>-10</sup> Pa·m <sup>3</sup> /s(He) or less<br>Metal seal model: 1×10 <sup>-11</sup> Pa·m <sup>3</sup> /s(He) or less                  |               |               | Rubber seal model: 1×10 <sup>-10</sup> Pa·m <sup>3</sup> /s(He) or less   |               |               |
| Wetted materials                                 | Rubber seal model: SUS316L,PTFE,Magnetic stainless steel,FKM<br>Metal seal model: SUS316L,PTFE,Magnetic stainless steel  |               |               | Rubber seal model: SUS316L,PTFE,Magnetic stainless steel,FKM  |               |               |
| Standard fitting                                 | 1/4inch SWL: 127mm / 1/4inch VCR: 124mm  |               |               | 3/8inch SWL: 181mm / 1/2inch VCR: 180mm   |               |               |
| Mounting orientation                             | Free   |               |               | Free  |               |               |

## S600 Model selection

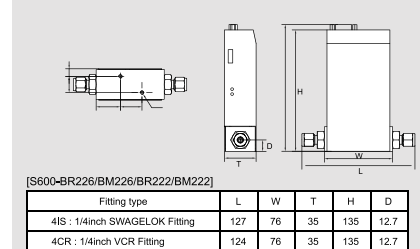
|   |                |  |
|---|----------------|--|
| ① | Model          | MFC:S600<br>MFM:S600M  |
| ② | Type           | BR:Rubber seal<br>BM:Metal seal<br>CR:FKM  |
| ③ | Connector      | 2:D-sub 9pin   |
| ④ | Power supply   | 1:±15v<br>2:24v  |
| ⑤ | Communication  | 2:0-5V/RS485<br>6:PROFIBUS   |
| ⑥ | Fittings       | 4IS :1/4 inch Swagelok(127mm) :S600-BR(M)2**<br>4CR :1/4 inch VCR(124mm) :S600-BR(M)2**<br>6IS :3/8 inch Swagelok(181mm) :S600-CR2**<br>8CR :1/2 inch VCR(180mm) :S600-CR2** |
| ⑦ | Gas            | N <sub>2</sub>   |
| ⑧ | F.S. flow rate | (10,20,30,50,100,200,300,500)SCCM<br>(1,2,3,5,10,20,30,50,100,150,200)SLM  |

\*For more information, please contact us.

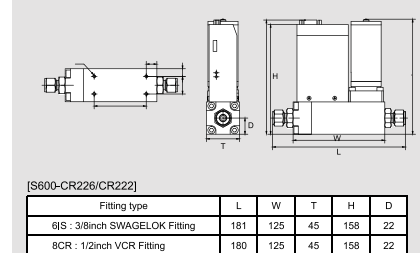
E.g. S600 - BR226 - 4CR - N<sub>2</sub> - 100SCCM

