

High-Performance Gas Solenoid Valve for Industrial Applications GV-A

User's Manual for "Installation and Configuration"



How this unit is delivered:

The unit is not provided with the threaded flanges.
Obtain the threaded flanges separately and mount
them for use at your site.

(Photo: Valve with threaded flange (sold separately))

**Thank you for purchasing the GV-A
High-Performance Gas Solenoid Valve
for Industrial Applications. This manual
contains information for ensuring the
correct use of the GV-A.**

**This manual should be read by those who
design and maintain equipment that uses
the GV-A.**

**Also, the manual provides necessary
information for installation, maintenance,
and troubleshooting. Be sure to keep this
manual nearby for handy reference.**

Azbil Corporation

IMPORTANT

- This unit has functions that are extremely important for the safe operation of combustion equipment. Read this user's manual carefully to use the unit correctly.
- To ensure the safety of equipment that incorporates this device, all work related to this device should be conducted by specialists having sufficient knowledge, experience, and skills related to combustion and industrial furnaces.
- Before starting to operate the unit, be sure to perform an external leak inspection and an internal leak inspection on your own responsibility.
- Before wiring, installing, or removing the unit, be sure to turn off the power and gas supply. Failure to do so could result in an electric shock or gas leak.

NOTICE

Be sure that the user receives this manual before the product is used.

Copying or duplicating this user's manual in part or in whole is forbidden.
The information and specifications in this manual are subject to change without notice.



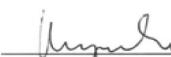

Considerable effort has been made to ensure that this manual is free from inaccuracies and omissions. If you should find an error or omission, please contact Azbil Corporation.

In no event is Azbil Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

CE Declaration of Conformity

The following is the CE Declaration of Conformity issued by Elster GmbH.




	
 Konformitätserklärung <i>Declaration of Conformity</i>	
Produkt <i>Product</i>	Automatische Absperrventile und Mehrfachstellgeräte und ihre Kombinationen <i>Automatic shut-off valves and multi functional controls and combinations of this</i>
Typ, Ausführung <i>Type, Model</i>	VAS... VAD / VAG / VAV / VAC
Produkt-ID-Nummer <i>Product ID number</i>	CE-0063BO1580
EU-Richtlinien <i>EC-Directives</i>	90/396/EWG 89/336/EWG 73/23/EWG
Normen <i>Standards</i>	EN 161, EN 88, EN 126, EN 12067-1, EN 1854
EG-Baumusterprüfung <i>EC-Type Examination</i>	Nederlands Centrum voor Gastechnologie (GASTEC NV), Notified Body 0063 27.09.2004
Überwachungsverfahren <i>Surveillance Procedure</i>	90/396/EWG Anhang II Absatz 3 Bureau Veritas Quality International Ltd. Notified Body 0301 Erstzertifizierung ISO 9001: 22.04.1991
Wir erklären als Hersteller: Die entsprechend gekennzeichneten Produkte erfüllen die Anforderungen der aufgeführten Richtlinien und Normen. Sie stimmen mit dem geprüften Baumuster überein. Die Herstellung unterliegt dem genannten Überwachungsverfahren. We declare as manufacturer: <i>Products labelled accordingly meet the requirements of the listed directives and standards. They are conform to the examined type samples. The production underlies the stated surveillance procedure.</i>	
Osnabrück, 11.10.2004	
 Leiter Geschäftssegment Armaturen Head of Business Center, Components	 Zuständiger Konstrukteur Responsible Technical Designer
G. Kromschroder AG, Postfach 2809, D – 49018 Osnabrück	


Note:

1. Azbil's GV-A corresponds to Elster GmbH's model VAS.
VCS (double valve) is a product consisting of two VAS (single valve) units connected in series.
2. VAS is certified under EN 161 Class A Group 2 and has obtained the Product ID Number CE-0063BO1580, which is printed on the Elster GmbH product label of the valve unit.

Conventions Used in This Manual

To prevent injury to the operator and others, and to prevent property damage, the following types of safety precautions are indicated:

**WARNING** Warnings are indicated when mishandling this product might result in death or serious injury.

**CAUTION** Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to the product.

In describing the product, this manual uses the icons and conventions listed below.



: Use caution when handling the product.



: The indicated action is prohibited.



: Be sure to follow the indicated instructions.

Handling Precautions

: Handling Precautions indicate items that the user should pay attention to when handling this module.

Note

: Notes indicate information that might benefit the user.



: This indicates the item or page that the user is requested to refer to.

(1)(2)(3)

: Numbers within parentheses indicate steps in a sequence or parts of an explanation.

[XXX], [XX]

: Square brackets indicate a message or button shown on the PC screen.

[XXXX]Key

: Indicates keys on the keyboard.

[X]Key

[XXX]+[XX]Key










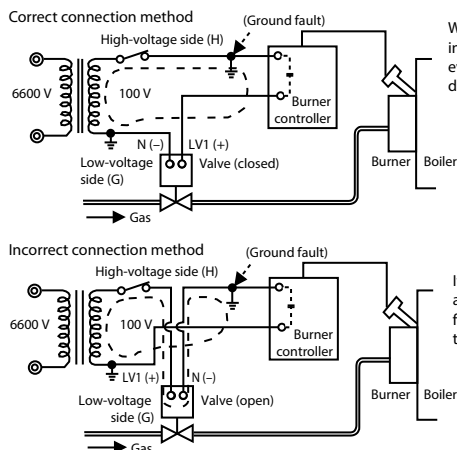





: Refers to the operation of pressing the [xxx] key while holding down the [xxxx] key.

>>











: Indicates the result of an operation, details displayed on the personal computer or other devices, or the state of the device after operation.

Safety Precautions

WARNING

	Before using the unit, be sure to read this manual in order to use the product correctly. Incorrect installation, adjustment, modification, operation, or maintenance may result in an injury or accident.
	The unit should be installed, wired, adjusted, inspected, and maintained by specialists having sufficient knowledge and skills related to combustion and industrial furnaces.
	After piping and wiring the unit, be sure to perform gas leak inspections before supplying gas. Failure to do so might cause fire or device failure.
	Do not place your foot on the unit or climb on it. Doing so is extremely dangerous, because the seal might be damaged, resulting in an external gas leak from the valve unit or pipe flange.
	Do not install the unit outdoors where it is exposed to wind, rain, or direct sunlight. Doing so may cause device failure.
	The valve unit is a heavy object. The edges at the bottom of the valve unit may cause injuries during handling. Wear work gloves or other protective gear when handling this product. Also wear work gloves or other protective gear when unpacking the product.
	Do not touch the valve seat directly or push it up with a screw driver. If the valve seat is damaged, the sealing ability cannot be maintained, resulting in gas leaks.
	Before wiring, installing, or removing the unit, be sure to turn off the power and gas supply. Failure to do so could result in an electric shock or gas leak.
	<p>Connect the unit to the low-voltage side (G). If it is connected to the high-voltage side (H), a ground-fault current may flow into the unit, causing the valve to open and the gas to flow out, regardless of the burner controller.</p> <div data-bbox="355 1200 1270 1648">  <p>When the valve is wired to the low-voltage side correctly, as shown in the figure, no ground-fault current flows into the solenoid valve, even if an insulation failure causes a ground fault. Therefore, the valve does not open and there is no risk of gas outflow.</p> <p>If the valve is wired to the high-voltage side, as shown in the figure, a ground-fault current flows into the solenoid valve when the ground fault shown in the figure occurs. Regardless of the burner controller, therefore, the solenoid valve opens and the gas flows out.</p> </div>
	Be sure to check that the unit has been correctly wired before turning on the power. Incorrect wiring of the unit can damage the unit and lead to other hazards.
	While the equipment is operating do not touch the coil part of the solenoid valve directly. It may reach a high temperature (80°C or more), causing burns.
	Do not reuse any removed O-ring. Be sure to use new O-rings when replacing the unit, and when removing or re-attaching the threaded flanges. Reusing O-rings may cause gas leaks.
	When replacing an O-ring, before assembling make sure that the threaded flange is not biting into the O-ring. Biting may lead to external gas leaks.
	Connect the ground wire to the ground terminal to prevent electric shock in case of an electrical fault.

