

Warnings and Cautions for Model MQV____ Flow Controllers

(For installation and use of this device, refer to the warnings and cautions in the user's manual.)

- Never allow gases that are within explosive limits to pass through this device. Doing so might result in an explosion accidents.
- Never use a device for oxygen gas if it is not a special oil-free oxygen gas model. Doing so could cause the gas to ignite. Even if gas-contacting sections have been treated to be oil-free, they cannot be used for oxygen if they have previously been used for some other gas.
- If the device is used for burner air-fuel ratio control, take the necessary countermeasures with the equipment to prevent the occurrence of backfire and to avoid any influence to the device even if backfire occurs. Pressure increase or fire in the pipes caused by the backfire of the burner could damage the controller.
- Prevent foreign matter from entering the device. If rust, water droplet, oil mist, or dust in the pipes enters the device, measurement or control error or damage might occur.
- If there is a possibility of foreign matter entering the device, provide a filter, strainer or mist trap capable of eliminating foreign matter 0.1 μm or greater in diameter at the upstream. Be sure to inspect and replace the filter at regular intervals.
- Use the device within the operating differential pressure range. Also, do not subject it to pressure beyond the rated pressure resistance range. Doing so might damage it.
- Do not subject this device to pressure beyond its rated pressure resistance. Doing so might result in damage.
- Be sure to use within the flow rate range stated in the product specifications. To prevent excessive flow rate, design instrumentation that includes, as appropriate, supply pressure management, a throttle valve, etc. Exceeding the upper limit of the range may result in display and output values that are considerably lower than the actual flow rate.
- If a problem with this device could result in damage, include appropriate redundancy in the system design.
- The valve on this device cannot completely shut a flow off. If complete shutoff is required, provide a shutoff valve separately. When the external valve is closed, it is necessary also to fully close the valve of the device using either of the following methods:
 - Set the flow rate setpoint to zero.
 - Make the valve operation mode to fully closed.

If this valve remains in normal control status when the external shutoff valve is closed (zero flow rate), there will be an excessively large flow as soon as the external shutoff valve is opened. For the model MQV0050(J,K)/0200(J,K)/0500(J,K), if the external shutoff valve is closed continuously for 5 minutes or more in control mode or with the valve forced fully open, the valve overheating limit (AL71) will be activated and the current to the valve will be forcibly limited.

- Before connecting pipes with Swagelok or VCR connections, check the precautions in the instruction provided by the connecting joint manufacturer. When separately purchasing a connecting joint, use the following made by Swagelok Co., Ltd:
 - 1/4" Swagelok: SS-400-1-6ST (standard)
SS-400-1-6STSC11 (oil-inhibited)
 - 1/2" Swagelok: SS-810-1-8ST (standard)
SS-810-1-8STSC11 (oil-inhibited)
 - 1/4" VCR: SS-4-VCR-1-00032SC11
 - 3/8" VCR: SS-8-VCR-1-8STSC11 or equivalent
- Observe the following when using the device (oil-free model) for oxygen gas:
 - Piping should be carried out by a specialist skilled in handling oxygen gas.
 - Use oil-free pipes and parts.
 - Be sure to remove foreign matter, burrs, etc, from the pipes before connecting the device.
 - Install a filter upstream of the device.
- Mount securely in order to prevent vibration. Otherwise, equipment failure could result.
- Mount the device horizontally. Do not mount it with the display facing down. Doing so might cause measurement error or equipment failure.
- For the model MQV0050(J,K)/0200(J,K)/0500(J,K)/1000(J,K), to keep pressure loss in the piping as low as possible, use as large a diameter pipe as possible. If the pressure loss in the piping is high, the gas supply pressure to this device (operating differential pressure) may fluctuate greatly, resulting in unstable control.
- When using a relay for external contact input and/or external 3-way switching input, always use a relay designed for micro-current use (with gold contacts). Failure to do so could cause faulty contact, resulting in malfunction.
- If there is a risk of a power surge caused by lightning, use Azbil Corporation's SurgeNon to prevent possible fire or equipment failure.
- Gas type switching by external contact input, flow rate switching, and analog input/output voltage range switching by external 3-way input switching should be done only after setting the operation mode to fully closed. Switching while controlling could cause large fluctuations.
- Do not use a semi-standard gas model with gases other than those below. Doing so may degrade the O-ring seal.
 - Compatible gases: Nitrogen (N_2), air, argon (Ar), carbon dioxide (CO_2), ammonia (NH_3), and acetylene (C_2H_2).
- If a semi-standard gas model is used for a gas with an ammonia component, be sure the gas is dry, with a dew point of -20°C or less. Otherwise the sensor may be damaged.

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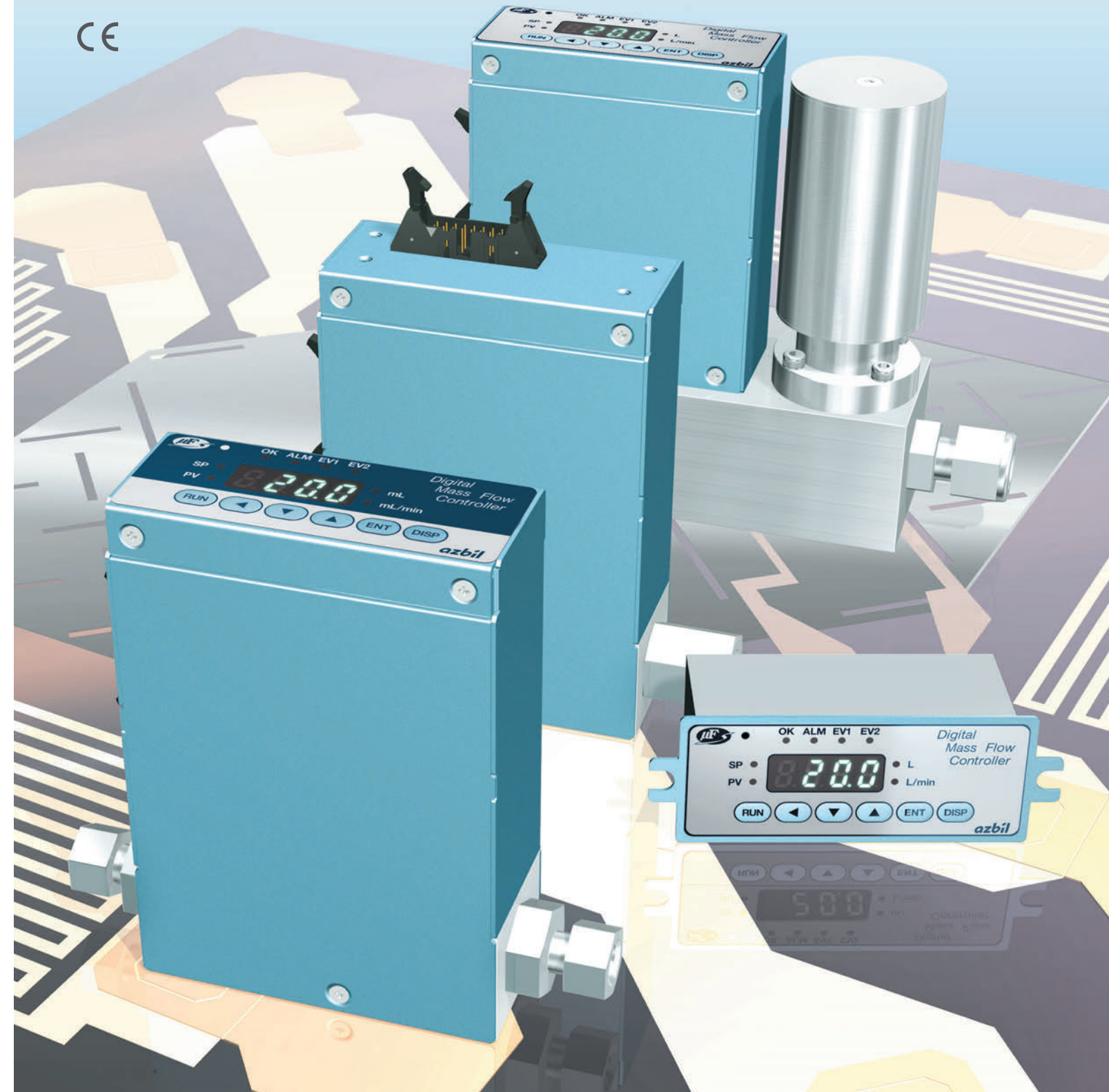
1st Edition : Mar. 2006-ST
9th Edition : Mar. 2023-SK/AZ

azbil



Digital Mass Flow Controller

New advances in finely honed control capability!
Superior high-speed control (300ms) with an enhanced variety of functions.



The Ultra Fast Micro Thermal Flow Sensor, Combined with Advanced Actuator Control Technology

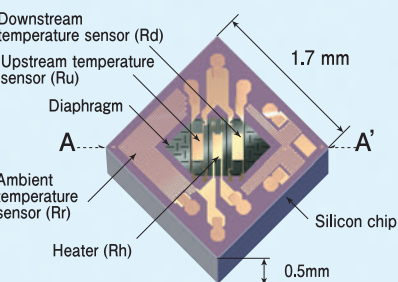
300ms* high-speed control can be used for low differential pressure work.
Selectable control range, power circuit isolation, and emphasis on usability

(* 500ms for the model MQV9005/9200/9050B and C, 700ms for the model MQV0050/0200/0500/1000J and K)

The model MQV_____ features high performance digital mass flow controllers that incorporate the micro thermal flow sensor developed by Azbil Corporation, a pioneer in MEMS flow sensors. The model MQV_____ uses advanced PID control technology to drive a proportional actuator.

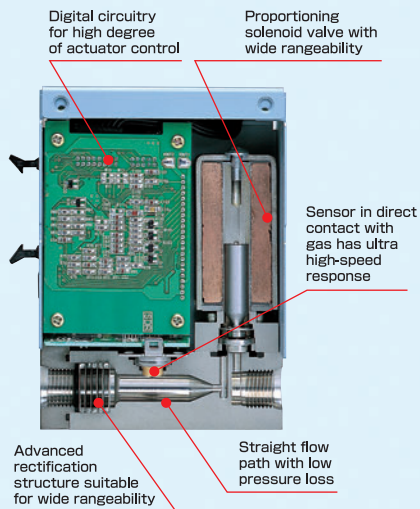
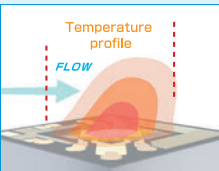
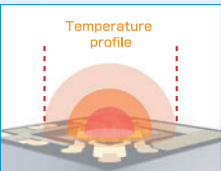
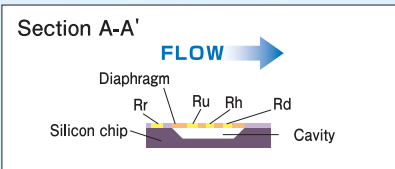


Structure and features of the micro thermal flow sensor



Principle of measurement

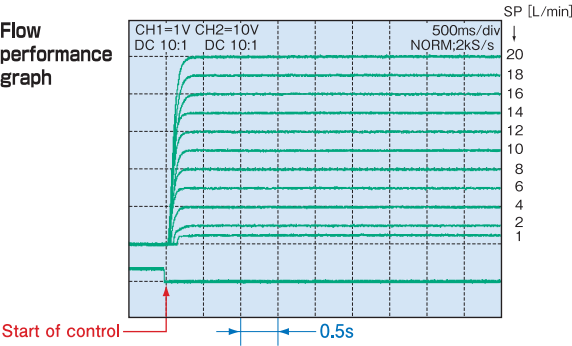
When there is no gas flow, the temperature distribution around the heater is symmetric. When the gas starts to flow from Ru to Rd, the temperature at Ru upstream decreases and the temperature at Rd downstream increases, thus causing a distortion of the symmetry in temperature distribution. The temperature difference between Ru and Rd is used to calculate the mass flow rate (flow rate \times density).



12 advantages

Advantage 1 Advanced 300ms high-speed controllability

Achieves 300ms high-speed control (700ms for the model MQV0050/0200/0500/1000J and K). The model MQV_____ offers exceptionally fast response from no flow to the stable setpoint flow rate, and after setpoint changes. This high-speed response to changes in primary gas pressure can minimize the effects on secondary flow.



Advantage 3 Broad lineup of models

The lineup includes models with or without integrated display, and models for standard gas, for hydrogen/helium, and for special gases. Select the optimum model for your application needs.



Advantage 2 Reliable control

Standard model
Accuracy: $\pm 0.5\%$ FS / $\pm 1.0\%$ FS
Repeatability: $\pm 0.25\%$ FS / $\pm 0.5\%$ FS

High accuracy model (standard gas model only)
Accuracy: $\pm 1.0\%$ SP
Repeatability: $\pm 0.5\%$ SP

Control range: 1 to 100% FS

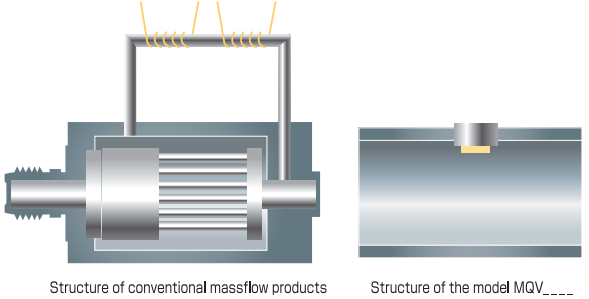
Note: For detailed specifications, refer to page 3.
% SP refers to deviation from the setpoint.



Advantage 4 Operation at low differential pressure is a standard feature

The model MQV_____ does not use capillaries that have large pressure loss.
So the model MQV_____ can control in the low pressure difference.

Optimum for low pressure gas control application
Ex.: Brazing, production of fluorescent lamps, etc.



Advantage 5 Wide range of standard functions

The model MQV_____ comes with a multitude of standard functions such as flow rate indication and totalizing. Without the need to process software like a PLC, the model MQV_____ handles a wide range of applications with ease.

Major functions

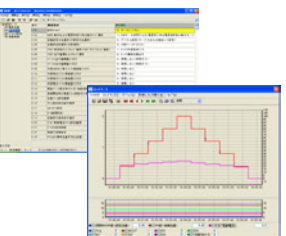
- Flow rate indication
- Flow rate totalizing
- Valve open/close indication
- OK flow rate indication/output
- Indication of amperage to valve
- Flow rate unit and decimal point location change
- Up to 8 preset setpoints
- Valve forced open/closed
- Automatic valve shut-off
- Gas type changeover
- Gas type selection (freely change gas conversion factor)
- Selectable control range
- SP ramp setting
- Slow start option
- Control dead zone setting
- External switch input (for SP change, gas type changeover and range changeover)
- Event output (abnormal flow rate, operation mode)
- Alarm output

Six easy-to-operate buttons, superior indication function, and SP change even in control run mode.



Advantage 6 PC loader communications functions

A convenient personal computer loader function has been integrated as a standard feature. The MLP loader software, which is sold separately, allows not only configuration of various settings, but also monitoring of flow rate trends and other operating status information on the PC screen. Acquired data can also be saved as a CSV file.



Easy connection using a dedicated USB (PC side) communications cable (included with the MLP100)

Advantage 7 A variety of available input and output signals



Voltage signal (0–5Vdc and 1–5Vdc)
Current signal (4–20mA and 0–20mA) (Selectable by setting)
Switch between 3 inputs and between 2 event outputs
RS-485 communications (optional)
Dedicated port for connection to a PC

Advantage 9 Engineered for flexible installation

On models with an integrated display, the display direction can be changed 180 degrees.



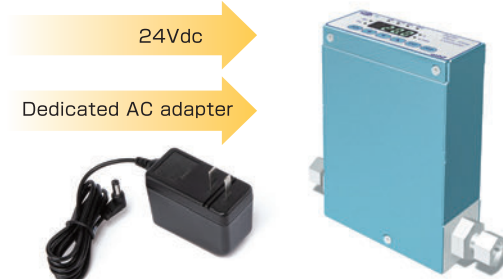
Advantage 11 CE marking

The model MQV_____ is CE-compliant.



Advantage 8 Can be connected to a regular 24Vdc power supply

The internal power supply circuit of this device is isolated from its analog circuits. When multiple model MQVs are controlled by PLC analog input/output, even if the analog module of the PLC is not isolated between channels, a common power supply can be used. Even without individual power supplies, there is no negative effect from surrounding circuits. An AC adapter (100 to 240Vac) is also available by separate purchase.



Advantage 10 Wide temperature range

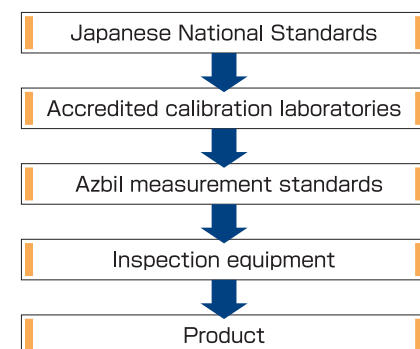
As a product developed for general industrial markets, the model MQV_____ can be used from -10 to +60°C (ambient temperature and gas temperature).



-10°C to +60°C

Advantage 12 JCSS traceability

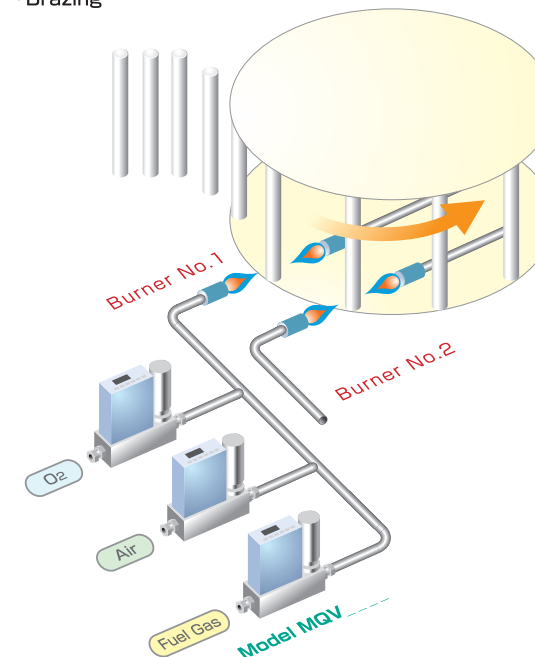
The model MQV_____ offers Japan Calibration Service System (JCSS) traceability, based on Japanese National Standards and Japanese measurement law, and in conjunction with Advanced Industrial Science and Technology (AIST).