E.g)1:S600-BR226-4CR-N<sub>2</sub>-100SCCM

### S600-BR226/BM226/BR222/BM222



### S600-CR226/CR222







## Specification S48 series

| Model                           | S48-32 series Rubber seal model / Metal seal model   |               |               | S48-28 series Rubber seal model  |               |               |
|---------------------------------|--|---------------|---------------|--|---------------|---------------|
| Product Model Type No           | S48-32 (Rubber seal, ±15VDC power)<br>S48-32 (Rubber seal, +24VDC power)<br>S48-32M (Metal seal, ±15VDC power)<br>S48-32M (Metal seal, +24VDC power) |               |               | S48-28 (Rubber seal, ±15VDC power)<br>S48-28 (Rubber seal, +24VDC power)   |               |               |
| Full scale flow range           | 10/20/30/50/100/200/300/500 SCCM<br>1/2/3/5 SLM  | 10/20/30 SLM  | 50 SLM        | 100 SLM  | 150 SLM       | 200 SLM       |
| Valve type                      | Normally closed  |               |               | Normally closed  |               |               |
| Valve actuator                  | Solenoid valve   |               |               | Solenoid valve   |               |               |
| Flow rate control range         | 2~100% of F.S.   |               |               | 5~100% of F.S.   |               |               |
| Response                        | ≤2sec  |               |               | ≤2sec  |               |               |
| Accuracy                        | ±1% F.S.   |               |               | ±1% F.S.   |               |               |
| Linearity                       | ±0.5% F.S.   |               |               | ±0.5% F.S.   |               |               |
| Repeatability                   | ±0.2% F.S.   |               |               | ±0.2% F.S.   |               |               |
| Operating differential pressure | 50~300kPa(D)   | 100~300kPa(D) | 150~300kPa(D) | 100~300kPa(D)  | 150~300kPa(D) | 200~300kPa(D) |
| MAX. Operating pressure         | 300kPa(G)  |               |               | 300kPa(G)  |               |               |
| Pressure resistance             | 1MPa(G)  |               |               | 1MPa(G)  |               |               |
| Flow rate set signal            | [±15VDC] 0.1~5VDC(2~100%F.S.)<br>[+24VDC] ①0.1~5VDC(2~100%F.S.) ②1.08~5VDC(2~100%F.S.)<br>③4.32~20mA(2~100%F.S.)                                     |               |               | [±15VDC] 0.25~5VDC(5~100%F.S.)<br>[+24VDC] ①0.25~5VDC(5~100%F.S.) ②1.2~5VDC(5~100%F.S.)<br>③4.8~20mA(5~100%F.S.) |               |               |
| Flow rate output signal         | [±15VDC] 0~5VDC (0~100% F.S.)<br>[+24VDC] ①0~5VDC (0~100% F.S.) ②1~5VDC (0~100% F.S.)<br>③4~20mA (0~100% F.S.)                                       |               |               | [±15VDC] 0~5VDC (0~100% F.S.)<br>[+24VDC] ①0~5VDC (0~100% F.S.) ②1~5VDC (0~100% F.S.)<br>③4~20mA (0~100% F.S.)   |               |               |
| Power supply                    | [±15VDC]: +15VDC±5% 100mA, -15VDC±5% 150mA<br>[+24VDC]: +11V~+25V (+24V 250mA)   |               |               | [±15VDC]: +15VDC±5% 100mA, -15VDC±5% 200mA<br>[+24VDC]: +11V~+25V (+24V 350mA)                                   |               |               |
| Operating temperature           | 5~50°C (recommended temperature range: 15~35°C)  |               |               | 5~50°C (recommended temperature range: 15~35°C)  |               |               |
| Leak integrity                  | Rubber seal model: 1×10 <sup>-6</sup> Pa·m <sup>3</sup> /s(He) or less<br>Metal seal model: 1×10 <sup>-7</sup> Pa·m <sup>3</sup> /s(He) or less      |               |               | Rubber seal model: 1×10 <sup>-6</sup> Pa·m <sup>3</sup> /s(He) or less   |               |               |
| Wetted materials                | Rubber seal model: SUS316L, PTFE, Viton<br>Metal seal model: SUS316L, PTFE   |               |               | Rubber seal model: SUS316L, PTFE, Viton  |               |               |
| Standard fitting                | 1/4inch SWL: 127mm / 1/4inch VCR: 124mm  |               |               | 3/8inch SWL: 181mm   |               |               |
| Mounting orientation            | Free   |               |               | Free   |               |               |

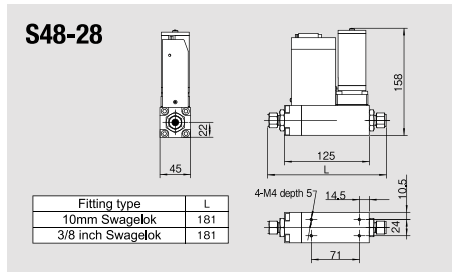
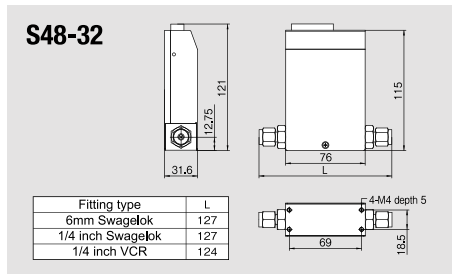
## S48 Model selection

|   |                     |   |
|---|---------------------|---|
| ① | Model               | S48-32-HMT<br>S48-28-HMT  |
| ② | Type                | MFC<br>MFM  |
| ③ | F.S. flow rate      | (10,20,30,50,100,200,300,500)SCCM; (1,2,3,5,10,20,30,50)SLM :S48-32<br>(100,150,200)SLM :S48-28   |
| ④ | Fittings            | 4IS :1/4 inch Swagelok(127mm) :S48-32<br>4CR :1/4 inch VCR(124mm) :S48-32<br>6MS :6mm Swagelok(127mm) :S48-32<br>6IS :3/8 inch Swagelok (181mm) :S48-28<br>10MS :10mm Swagelok(181mm) :S48-28 |
| ⑤ | Gas                 | N <sub>2</sub>  |
| ⑥ | Power supply        | ±15V<br>24V   |
| ⑦ | Input/Output signal | 0-5V<br>1-5V<br>0-10V<br>4-20mA   |
| ⑧ | Seal type           | FKM<br>EPDM   |