CAUTION

	Use this device within the operating environment ranges listed in the specifications. Not doing so might cause fire or device failure.
	Use this device only for natural gas, LPG (propane/butane) and air. Using any other gas may corrode metal parts or deteriorate rubber parts, causing gas leaks or other problems.
	Do not allow wire clippings, metal shavings, water, etc. to enter the unit. Foreign objects, etc., can cause fire or faulty operation.
	Use cables with heat resistance of 80°C or more. Failure to do so might increase the temperature of the terminal block and damage the cable insulation.
	When using a gas that contains a large amount of dust (such as non-liquefied natural gas), install a gas filter upstream to reduce the risk of dust entering the valve.
	When using LPG, attach a mist trap, if necessary, to reduce the risk of any re-liquefied component (viscous substance) entering the unit.
	Do not disassemble this device. Doing so may result in an electric shock or gas leak.
	Do not grip the unit with a vise or other equipment. Use a compatible wrench to grip only the octagonal part of the threaded flange for the valve unit. Improperly gripping this product can cause gas leaks or other problems.
	This unit has a limited lifespan. Do not use it if it has exceeded the lifespan. ( See "Chapter 8. Specifications" on page 27.) Operation after the lifespan is exceeded might result in a gas leak, fire, or electric shock.

■ Precautions on facility design

Facilities that use combustion safety equipment should be designed with careful consideration of safety guidelines such as the following.

- Technical policy on safety standards for combustion equipment in industrial furnaces, by the Ministry of Health, Labour and Welfare [Japan]
- General safety code for industrial combustion furnaces (JIS B 8415:2008)
- Forced draught burners - Part 1: Gas burners (JIS B 8407-1:2012)
- Forced draught burners - Part 2: Oil burners (JIS B 8407-2:2012)
- Index of safety technology of industrial gas combustion equipment, by the Japan Gas Association
- Index of safety technology of gas boiler combustion facilities, by the Japan Gas Association
- Standard for ovens and furnaces (NFPA 86), by the National Fire Protection Association [U.S.]
- Industrial thermoprocessing equipment (EN 746) [Europe] Appliances burning gaseous fuels (Directive 93/68/EEC) [Europe]

If the system is to be used overseas, refer to the laws and standards of the relevant country when designing the system.

● **Important points for ensuring combustion safety**

- Both the main valve and pilot valve must have a redundant shutoff configuration.
- Connect this device directly to the load terminals (for main and pilot valves) of the burner controller.
- Do not provide any mechanical or electrical bypass of this device.

Organization of This User's Manual

This manual is organized as follows:

Chapter 1. Overview

Provides a list of features and model numbers and gives the name of each part.

Chapter 2. Restrictions on Installation

Describes restrictions on the installation.

Chapter 3. Piping and Wiring

Describes piping and wiring methods.

Chapter 4. Adjustments

Describes how to adjust the gas flow rate.

Chapter 5. Inspection, Maintenance and Disposal

Describes how to maintain, inspect and dispose of the unit.

Chapter 6. Troubleshooting

If some problem arises during the operation of the device, this chapter tells how to determine the cause and take countermeasures.

Chapter 7. Joining Two Valves Together

Describes the double-valve configuration.

Chapter 8. Specifications

Describes the specifications, external dimensions, etc.

Appendix

Provides reference materials such as European standards (extracts) and Supply Pressure of Town Gas (extracted from the Index of safety technology of industrial gas combustion equipment) and explains the terms used in this document.

Contents

CE Declaration of Conformity	
Conventions Used in This Manual	
Safety Precautions	
Organization of This User's Manual	

Chapter 1. Overview

1 - 1	Overview and Features	1
1 - 2	Model Number List	2
1 - 3	Part Names	4
1 - 4	Exploded View	6

Chapter 2. Restrictions on Installation

■ Installation space	7
■ Mounted orientation	7
■ Ambient temperature	8
■ Filter installation	8

Chapter 3. Piping and Wiring

3 - 1	Piping Method.....	10
	■ Before piping	10
	■ Piping work	10
3 - 2	Wiring Method	12
	■ Valve without a POC switch	12
	■ Valve with POC switch	13

Chapter 4. Adjustments

■ Maximum flow rate adjustment and initial flow rate adjustment	15
■ Adjusting the maximum flow rate	15
■ Adjusting the initial flow rate (slow opening type only)	16

Chapter 5. Inspection, Maintenance and Disposal

5 - 1	Inspection	17
	■ Gas leak inspections performed after piping and wiring	17
	■ External and internal gas leak inspections (regular inspection cycle: Once a month)	18
5 - 2	Maintenance	19
	■ Replacing the valve unit	19
5 - 3	Disposal	20

Chapter 6. Troubleshooting

- The valve does not open.21
- The flow rate is low (a large pressure loss).21
- The slow opening operation is disabled.21

Chapter 7. Joining Two Valves Together

- Method for joining two valves together23
- Method for connecting the terminal boxes24

Chapter 8. Specifications

- Specifications27
- Flow rate characteristics (flow rate at 15°C, 101.325 kPa)29
- External Dimensions31


Appendix

- About European Standards App-1
- Supply Pressure of Town Gas App-2
- Explanation of Terminology App-3

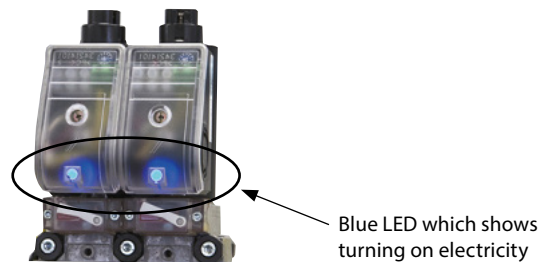
Chapter 1. Overview

1 - 1 Overview and Features

The GV-A High-Performance Gas Solenoid Valve for Industrial Applications is used as a safety shutoff valve for gas supplied to gas burners and other gas combustion equipment.

This is an imported product from Germany's Elster GmbH .

- This product consists of a valve unit and threaded flange, and includes a solenoid coil with a compact design.
- The maximum operating pressure is 50 kPa.
- This product is available in both quick opening and slow opening types. The quick opening type has a maximum flow rate adjustment (variable) mechanism. The slow opening type has an initial flow rate adjustment mechanism and a maximum flow rate adjustment mechanism.
- The valve close confirmation switch has an indicator that allows visual confirmation of operation. The valve is also available with a proof-of-closure (POC) switch.
- This device is compliant with EN 161. Also, size 1 of the valve has obtained SIL 3 and PL e certification.
- As standard equipment, a blue LED is provided to allow the operator to check the status of the power supplied to the device.
- Blue LED shows turning on electricity to this product.



SIL 3 (Safety Integrity Level 3)

Safety systems must receive safety certification (SIL) by a third party. SIL 3 is a level at which risk is reduced to between 1/1000 and 1/10,000 of the risk at a plant where safety measures are not adopted. SIL 1 indicates the risk is reduced down to the 1/10–1/100 range.

PL (Performance Level)

The performance level indicates the ability of safety-related parts to perform a safety function. Hardware failure rates and software safety requirements were added to the qualitative requirements described in category B, items 1 to 4 in EN 954-1 and ISO 13849-1:1999 (JIS B 9705-1:2000) to provide quantitative safety levels designated from PL a to PL e.

1 - 2 Model Number List

Base model number	Valve size	Operation type	Rated supply voltage	POC switch	POC switch orientation	Inspection report	Additional process	Description
GV-A								High-Performance Gas Solenoid Valve for Industrial Applications
	100							Valve size 1 (for port sizes 10A, 15A, 20A, 25A)
	200							Valve size 2 (for port sizes 25A, 32A, 40A, 50A)
	300							Valve size 3 (for port sizes 40A, 50A, 65A)
		N						Quick opening type
		L						Slow opening type
			P					100 Vac
			Y					200 Vac
			*1	G				With POC switch
			*2	0				Without POC switch
				*1	R			POC switch on right side as viewed from upstream
				*2	0			None
						D		With inspection report
						0		Without inspection report
							0	None

Note: Choose the threaded flange that is correct for your pipe size.

*1 If "G" is selected for POC switch, only "R" can be selected for POC switch orientation.

*2 If "0" is selected for POC switch, only "0" can be selected for POC switch orientation.

● Parts Sold Separately

• Threaded flange

One threaded flange is included. Two pipe flanges are required for each valve.

☞ For details, refer to "■ Method for joining two valves together" (page 23).

Model number	Product name	Product code*
74921504	Port size 10A for valve size 1	FLV110R/B
74921505	Port size 15A for valve size 1	FLV115R/B
74922229	Port size 20A for valve size 1	FLV120R/B
74922230	Port size 25A for valve size 1	FLV125R/B
74922231	Port size 25A for valve size 2	FLV225R/B
74922232	Port size 32A for valve size 2	FLV232R/B
74922233	Port size 40A for valve size 2	FLV240R/B
74922234	Port size 50A for valve size 2	FLV250R/B
74922235	Port size 40A for valve size 3	FLV340R/B
74922236	Port size 50A for valve size 3	FLV350R/B
74922237	Port size 65A for valve size 3	FLV365R/B

* The product code is a product identification code that is printed on the product package, and it is separate from the model number.

The valve size and pipe diameter are indicated by this code.

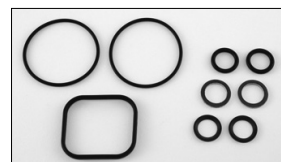


• Seal set

This set includes O-rings used for joining two valves together.

☞ For details, refer to "■ Method for joining two valves together" (page 23).

Model number	Product name
74921988	For valve size 1
74921989	For valve size 2
74921990	For valve size 3



• Cable gland set

To join two valves with POC together, connect their terminal boxes.

☞ “■ Valve with POC switch” (page 13)

Model number	Product name
74921985	Bushings for valve size 1
74921986	Bushings for valve size 2
74921987	Bushings for valve size 3



• Bolt set and strainer set

Use them for maintenance purposes, if necessary.

The required number of all items below is included with the initial purchase of the valve.

Model number	Product name
74921992	Bolt set for valve size 1
74921993	Bolt set for valve size 2
74921994	Bolt set for valve size 3
74921997	Strainer set for valve size 1
74921998	Strainer set for valve size 2
74921999	Strainer set for valve size 3

• Bolt set



Bolt × 2
Strainer × 1
Nut × 2

• Strainer set



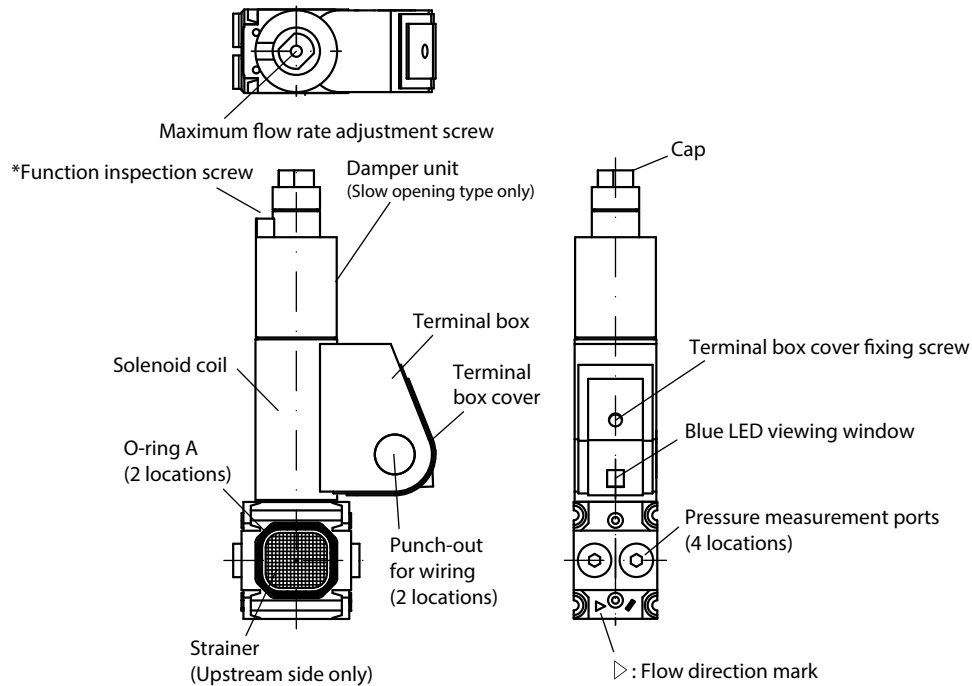
Strainer × 1
O-ring* × 2
* O-ring used to mount the threaded flange

How this unit is delivered:

The unit is not provided with the threaded flanges. Obtain the threaded flanges separately and mount them for use at your site.

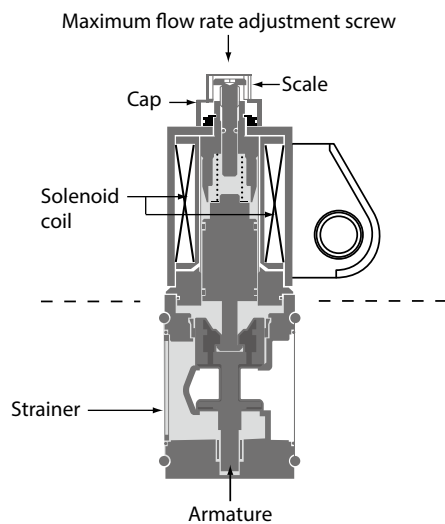
1 - 3 Part Names

● Valve without a POC switch

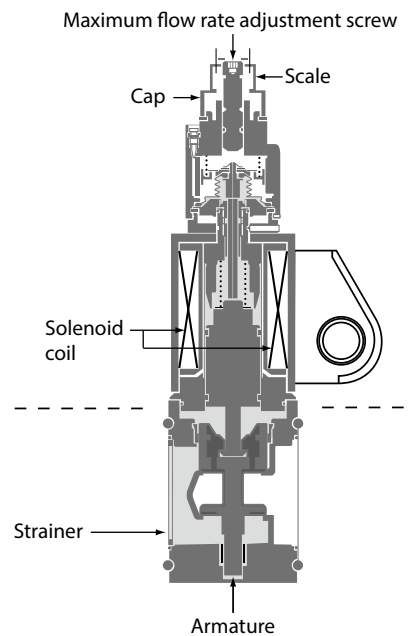


Internal structure

● Quick opening



● Slow opening

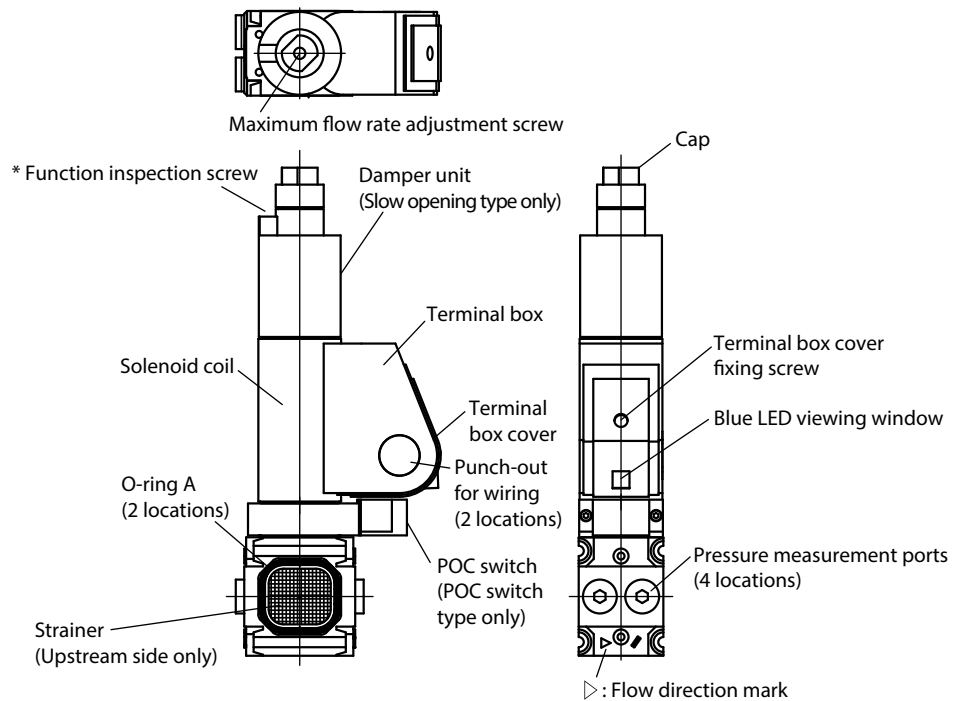


Note: In the above diagrams, the upper parts above the — — lines are turned anti-clockwise by 90° for a better understanding of the internal structure.

! Handling Precautions

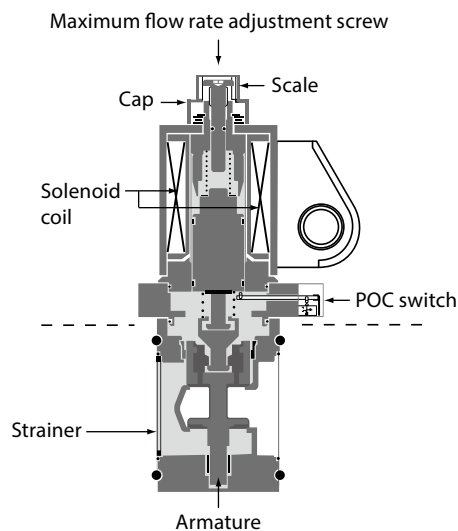
- Function inspection screw
This screw is used for function inspections. Do not turn it, as it is not supposed to be adjusted at the site. Turning it may cause an internal oil leak or make the valve unable to open.

● Valve with a POC switch

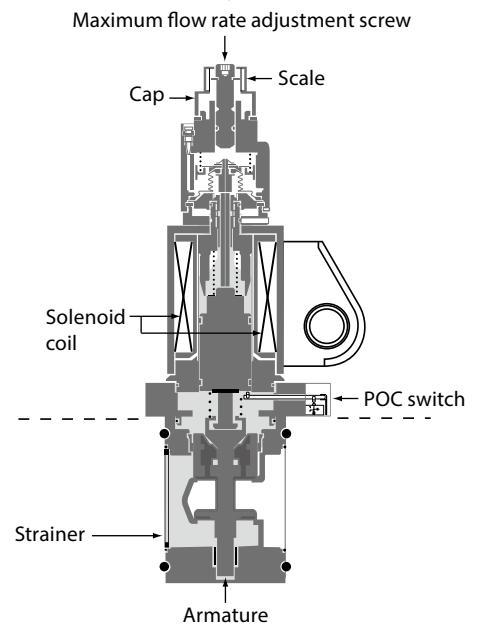


Internal structure

● Quick opening type



● Slow opening type



Note 1: In the above diagrams, the upper parts above the — — — lines are turned anti-clockwise by 90° for a better understanding of the internal structure.

Note 2: In the case of the POC switch type, the terminal box and POC switch cannot be turned.

! Handling Precautions

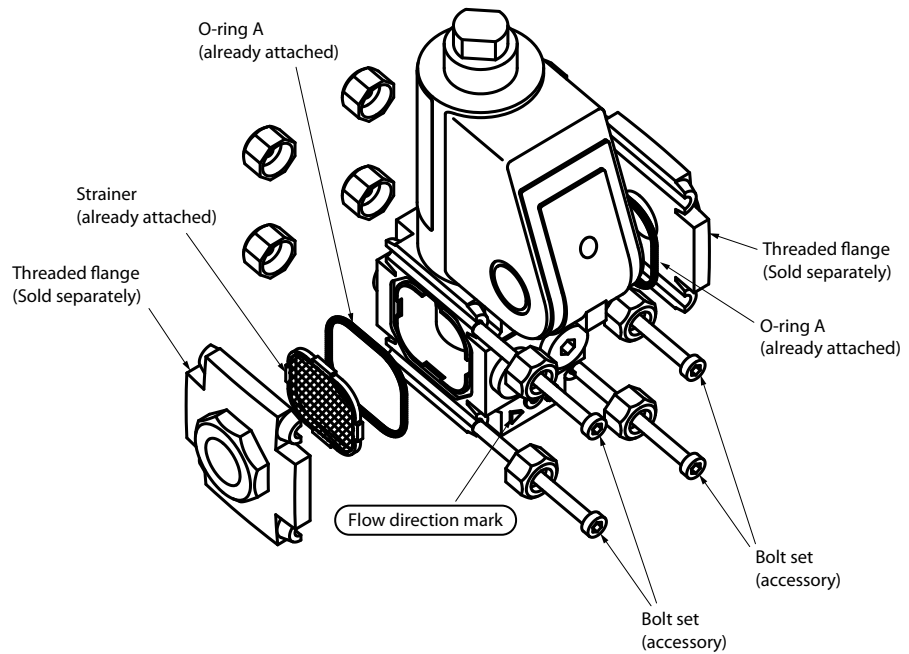
- Function inspection screw
This screw is used for function inspections. Do not turn it, as it is not supposed to be adjusted at the site. Turning it may cause an internal oil leak or make the valve unable to open.

1 - 4 Exploded View

Parts are shown in exploded view below.

The threaded flanges are sold separately.

☞ refer to "■ Parts Sold Separately" (page 2)



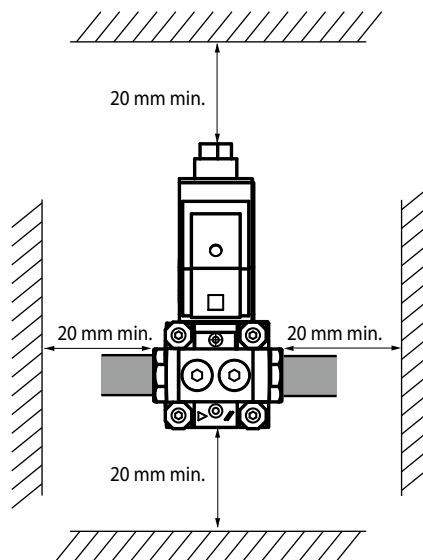
Chapter 2. Restrictions on Installation

■ Installation space

Leave a space of at least 20 mm around the device for heat dissipation.

For installation near a furnace wall or other location where high temperatures are expected, leave sufficient distance to ensure that the allowable ambient temperature is not exceeded.

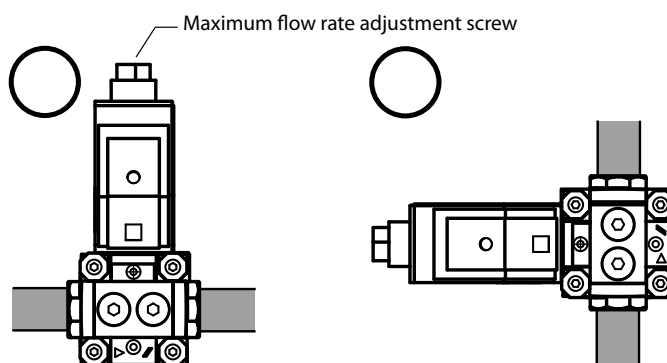
Leave a space of 200 mm or more for maintenance inspections.



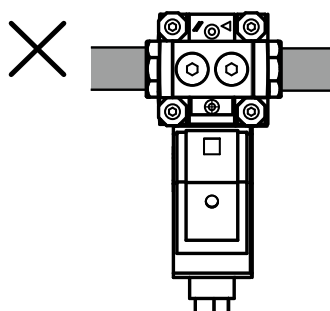
■ Mounted orientation

Install vertically with the maximum flow rate adjustment screw facing up, or install horizontally.

- Correct installation



- Incorrect installation

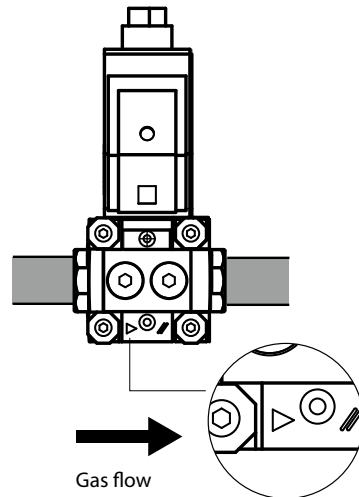


■ Ambient temperature

Install where the ambient temperature is between -20 and +60°C.

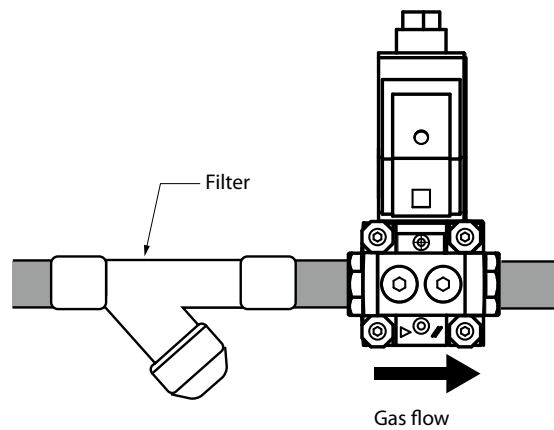
Direction of gas flow

Align the flow direction mark on the valve with the actual direction of gas flow.










■ Filter installation

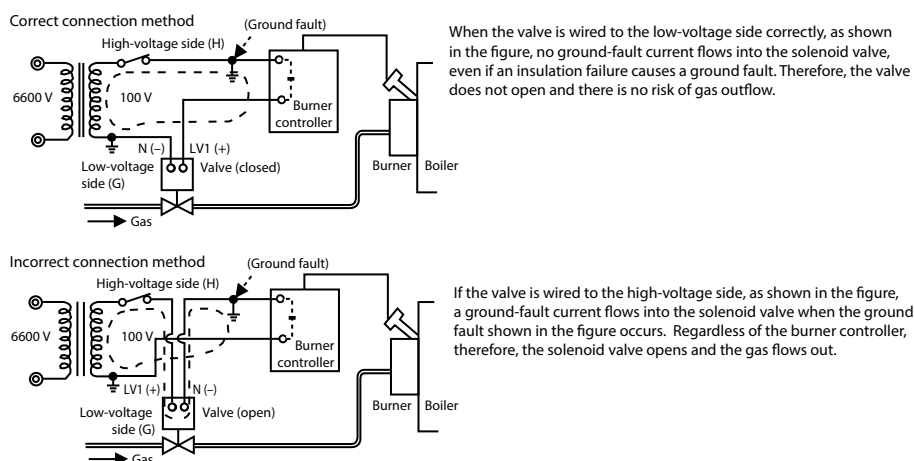
Be sure to install an appropriate filter upstream.







Chapter 3. Piping and Wiring

WARNING

-  After piping and wiring the unit, be sure to perform gas leak inspections before supplying gas. Not doing so might cause fire or device failure.
-  Before wiring, installing, or removing the unit, be sure to disconnect the power and gas supply. Failure to do so could result in an electric shock or gas leak.
-  Do not install the unit outdoors, where it may be exposed to wind, rain or direct sunlight. Doing so may cause device failure.
-  Do not touch the valve seat directly or push it up with a screw driver. If the valve seat is damaged, the sealing ability cannot be maintained, resulting in gas leaks.
-  While the equipment is operating do not touch the coil part of the solenoid valve directly. It may reach a high temperature (80 °C or more), causing burns.
-  Connect the ground wire to the ground terminal to prevent electric shock in case of current leakage.
-  Connect the unit to the low-voltage side (G). If it is connected to the high-voltage side (H), a ground-fault current may flow into the unit, causing the valve to open and the gas to flow out, regardless of the burner controller.



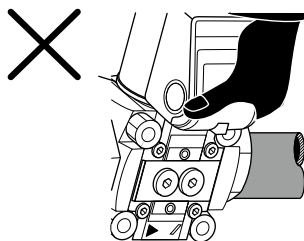
CAUTION

-  Use the unit within the operating ranges listed in the specifications. Not doing so might cause fire or device failure.
-  Use cables with heat resistance of 80 °C or more. Failure to do so might increase the temperature of the terminal block and damage the cable insulation.
-  Do not allow wire clippings, metal shavings, water, etc. to enter the unit. Foreign objects, etc., can cause fire or faulty operation.
-  Do not grip the unit with a vise or other equipment. Use a compatible wrench to grip only the octagonal part of the threaded flange for the valve unit. Improperly gripping this product can cause gas leaks or other problems.

3 - 1 Piping Method

! Handling Precautions

- Do not apply too much force to the valve unit when screwing the pipe. Doing so might damage the unit or cause a gas leak.



■ Before piping

● Strainer check

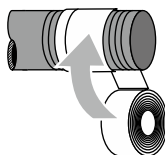
Check to make sure that the strainer in the inlet on the upstream side of the valve unit is in its proper place.

● Air flushing

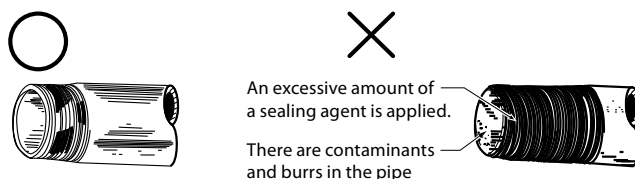
Before attaching the valve to the pipe, flush with air to remove metal shavings, burrs, and other foreign objects from the inside of the pipe.

■ Piping work

- Wrap sealing tape around the male threads of the pipe. (Or apply sealing compound.)



If using a sealing compound, apply the proper amount and do not apply to the area from the end of the thread to the second ridge.




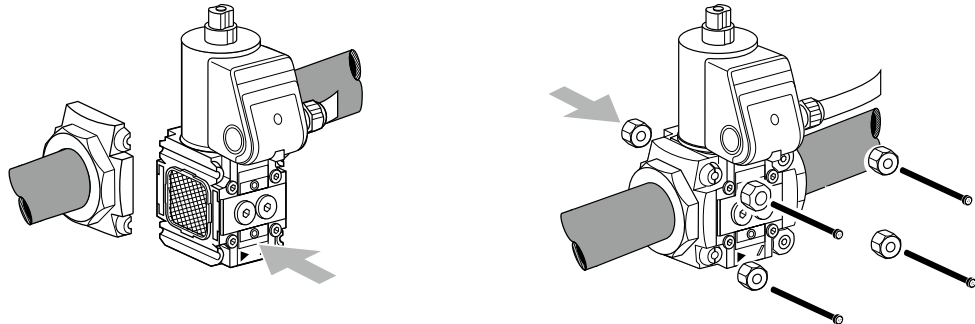
! Handling Precautions

- An excessive amount of sealing compound, contaminants, burrs, etc., may block the strainer or reduce the flow rate.

- To tighten, grip the octagonal part of the pipe flange with a wrench.

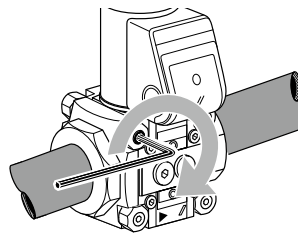


- (3)  Refer to section "1 - 4 Exploded View," (page 6) when inserting the valve between the upstream and downstream pipe flanges.



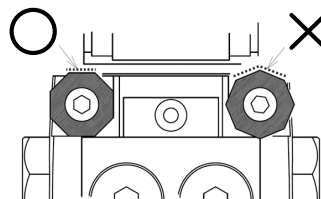
Handling Precautions

- Push both pipe ends apart and insert the valve, taking care not to damage the O-rings that are attached to each side.
 - Fit the O-rings properly into their grooves. If they are not inserted sufficiently, the seal may not last.
 - Connect the pipe flanges to the valve unit after attaching the O-rings and strainer.
- (4) Check the pipe flange position and the gas flow direction again, and then tighten the bolt part of the pipe flanges with a hexagonal wrench.




Handling Precautions

- Tighten to the appropriate torque below. Do not overtighten. Doing so might damage the threads, resulting in a gas leak.
Bolt for valve size 1: 4.5 N·m
Bolt for valve size 2: 8.0 N·m
Bolt for valve size 3: 14.0 N·m
- Tighten all octagonal nuts and washers so that they are in the "Correct" position shown in the following figure. If they are positioned as in the "Incorrect" example, the tapered part will not engage sufficiently and the flange will not be attached tightly, resulting in a gas leak.



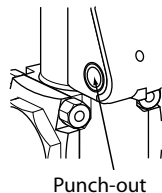
Handling Precautions

- After completing the piping work, be sure to inspect for gas leaks.
For the execution method:
 Refer to "Gas leak inspection after piping and wiring" (page 15)

3 - 2 Wiring Method

■ Valve without a POC switch

- (1) Decide which knockout to use for the power wiring.
- (2) Without removing the terminal box cover, use a screwdriver or other tool to tap the plug out.



! Handling Precautions

- Avoid damaging the interior of the terminal box.
- (3) Remove the terminal box cover.
 - (4) Put the cable through the included M20 cable gland.



- (5) Put the M20 cable gland through the knockout hole.



- (6) Inside the terminal box, put the cable through the cable gland nut.

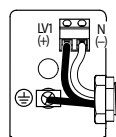
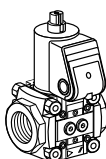


- (7) Tighten the nut inside the terminal box to secure the M20 cable gland to the terminal box.



- (8) Connect the high potential wire (H) to LV1(+) and the low potential wire (G) to N(-).

Connect the ground wire to the ground terminal.



- (9) Tighten the nut outside the box to secure the cable.
- (10) Attach the terminal box cover.

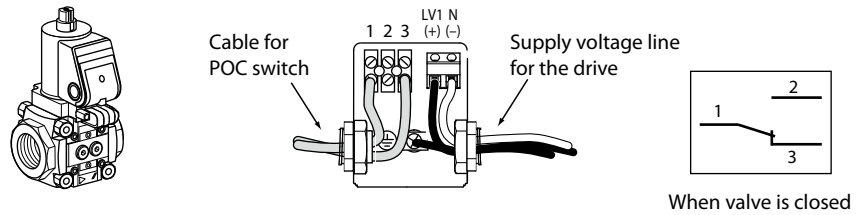
■ Valve with POC switch

The wiring procedure is the same as in the preceding section, “Valve without a POC switch.”

With regard to Step (8), however, the following is shown as an example.

The terminal numbers 1, 2, and 3 are indicated on the board.

Example: Wire in the following way to receive an “ON” signal from the POC switch when the valve is closed.



! Handling Precautions

- When using the POC switch on a low-voltage circuit, be sure to separate the wiring to the low-voltage circuit from the wiring to the line voltage used to drive this device, in order to prevent any induction from the line voltage.
- Raise the connector part from the circuit board to wire the POC switch. After wiring, place the connector back in its original place without turning it upside down.
- Do not use No.2 terminal of the POC switch in case of slow-open types.

-MEMO-

Chapter 4. Adjustments

■ Maximum flow rate adjustment and initial flow rate adjustment

	Adjustment mechanism	
	Maximum flow rate adjustment	Initial flow rate adjustment
Slow opening type	Approx. 20 to 100% of the maximum flow rate	Approx. 0 to 70%*
Quick opening type		-

* Initial flow rate < Maximum flow rate

● Maximum flow rate adjustment

With 100 % as the maximum, the valve opening can be adjusted within approximately the 20–100 % range.

● Initial flow rate adjustment

The initial flow rate is the flow rate at which the gas is supplied immediately after the power is turned on.

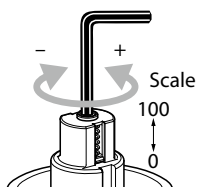
The slow opening valve type, which has an initial flow adjustment function, is available to prevent explosive ignition.

When the power is turned on, the slow opening type gradually opens within a maximum time of about 10 seconds. The flow rate at startup is adjustable within a range of about 0–70 %.

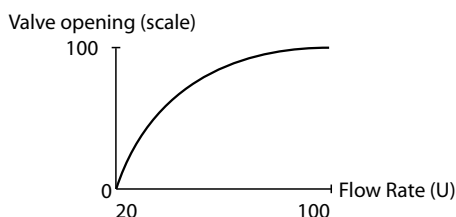
■ Adjusting the maximum flow rate

The factory default setting is at the maximum flow rate. As required by the application, the maximum flow rate can be adjusted.

Turn the flow rate adjustment screw with a hexagonal wrench.



- Relationship between valve travel and flow rate



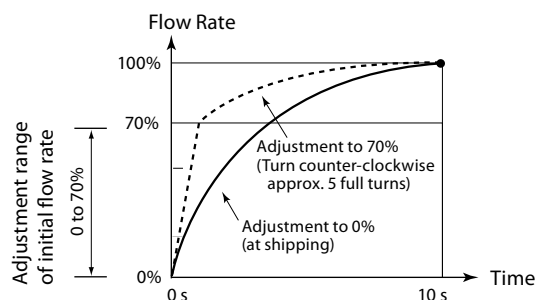
Note

- The flow rate adjustment range is marked on the cover cap. Check the change in the actual flow rate at the site while adjusting.
- Turning of the cover cap does not affect flow rate adjustment.
- Turning of the flow rate adjustment screw too far will not cause gas to leak.

■ Adjusting the initial flow rate (slow opening type only)

Changing the initial flow rate also changes the opening time.

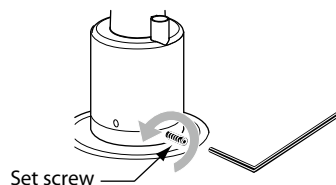
- Relationship between the time and flow rate
The valve gradually opens from the initial flow rate to the maximum flow rate in about 10 seconds.
The factory default rate is 0 %. The initial flow rate can be adjusted as needed.
- Relationship between rotation of the damper unit and initial flow rate



Note

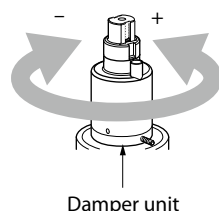
- Up to 5 full turns are possible.
- To allow the damper unit to operate completely, it is necessary to leave an interval of 20 seconds after the valve is closed and before the power is turned back on.

(1) Tighten the setscrew with a hexagonal wrench.

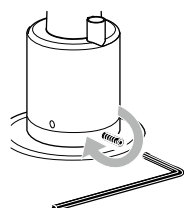


Handling Precautions

- Do not remove the setscrew.
- (2) Turn the damper unit clockwise (tightening) to decrease the initial gas flow. Turn it counterclockwise (loosening) to increase the initial flow. Adjust the flow rate.



(3) Tighten the setscrew with a hexagonal wrench.



Chapter 5. Inspection, Maintenance and Disposal

5 - 1 Inspection

■ Gas leak inspections performed after piping and wiring

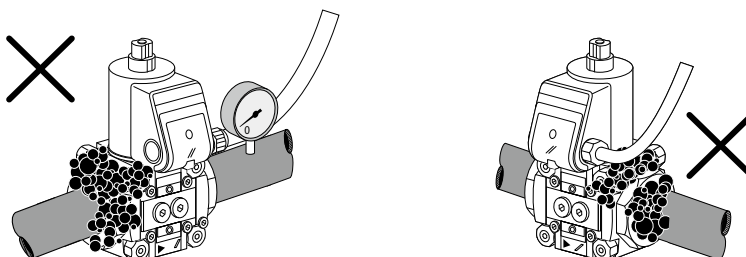
⚠ WARNING

- ❗ The unit should be installed, wired, adjusted, inspected, and maintained by specialists having sufficient knowledge and skills related to combustion and industrial furnaces.
- ❗ After piping and wiring the unit, be sure to perform gas leak inspections before supplying gas. Failure to do so might cause fire or device failure.

After piping and wiring the unit, check for any external leak mainly from the upstream (inlet) and downstream (outlet) threaded flanges and also for any internal leak inside the unit.

● External gas leak inspection

Check for any external gas leaks from the piping connections and the unit using a gauge test or a leak detector solution.

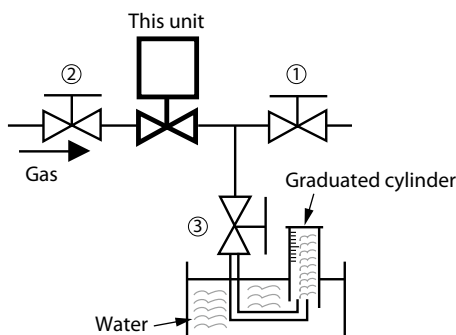


❗ Handling Precautions

- If the gas is leaking from a threaded flange (external leak), check to make sure that the sealing parts such as O-rings are attached correctly and none of them are damaged. Attach them correctly, if necessary. Any damaged O-ring must be replaced.

● Internal gas leak inspection

Close only the manual valve (1), shown in the following figure, connect a rubber hose to the end of the manual valve (3), and then place the end 10 mm below the water surface to see if any bubbles come out.



● Gas leakage amount

40 ml/h or less (GV-A100, 200)
60 ml/h or less (GV-A300)
(When 50 kPa is applied, for both internal leaks and external leaks)

■ External and internal gas leak inspections (regular inspection cycle: Once a month)

! Handling Precautions

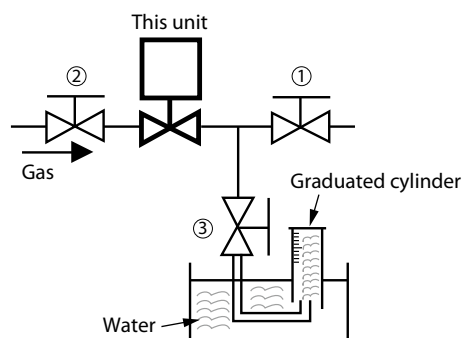
- When performing the inspections, refer to the "Index of Safety Technology of Industrial Gas Combustion Equipment", issued by Japan Gas Association.

● External gas leak inspection

Close the manual valves (1) and (3) in the right-hand figure, and check for any leaks using a gas detector or a leak detector solution.

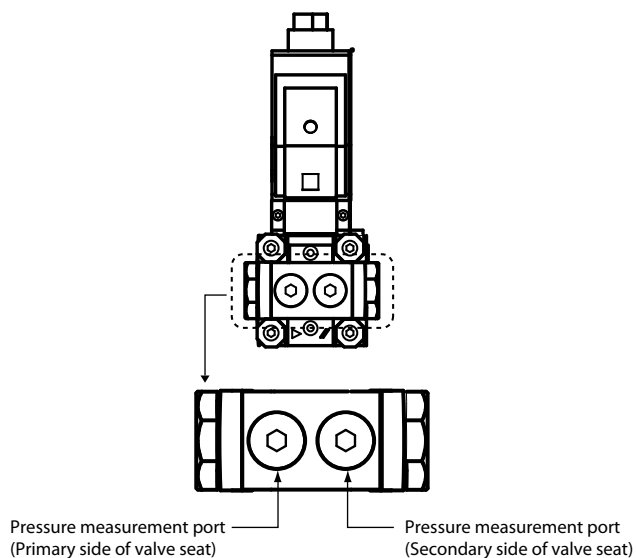
● Internal gas leak inspection

Close only the manual valve (1), shown in the right-hand figure, connect a rubber hose to the end of the manual valve (3), and then place the end 10 mm below the water surface to see if any bubbles come out.



• Pressure measurement ports

This unit is provided with the pressure measurement ports used to measure the upstream and downstream pressures of the valve seat. Use the ports, when pressure measurement is required.



Note 1. The female screw size for the pressure measurement ports shall be G1/4.

Note 2. The size of the male screws to be inserted into the pressure measurement ports shall be G1/4 and the length shall be 7 mm or less.

Note 3. Pressure measurement ports are also found on the opposite side.

! Handling Precautions

- If the male screw exceeds 7 mm, the sealing ability may be lost.
- Do not use a tapered screw as the male screw.
Or the sealing ability may be lost.

5 - 2 Maintenance

■ Replacing the valve unit

⚠ WARNING



Before wiring, installing, or removing the unit, be sure to turn off the power and gas supply. Failure to do so could result in an electric shock or gas leak.



After piping and wiring the unit, be sure to perform gas leak inspections before supplying gas. Failure to do so might cause fire or device failure.

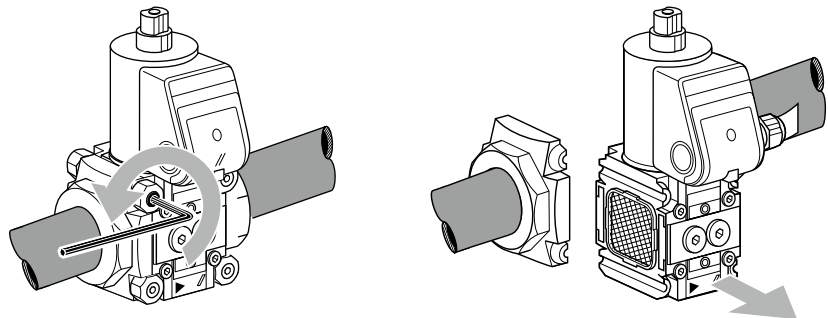
● Replacement procedure

- (1) Turn off the power.



Handling Precautions



- The temperature at the coil part remains high, immediately after the power is turned off. Be careful not to get burned.
- (2) Close the gas cock to stop the gas supply.
 - (3) Remove the cables from the unit.
 - (4) Loosen the threaded flange fixing bolt with a hexagonal wrench, and remove the unit from the threaded flange.



- (5) Provide a new valve unit and check it according to "1-4 Part Configuration" (page 5).



Handling Precautions

- Do not reuse any used O-ring to maintain the sealing ability.
 - Fit the O-rings properly into their grooves. If they are not inserted sufficiently, the seal may not last.
- (6) Connect the unit to the threaded flange.
 Refer to "3 - 1 Piping Method" (page 10).
 - (7) Rewire the cables removed in Step (3).
 Refer to "3 - 2 Wiring Method" (page 12).
 - (8) After completing the piping work, be sure to perform a gas leak inspection.

5 - 3 Disposal

When disposing of this unit, dispose of it appropriately as industrial waste in accordance with local laws and regulations.

Chapter 6. Troubleshooting

■ The valve does not open.

Cause	Action
Applied voltage error	Check to make sure that the applied voltage is within the range of the rated voltage –15% to +10%. If it is not within the range, supply a proper voltage. Example: When the rated voltage is 100 Vac, the range is 85 to 110 Vac.
Improper gas pressure is being applied	Check to make sure that the maximum operating pressure is not exceeding 50 kPa. If the operating pressure is exceeding it, supply it at 50 kPa or less.
Product failure	If both the applied voltage and the applied pressure are proper, it may be an internal coil disconnection or an internal unit failure. Replace the valve unit in accordance with "■ Replacing the valve unit" (page 19). Contact Azbil for any inspection issue.

■ The flow rate is low (a large pressure loss).

Cause	Action
Blocked strainer	Remove the valve unit from the threaded flange to check to make sure that the strainer is not blocked. If it is blocked, clean it or replace it with a new strainer.
The flow rate adjustment screw is tight.	Check to make sure that the flow rate adjustment screw is not tightened too much. If it is tightened too much, loosen the adjustment screw to increase the flow rate.

■ The slow opening operation is disabled.

Cause	Action
The initial flow adjustment is large.	Decrease the initial flow adjustment (tightening).
Oil is leaking.	If oil is leaking, replace the valve unit in accordance with "■ Replacing the valve unit" (page 19).

-MEMO-

Chapter 7. Joining Two Valves Together

■ Method for joining two valves together

When joining two valves together, the part configuration shown in the following figure applies.

First, connect two valve units and stick the pipe into the dedicated pipe flange.

Then, connect the dedicated pipe flange to the valve unit.

☞ Refer to "3 - 1 Piping Method" (page 9).

The dedicated pipe flanges and O-ring B are sold separately.

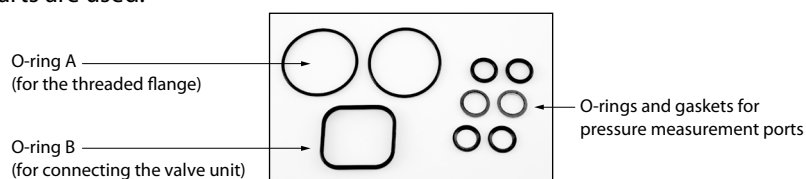
☞ Refer to "● Parts Sold Separately" (page 2).

! Handling Precautions

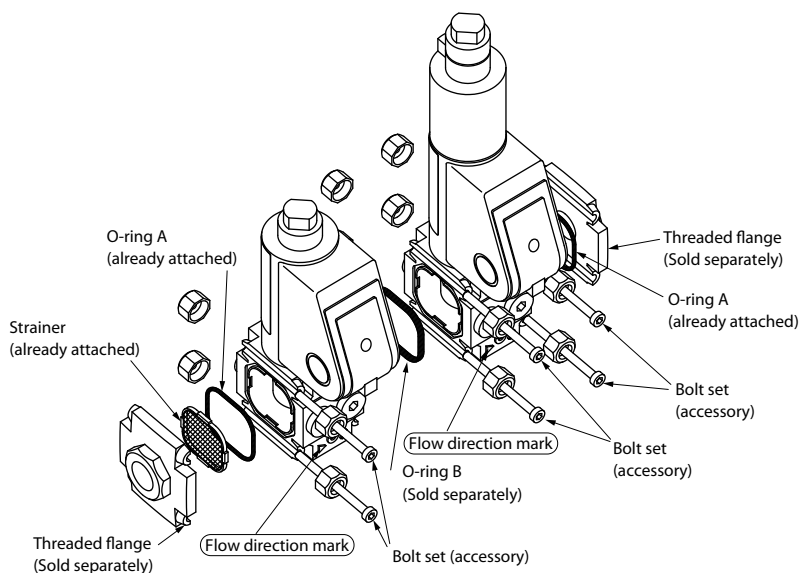
- To connect the terminal boxes together, remove the punch-put plugs from the boxes before joining the two valves.
 - Align the upstream flow direction of the unit with the downstream flow direction.
- (1) Remove the strainer from the downstream valve unit.
 - (2) Remove both of the two O-rings A attached to the surface where the two valve units will face each other. Attach an O-ring B (sold separately) instead. Dispose of the removed O-rings A (two rings) and the strainer.

! Handling Precautions

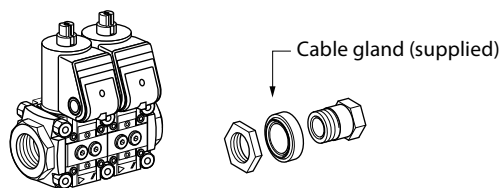
- Use only the O-ring B in the seal set (page 2), which is sold separately. No other parts are used.



- (3) In the case of the POC switch type, connect the terminal boxes with the cable bushing before joining the valves together. For the connection method, ☞ Refer to "■ Method for connecting the terminal boxes" (page 24).
- (4) Use two bolt sets (supplied) to tighten the central joint part. For the tightening torque, refer to page 10.



■ Method for connecting the terminal boxes



Note

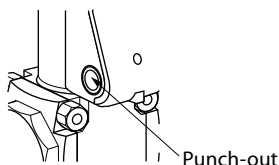
- In the case of the non-POC switch type, both of the terminal boxes can be turned.
- No cable bushing is required when wiring the upstream side and the downstream side independently from each other. In that case, the terminal boxes do not need to be connected together.

● Connecting method

- (1) Decide on the terminal box orientation in relation to the gas flow: the right-hand side or left-hand side.
Once this positional relationship is decided on, the location where the upstream and downstream terminal boxes should be connected and wired together will be determined.

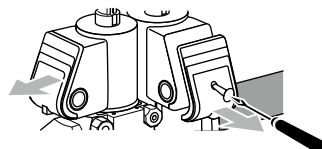
Handling Precautions

- In the case of the POC switch type, neither of the terminal boxes can be turned. The POC switch and terminal box are attached on the right-hand side as viewed from the upstream.
- (2) Use a screw driver or other tool to tap the punch-out plug on the connecting side to remove it, while keeping the terminal box cover on.

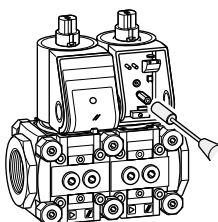


Handling Precautions

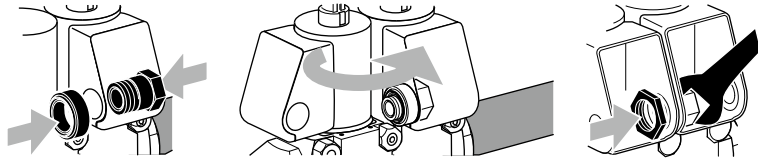
- Avoid damaging the interior of the terminal box.
- (3) Remove the terminal box cover.



- (4) For GV-A200 and GV-A300, remove the ground terminal at the center inside the terminal box (hexagonal support: width across flats = 8).



- (5) Attach the cable gland.



- (6) For GV-A200 and GV-A300, attach the ground terminal (hexagonal support) back as it was. (Recommended tightening torque: 3.0 N·m)

- (7) