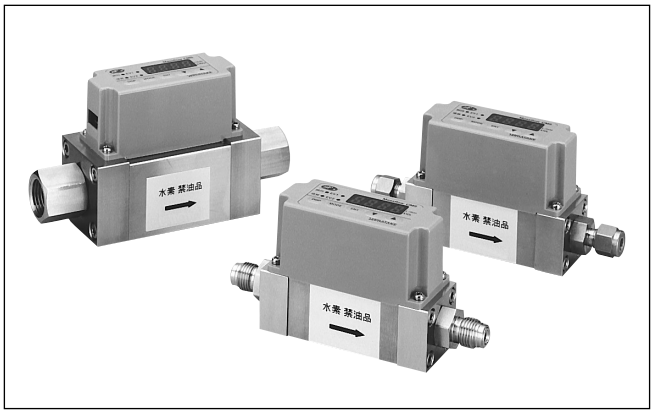
Gas Mass Flow Meter for Hydrogen and Helium Gases

Overview

The CMS Gas Mass Flow Meter incorporates a microflow sensor, the thermal micro-flow sensor developed by Azbil Corporation utilizing
silicon micro-machining technology. By integrating this sensor with advanced channel design technology, it was possible to achieve new levels of accuracy and measurement range at a low price.
This is a next-generation flow meter with improved usability and reliability.



Features

- The CMS incorporates a micro-flow sensor, built with silicon micro-machining and thin-film technologies. The thermal flow sensor is a mere 1.7 mm and 0.5 mm thick and features high sensitivity and fast response.
- Because the CMS is a mass flow meter, its measurements are not affected by temperature or pressure.
- High accuracy of ±5 % rdg. and high resolution
- Analog output signals can be switched among 0–5 V, 1–5 V, and 4–20 mA by the keys.
- The CMS's functions include instantaneous flow rate indication, totalized or reverse-totalized flow display, event output, totalizer pulse output, totalized flow reset input, output scaling, gas type switching, etc. for a variety of applications.

Specifications

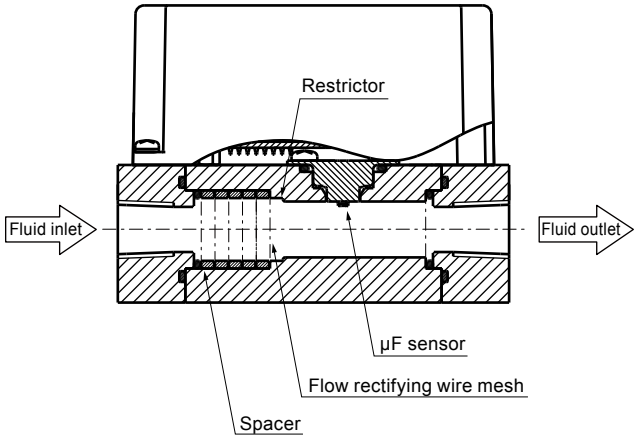
Item			Description					
Model No.			CMS0010	CMS0050	CMS0200	CMS0500	CMS1000	CMS2000
Applicable gas type			Hydrogen, helium The gas must be dry and not contain corrosive components (chlorine, sulfur, acid, etc.). Also, it must be clean, without dust or oil mist.					
Flow rate range *1			0–10 L/min (standard)	0–50 L/min (standard)	0–200 L/min (standard)	0–500 L/min (standard)	0–1000 L/min (standard)	0–2000 L/min (standard)
			"Standard" refers to the volumetric flow rate normalized for 20 °C and 101.325 kPa (atmospheric pressure).					
Max. measurable flow rate (at 20 °C, 101.325 kPa) *2		Hydrogen	10 L/min	50 L/min	200 L/min	500 L/min	1000 L/min	2000 L/min
		Helium	10 L/min	50 L/min	200 L/min	500 L/min	1000 L/min	2000 L/min
Measurement accuracy at 23 °C and 101.325 kPa (x: measured flow rate)			0.1 ≤ x < 2 L/min ±1 % FS ± 1 digit 2 ≤ x ≤ 10 L/min ±5 % rdg. ± 1 digit	0.5 ≤ x < 10 L/min ±1 % FS ± 1 digit 10 ≤ x ≤ 50 L/min ±5 % rdg. ± 1 digit	2 ≤ x < 40 L/min ±1 % FS ± 1 digit 40 ≤ x ≤ 200 L/min ±5 % rdg. ± 1 digit	5 ≤ x < 100 L/min ±1 % FS ± 1 digit 100 ≤ x ≤ 500 L/min ±5 % rdg. ± 1 digit	10 ≤ x < 200 L/min ±1 % FS ± 1 digit 200 ≤ x ≤ 1000 L/min ±5 % rdg. ± 1 digit	20 ≤ x < 400 L/min ±1 % FS ± 1 digit 400 ≤ x ≤ 2000 L/min ±5 % rdg. ± 1 digit
Repeatability			Within ±0.5 % FS					
Temperature characteristics			At 0–75 % of flow rate range: ±0.10 % FS/°C ±1 digit max. At 75–100 % of flow rate range: ±0.15 % FS/°C ±1 digit max.					
Pressure characteristics	Operating pressure 0 to 1.0 MPa	Flow rate range 0 to 50 %	±0.3 % FS / 0.1 MPa ±1 digit max.	±0.1 % FS / 0.1 MPa ±1 digit max.				
		Flow rate range 50 to 100 %	±3 % rdg. ±1 digit max.	±0.1 % rdg. / 0.1 MPa ±1 digit max.	±0.5 % rdg. / 0.1 MPa ±1 digit max.	±0.3 % rdg. / 0.1 MPa ±1 digit max.	±0.5 % rdg. / 0.1 MPa ±1 digit max.	
	Operating pressure (negative) -0.07 to 0 MPa	Flow rate range 0 to 50 %	±0.5 % FS / 0.01 MPa ±1 digit max.	±0.2 % FS / 0.01 MPa ±1 digit max.	±0.5 % FS / 0.01 MPa ±1 digit max.	±0.2 % FS / 0.01 MPa ±1 digit max.	±0.5 % FS / 0.01 MPa ±1 digit max.	
		Flow rate range 50 to 100 %	±1 % rdg. / 0.01 MPa ±1 digit max.	±0.5 % rdg. / 0.01 MPa ±1 digit max.	±1 % rdg. / 0.01 MPa ±1 digit max.	±0.5 % rdg. / 0.01 MPa ±1 digit max.	±1 % rdg. / 0.01 MPa ±1 digit max.	
Operating temperature			-10 to +60 °C					
Storage temperature			-20 to +70 °C					
Operating humidity			10 to 90 % RH (without condensation)					

Item			Description					
Model No.			CMS0010	CMS0050	CMS0200	CMS0500	CMS1000	CMS2000
Operating pressure			-0.07 to 1.0 MPa					
Pressure resistance			1.5 MPa					
Pipe size, connection method			9/16-18 UNF, Rc 1/4, 1/4 Swagelok, 1/4 VCR Select by model number.			3/4-16 UNF, Rc 1/2, 1/2 Swagelok, 3/8 VCR equivalent products Select by model number.		
Gas-contacting material			SUS316, fluoroelastomer (Viton O ring)					
Case material			Polycarbonate					
Mounting orientation			Horizontal mounting (but the display should not face downward), left to right flow For vertical piping, drift may occur when the flow rate is zero. For details, contact the azbil Group.					
External leakage			Helium leakage rate 1×10^{-6} Pa·m³/s max.					
Rated voltage			12 to 24 V DC					
Supply voltage range			11.4 to 25.2 V DC					
Current consumption			100 mA max.					
Sampling cycle			100 ms ±10 ms					
Display unit	Flow rate indication		4-digit 7-segment LED (display of the instantaneous flow rate and totalized flow can be switched)					
	Instantaneous flow rate	Min. displayed value	0.01 L/min	0.1 L/min	1 L/min	1 L/min	1 L/min	5 L/min
		Display resolution	0.01 L/min	0.1 L/min	1 L/min	1 L/min	1 L/min	5 L/min
	Totalized flow	Display unit	1 L		10 L			
		Display range	0 to 99999999					
		Data storage	Data is written to the memory every 10 minutes. (The totalized value can be reset by the keys or external contact input.)					
		Status display	Instantaneous flow rate LED / totalized flow LED / event LED					
Output signal (instantaneous flow rate output)			DC 0–5 V / 1–5 V / 4–20 mA, changeable by the keys Allowable load resistance: 250 kΩ min. for voltage output, 300 Ω max. for current output					
Output scaling			Select from 0–1, 0–2.5, 0–5, and 0–10 L/min, or change within 10–250 % FS in increments of 1 % Factory default: 0–10 L/min	Select from 0–10, 0–20, 0–30, and 0–50 L/min, or change within 10–250 % FS in increments of 1 % Factory default: 0–50 L/min	Select from 0–20, 0–50, 0–100, and 0–200 L/min, or change within 10–250 % FS in increments of 1 % Factory default: 0–200 L/min	Select from 0–100, 0–200, 0–300, and 0–500 L/min, or change within 10–250 % FS in increments of 1 % Factory default: 0–500 L/min	Select from 0–100, 0–250, 0–500, and 0–1000 L/min, or change within 10–250 % FS in increments of 1 % Factory default: 0–1000 L/min	Select from 0–200, 0–500, 0–1000, and 0–2000 L/min, or change within 10–250 % FS in increments of 1 % Factory default: 0–2000 L/min
Event output	Number of outputs		2					
	Output rating		Open collector (maximum rating: 30 V DC, 50 mA)					
	Event function		Event No.	Functions	Setting range	ON-delay	Event standby	
			EV1 (Event 1)	Instantaneous flow rate high limit	Within the maximum flow rate range	0 to 60 s (variable)	-	A function to prevent event output after startup until the minimum flow rate is reached
				Instantaneous flow rate low limit			○	
				Totalized flow count-up	0 to 99999999	-	-	
				Reverse-totalized flow countdown				
				Flow rate data serial output	-			
				Error output				
			EV2 (Event 2)	Instantaneous flow rate high limit	Within the maximum flow rate range	0 to 60 s (variable)	-	
				Instantaneous flow rate low limit			○	
				Totalized flow count-up	0 to 99999999	-	-	
				Reverse-totalized flow countdown				
				Totalizer pulse output: Pulse width 100 ms ±10 % Pulse weight CMS0010/0050:1,10, 100 L/pulse (changeable by the keys) CMS0200/0500/1000/2000:10, 100, 1000 L/pulse (changeable by the keys)				
			Instantaneous flow rate high/low limits, totalized flow count-up, reverse-totalized flow countdown, totalizer pulse output (Event 2 only), flow rate data serial output (Event 1 only), error output (Event 1 only) can be selected.					
External contact input	Number of inputs		1 (dedicated for totalized flow count reset input)					
	Input specifications		Circuit type of other device: Non-voltage contacts or open collector Terminal voltage (contacts OFF): 4.5 ±1 V Terminal current (contacts ON): approx. 0.5 mA (current to contacts) Allowable ON contact resistance: 250 Ω Allowable OFF contact resistance: 100 kΩ min. Allowable ON residual voltage: 0.8 V max. (for open collector) Allowable OFF leakage current: 50 μA max. (for open collector)					
Serial data output			Open collector (maximum rating: 30 V DC, 50 mA)					
Communication protocol (option)			RS-485 interface, 3-wire system Max. wiring distance: 300 m. Communication speed: 9600/4800/2400 bps. Totalized/instantaneous flow rate, etc., can be read and the device can be set up.					
Gas type switching			Select hydrogen or helium by the keys					

Item	Description					
Model No.	**CMS0010**	**CMS0050**	**CMS0200**	**CMS0500**	**CMS1000**	**CMS2000**
Gas type conversion function	Specify a conversion factor from 0.10 to 8.00 by the keys in accordance with the gas type.					
Electrical connection	Harness with dedicated connectors (sold separately). Applicable connector: DF-11-10DS-2C, made by Hirose Electric Co.					
Applicable standards	EN 61326-2-3:2013, EN 61326-1:2013 (to be used in an industrial electromagnetic environment) During EMC testing, the reading or output may fluctuate by the equivalent of ±10 % FS.					
Weight	Approx. 800 g			Approx. 1400 g		Approx. 2000 g

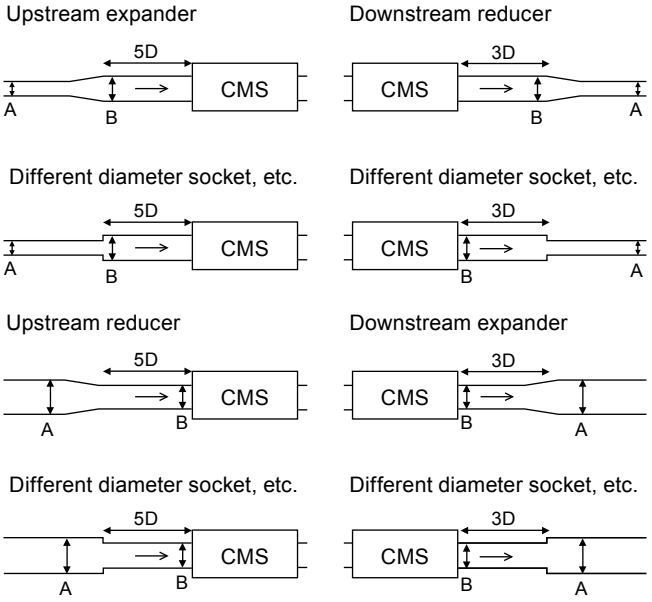
*1. The flow rate range is for hydrogen/helium.
In addition, analog output scaling can be changed by the keys.
*2. Other types of gases can be measured by changing the conversion factor in accordance with the gas type. For details, contact the azbil Group.