Sample applications

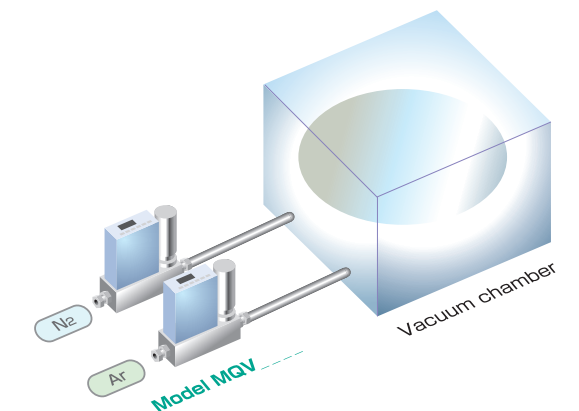
Air/fuel ratio control for burner

- Manufacturing of backlights
- Halogen lamps
- Glass-forming
- Brazing



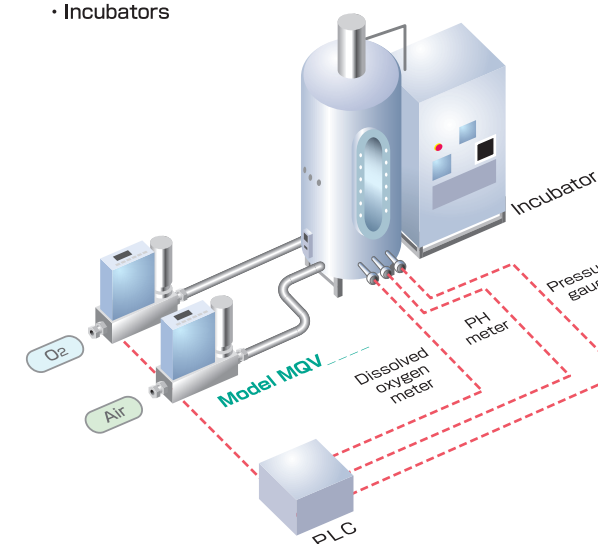
Gas flow rate control for vacuum

- Sputtering
- Plasma cleaning



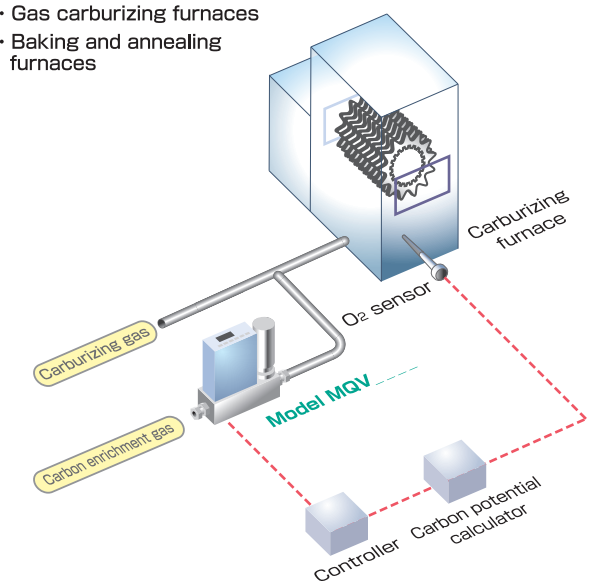
Various test equipment

- Evaluation equipment
- Gas analyzers
- Incubators



Control of furnace internal atmosphere

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



Specifications

Standard gas model / Small-flow type

Model No.		MQV9005	MQV9020	MQV9200	MQV9500	MQV0002	MQV0005	MQV0020	MQV0050 (B,C)	MQV0100	
Valve type		Proportional solenoid valve									
Valve operation		Normally closed when de-energized (N.C.)									
Standard full-scale flow rate <small>[Note 1]</small>		5mL/min (standard)	20mL/min (standard)	200mL/min (standard)	0,500L/min (standard)	2,00L/min (standard)	5,00L/min (standard)	20,0L/min (standard)	50,0L/min (standard)	100L/min (standard)	
Gas types		Air/nitrogen (N2), oxygen (O2), argon (Ar).		Air/nitrogen (N2), oxygen (O2), argon (Ar), carbon dioxide (CO2), city gas 13A (LNG: 45MJ/m³), city gas 13A (LNG: 46MJ/m³), methane 100% (CH4), propane 100% (C3H8), butane 100% (C4H10).					Air/nitrogen (N2), oxygen (O2), argon (Ar), carbon dioxide (CO2)		
				The gas must be dry, without corrosive components (chlorine, sulfur, acid). It must also be clean, without dust or oil mist. <small>[Note 3]</small>							
Control	Response(at std. differential pressure)	0,5s for SP ±2% FS (typ.)			0,3s for SP ±2% FS (typ.)						
	Accuracy <small>[Note 4]</small> (at standard temperature and differential pressure; Q is flow rate)	± 1% FS			Standard model: ±0,5% FS (0% FS≤Q≤50% FS) ± 1% FS (50% FS<Q≤100% FS) High accuracy model: ±0,2% FS (0% FS≤Q<20% FS) ± 1% SP (20% FS≤Q≤100% FS) <small>[Note 5]</small>					Std. model: ±1% FS (0% FS<Q≤80% FS) ±2% FS (80% FS<Q≤100% FS)	
Pressure	Required differential pressure <small>[Note 6]</small>	5kPa	30kPa	50kPa	5kPa	50kPa	5kPa	50kPa	100kPa	250kPa	
	Operating differential pressure range	300kPa max.								400kPa max.	
	Max. inlet pressure	0,5MPa (gauge) <small>[Note 7]</small>									
Temp.	Operating temp.	- 10 to +60°C									
Humidity	Operating humidity	10 to 90% RH (no condensation allowed)									
Analog output	Output range	0-5Vdc / 1-5Vdc / 0-20mAdc / 4-20mAdc (selectable)									
Alarm/event output	Number of outputs	Alarm: 1. Event: 2.									
External switching input	Input type, number of inputs	External 3-way switching inputs: 1. External contact inputs (2-way switching): 3.									
Communications	System	(1) Dedicated PC loader connection <small>[Note 9]</small> (2) RS-485 communications (3-wire system) <small>[Note 10]</small>									
Power	Rating	24Vdc, current consumption 300mA max.									
	Isolation	Power circuit is isolated from input/output circuit.									
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					9/16-18 UNF, Rc 1/4", 3/8" Swl, 3/8" VCR	
Mounting orientation		Horizontal. Note that the display panel must not face down.									
Weight		Approx. 1,1kg			Approx. 1,2kg						
Certifications		CE marking									

Standard gas model / Medium-flow type

Model No.		MQV0050 (J,K)		MQV0200		MQV0500	
Valve type		Proportional solenoid valve					
Valve operation		Normally closed when de-energized (N.C.)					
Standard full-scale flow rate [Note 1]		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, [Note 3]					
Control	Response(at std. differential pressure)	0.7s for SP ±2% FS (typ.) (When control is started from fully closed condition, and when the setpoint is changed while control is performed.)					
	Accuracy [Note 4] (at standard temperature and differential pressure; Q is flow rate)	Standard model:±0.5% FS (0% FS≤Q≤40% FS) ±1% FS (40% FS<Q≤80% FS) ±1.5% FS (80% FS<Q≤100% FS)					
		(None)	High accuracy model: ±0.3% FS (0% FS≤Q<25% FS) ±1.2% SP (25% FS≤Q<80% FS) [Note 5] ±1.5% SP (80% FS≤Q≤100% FS)				
Pressure	Required differential pressure [Note 6]	10kPa		100kPa		150kPa	
	Operating differential pressure range	100kPa max.	300kPa max. (−10℃≤T≤40℃) 180kPa max. (40℃<T≤60℃)		300kPa max. (−10℃≤T≤35℃) 240kPa max. (35℃<T≤50℃)		
			(Condition: power supply voltage = 24.0V) [Note 8]				
	Max. inlet pressure	0.5MPa (gauge)					
Temp.	Operating temp.	−10 to +60℃				−10 to +50℃	
Humidity	Operating humidity	10 to 90% RH (no condensation allowed)					
Analog output	Output range	0–5Vdc / 1–5Vdc / 0–20mAdc / 4–20mAdc (selectable)					
Alarm/event output	Number of outputs	Alarm: 1. Event: 2.					
External switching input	Input type, number of inputs	External 3-way switching inputs: 1. External contact inputs (2-way switching): 3.					
Communications	System	(1) Dedicated PC loader connection [Note 9] (2) RS-485 communications (3-wire system) [Note 10]					
Power	Rating	24Vdc, current consumption 400mA max.				24Vdc, current consumption 500mA max.	
	Isolation	Power circuit is isolated from input/output circuit.					
Matl. of gas-contacting parts		Standard gas model to SUS316, Teflon, fluororubber					
Connection method		Rc 1/2", 1/2" Swl, 3/8" VCR, 3/4-16 UNF					
Mounting orientation		Horizontal. Note that the display panel must not face down.					
Weight		Approx. 3.5kg					
Certifications		CE marking					

Semi-standard gas model

Model No.		MQV9200	MQV9500	MQV0002	MQV0005	MQV0020	MQV0050 (B,C)	MQV0200	MQV0500
Valve type		Proportional solenoid valve							
Valve operation		Normally closed when de-energized (N.C.)							
Standard full-scale flow rate [Note 1]		200mL/min (standard)	0,500L/min (standard)	2,00L/min (standard)	5,00L/min (standard)	20,0L/min (standard)	50,0L/min (standard)	200L/min (standard)	500L/min (standard)
Gas types		Air/nitrogen (N ₂), argon (Ar), carbon dioxide (CO ₂), acetylene (C ₂ H ₂), ammonia (NH ₃) [Note 2] The gas must be dry, without corrosive components (chlorine, sulfur, acid). It must also be clean, without dust or oil mist. The dew point of the ammonia gas must be -20° or below. [Note 3]							
Control	Response(at std. differential pressure)	0.3s for SP ±2% FS (typ.) (When control is started from fully closed condition, and when the setpoint is changed while control is performed.)						0.7s for SP ±2% FS (typ.)	
	Accuracy [Note 4] (at standard temperature and differential pressure; Q is flow rate)	±0.5% FS (0% FS≤Q≤50% FS) ±1% FS (50% FS<Q≤100% FS)						±0.5% FS (0% FS≤Q≤40% FS) ±1% FS (40% FS<Q≤80% FS) ±1.5% FS (80% FS<Q≤100% FS)	
Pressure	Required differential pressure [Note 6]	50kPa	5kPa	50kPa	5kPa	50kPa	100kPa	100kPa	150kPa
	Operating differential pressure range	300kPa max.						300kPa max. (-10℃≤T≤40℃) 180kPa max. (40℃<T≤60℃) (Condition: power supply voltage = 24.0V)[Note 8]	300kPa max. (-10℃≤T≤35℃) 240kPa max. (35℃<T≤50℃)
	Max. inlet pressure	0.5MPa (gauge) [Note 7]							
Temp.	Operating temp.	- 10 to +60℃							- 10 to +50℃
Humidity	Operating humidity	10 to 90% RH (no condensation allowed)							
Analog output	Output range	0-5Vdc / 1-5Vdc / 0-20mAdc / 4-20mAdc (selectable)							
Alarm/event output	Number of outputs	Alarm: 1. Event: 2.							
External switching input	Input type, number of inputs	External 3-way switching inputs: 1. External contact inputs (2-way switching): 3.							
Communications	System	(1) Dedicated PC loader connection [Note 9] (2) RS-485 communications (3-wire system) [Note 10]							
Power	Rating	24Vdc, current consumption 300mA max.						24Vdc, current consumption 400mA max.	24Vdc, current consumption 500mA max.
	Isolation	Power circuit is isolated from input/output circuit.							
Matl. of gas-contacting parts		Standard gas model to SUS316, Teflon, EPDM							
Connection method		Rc 1/4", 1/4" Swl, 1/4" VCR						1/2" Swl,	
Mounting orientation		Horizontal. Note that the display panel must not face down.							
Weight		Approx. 1.2kg						Approx. 3.5kg	
		CE marking							

Hydrogen / Helium gas model

Model No.		MQV9020	MQV9050	MQV9500	MQV0005	MQV0010	MQV0050	MQV0200
Valve type		Proportional solenoid valve						
Valve operation		Normally closed when de-energized (N.C.)						
Standard full-scale flow rate [Note 1]		20.0mL/min (standard)	50.0mL/min (standard)	0.500L/min (standard)	5.00L/min (standard)	10.00L/min (standard)	50.0L/min (standard)	200L/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. [Note 3]						
Control	Response(at std. differential pressure)	500ms for SP ±2% FS (typ.) (When control is started from fully closed condition, and when setting is changed while control is performed.)		0.3s for SP ±2% FS (typ.)				
	Accuracy (at standard temperature and differential pressure; Q is flow rate)	± 1.0%FS (50%FS<Q≤100%FS) ±0.5%FS (0%FS≤Q≤50%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	Required differential pressure [Note 6]	Hydrogen: 2.5kPa Helium: 5kPa	Hydrogen: 10kPa Helium: 20kPa	Hydrogen : 20kPa Helium : 40kPa		Hydrogen: 80kPa Helium: 150kPa	Hydrogen: 20kPa Helium: 40kPa	Hydrogen: 100kPa Helium: 180kPa
	Operating differential pressure range	300kPa max. (-10℃≤T≤60℃)						
	Max. inlet pressure	0.5MPa (gauge) [Note 7]						
Temp.	Operating temp.	- 10 to +60℃						
Humidity	Operating humidity	10 to 90% RH (no condensation allowed)						
Analog output	Output range	0-5Vdc / 1-5Vdc / 0-20mAdc / 4-20mAdc (selectable)						
Alarm/event output	Number of outputs	Alarm: 1. Event: 2.						
External switching input	Input type, number of inputs	External 3-way switching inputs: 1. External contact inputs (2-way switching): 3.						
Communications	System	(1) Dedicated PC loader connection [Note 9] (2) RS-485 communications (3-wire system) [Note 10]						
Power	Rating	24Vdc, current consumption 300mA max.						
	Isolation	Power circuit is isolated from input / output circuit.						
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				
Mounting orientation		Horizontal. Note that display panel must not face down.						
Weight		Approx. 1.1kg			Approx. 1.2kg			
Certifications		CE marking						

Selection Guide

Semi-standard gas model

Low flow rate Ex. MQV9200BSSE000100

Basic model No.	Flow rate range	Display	Material	Connection	Gas type	Option (1)	Option (2)	Option (3)	Option (4)	Option (5)	Design code	Description
MQV	9200											Digital mass flow controller
	9500											2 to 200mL/min (standard) [Note 1]
	0002											0.004 to 0.500L/min (standard) [Note 1]
	0005											0.02 to 2.00L/min (standard) [Note 1]
	0020											0.04 to 5.00L/min (standard) [Note 1]
	0050											0.2 to 20.0L/min (standard) [Note 1]
												0.4 to 50.0L/min (standard) [Note 1]
		B										Integrated display model (body length 90mm)
		C										Separate display model (body length 90mm)
			S									SUS316
				R								Rc 1/4"
				S								1/4" Swagelok
				V								1/4" VCR
					E							Semi-standard gas [Note 2]
						O						(None)
							O					(None)
								1				Model with RS-485 communications (CPL) function
												Without optional functions
												Oil-inhibiting treatment for gas-contacting parts
										O		(None)
										D		With inspection certificate
										Y		With traceability certificate
											O	Product version

Medium flow rate Ex. MQV0200JSSE000100

Basic model No.	Flow rate range	Display	Material	Connection	Gas type	Option (1)	Option (2)	Option (3)	Option (4)	Option (5)	Design code	Description
MQV	0200											Digital mass flow controller
	0500											2 to 200L/min (standard) [Note 1]
												4 to 500L/min (standard) [Note 1]
		J										Integrated display model (body length 150mm)
		K										Separate display model (body length 150mm)
			S									SUS316
				S								1/2" Swagelok
					E							Semi-standard gas
						O						(None)
							O					(None)
								1				Model with RS-485 communications (CPL) function
												(None)
												Oil-inhibiting treatment for gas-contacting parts
										O		(None)
										D		With inspection certificate
										Y		With traceability certificate
											O	Product version

[Note 1] L/min (standard) indicates the flow rate (L/min) converted to 20°C, one atmosphere (1 atm). The reference temperature can be changed to 0°C, 25°C, or 35°C. The controllable flow rate range varies according to the gas type. [Note 2] Applies only to ammonia, acetylene. Since the factory setting is air/nitrogen, be sure to set the gas type conversion factor (C.F.) before use.

Hydrogen / Helium gas model

Low flow rate Ex. MQV9500BSRH0000100

Basic model No.	Flow rate range	Display	Material	Connection	Gas type	Option (1)	Option (2)	Option (3)	Option (4)	Option (5)	Design code	Description
MQV	9020											Digital mass flow controller
	9050											0.2 to 20.0mL/min (standard) [Note 1]
	9500											0.4 to 50.0mL/min (standard) [Note 1]
	0005											0.004 to 0.500L/min (standard) [Note 1]
	0010											0.04 to 5.00L/min (standard) [Note 1]
	0050											0.10 to 10.00L/min (standard) [Note 1]
	0200											0.4 to 50.0L/min (standard) [Note 1]
												2 to 200L/min (standard) [Note 1]
		B										Integrated display
		C										Separate display
			S									SUS316, Teflon, Viton
				R								Rc 1/4"
				S								1/4" Swagelok
				V								1/4" VCR
				U								9/16-18 UNF
					H							Hydrogen/helium [Note 2]
						O						(None)
							O					(None)
								1				RS-485 (CPL) communications
												(None)
												Gas-contacting parts treated to be oil-inhibited
										O		(None)
										D		Inspection certificate provided
										Y		Traceability certificate provided
											O	Product version

[Note 1] L/min (standard) indicates the hydrogen flow rate (L/min) per minute converted to 20°C, one atmosphere (1 atm). The reference temperature can be changed to 0°C, 25°C, or 35°C. The controllable flow rate range varies according to gas type. [Note 2] Although the gas type is set to hydrogen at the factory, it can be changed to helium.

Table 3. Optional parts (sold separately)

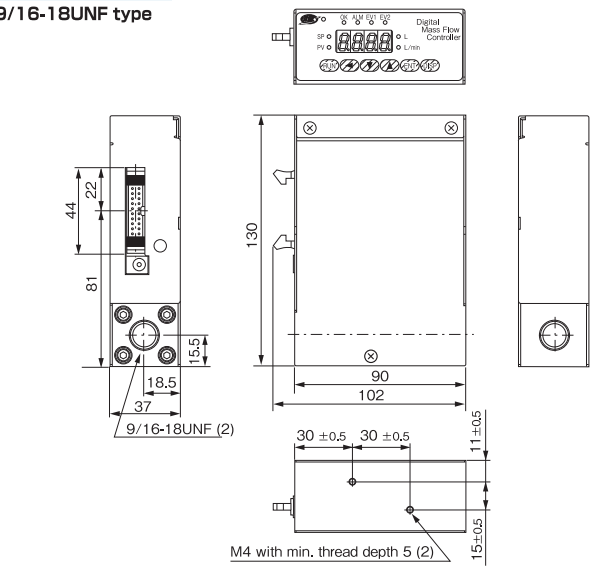
Name	Part No.	Description
Cable with dedicated connector	81446681-001	2m 20-core flat cable
Cable with dedicated connector	81446951-001	5m 20-core shielded cable
AC adapter made by UNIFIVE Co., Ltd.	UU318-2475	Rating: 24Vdc 750mA
Potentiometer for setting flow rate	81446683-002	Digital dial, 5kΩ, 10 turns
Front cover for separate display	81446858-001	Resin
PC loader package	MLP100A100	A dedicated software & cable

External Dimensions (Unit: mm)

Standard gas model/semi-standard gas model: MQV9005/9020/9200/9500/0002/0005/0020/0050B,C
Hydrogen/helium gas model: MQV9020/9050/9500/0005/0010/0050/0200B,C

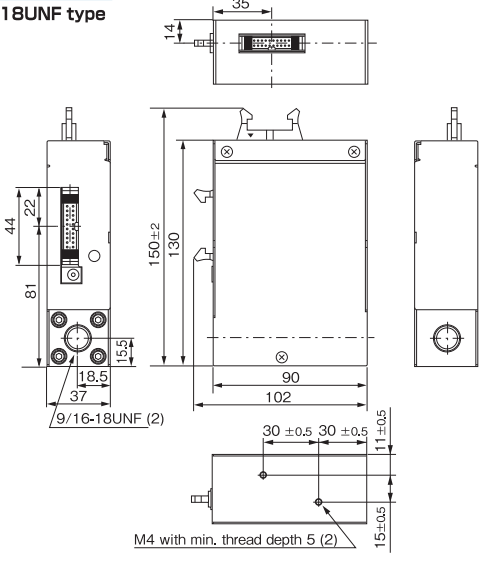
With integrated display

Ex.: 9/16-18UNF type



With separate display

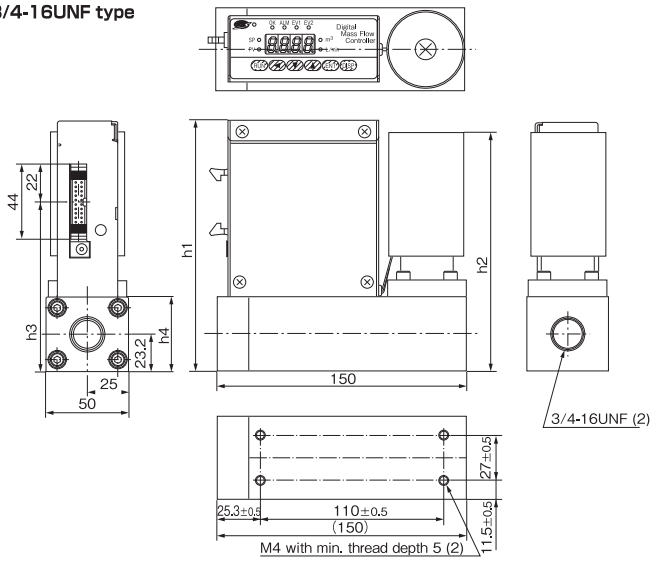
Ex.: 9/16-18UNF type



Standard gas model/semi-standard gas model: MQV0050/0200/0500J,K

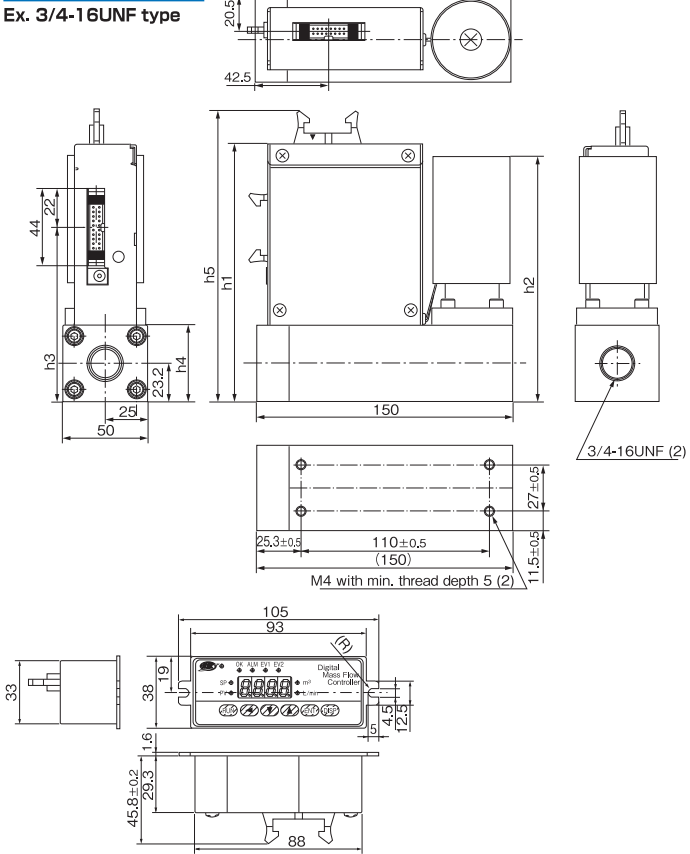
With integrated display

Ex. 3/4-16UNF type

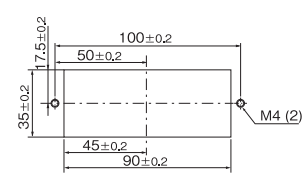


With separate display

Ex. 3/4-16UNF type



Mounting panel cutout dimensions (recommended)



The "h" dimensions for the above diagrams

	h1	h2	h3	h4	h5
MQV0050J,K/MQV0200J,K	151	145	102	45	172
MQV0500J,K	152	146	103	46	173