

OUTLINE

THE MODEL MF1100A MASS FLOW CONTROLLER FEATURES EXTENDED CAPABILITY OF RANGES UP TO 20 SLM, HIGHER TEMPERATURE STABILITY AND MANY FUNCTIONS.

FEATURES

- MINIMUM RANGE OF 5 SCCM & UP TO 20 SLM
- COMPACT SIZE
- STANDARD SOFT-START FUNCTION
- MINIMUM LEAKAGE OF  $1.013 \times 10^{-10} \text{Pa} \cdot \text{m}^3/\text{s}$  (He)



SPECIFICATIONS

MODEL	MASS FLOW METER		MASS FLOW CONTROLLER	
	Low cost	Standard	Low cost	Standard
	MF1121A	MF1111A	MF1171A (N C) MF1181A (N O) (Note2)	MF1141A (N C) MF1151A (N O) (Note2)
Range (Note1)	15 ranges, refer to range table			
Capacity	N/A		2 to 100 % F.S.	
Accuracy	±2 % F.S. max.	±1.5 % F.S. max.	±2 % F.S. max.	±1.5 % F.S. max.
Linearity	±1 % F.S. max.	±0.7 % F.S. max.	±1 % F.S. max.	±0.7 % F.S. max.
Repeatability	±0.2 % F.S. max.	±0.2 % F.S. max.	±0.2 % F.S. max.	±0.2 % F.S. max.
Setting time	3 s max. to a point within ±2 % of a set point			
Line pressure	1.0 MPa max.			
Over pressure	1.5 MPa max.			
Loss of head	5.0 kPa max		N/A	
Differential pressure	N/A		5 to 5,000 SCCM : 34 to 275 kPa 10 to 20 SLM : 64 to 275 kPa	
Operating temperature range	5 to 45 °C (Including sample gas temperature)			
Temperature stability	±0.1 % /°C F.S. max. within the operation temperature range (standard)			
Leakage	1.013×10 <sup>-9</sup> Pa·m <sup>3</sup> /s (He) max. (standard)			
Control set point input	N/A		0 to 5 VDC	0 to 5 VDC (standard) 1 to 5 VDC (option)
Influence of physical output performance	0 ~ 5 VDC		0 to 5 VDC	0 to 5 VDC (standard) 1 to 5 VDC (option)
Orientation error	±0.5 % F.S. max. any orientation available			
Process materials	Stainless steel SUS316 and Viton®		SUS316, Teflon® & Viton®	
Process connection	1/4 Swageloc® (standard), VCR® (option)			
Weight	680 g		800 g	
Power consumption	1 VA max.		3 VA max.	

Note1: Standard ranges are calibrated with nitrogen gas. The ranges may subject to change in service gases.

SCCM : Standard Cubic Centimeter per Minute at 0°C, 1013 hPa

SLM : Standard Liter per Minute at 0°C, 1013 hPa

Note2: (NC) : Normal Close

(NO) : Normal Open

MODEL CODE NUMBER

MODEL	DESCRIPTION	
MF1111A	Mass Flow Meter	
MF1121A	Mass Flow Meter	
MF1141A	Mass Flow Controller (Normal Close)	
MF1151A	Mass Flow Controller (Normal Open)	
MF1171A	Mass Flow Controller (Normal Close)	
MF1181A	Mass Flow Controller (Normal Open)	
MF1191A	Custom (Consult Ohkura)	
CODE	RANGE	
	MASS FLOW METER	MASS FLOW CONTROLLER
01	0 ~ 5 SCCM	0.1 ~ 5 SCCM
02	0 ~ 10 SCCM	0.2 ~ 10 SCCM
03	0 ~ 20SCCM	0.4 ~ 20SCCM
04	0 ~ 30 SCCM	0.6 ~ 30 SCCM
05	0 ~ 50 SCCM	1 ~ 50 SCCM
06	0 ~ 100 SCCM	2 ~ 100 SCCM
07	0 ~ 200 SCCM	4 ~ 200 SCCM
08	0 ~ 300 SCCM	6 ~ 300 SCCM
09	0 ~ 500 SCCM	10 ~ 500 SCCM
10	0 ~ 1000 SCCM	20 ~ 1000 SCCM
11	0 ~ 2000 SCCM	40 ~ 2000 SCCM
12	0 ~ 3000 SCCM	60 ~ 3000 SCCM
13	0 ~ 5000 SCCM	100 ~ 5000 SCCM
14	0 ~ 10 SLM	0.2 ~ 10 SLM
15	0 ~ 20 SLM	0.4 ~ 20 SLM
99	Custom (Consult Ohkura)	
CODE	SERVICE GAS	
A	Nitrogen (N <sub>2</sub> )	
B	Air	
C	Oxygen (O <sub>2</sub> )	
D	Hydrogen (H <sub>2</sub> )	
E	Helium (He)	
F	Argon (Ar)	
Z	Other than listed above	
CODE	PROCESS CONNECTION	
0	Swageloc® 1/4	
3	VCR® 1/4 Option	
9	Custom (Consult Ohkura)	
CODE	SETPOINT INPUT/ OUTPUT	
0	Mass Flow Meter	
1	0 ~ 5 VDC input / 0 ~ 5 output	(Standard)
2	0 ~ 5 VDC input / 0 ~ 5 output with optional Soft Start	(Option Note 1)
3	1 ~ 5 VDC input / 1 ~ 5 VDC output	(Option Note 2)
4	1 ~ 5 VDC input / 1 ~ 5 VDC output / Soft Start	(Option Note 1)
9	Custom (Consult Ohkura)	

ADDITIONAL CODE NUMBER

CODE	BODY MATERIAL	
1	Stainless steel, SUS316	
2		
CODE	SEAL MATERIAL	
1	Viton®	
2	Neoprene	
9	Custom (Consult Ohkura)	
CODE	LEAKAGE	
1	1.013×10 <sup>-9</sup> Pa·m <sup>3</sup> /s (He) max. (Standard)	
2	1.013×10 <sup>-10</sup> Pa·m <sup>3</sup> /s (He) max. (Option Note 3)	
CODE	TEMPERATURE EFFECT	
1	0.1 % F.S./°C max. (Standard)	
2	0.05 % F.S./°C max. (Option Note 3)	
9	Custom (Consult ohkura)	
CODE	SETPOINT ADJUSTER / INDICATOR	
A	No adjuster / indicator	
B	Digital indicator included	
D	Digital potentiometer & Digital indicator included	
T	1 ~ 5 VDC Digital indicator	
V	Digital potentiometer & Custom indicator	
X	Custom adjuster & Digital indicator	
Z	Custom adjuster & indicator	
CODE	POWER SUPPLY	
0	Power supply not required	
1	Single output model SE5101B01	
2	4 output model SE5401B01	
CODE	CABLE	
0	None	
1	Standard 2m, Mass Flow Meter	HMSU2090A0201
2	Optional 3m, Mass Flow Meter	HMSU2090A0202
3	Optional 5m, Mass Flow Meter	HMSU2090A0203
4	Standard 2m, Flow Controller	HMSU2090A0101
5	Optional 3m, Flow Controller	HMSU2090A0102
6	Optional 5m, Flow Controller	HMSU2090A0103
8	Custom, Mass Flow Meter	
9	Custom, Mass Flow Controller	
CODE	MOUNTING BRACKET	
0	None	
1	Installed	

Note 1: Available for mass flow controller model(NC) only.

Note 2: Available for mass flow controller model only.

Note 3: Available for mass flow controller model and mass flow meter only.

DIMENSIONS

SERVICE GAS AVAILABILITY AND CONVERSION FACTOR (CF)

GAS	SYMBOL	CF	GAS	SYMBOL	CF
Argon	Ar	1.40	Hydrogen	H <sub>2</sub>	1.00
Air	Air	1.00	Helium	He	1.40
Diborane	B <sub>2</sub> H <sub>6</sub>	0.46	Ammonia	NH <sub>3</sub>	0.78
Methane	CH <sub>4</sub>	0.74	Neon	Ne	1.39
Ethane	C <sub>2</sub> H <sub>6</sub>	0.51	Nitrogen monoxide	NO	0.99
Propane	C <sub>3</sub> H <sub>8</sub>	0.34	Nitrogen dioxide	NO <sub>2</sub>	0.75
Butane	C <sub>4</sub> H <sub>10</sub>	0.32	Nitrous oxide	N <sub>2</sub> O	0.74
Acetylene	C <sub>2</sub> H <sub>2</sub>	0.66	Nitrogen	N <sub>2</sub>	1.00
Ethylene	C <sub>2</sub> H <sub>4</sub>	0.64	Oxygen	O <sub>2</sub>	0.99
Propylene	C <sub>3</sub> H <sub>6</sub>	0.44	Phosphine	PH <sub>3</sub>	0.78
Carbonic acid	CO <sub>2</sub>	0.74	Silane	SiH <sub>4</sub>	0.66
Carbon monoxide	CO	1.00	Sulfur dioxide	SO <sub>2</sub>	0.70

Consult factory for an availability of a gas other than listed above.

A flow rate changes depending on a gas. Ratio of a flow rate of a service gas to the flow rate of Nitrogen gas provides a conversion factor (CF). Model MF1100A Mass Flow Controller is calibrated with nitrogen gas at factory. Service to another gas than indicated on an instrument requires a correction by conversion factor (CF).

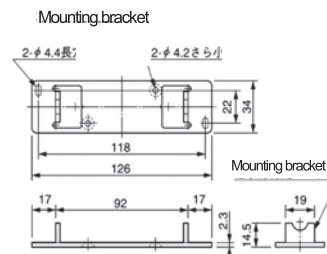
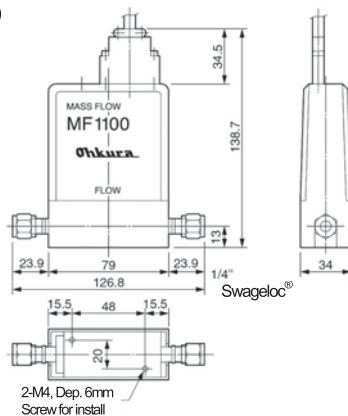
In case of service of an instrument calibrated to gas "A" to gas "B", the actual flow rate "QB" of "B" gas to a readout of flow rate "QA" of "A" gas is calculated using each conversion factor as follows;

$$QB = QA \cdot CF_B / CF_A$$

We recommend recalibration with a service gas for accuracy if required.

DIMENSIONS

(Unit: mm)



DIGITAL INDICATOR

SPECIFICATION

Model number	HMSU2091D xx	HMSU2428B xx
Input	0 ~ 5 VDC	1 ~ 5 VDC
Max. readout	1999	
Display	7 segment LED, Red	
Over scale indication	Blink "0000" or "-0000"	Blink "1999"
Power input	+5 VDC ±5 %	
Power consumption	Approx. 0.3 VA	Approx. 0.43 VA
Weight	Approx. 40 g	Approx. 85 g

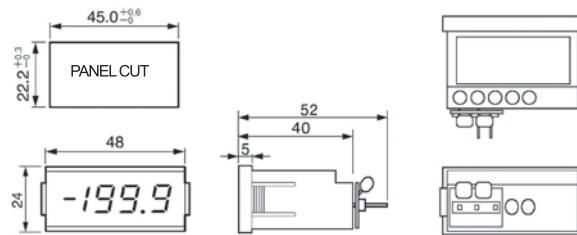
Model Code Number HMSU2091D + CODE below  
 Model Code Number HMSU2428B + CODE below

CODE	RANGE	CODE	RANGE
01	0 ~ 5.00 SCCM	09	0 ~ 500 SCCM
02	0 ~ 10.00 SCCM	10	0 ~ 1000 SCCM
03	0 ~ 20.0 SCCM	11	0 ~ 2.00 SLM
04	0 ~ 30.0 SCCM	12	0 ~ 3.00 SLM
05	0 ~ 50.0 SCCM	13	0 ~ 5.00 SLM
06	0 ~ 100.0 SCCM	14	0 ~ 10.00 SLM
07	0 ~ 200 SCCM	15	0 ~ 20.00 SLM
08	0 ~ 300 SCCM	99	Custom

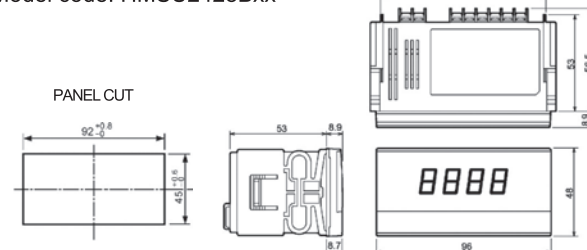
Note: Engineering units is indicated by a label print.

DIMENSIONS (Unit: mm)

Model code: HMSU2091Dxx



Model code: HMSU2428Bxx



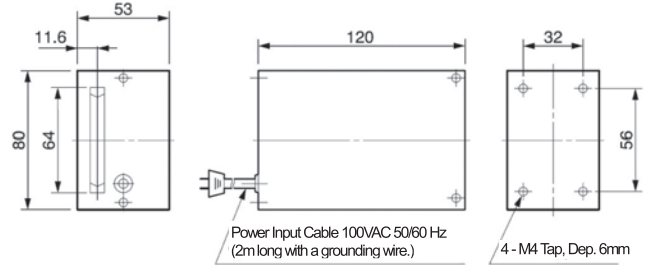
POWER SUPPLY

SPECIFICATION

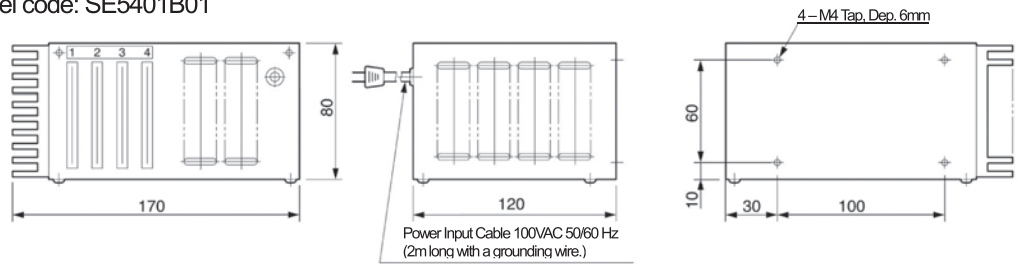
Model	SE5101B01	SE5401B01
Number of outputs	1	1 to 4
Output voltage	+15VDC 50mA	+15VDC 0.2A
	-15VDC 350mA	-15VDC 1.4A
	+5VDC 250mA	+5VDC 1.0A
Power input	100 VAC±10% 50/60Hz	
Operating temperature range	5~45 °C	
Mounting	Wall mount	
Case finish	Metallic silver	
Weight	Approx. 0.8 kg	Approx. 2 kg

DIMENSIONS (Unit: mm)

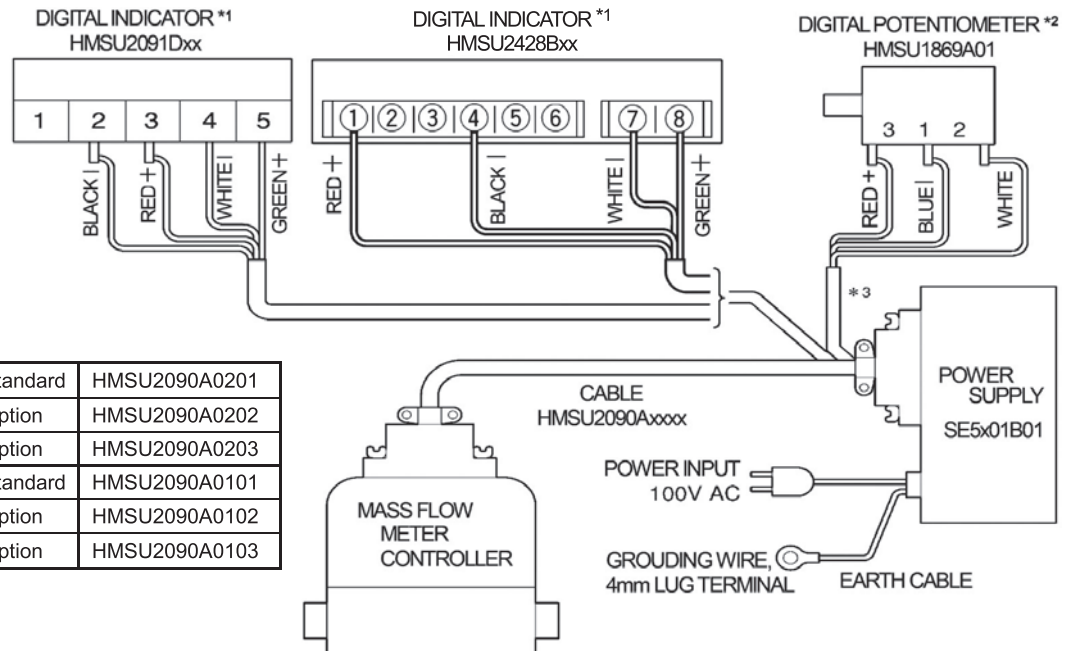
Model code: SE5101B01



Model code: SE5401B01



WIRE HOOKUP



HOOK UP CABLE

Mass Flow Meter	2 m long	Standard	HMSU2090A0201
	3 m long	Option	HMSU2090A0202
	5 m long	Option	HMSU2090A0203
Mass Flow Controller	2 m long	Standard	HMSU2090A0101
	3 m long	Option	HMSU2090A0102
	5 m long	Option	HMSU2090A0103