CMS Structure



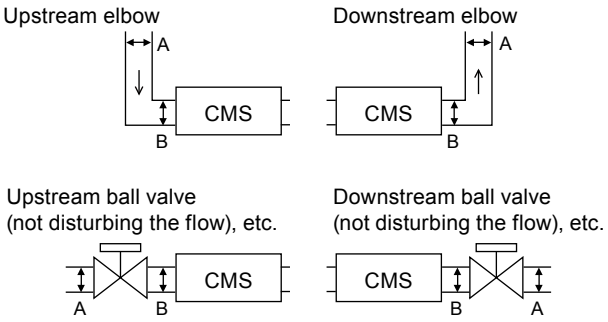
Straight Pipe Section

If the flowmeter and the pipe have different internal diameters (diameters A and B are different), a straight pipe section is required.



D represents the connecting port size.
CMS0500/1000/2000 : 12mm
CMS0010/0050/0200 : 6mm

If the flowmeter and the pipe have the same internal diameter (diameters A and B are the same), a straight pipe section is not required.



Handling Precautions

- If a valve that disturbs the flow (a butterfly valve, etc.) is used, provide a straight pipe section whose length is five times the pipe diameter between the valve and the CMS.

Function Settings (press the MODE key)

Mode	Function	CMS0010	CMS0050	CMS0200	Factory default
01	Key lock	00: Off 01: On	00: Off 01: On	00: Off 01: On	00
02	Measurement mode	00: Instantaneous flow rate 01: Instantaneous flow rate and totalized flow 02: Instantaneous flow rate and reverse-totalized flow	00: Instantaneous flow rate 01: Instantaneous flow rate and totalized flow 02: Instantaneous flow rate and reverse-totalized flow	00: Instantaneous flow rate 01: Instantaneous flow rate and totalized flow 02: Instantaneous flow rate and reverse-totalized flow	01
03	Event 1	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: Flow rate data serial output 06: Error output	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: Flow rate data serial output 06: Error output	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: Flow rate data serial output 06: Error output	00
04	Event 2	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: 1 L/pulse totalizer pulse output 06: 10 L/pulse totalizer pulse output 07: 100 L/pulse totalizer pulse output	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: 1 L/pulse totalizer pulse output 06: 10 L/pulse totalizer pulse output 07: 100 L/pulse totalizer pulse output	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: 10 L/pulse totalizer pulse output 06: 100 L/pulse totalizer pulse output 07: 1000 L/pulse totalizer pulse output	00
05	On-delay EV1	00: Not used 01: Used	00: Not used 01: Used	00: Not used 01: Used	00
06	On-delay EV2	00: Not used 01: Used	00: Not used 01: Used	00: Not used 01: Used	00
07	Event standby	00: Not used 01: Used	00: Not used 01: Used	00: Not used 01: Used	00
08	Gas type	08: User-specified conversion factor for the gas type 09: Hydrogen 10: Helium	08: User-specified conversion factor for the gas type 09: Hydrogen 10: Helium	08: User-specified conversion factor for the gas type 09: Hydrogen 10: Helium	09
09	Analog Output scaling	00: 0 to 10 L/min (standard) 01: 0 to 6 L/min (standard) 02: 0 to 4 L/min (standard) 03: 0 to 2 L/min (standard) 04: User-specified scaling	00: 0 to 50 L/min (standard) 01: 0 to 30 L/min (standard) 02: 0 to 20 L/min (standard) 03: 0 to 10 L/min (standard) 04: User-specified scaling	00: 0 to 200 L/min (standard) 01: 0 to 100 L/min (standard) 02: 0 to 50 L/min (standard) 03: 0 to 20 L/min (standard) 04: User-specified scaling	00
10	Analog output switching	00: 0 to 5 V 01: 1 to 5 V 02: 4 to 20 mA	00: 0 to 5 V 01: 1 to 5 V 02: 4 to 20 mA	00: 0 to 5 V 01: 1 to 5 V 02: 4 to 20 mA	00
11	Standard temperature	0 to 35 °C	0 to 35 °C	0 to 35 °C	20
12	Low-flow cutoff setting	00: No low-flow cutoff 01: Less than the minimum displayed flow rate 02: 1 % FS 03: 2.5 % FS 04: 5 % FS	00: No low-flow cutoff 01: Less than the minimum displayed flow rate 02: 1 % FS 03: 2.5 % FS 04: 5 % FS	00: No low-flow cutoff 01: Less than the minimum displayed flow rate 02: 1 % FS 03: 2.5 % FS 04: 5 % FS	01
30	Communication address setting	00: Communication function disabled 01 to 99: Communication address	00: Communication function disabled 01 to 99: Communication address	00: Communication function disabled 01 to 99: Communication address	00
31	Transmission speed	00: 9600 bps 01: 4800 bps 02: 2400 bps	00: 9600 bps 01: 4800 bps 02: 2400 bps	00: 9600 bps 01: 4800 bps 02: 2400 bps	00
32	Data format	00: Even parity 01: No parity	00: Even parity 01: No parity	00: Even parity 01: No parity	00

Modes 30 to 32 are displayed only on models with RS-485 communication functions. The selectable items and setting range may differ depending on the other settings.
For details, please refer to user's manual CP-SP-1118E.

