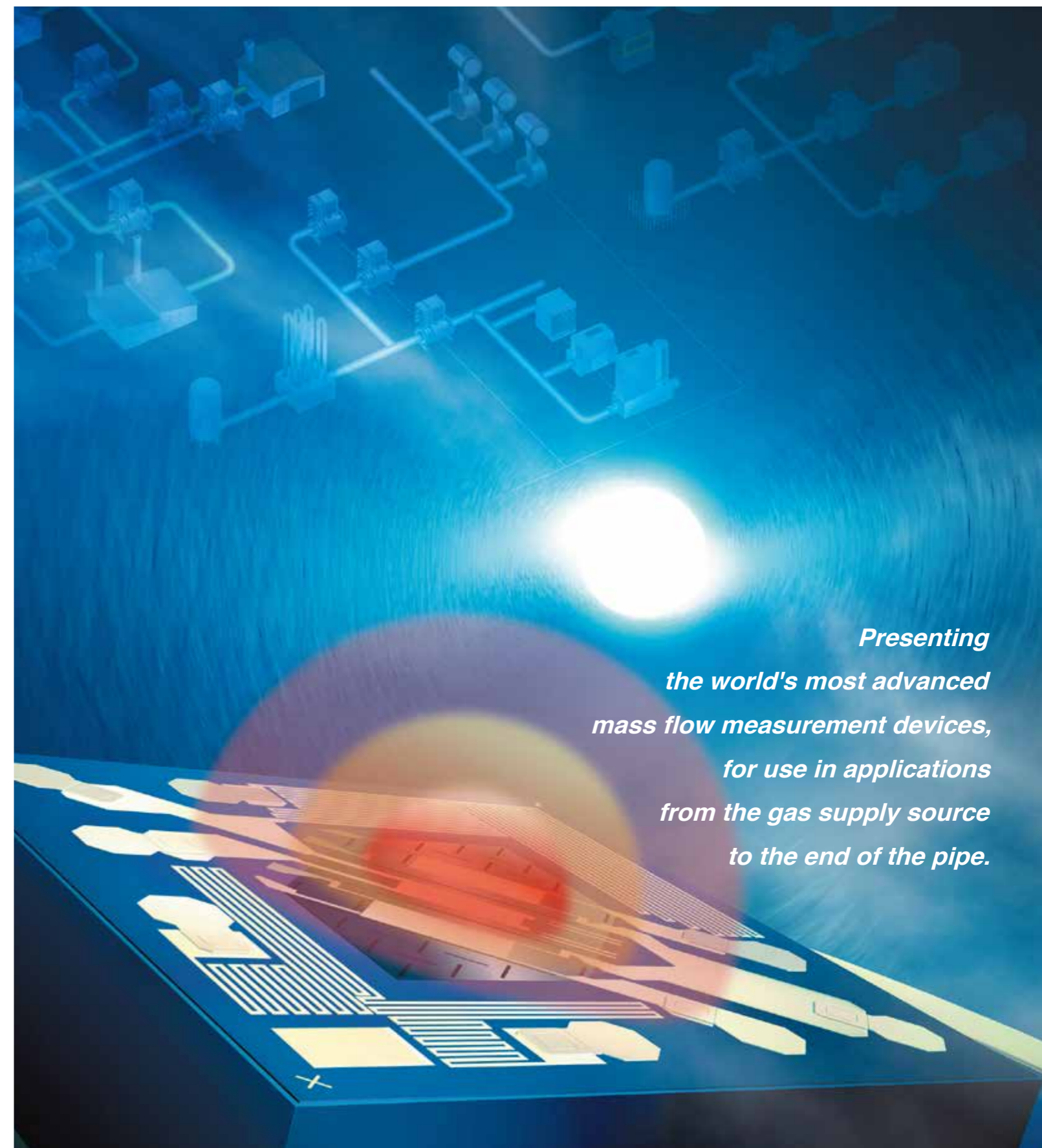


azbil



Gas Mass Flowmeters Micro Flow (μF) Selection Guide



*Presenting
the world's most advanced
mass flow measurement devices,
for use in applications
from the gas supply source
to the end of the pipe.*

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

<http://www.azbil.com/products/factory/order.html>

Other product names, model numbers and company names may be trademarks of the respective company.

*[Notice] Specifications are subject to change without notice.
No part of this publication may be reproduced or duplicated
without the prior written permission of Azbil Corporation.*

Azbil Corporation
Advanced Automation Company

Yamatake Corporation changed its name to Azbil Corporation on April 1, 2012.

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

INTRODUCING MASS FLOWMETERS

Thermal gas mass flow measurement using a MEMS (micro electromechanical systems) flow sensor helps users improve quality and save energy.

Features of the Micro Flow sensor



High speed 2ms response



Mass flow measurement without the need to compensate for changes in temperature and pressure



Wide 300:1 range



Symmetric structure measures reverse flow as well.



Very low age deterioration
High repeatability

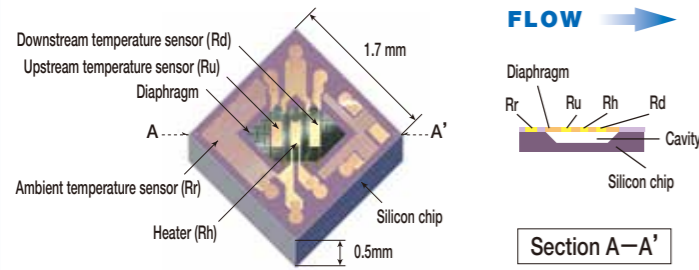


Proven reliability in 3,500,000 actual applications



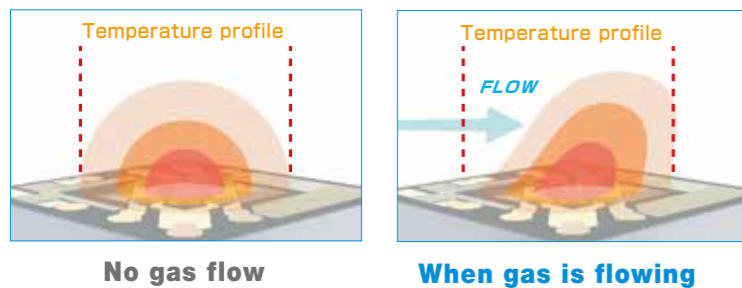
Note: Features of the μF sensor are described below. Functions differ by model.

Sensor structure



- Ultra-miniature structure (1.7 mm square x 0.5 mm thick)
- High resolution (1 mm/s)
- High speed response, unaffected by changes in pressure and temperature

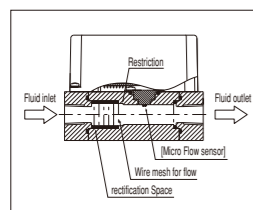
Measurement principle



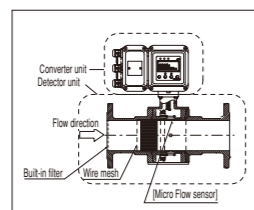
When there is no gas flow, the temperature distribution around the heater is symmetric. When gas starts to flow, the temperature upstream of the heater begins to decrease, while the temperature downstream increases, causing a distortion of the symmetric temperature distribution. This temperature difference causes a difference in resistance in a temperature sensor (a thin platinum film), and is used to calculate the mass flow rate (flow rate x density).

Examples of product structure

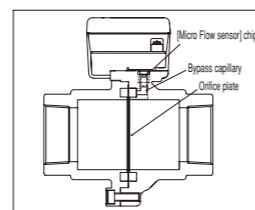
Model CMS section drawing



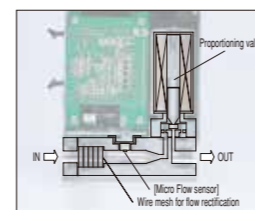
Model CML section drawing



Model CMG section drawing



Model MQV section drawing



Advantages

- Sensor is located on the pipe wall.
- No need for a straight pipe section with low pressure loss (models with built-in flow rectifier)
- Wide measurement range

Points to keep in mind

- Corrosive gases cannot be measured
- Low tolerance for foreign matter deposition (filter installation required)

Mass flowmeter / Gas flowmeter

Model No.	Appearance	Major applications	Pipe size (B)	Flow rate range	Air	Nitrogen	Oxygen	Argon	Carbon dioxide	City gas	Methane	Propane	Butane	Hydrogen	Helium	Laughing gas
Model CMS		Industrial gas management by department; experimentation and research	$\frac{1}{4}$ $\frac{1}{2}$	0.5 L/min to 2000 L/min	■	■	■	■	■	■	■	■	■	■	■	■
Model MCF		Energy-saving management for compressed air and nitrogen gas	$\frac{1}{4}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ 2	200 L/min to 12000 L/min	■	■										■
Model CMG		Unit consumption management for burner air-fuel ratio	$\frac{1}{2}$ 1 1 $\frac{1}{2}$ 2	4 m ³ /h to 150 m ³ /h	■					■	■	■	■			
Model MVF		Energy conservation management	2 3 4 6	2302 m ³ /h to 16839 m ³ /h	■	■	■	■	■	■	■	■	■			
Model CMF		Metered distribution and management of medical gases	$\frac{1}{2}$ 1	200 L/min to 160 m ³ /h	■	■	■									■
Model CML		Unit consumption management and metered distribution of city gas and industrial gases	2 3 4 6	160 m ³ /h to 1600 m ³ /h	■	■	■	■	■	■	■	■	■			
Model CMP		Metered distribution of city gas	2 3 4 6	160 m ³ /h to 1600 m ³ /h					■							
Model MCS		Chip pickup detection	$\frac{1}{8}$	-0.5 to +0.5 L/min 0 to 0.5 L/min -3 to +3 L/min 0 to 3 L/min	■	■										

Mass flow controller / Gas flow rate control

Model F4H		PVD, DLC, Plasma system, analyzer	$\frac{1}{4}$	50m L/min to 20 L/min	■	■	■	■	■							■	■
Model MQV		Tooling burner air-fuel ratio control, and fuel battery evaluation equipment	$\frac{1}{4}$ $\frac{1}{2}$	5m L/min to 500 L/min	■	■	■	■	■	■	■	■	■	■	■	■	■
Model MPC		Replacement of float type flowmeter (purgemeter) Auxiliary devices	$\frac{1}{8}$	0.5 L/min to 20 L/min	■	■		■	■								

Auxiliary devices

Model MFF25		For oil mist and dust (MCF models only)	$\frac{1}{4}$ to 1	300 L/min to 6000 L/min	■	■											
Model MFF100 Model MFF200		For oil mist and dust	$\frac{3}{8}$ to 6	35 m ³ /h to 11520 m ³ /h	■	■	■	■	■	■	■	■	■	■	■	■	■
Model MFF300		For dust (not for oil mist)	2 to 6	160 m ³ /h to 1600 m ³ /h	■	■		■	■	■	■	■	■				
Model FC		For dust (not for oil mist)	2 to 6	160 m ³ /h to 1600 m ³ /h	■	■		■	■	■	■	■	■				

Gas mass flowmeter

Model CMS

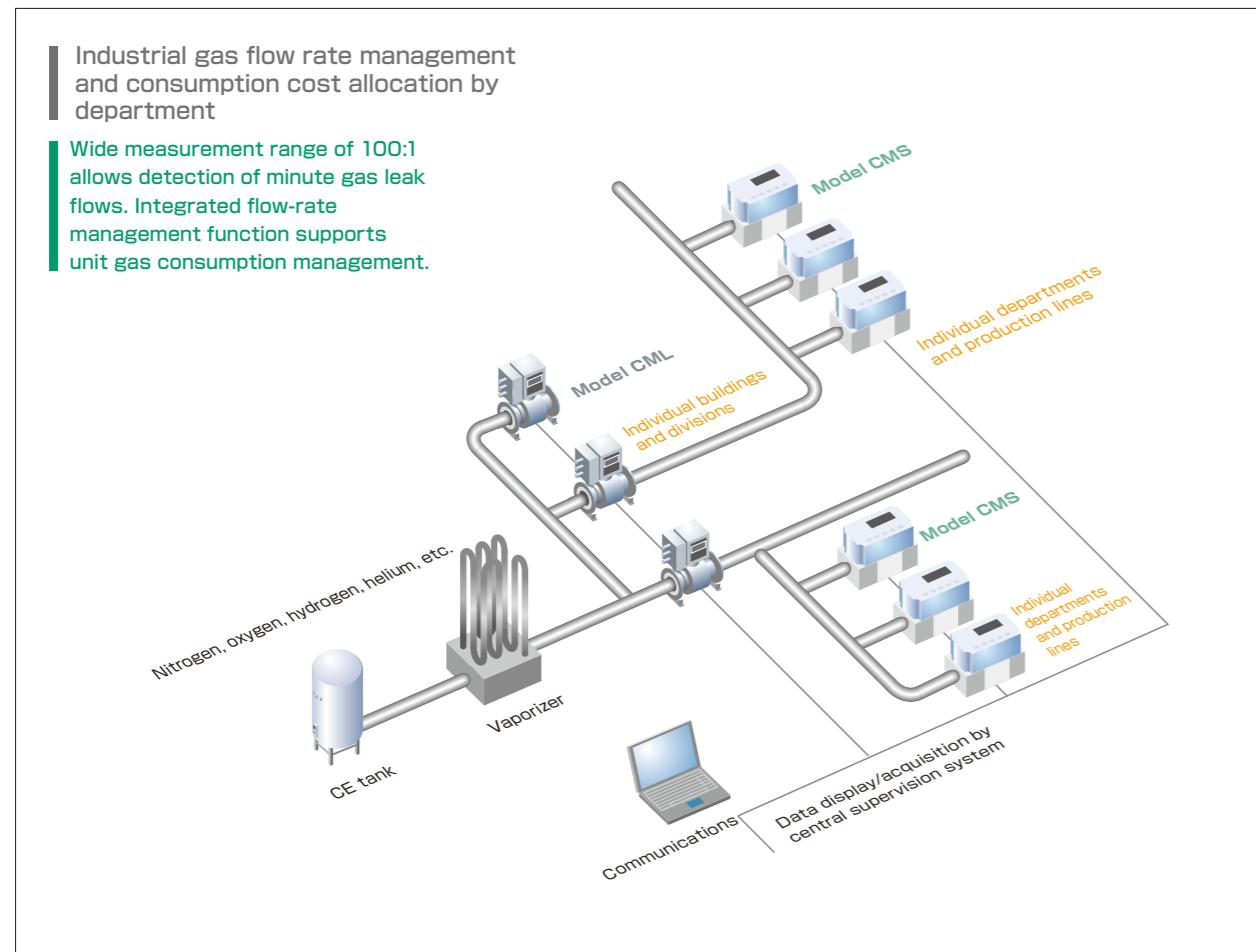
The ultimate compact mass flowmeter, with both high functionality and a 100:1 measurement range!



SUS/SUS316 model Hydrogen/helium model

Model	SUS/SUS316 model		Hydrogen/helium model	
Applicable gas	Air/nitrogen, oxygen, argon, carbon dioxide, city gas 13A (45/46MJ), methane, propane, butane		Hydrogen, helium	
Flow rate range: L/min (standard)	0.5/2/5/20/50 (air)	200/500 (air)	10/50/200	500/1000/2000
Accuracy	±3% RD		±5% RD	
Measurement range	100 : 1			
Minimum flow rate	500 : 1			
Operating pressure	-0.07 to +1 MPa			
Operating temperature	-10 to +60 °C			
Output	0-5V / 1-5V / 4-20 mA output, selectable using keys on the CMS body			
Communications	RS-485 (optional for SUS316, hydrogen and helium models)			
Power supply	12 to 24V dc			
Pipe size / connection standard	Rc 1/4, Swl, VCR	Rc 1/2, Swl, VCR	Rc 1/4, Swl, VCR	Rc 1/2, Swl, VCR
Straight pipe length	Not required if pipe size is uniform.			
Material	Gas-contacting parts: SUS304 or SUS316, fluororubber		Gas-contacting parts: SUS316L, fluororubber	
Weight	800 g	1400 g (2000 g for 500 L type)	800 g	1400 g (2000 g for 2000 L type)

Application example



Air flowmeter

Model MCF

A superb way to save energy when using compressed air or nitrogen.



Model No.	MCF008	MCF015	MCF025	MCF040	MCF050
Gas types	Air/nitrogen. (Note that gas must be dry, without corrosive components such as chlorine, sulfur and acid. It must also be clean, without dust or oil mist.)				
Flow rate range [L/min (normal)] *1	0 to 200	0 to 500 / 0 to 1000	0 to 3000	0 to 6000	0 to 12000
Measurement accuracy	± 3% FS				
Measurement range	50:1				
Minimum flow rate	100:1				
Temperature	-10 to +60 °C (without condensation)				
Pipe size	8A (1/4B)Rc,G,NPT	15A (1/2B)Rc,G,NPT	25A (1B)Rc,G,NPT	40A (1 1/2B)Rc,G,NPT	50A (2B)Rc,G,NPT
Body material	Aluminum alloy				
Case material	Denatured PPO				
Operating pressure range	-0.07 to +1.0 MPa				
Power supply	24V dc, 120 mA max. / Battery (Battery model)				
Output signal (instantaneous flow rate)	4 to 20 mA, allowable load resistance 300 Ω max.				
Communications	RS-485 (Modbus, option)				
Event output	One open collector output (rating 30V dc, 50 mA), with output type selectable from event function.				
Event function	Selectable from pulse output for integration *2, instantaneous flow rate high/low limit alarm, integration count up/down, or alarm output.				
Protective structure	IP65. (Rating is based on JIS C 0920 and IEC529. For purposes of installation indoors, device is waterproof and dustproof.)				
Mass	400 g	400 g	500 g	700 g	1100 g

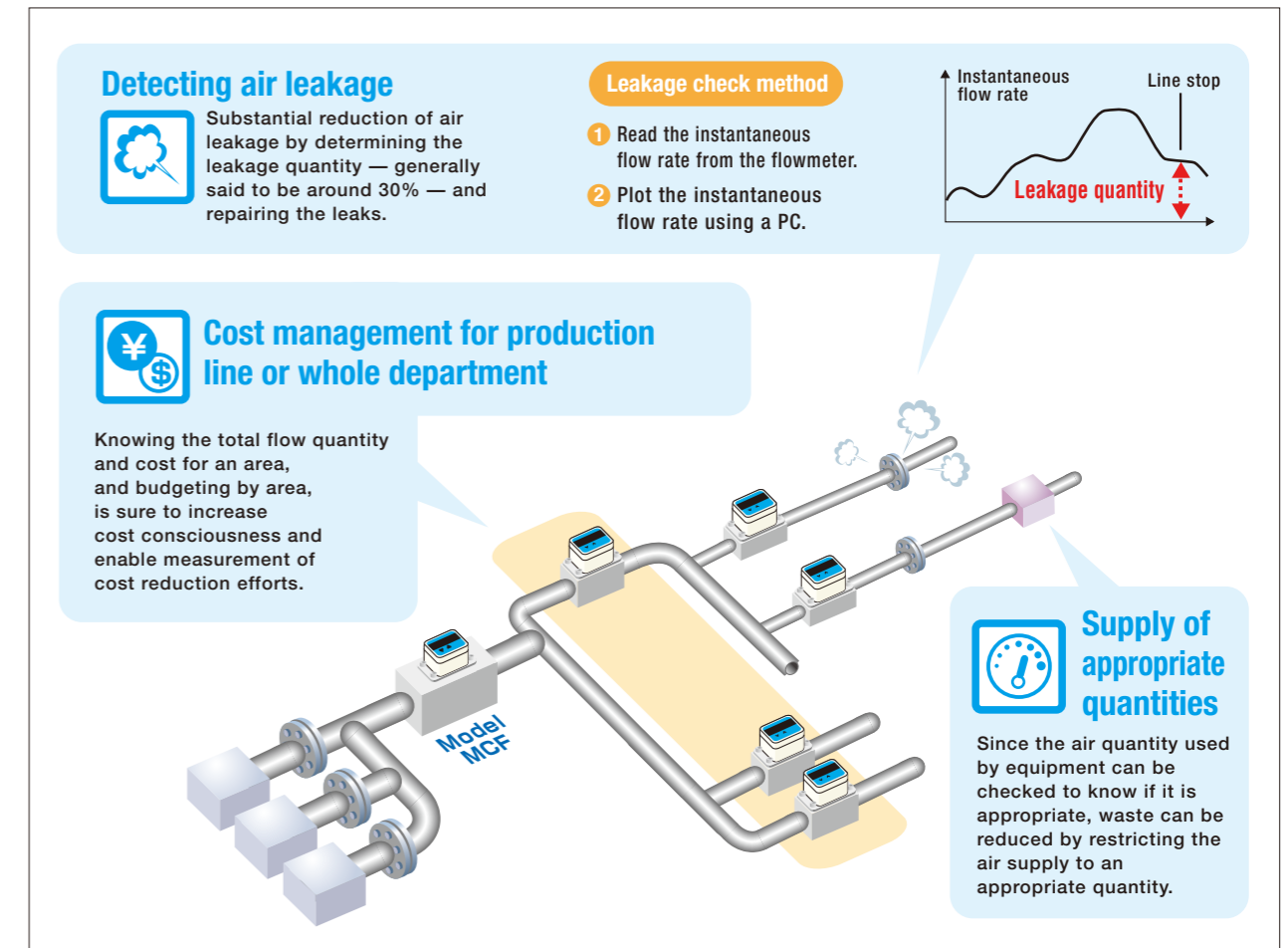
Notes: *1. The unit L/min (normal) refers to the volumetric flow rate adjusted for 0°C, 101.325 kPa. *2. Integrated pulse output specifications (selectable by settings)

• Pulse width: 50 ms, 250 ms, 500 ms

• Pulse weight:

Model No.	Pulse weight (L/pulse)
MCF008	10, 100, 1000
MCF015	10, 100, 1000
MCF025	10, 100, 1000
MCF040	100, 1000, 10000
MCF050	100, 1000, 10000

Application example



Model CMG

Flowmeters that provide optimal control of burner air/fuel ratio or unit consumption management



Model MVF

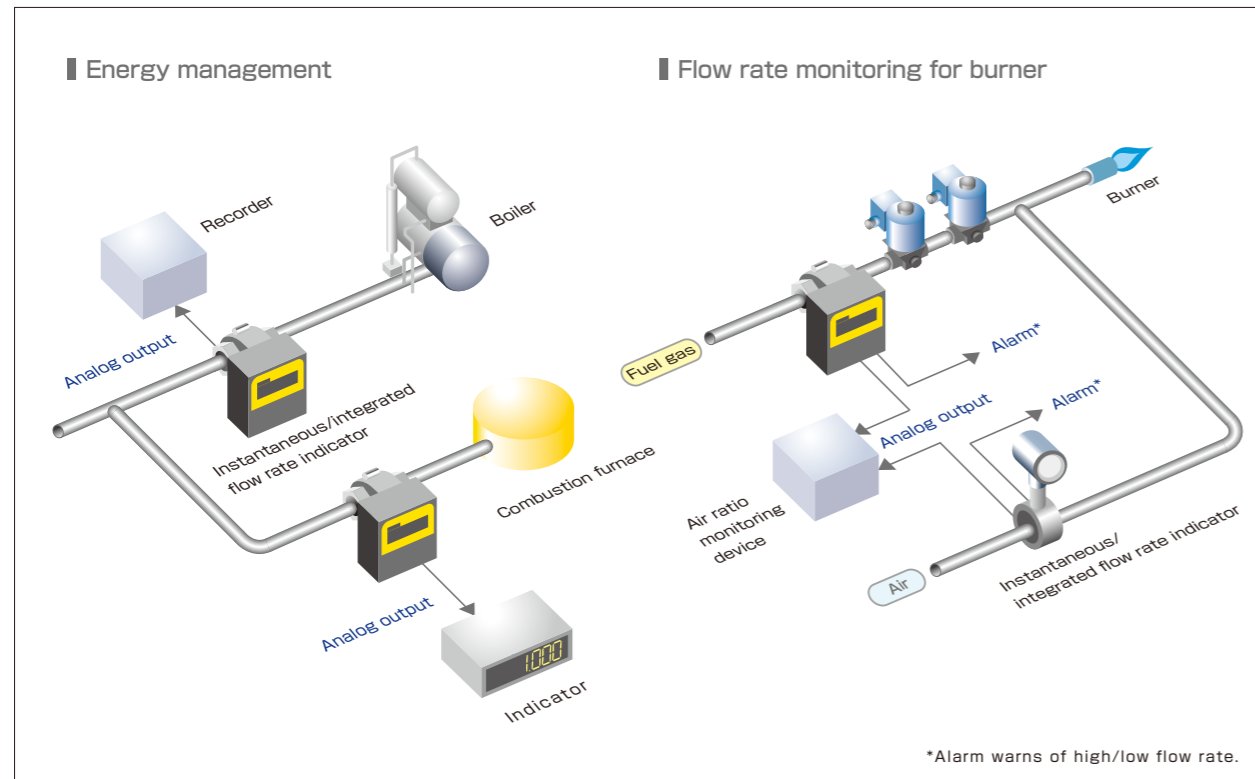
Wide 100:1 measurement range overturns common beliefs about vortex gas flowmeters. Temperature/pressure compensation functions are integrated.



Model	Air model	City gas model		Propane model	Butane model
Applicable gas	Air	City gas 13A		Propane	Butane
Flow rate range : m ³ /h(normal)	4/10/30/80/150	4/10/30/80/150	80/150	2/4/10/25/50	1/3/8/20/40
Accuracy	±4% RD			±6% RD	
Measurement range	10 : 1				
Minimum flow rate	30:1				
Operating pressure	0 to 100 kPa	0 to 100 kPa	0 to 990 kPa	0 to 100 kPa	0 to 100 kPa
Operating temperature	-10 to +60 °C				
Output	1-5V/4-20mA, selectable by model number				
Power supply	24V dc / 100V ac / 200V ac, selectable by model number				
Pipe size	15A/25A/40A/50A		40A/50A	15A/25A/40A/50A	
Connection type	Rc thread		JIS10k RF	Rc thread	
Straight pipe length	15A and 25A: not required. 40A, 50A: 10 cm to 40 cm				
Material	1/4B and 1B: die cast aluminum (ADC12) 1/2B and 2B: cast aluminum alloy (AC4A)		SCS13	1/4B and 1B: die cast aluminum (ADC12) 1/2B and 2B: cast aluminum alloy (AC4A)	
Protective structure	IP54 (JIS C 0920) dustproof and splash-proof structure				
Weight	850 to 2000 g	850 to 2000 g	9 to 10 kg	850 to 2000 g	850 to 2000 g

Applicable gas	Air/nitrogen, oxygen, argon, carbon dioxide, city gas 13A (45/46MJ), propane, butane, other inert gases.			
Flow rate range: m ³ /h (normal) at pressure of 0.5 MPa	1280	2826	4352	9364
Accuracy	Volumetric flow rate: ±2% RD. After temperature and pressure compensation: ±3.5% RD			
Measurement range	100 : 1			
Minimum flow rate (at a pressure of 0.5 MPa)	2.3 m ³ /h (normal)	5.2 m ³ /h (normal)	7.9 m ³ /h (normal)	17.1 m ³ /h (normal)
Operating pressure	0 to 1.0 MPa			
Operating temperature	-15 to +60 °C			
Output	4-20 mA and integrated pulse output			
Communications	RS-485			
Power supply	24V dc			
Pipe size	2B (50A)	3B (80A)	4B (100A)	6B (150A)
Connection type	Wafer connection			
Straight pipe length	10D (at upstream elbow)			
Material	Gas contacting parts: SCS13A, SUS304 and fluororubber. Case: Aluminum alloy			
Protective structure	IP67 waterproof structure			
Weight	6.3 kg	6.6 kg	9 kg	17 kg

Application example



Measurement principle

Through-hole

Sensing unit

μF (Micro Flow) sensor

Vortex generator

Downstream of a vortex generator situated in a gas flow, a vortex proportional to the flow velocity is generated. As shown in the figure, there is a hole in the vortex generator through which gas flows due to the action of the vortex. This flow is measured by a μF (Micro Flow) sensor capable of high-speed measurement of both direct and reverse flow. Consequently, vortex flowmeters can now achieve a 100:1 measurement range instead of the 15:1 range of the older piezoelectric vortex types. In addition, the integrated temperature and pressure sensors make the MVF indispensable for gas energy management. There is no need to install separate temperature/pressure compensation devices, contributing to total cost reduction.

Measurement ranges compared (for 80A pipe size, 0.5MPa)

Flow velocity 0.3m/s	Flow velocity 30m/s
29 to 2826	
Yamajake's MVF0800	90 to 9000
Ultrasonic wave	600 to 9000
Vortex (piezoelectric type)	800 to 8000
Differential pressure type	800 to 8000

For leakage in low load operations

Unused range in practice

Sample applications

Burner air-fuel ratio control, city gas and industrial gas energy management

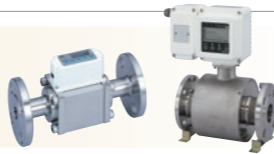
Medical gas meter

Model CMF

Ideal for medical gas management and metered distribution.
Conforms to JIS T 7101 medical-use pipe specifications.



(CMF015 type only)



CMF015

CMF050

Model No.	CMF015	CMF050
Applicable gas	Oxygen, nitrogen, artificial air/synthetic air, laughing gas	
Flow rate range: L/min (standard)	200 (oxygen)	2666 (oxygen)
Accuracy	CMF015 : ±3% RD CMF050 : ±2% RD	
Measurement range	100 : 1	160 : 1
Minimum flow rate	100 : 1	800 : 1
Operating pressure	0 to 0.7 MPa	0 to 1.0 MPa
Operating temperature	-10 to +60 °C	-25 to +60 °C
Output	4-20mA and integrated pulse output	
Communications	RS-485 (standard)	
Power supply	12 to 24V dc	85 to 264V ac
Pipe size	1/2B (15A)	2B (50A)
Connection type	JIS10K RF	
Straight pipe length	Not required	
Material	Gas contacting parts: SUS303/316 and fluororubber. Case: polycarbonate	Gas contacting parts: SUS304/SCS13A and fluororubber. Case: aluminum alloy
Protective structure	Indoor specifications	IP65 Waterproof structure
Weight	2.7 kg	21 kg

High-flow mass flowmeter / Gas meter

Model CML Model CMP

Flowmeters with a 1/1280 measurement range and high ±1% RD accuracy.



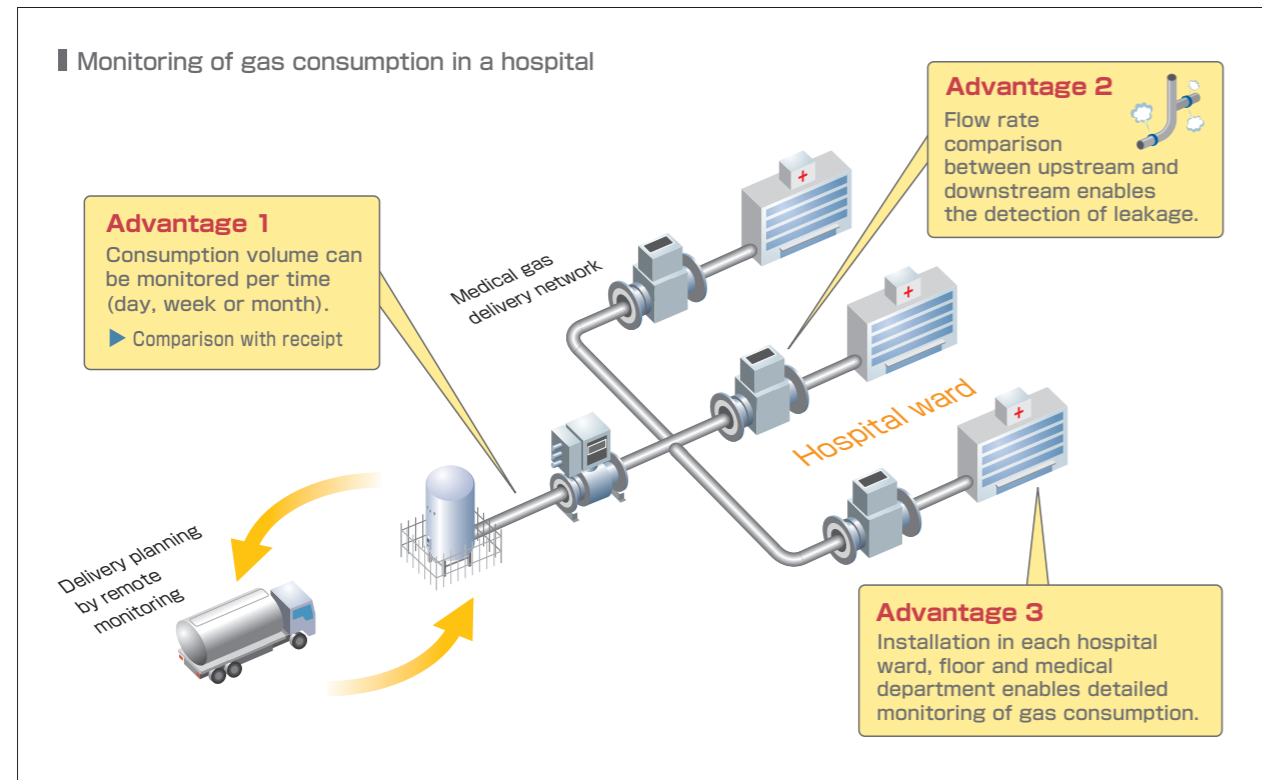
Model CML

Model CMP

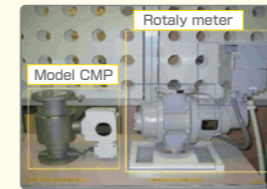
Model No.	Model CML				Model CMP			
Applicable gases	Air/nitrogen, oxygen, argon, carbon dioxide, city gas 13A (45/46MJ), propane, butane.				Air/nitrogen, city gas 13A (45/46MJ), city gas 12A, propane.			
Flow rate range: m³/h (normal)	160 (air)	400 (air)	650 (air)	1600 (air)	160 (13A)	400 (13A)	650 (13A)	1600 (13A)
Accuracy	±2% RD				±1% RD			
Measurement range	160:1				160:1			
Minimum flow rate	1280:1				320:1			
Operating pressure	0 to 1.0 MPa				0.01 to 1.0 MPa			
Operating temperature	-25 to +60 °C				-25 to +60 °C			
Output	4-20 mA and integrated pulse output				4-20 mA and integrated pulse output			
Communications	RS-485				—			
Power supply	85V ac to 264V ac				Built-in battery			
Pipe size	2B (50A)	3B (80A)	4B (100A)	6B (150A)	2B (50A)	3B (80A)	4B (100A)	6B (150A)
Connection type	JIS10K RF flange				—			
Straight pipe length	Not required				—			
Material	Gas contacting parts: SUS304/SCS13A. Case: aluminum alloy				—			
Protective structure	IP65 waterproof structure				—			
Weight	21 kg	24 kg	29 kg	45 kg	15 kg	24 kg	29 kg	45 to 66 kg

Application example

Monitoring of gas consumption in a hospital



Model CMP Medium pressure gas meter for metered distribution of city gas

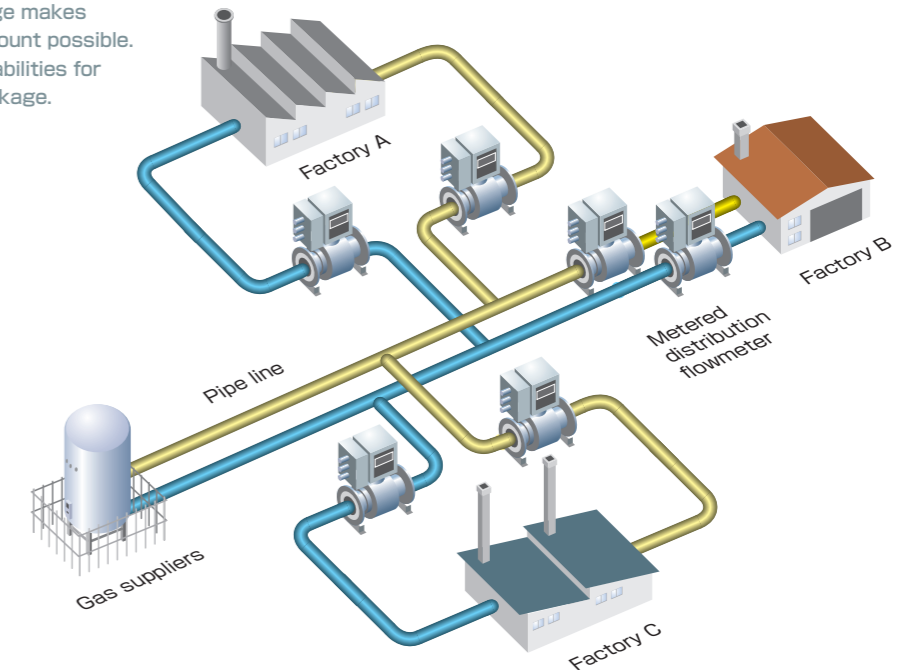


- Thanks to reduced size and weight, a crane is not required for installation.
Rotary 183 kg → CMP 44 kg (150A)
- Optional piping layout is possible in 4 flow directions.
- Straight pipe length is not required.

Application example

Metered distribution of industrial gas

1/1280 measurement range makes an accurate integrated count possible.
Powerful monitoring capabilities for unit consumption and leakage.



Chip pickup detection mass-flow sensor

Model MCS

5ms ultra high-speed response.
At only 9g, compact and lightweight



Applicable gas	Air/nitrogen, oxygen				
Flow rate range: L/min (standard)	-3 to +3	0 to +3	-0.5 to +0.5	0 to +0.5	0 to +10
Accuracy	±5% FS		±6% FS		±5% FS
Response time	5ms max. (95% response to a step state flow rate change)				
Operating pressure	-100 to +200 kPa				
Operating temperature	0 to +50 °C				
Output	1-5V output (non-linear)				
Power supply	12 to 24V dc				
Pipe size	M5 female (brass insertion)				
Straight pipe length	Not required				
Material	Gas contacting parts: PPS resin, ceramic and brass. Cover: PC (polycarbonate)				
Weight	9 g				

Multi-channel indicator for Model MCS

Model MCW

Supply power (DC24V)
to Model MCS

Separate flow rate range can be set for each channel,
with display and event output.



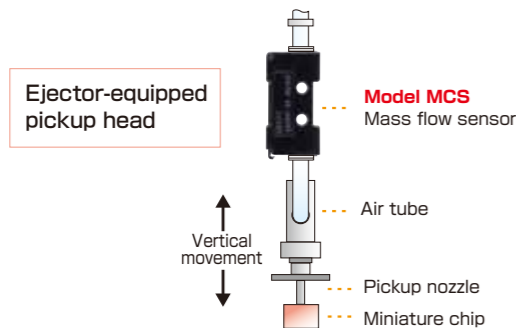
MCW100 1ch type



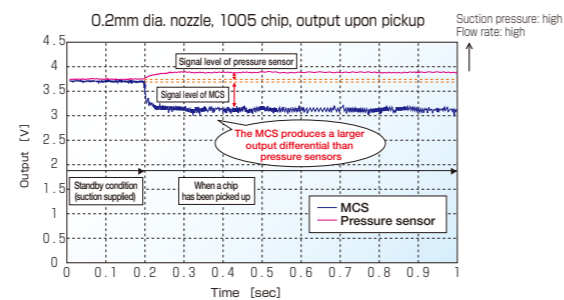
MCW400 4ch type

Application example

Installation example for miniature chip pickup detection

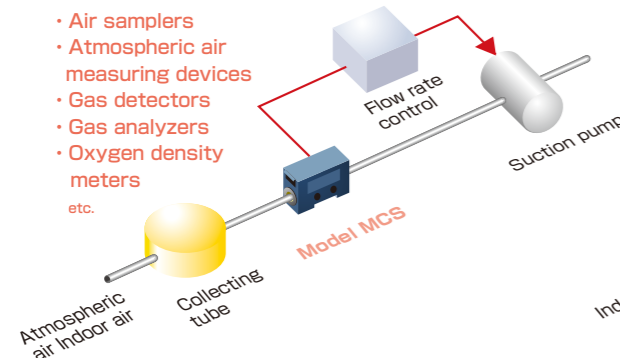


For detecting chip pickup, the MCS produces a larger output differential between chip and no-chip conditions than a standard pressure sensor.

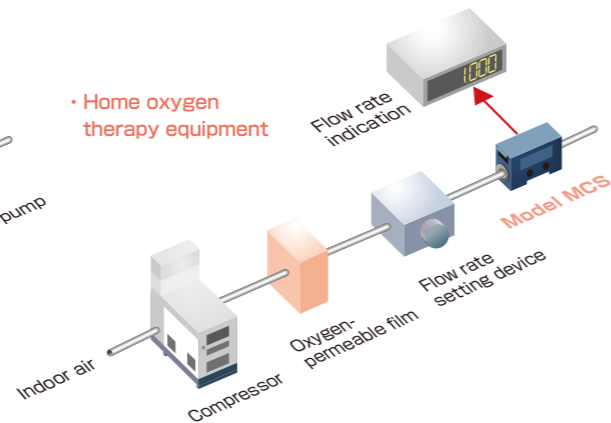


Sample applications for physical, chemical, and medical devices

- Air samplers
- Atmospheric air measuring devices
- Gas detectors
- Gas analyzers
- Oxygen density meters
- etc.



- Home oxygen therapy equipment



Compact Digital Mass Flow Controller

Model F4H

Saving Space, Saving wiring, Saving cost



fluororubber seal model only



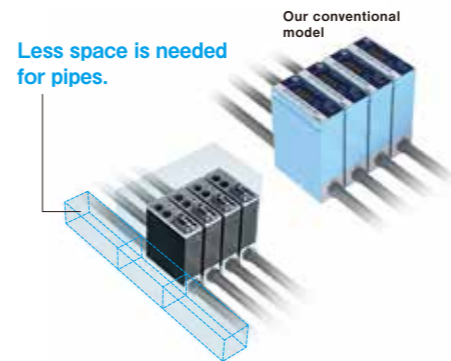
Model No.	F4H9050	F4H9200	F4H9500	F4H0002	F4H0005	F4H0020
Valve operation	Normally closed when de-energized(N.C.)					
Full-scale flow rate (air)	50.00 mL/min	200.0 mL/min	500.0 mL/min	2,000 L/min	5,000 L/min	20.00 L/min
Gas type	Air/nitrogen model: air/nitrogen, argon, carbon dioxide, hydrogen, and helium (switchable by setting) Oxygen model: oxygen, air/nitrogen, argon, carbon dioxide, hydrogen, and helium (switchable by setting)					
Control	Repeatability	±0.2% FS ± 1 digit				
	Accuracy	±2%FS	±1% FS			
	Offset of PV from SP	±0.1% FS ± 1 digit max.				
Pressure	Operating differential pressure range	20 to 200 kPa	50 to 300 kPa	100 to 300 kPa	50 to 300 kPa	100 to 300 kPa
	Operating differential pressure range	20 to 200 kPa	100 to 300 kPa	150 to 300 kPa	100 to 300 kPa	150 to 300 kPa
	Allowable inlet pressure	0.5 MPa (gauge) max.				
Temperature	Allowable operating temperature range					-10 to +50 °C
Analog input for flow rate setting	0 to 5 Vdc (factory setting), can be switched to 1 to 5 Vdc or 4 to 20 mAdc by host communication or PC loader					
Analog output for instantaneous flow rate	0 to 5 Vdc (factory setting), can be switched to 1 to 5 Vdc or 4 to 20 mAdc by host communication or PC loader					
Communications	CPL communication, Modbus RTU (select either by model number when ordering)					
Power	24 Vdc, current consumption: 300 mA max.					
Material of gas-contacting parts	Standard gas or oxygen model: SUS316, fluorocarbon resin, fluororubber					
Standards compliance	EN 61326-1:2013, EN61326-2-3:2013					
Weight	Approx. 700 g (excluding fitting)					

Advantages

Compact Design Saves Space

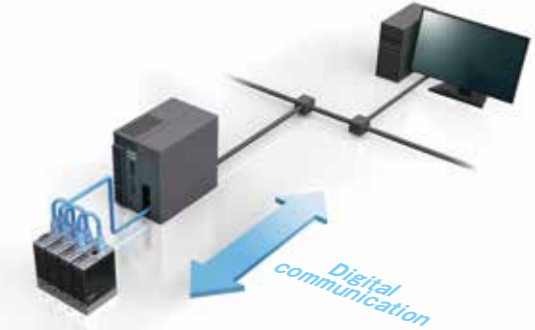
With a width of 28 mm, the product's slim design allows closer spacing of pipes, saving more space.

Less space is needed for pipes.



All Models Have Communication Functions

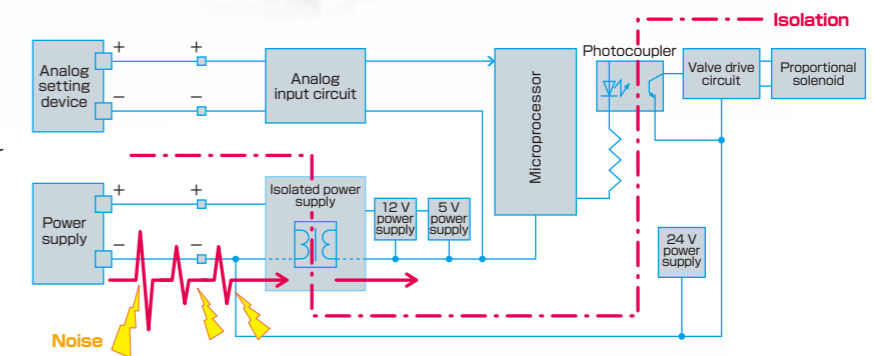
The large amount of data stored in the digital mass flow controller can be uploaded using the communication functions. This feature can be used not only to diagnose the mass flow controller, but also to diagnose the system that is using the mass flow controller.



High Noise Tolerance

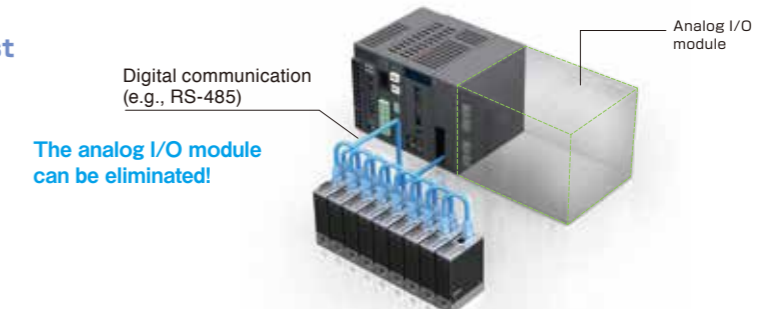
Isolation of the power supply from the signal circuit

By isolating the valve drive circuit from other circuits, power supply circuit and analog circuit isolation (patent No. 5132617) is achieved, even with a small-capacity isolated power supply. Thanks to this feature, noise from power wiring has no effect on signals.



Reduction in Overall Cost

By switching from an analog to a digital connection with the PLC, the analog I/O module can be eliminated.





Standard gas / Small flow rate model

Model No.	MQV9005	MQV9020	MQV9200	MQV9500	MQV0002	MQV0005	MQV0020	MQV0050 (B,C)	MQV0100
Standard full-scale flow rate	5 mL/min (standard)	20 mL/min (standard)	200 mL/min (standard)	0.500 L/min (standard)	2.00 L/min (standard)	5.00 L/min (standard)	20.0 L/min (standard)	50.0 L/min (standard)	100.0 L/min (standard)
Gas types	Air/nitrogen (N ₂), oxygen (O ₂), argon (Ar). The gas must be dry, without corrosive components (chlorine, sulfur, acid). It must also be clean, without dust or oil mist.		Air/nitrogen (N ₂), oxygen (O ₂), argon (Ar), carbon dioxide (CO ₂), city gas 13A (LNG: 45MJ/m ³), city gas 13A (LNG: 46MJ/m ³), methane 100% (CH ₄), propane 100% (C ₃ H ₈), butane 100% (C ₄ H ₁₀). The gas must be dry, without corrosive components (chlorine, sulfur, acid). It must also be clean, without dust or oil mist.					Air/nitrogen (N ₂), oxygen (O ₂), argon (Ar), carbon dioxide (CO ₂).	
Control	Control range	2 to 100% FS (see Table 1 below)		1 to 100% FS					
	Response (at std. differential pressure)	0.5s for SP ±2% FS (typ.)		0.3s for SP ±2% FS (typ.)					
	Accuracy (at standard temperature and differential pressure; Q is flow rate)	±1% FS		(1) Standard model: ±0.5% FS (0% FS ≤ Q ≤ 50% FS) ±1% FS (50% FS < Q ≤ 100% FS) (2) High accuracy model: ±0.2% FS (0% FS ≤ Q < 20% FS) ±1% SP (20% FS ≤ Q ≤ 100% FS)					±2% FS (80% FS < Q ≤ 100% FS) ±1% FS (0% FS < Q ≤ 80% FS)
Pressure	Operating differential pressure range	300 kPa max.							400 kPa max.
	Max inlet pressure	0.5 MPa (gauge)							-10 to +60°C
Operating temp.	-10 to +60°C								
Input	0-5V dc / 1-5V dc / 0-20 mA dc / 4-20 mA dc (selectable)								
Output	0-5V dc / 1-5V dc / 0-20 mA dc / 4-20 mA dc (selectable)								
Communications	(1) Dedicated PC loader connection (2) RS-485 communications (3-wire system)								
Power supply	24Vdc, current consumption 300mA max.								
Matl. of gas-contacting parts	SUS316, Teflon, fluororubber, borosilicate glass, silicon		SUS316, Teflon, Fluororubber						
Connection method	1/4" Swl, 1/4" VCR		Rc 1/4", 1/4" Swl, 1/4" VCR, 9/16-18 UNF					Rc 1/4", 3/8" Swl, 9/16-18 UNF	
Weight	Approx. 1.1 kg		Approx. 1.2 kg						

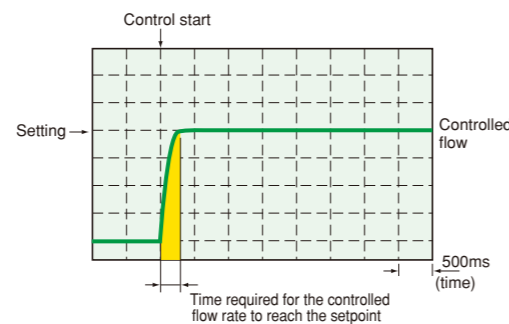
Hydrogen / Helium gas model

Model No.	MQV9020	MQV9050	MQV9500	MQV0005	MQV0010	MQV0050	MQV0200
Standard full-scale flow rate	20.0 mL/min (standard)	50.0 mL/min (standard)	0.500 L/min (standard)	5.00 L/min (standard)	10.00 L/min (standard)	50.0 L/min (standard)	200 L/min (standard)
Gas types	Hydrogen (H ₂), helium (He). The gas must be dry and not contain corrosive components (chlorine, sulfur, acid). It must also be clean, without dust or oil mist.						
Control	Control range	500ms for SP ±2% FS (typ.)		1 to 100% FS			
	Response (at std. differential pressure)	0.3s for SP ±2% FS (typ.)		(When control is started from fully closed condition, and when setting is changed while control is performed.)			
	Accuracy (at standard temperature and differential pressure; Q is flow rate)	±0.5% FS (0% FS ≤ Q ≤ 50% FS) ±1.0% FS (50% FS < Q ≤ 100% FS)	±1.0% FS (0% FS ≤ Q ≤ 100% FS)	±0.5% FS (0% FS ≤ Q ≤ 40% FS) ±1.0% FS (40% FS < Q ≤ 80% FS) ±2.0% FS (80% FS < Q ≤ 100% FS)			
Pressure	Operating differential pressure range	300 kPa max. (-10°C ≤ T ≤ 60°C)					
	Max inlet pressure	0.5 MPa (gauge)					
Operating temp.	-10 to +60°C						
Input	0-5V dc / 1-5V dc / 0-20 mA dc / 4-20 mA dc (selectable)						
Output	0-5V dc / 1-5V dc / 0-20 mA dc / 4-20 mA dc (selectable)						
Communications	(1) Dedicated PC loader connection (2) RS-485 communications (3-wire system)						
Power supply	24V dc, current consumption 300 mA max.						
Matl. of gas-contacting parts	SUS316, Teflon, fluororubber, borosilicate glass, silicon		SUS316, Teflon, Fluororubber				
Connection method	1/4" Swl, 1/4" VCR		Rc 1/4", 1/4" Swl, 1/4" VCR, 9/16-18 UNF				
Weight	Approx. 1.1 kg		Approx. 1.2 kg				