\*For more information, please contact us.

|       |            |     |         |     |                |      |      |     |
|-------|------------|-----|---------|-----|----------------|------|------|-----|
| E.g.1 | S48-32-HMT | MFC | 500SCCM | 4IS | N <sub>2</sub> | 24V  | 0-5V | FKM |
| E.g.2 | S48-28-HMT | MFM | 100SLM  | 6IS | N <sub>2</sub> | ±15V | 0-5V | FKM |

E.g.)1:S48-32-HMT,,MFC,500SCCM,4IS,,N<sub>2</sub>,24V,0-5V,FKM,  
E.g.)2:S48-28-HMT,,MFM,100SLM,6IS,,N<sub>2</sub>,±15V,0-5V,FKM,



## Accessory

### Power supply unit



MT-51



MT-52

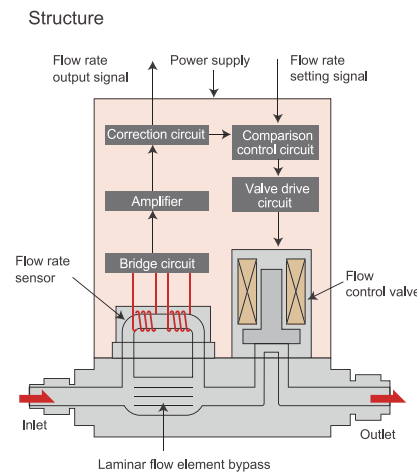


MT-52-\*J

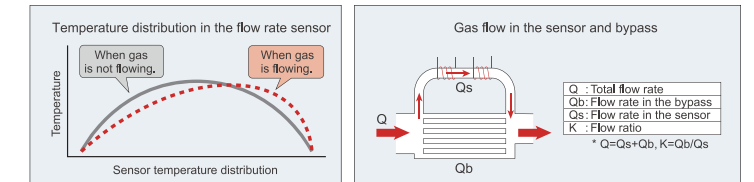
| Model                           | MT-51                        | MT-52                      | MT-52-2J                   | MT-52-3J | MT-52-4J |
|---------------------------------|------------------------------|----------------------------|----------------------------|----------|----------|
| Connection MFC Qty              | 1set                         | 1set                       | 2set                       | 3set     | 4set     |
| Power supply                    | AC100V~240V 50/60Hz          |                            | AC185V~240V 50/60Hz        |          |          |
| MFC Power supply                | ±15V                         | +V24                       | ±15V                       |          |          |
| MFC flow rate set signal        | 0~5VDC                       | 0~5VDC or 1~5VDC or 4~20mA | 0~5VDC or 1~5VDC or 4~20mA |          |          |
| MFC flow rate output signal     | 0~5VDC                       | 0~5VDC or 1~5VDC or 4~20mA | 0~5VDC or 1~5VDC or 4~20mA |          |          |
| Operation                       | Key switch                   |                            | Dial type potentiometer    |          |          |
| Instantaneous flow rate display | 3 digits and a half          |                            |                            |          |          |
| Max Integrated flow rate        | 9999×10 <sup>0</sup>         |                            |                            |          |          |
| External communication function | RS485 or RS232 or Modbus-RTU |                            | 0~5VDC or 1~5VDC or 4~20mA |          |          |
| Panel dimensions                | 96×96 mm                     | 96×96 mm                   | 483×110 mm                 |          |          |

## What is a Mass Flow Controller?

A mass flow controller automatically controls the flow rate of a 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 included 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.



### Operating principle



- The gas, which enters from the inlet, first splits to flow past the sensor or through the bypass.
- At the sensor, the mass flow rate is detected as a proportional change in temperature and converted by the bridge circuits to an electrical signal.
- 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.
- The comparison control circuit compares the flow rate setting signal and the actual flow rate setting signal from the sensor and sends a difference signal to the valve driving circuit.
- The flow rate control valve moves as appropriate to make the difference between the required 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.