Mode	Function	CMS0500	CMS1000	CMS2000	Factory default
01	Key lock	00: Off 01: On	00: Off 01: On	00: Off 01: On	00
02	Measurement mode	00: Instantaneous flow rate 01: Instantaneous flow rate and totalized flow 02: Instantaneous flow rate and reverse-totalized flow	00: Instantaneous flow rate 01: Instantaneous flow rate and totalized flow 02: Instantaneous flow rate and reverse-totalized flow	00: Instantaneous flow rate 01: Instantaneous flow rate and totalized flow 02: Instantaneous flow rate and reverse-totalized flow	01
03	Event 1	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: Flow rate data serial output 06: Error output	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: Flow rate data serial output 06: Error output	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: Flow rate data serial output 06: Error output	00
04	Event 2	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: 10 L/pulse totalizer pulse output 06: 100 L/pulse totalizer pulse output 07: 1000 L/pulse totalizer pulse output	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: 10 L/pulse totalizer pulse output 06: 100 L/pulse totalizer pulse output 07: 1000 L/pulse totalizer pulse output	00: Not used 01: Instantaneous flow rate high limit 02: Instantaneous flow rate low limit 03: Totalized flow count-up 04: Reverse-totalized flow countdown 05: 10 L/pulse totalizer pulse output 06: 100 L/pulse totalizer pulse output 07: 1000 L/pulse totalizer pulse output	00
05	On-delay EV1	00: Not used 01: Used	00: Not used 01: Used	00: Not used 01: Used	00
06	On-delay EV2	00: Not used 01: Used	00: Not used 01: Used	00: Not used 01: Used	00
07	Event standby	00: Not used 01: Used	00: Not used 01: Used	00: Not used 01: Used	00
08	Gas type	08: User-specified conversion factor for the gas type 09: Hydrogen 10: Helium	08: User-specified conversion factor for the gas type 09: Hydrogen 10: Helium	08: User-specified conversion factor for the gas type 09: Hydrogen 10: Helium	09
09	Analog Output scaling	00: 0 to 500 L/min (standard) 01: 0 to 300 L/min (standard) 02: 0 to 200 L/min (standard) 03: 0 to 100 L/min (standard) 04: User-specified scaling	00: 0 to 1000 L/min (standard) 01: 0 to 500 L/min (standard) 02: 0 to 250 L/min (standard) 03: 0 to 100 L/min (standard) 04: User-specified scaling	00: 0 to 2000 L/min (standard) 01: 0 to 1000 L/min (standard) 02: 0 to 500 L/min (standard) 03: 0 to 200 L/min (standard) 04: User-specified scaling	00
10	Analog output switching	00: 0 to 5 V 01: 1 to 5 V 02: 4 to 20 mA	00: 0 to 5 V 01: 1 to 5 V 02: 4 to 20 mA	00: 0 to 5 V 01: 1 to 5 V 02: 4 to 20 mA	00
11	Standard temperature	0 to 35 °C	0 to 35 °C	0 to 35 °C	20
12	Low-flow cutoff setting	00: No low-flow cutoff 01: Less than the minimum displayed flow rate 02: 1 % FS 03: 2.5 % FS 04: 5 % FS	00: No low-flow cutoff 01: Less than the minimum displayed flow rate 02: 1 % FS 03: 2.5 % FS 04: 5 % FS	00: No low-flow cutoff 01: Less than the minimum displayed flow rate 02: 1 % FS 03: 2.5 % FS 04: 5 % FS	01
30	Communication address setting	00: Communication function disabled 01 to 99: Communication address	00: Communication function disabled 01 to 99: Communication address	00: Communication function disabled 01 to 99: Communication address	00
31	Transmission speed	00: 9600 bps 01: 4800 bps 02: 2400 bps	00: 9600 bps 01: 4800 bps 02: 2400 bps	00: 9600 bps 01: 4800 bps 02: 2400 bps	00
32	Data format	00: Even parity 01: No parity	00: Even parity 01: No parity	00: Even parity 01: No parity	00

Modes 30 to 32 are displayed only on models with RS-485 communication functions. The selectable items and setting range may differ depending on the other settings.
For details, please refer to user’s manual CP-SP-1118E.

Factory Default Parameters (hold down the ENT + ▼ keys for 3 seconds)

Parameter	Item	CMS0010	CMS0050	CMS0200	CMS0500	CMS1000	CMS2000	Unit of measurement and setting range
P-01	Event 1 (instantaneous flow rate)	0	0	0	0	0	0	L/min (standard)
	Event 1 (totalized flow)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 to 99999999 Unit: The same as the unit used by the model for totalized flow display.
P-02	Event 2 (instantaneous flow rate)	0	0	0	0	0	0	0 to flow rate range high limit
	Event 2 (totalized flow)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 to 99999999 Unit: The same as the unit used by the model for totalized flow display
P-03	Event 1 hysteresis	0.50	5.0	50	50	50	50	L/min (standard)
P-04	Event 2 hysteresis	0.50	5.0	50	50	50	50	L/min (standard)
P-05	Event 1 ON-delay	0	0	0	0	0	0	Second
P-06	Event 2 ON-delay	0	0	0	0	0	0	Second
P-07	Initial reverse-totalized flow	00000000	00000000	00000000	00000000	00000000	00000000	00000000 to 99999999 Unit: The same as the unit used by the model for totalized flow display
P-08	Conversion factor for the gas type	1.00	1.00	1.00	1.00	1.00	1.00	No units
P-09	User-specified analog output scaling	100	100	100	100	100	100	10 to 250 %

The available parameters and setting range differ depending on function settings.
For details, please refer to user's manual CP-SP-1118E.

Model Selection

I II III IV V VI VII VIII IX X XI XII **Example: CMS0010BTTH200100**

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Description
Basic model No.	**Flow rate range**	**Type**	**Material**	**Connection**	**Gas type**	**Output**	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Appendix**	
CMS												Gas mass flow meter
	0010											Flow rate range: 0–10 L/min (standard) *1
	0050											Flow rate range: 0–50 L/min (standard) *1
	0200											Flow rate range: 0–200 L/min (standard) *1
	0500											Flow rate range: 0–500 L/min (standard) *1
	1000											Flow rate range: 0–1000 L/min (standard) *1
	2000											Flow rate range: 0–2000 L/min (standard) *1
		B										With display. Flow direction: left to right
		R										With display. Flow direction: right to left
			T									SUS316
				U								UNF CMS0500/1000/2000: 3/4-16 UNF CMS0010/0050/0200: 9/16-18 UNF
				T								Rc fitting CMS0500/1000/2000: Rc1/2 CMS0010/0050/0200: Rc1/4
				S								Swagelok fitting CMS0500/1000/2000: 1/2 Swagelok CMS0010/0050/0200: 1/4 Swagelok
				V								VCR fitting CMS0500/1000/2000: 3/8 VCR CMS0010/0050/0200: 1/4 VCR
					H							Hydrogen, helium *2
						2						Output: 4–20 mA / 0-5 V DC / 1–5 V DC
							0					No optional function
							1					With RS-485 communication
								0				No optional function
									1			Degreasing for gas-contacting parts
										0		No optional function
										D		With inspection report
										Y		With traceability certificate
											0	Product version

*1. "Standard" refers to the flow rate normalized for 20 °C and 101.325 kPa (atmospheric pressure).
*2. The factory default is hydrogen. For helium, set" Gas type" to" Helium."
The maximum measurable flow rate is the same for hydrogen and helium.

● Parts sold separately

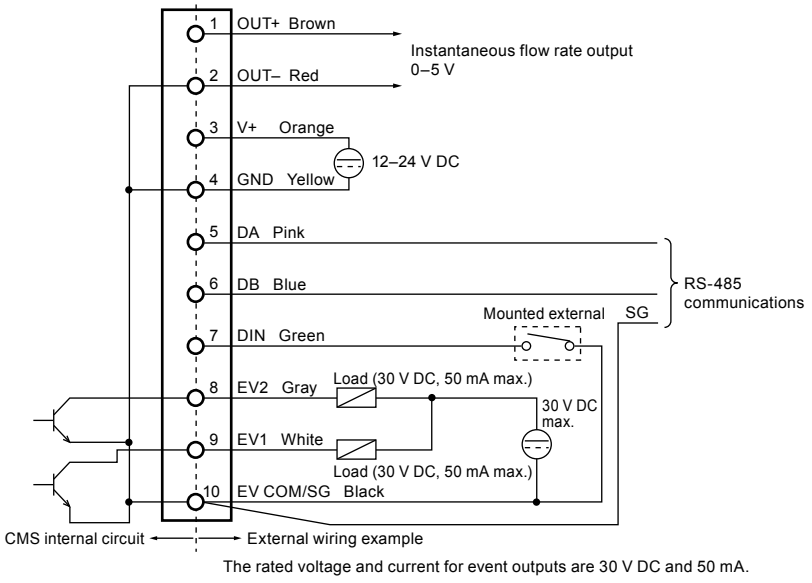
Name	Model No.	Description
Harness with dedicated connectors (For models without communication functions. One harness is necessary per CMS unit.)	**81446594-005**	For non-communication models, a 2 m harness without crimp terminals
	81446594-006	For non-communication models, a 5 m harness without crimp terminals
Harness with dedicated connectors (For models with RS-485 communication.* One harness is necessary per CMS unit.)	**81446594-007**	For communication models, a 2 m harness with M3.5 spade terminals
	81446594-008	For communication models, a 5 m harness with M3.5 spade terminals
AC adapter connection harness	**81446594-030**	For connecting the AC adapter
Mounting bracket (as needed)	**81446628-001**	For CMS0010/0050/0200
	81446721-001	For CMS0500/1000
	81446856-001	For CMS2000
Fitting for maintenance (For model SUS316 only. For replacement if fittings are damaged)	**81446834-001**	Two Rc 1/4 fittings
	81446834-002	Two Rc 1/2 fittings
	81446833-001	Two 1/4 Swagelok fittings
	81446833-002	Two 1/2 Swagelok fittings
	81446895-001	Two 1/4 VCR fittings
	81446895-002	Two 3/8 VCR fittings

* This harness can be used for models without communication functions.

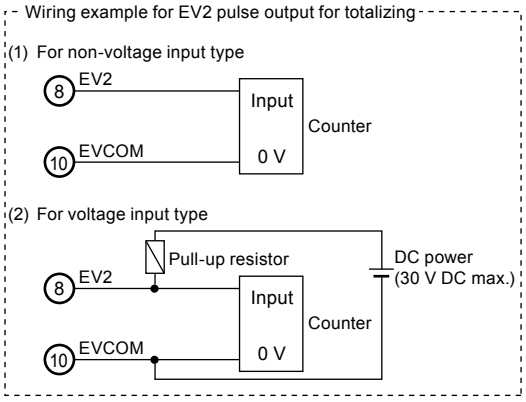
● Connector signal table

Pin No.	Signal name	Description	Notes
1	OUT+	Instantaneous flow rate output +	
2	OUT−	Instantaneous flow rate output −	
3	V+	Power+ (12–24 V DC)	
4	GND	Power GND	
5	DA	For RS-485 communications	Connect the pins only if a model with communication functions is used.
6	DB		
7	DIN	Totalized flow count reset input	
8	EV2	Event 2 output, totalizer pulse output	
9	EV1	Event 1 output, serial data output	
10	COM	Event output common	

● Wiring example

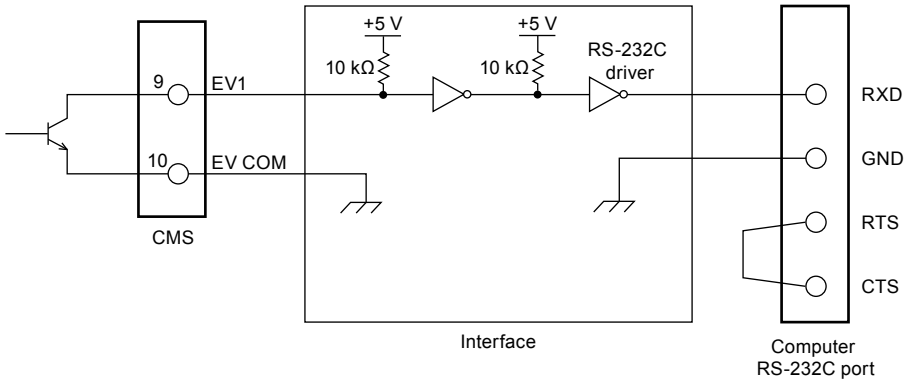


The rated voltage and current for event outputs are 30 V DC and 50 mA.



● For serial data output

• Wiring example

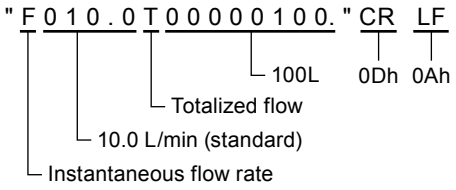


• Communication protocol

The currently displayed instantaneous flow rate data and totalized flow data are sent with ASCII encoding.

"F" is sent first followed by the instantaneous flow rate data, and then "T" followed by the totalized flow data.

Ex.: When the instantaneous flow rate is 10.0 L/min (standard) and the totalized flow is 100 L



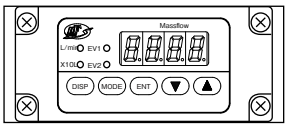
• Communication specifications

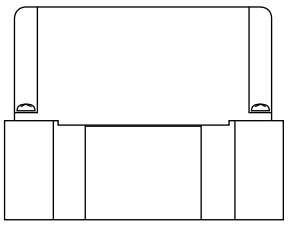
Item	Description
Communication method	RC-232C-compliant, start/stop synchronization
Transmission speed	9600 bps
Character length	8 bits
Stop bit	2 bits
Parity	None
Data transmission cycle	100 ±10 ms

External Dimensions

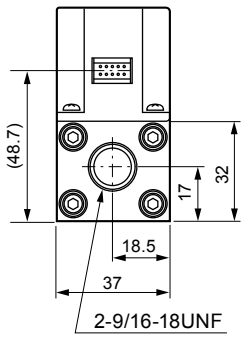
- **CMS0010/0050/0200**

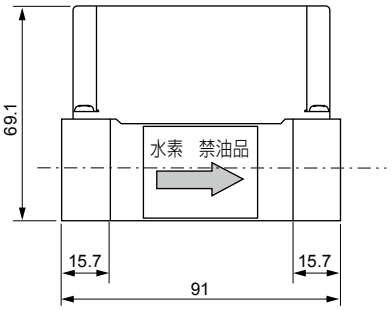
(Unit: mm)

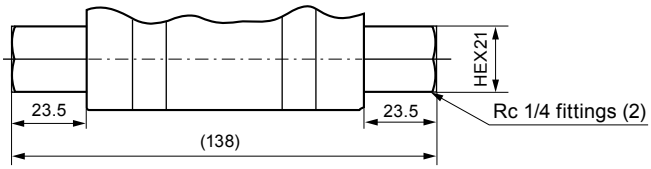




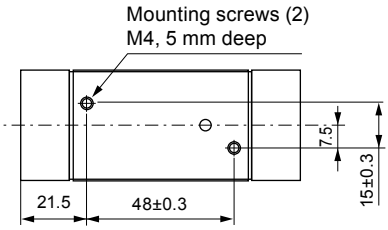
9/16-18 UNF connection type (standard)

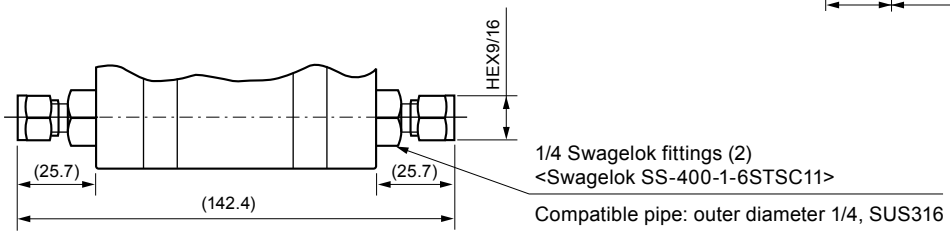




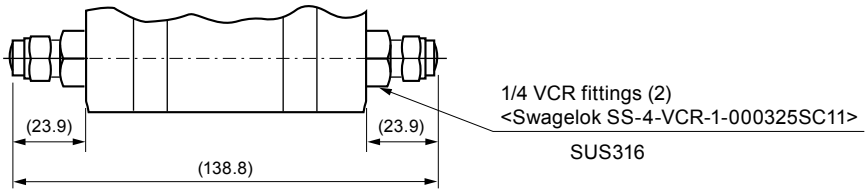


Rc 1/4 connection type (optional)





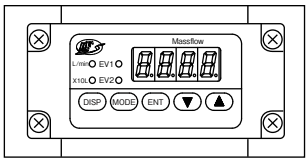
1/4 Swagelok connection type (optional)

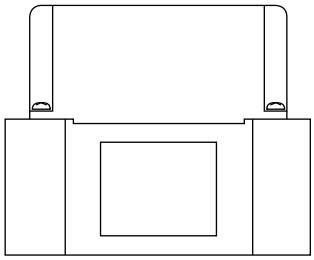


1/4 VCR connection type (optional)

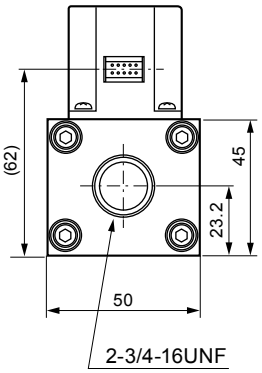
- **CMS0500/1000**

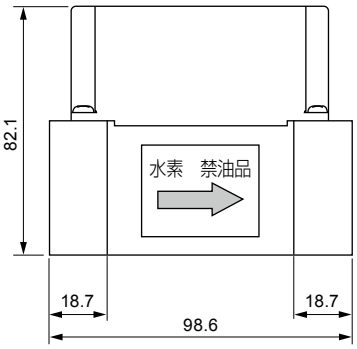
(Unit: mm)

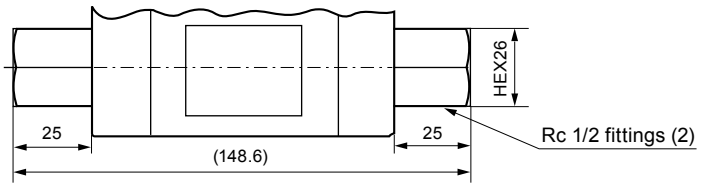




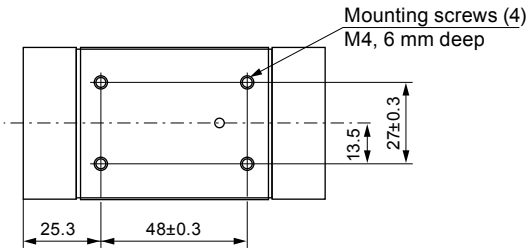
3/4-16 UNF connection type (standard)

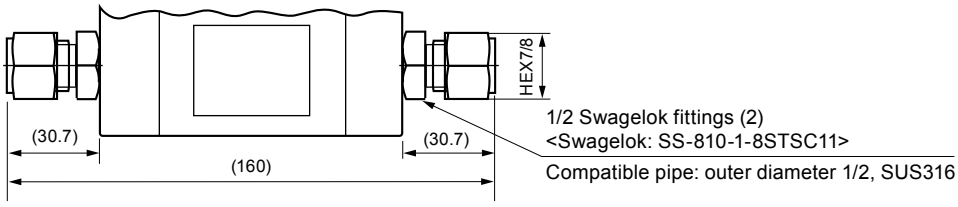




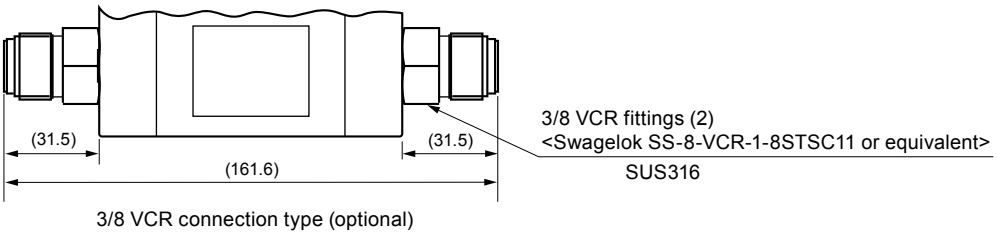


Rc 1/2 connection type (optional)





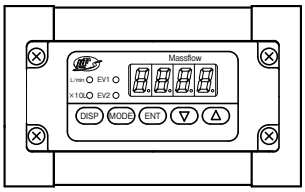
1/2 Swagelok connection type (optional)

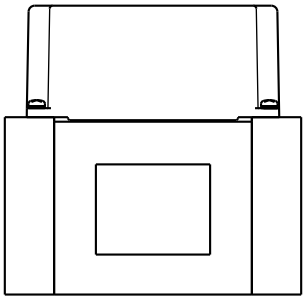


3/8 VCR connection type (optional)

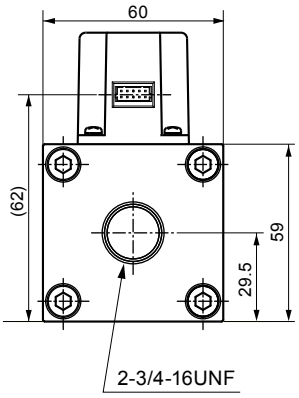
- **CMS2000**

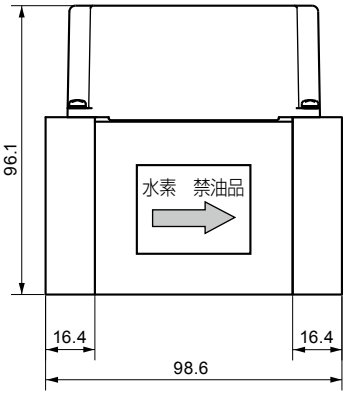
(Unit: mm)

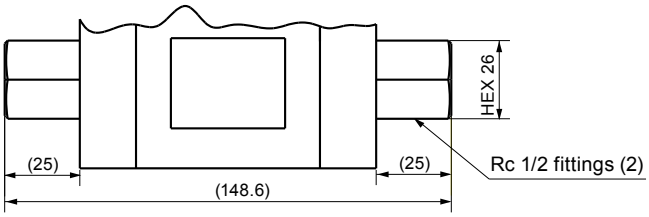




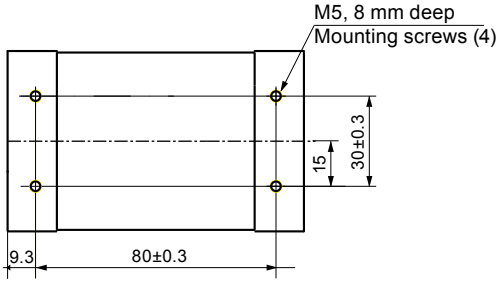
3/4-16 UNF connection type (standard)

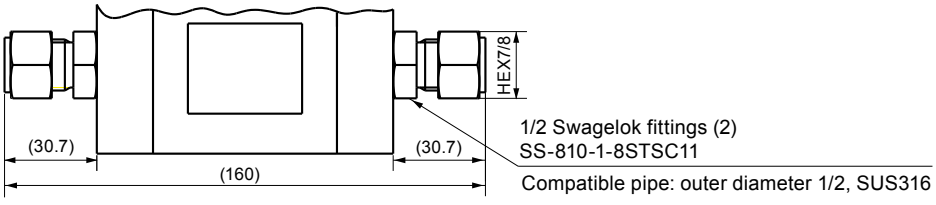




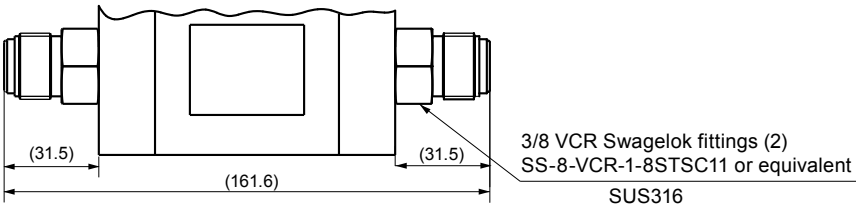


Rc 1/2 connection type





1/2 Swagelok connection type

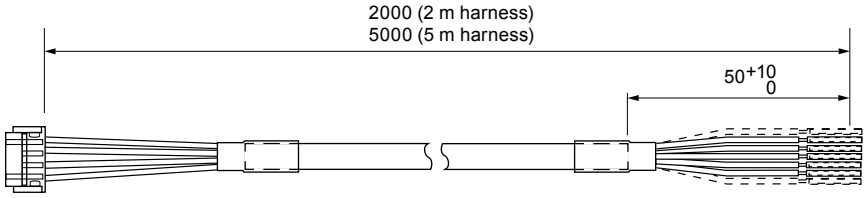


3/8 VCR connection type

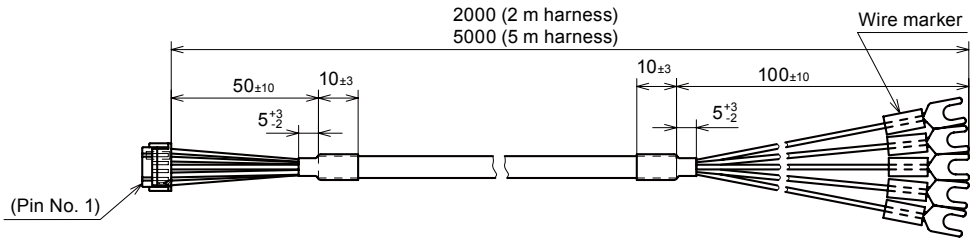
● Harness with dedicated connectors (connection cable)

(Unit: mm)

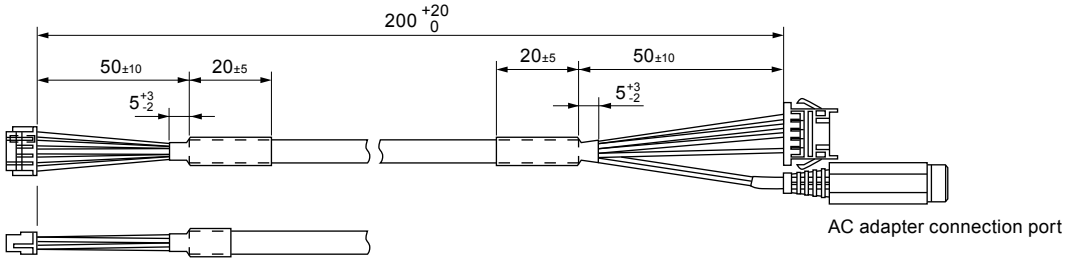
• For models without RS-485 communications
81446594-005 (2 m, 8 wires)
81446594-006 (5 m, 8 wires)



• For models with RS-485 communications (this harness can also be used for non-communication models)
81446594−007 (2 m, 10 wires, M3.5 spade terminals)
81446594−008 (5 m, 10 wires, M3.5 spade terminals)



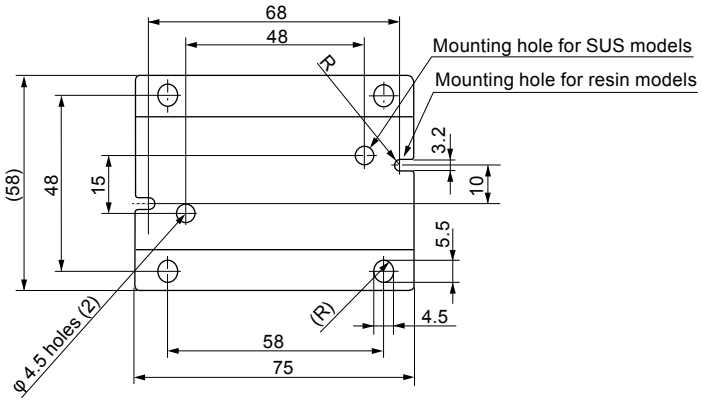
● AC adapter connection harness 81446594-030



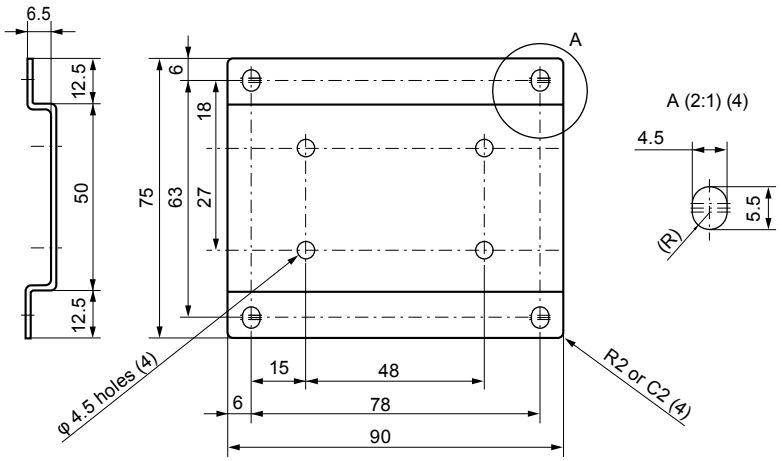
● Mounting bracket

(Unit: mm)

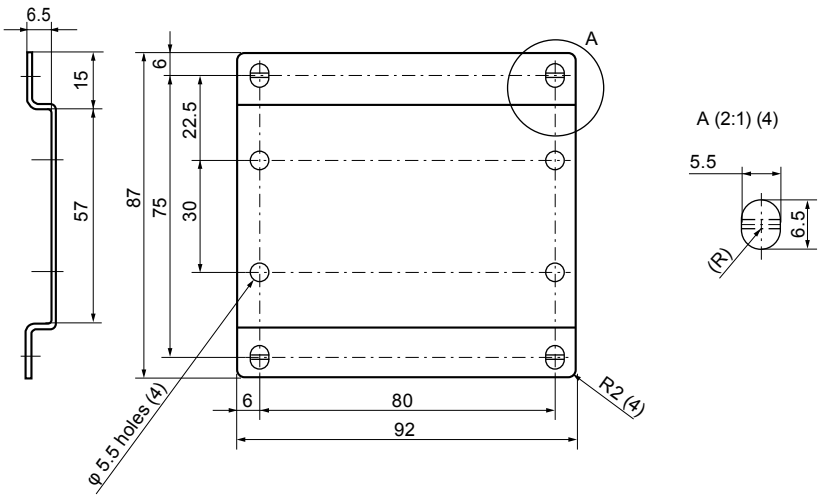
• 81446628-001 (for CMS0010/0050/0200)



• 81446721-001 (for CMS0500/1000)

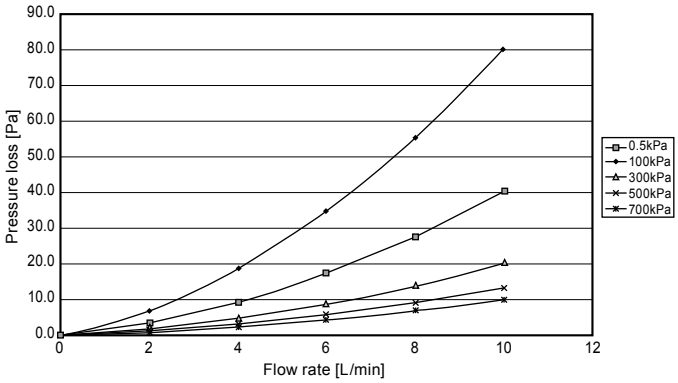


• 81446856-001 (for CMS2000)

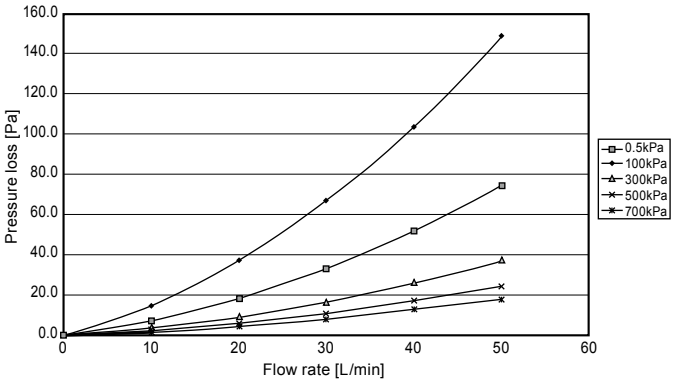


Pressure Loss

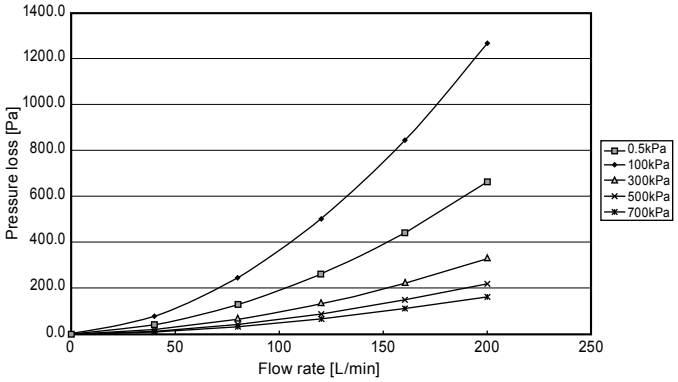
- **CMS0010**



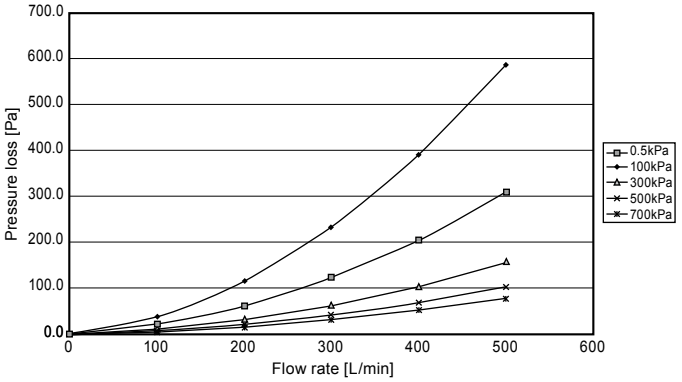
- **CMS0050**



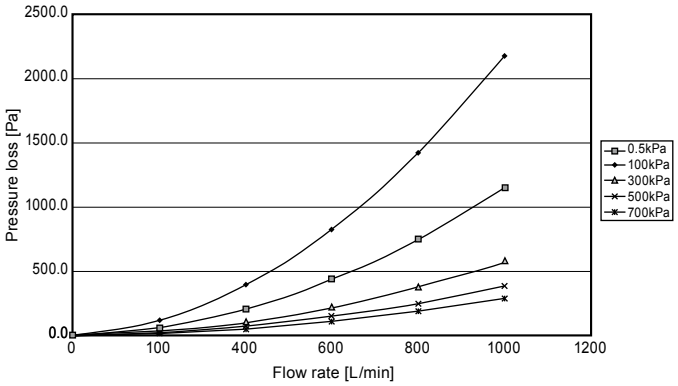
- **CMS0200**



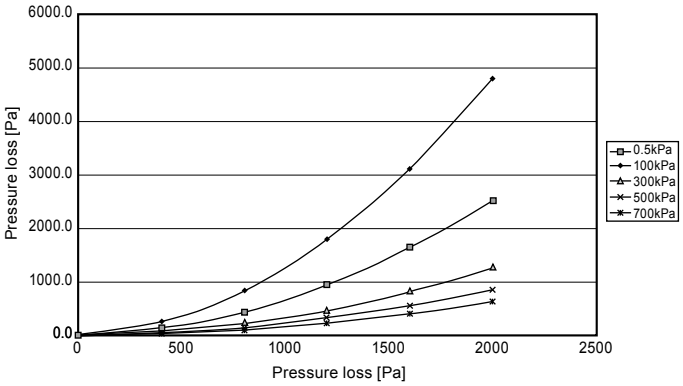
- **CMS0500**



- **CMS1000**



- **CMS2000**



Please read “Terms and Conditions” from the following URL before ordering and use.

https://www.azbil.com/products/factory/order.html

Specifications are subject to change without notice.

Azbil Corporation

Advanced Automation Company

1-12-2 Kawana, Fujisawa
Kanagawa 251-8522 Japan
URL: https://www.azbil.com/

1st edition: Nov. 2017
2nd edition: Jun. 2024