Standard gas / Middle flow rate model

Model No.	MQV0050 (J,K)	MQV0200	MQV0500
Standard full-scale flow rate	50.0L/min (standard)	200L/min (standard)	500L/min (standard)
Gas types	Air/nitrogen (N ₂), oxygen (O ₂), argon (Ar), carbon dioxide (CO ₂), city gas 13A (LNG: 45MJ/m ³), city gas 13A (LNG: 46MJ/m ³), methane 100% (CH ₄), propane 100% (C ₃ H ₈), butane 100% (C ₄ H ₁₀). The gas must be dry, without corrosive components (chlorine, sulfur, acid). It must also be clean, without dust or oil mist.		
Control	Control range	1 to 100% FS	
	Response (at std. differential pressure)	0.7s for SP ±2% FS (typ.)	
	Accuracy (at standard temperature and differential pressure; Q is flow rate)	(1) Std. model: ±0.5% FS (0% FS ≤ Q ≤ 40% FS) ±1% FS (40% FS < Q ≤ 80% FS) ±1.5% FS (80% FS < Q ≤ 100% FS) (2) High accuracy model: ±0.3% FS (0% FS ≤ Q < 25% FS) ±1.2% SP (25% FS ≤ Q < 80% FS) ±1.5% SP (80% FS ≤ Q ≤ 100% FS)	
Pressure	Operating differential pressure range	300 kPa max. (-10°C ≤ T ≤ 40°C) 180 kPa max. (40°C < T ≤ 60°C)	300 kPa max. (-10°C ≤ T ≤ 35°C) 240 kPa max. (35°C < T ≤ 50°C)
	Max inlet pressure	0.5 MPa (gauge)	
Operating temp.	-10 to +60°C		-10 to +50°C
Input	0-5V dc / 1-5V dc / 0-20 mA dc / 4-20 mA dc (selectable)		
Output	0-5V dc / 1-5V dc / 0-20 mA dc / 4-20 mA dc (selectable)		
Communications	(1) Dedicated PC loader connection (2) RS-485 communications (3-wire system)		
Power supply	24V dc, current consumption 400 mA max.		24V dc, current consumption 500 mA max.
Matl. of gas-contacting parts	SUS316, Teflon, Fluororubber		
Connection method	Rc 1/2", 1/2" Swl, 3/8" VCR, 3/4-16 UNF		
Weight	Approx. 3.5 kg		

Flow rate characteristics graph



Application example

Air/fuel ratio control glass-forming burner used in manufacturing of backlights, halogen lamps, etc.

Gas flow rate control for vacuum

- Evaporation coating
- Sputtering
- Plasma cleaning

Various test equipment

- Evaluation equipment
- Gas analyzers
- Incubators

Control of furnace internal atmosphere

- Baking furnaces for electronics parts
- Gas carburizing furnaces
- Baking and annealing furnaces

Model MPC

World's smallest (48 mm square × 73.7 mm deep) and lightest (300 g) mass flow controller



Model	Standard gas model			
Applicable gas	Air/nitrogen, argon, carbon dioxide			
Flow rate range: L/min (standard)	0.500 (air)	2.00 (air)	5.00 (air)	20.0 (air)
Accuracy	±2% FS			
Flow rate control range	4 to 100% FS		2 to 100% FS	
Response	1s max. (setting ±2%)			
Operating differential pressure range	300 kPa max.		50 to 300 kPa	
Pressure resistance	500 kPa			
Operating temperature	-10 to +50 °C			
Input	0-5V dc / 1-5V dc (only models with analog input/output function), external contact input (2 points)			
Output	0-5Vdc / 1-5Vdc (only models with analog input/output function), event output (2 points)			
Communications	Smart Loader connection (standard), RS-485 communications (option)			
Power supply	24V dc			
Pipe size / connection standard	1/8 Rc			
Straight pipe length	Not required			
Material	Gas-contacting parts: brass (Ni-plated), stainless steel, Teflon, and fluororubber			
Weight	300 g			

Application example

Furnace chamber gas density control

- Reflow furnace
- Die bonder
- etc.

Structure drawing

Suction flow rate control

- Gas sensor
- Gas analyzer
- Oxygen density meter
- Measurement equipment for sick building syndrome
- etc.

Gas mixing control

- Welding machine
- Incubator
- Use for various experiments
- etc.

We offer a variety of solutions related to gas flow measurement.

Calibration services

Do you know how accurate your existing flowmeter measurements are?

Flowmeter accuracy varies at different times depending upon the application, conditions and environment. It is risky to assume that your flowmeter's measurement is always as accurate as when you bought it. Long-term measurement reliability is necessary, especially for efficiency calculations, energy-saving evaluations, and business transactions. For that reason, regular flowmeter calibration is recommended for long-term use.

azbil offers calibration services.

Ask for calibration by azbil, for long-term flowmeter reliability.

Taking advantage of its design and production technologies as a flowmeter manufacturer, azbil is now offering calibration services, including JCSS (Japan Calibration Service System) calibration, pick-up and return calibration, and on-site calibration. We use JCSS traceability to ensure customer satisfaction.

On-site calibration service (available in Japan only)

Our technicians would be pleased to visit your factory or office to calibrate azbil products. On-site calibration significantly reduces the trouble and labor costs involved in removing flowmeters for calibration elsewhere. For your convenience, our service schedule is flexible.

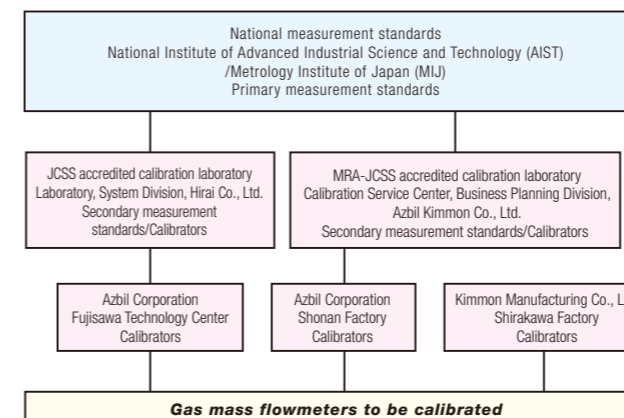
Loop calibration at the factory where the flowmeter is installed, with the usual operational configuration of the equipment, including connected indicators, etc. is available. This is the optimal calibration for meeting quality requirements for ISO, GMP, and HACCP.

We calibrate not only flowmeters, but also other measuring equipment, such as thermometers, hygrometers, and normal or differential pressure gauges. There's no need to change calibration contractors for different types of measuring equipment—azbil would be pleased to do all your calibrations.

Pick-up and return calibration service

With this service, we take your flowmeter to our testing facilities for high-accuracy calibration that is traceable to national measurement standards. This service is worthwhile when on-site calibration is difficult because of the installation conditions or environment of the flowmeter, or when calibration with especially high accuracy is needed. Another advantage is that, if a problem is found in the course of calibration, immediate adjustment or repair is available for Yamatake Micro Flow products and Kimmon products.

Traceability System



JCSS calibration service

On behalf of the Japanese government, and in compliance with Japan's measurement law, Accredited Calibration Laboratories provide this calibration service to meet national standards. ACS calibrates devices using secondary measurement standards/calibrators, which are evaluated by the primary measurement standards of Advanced Industrial Science & Technology (AIST), representing national standards. A calibration certificate with the JCSS logo is issued with the calibration results.

JCSS calibration service

azbil

Calibration Service Center,
Azbil Kimmon Co., Ltd.

MRA-JCSS accredited
calibration laboratory

Laboratory,
System Division,
Hirai Co., Ltd.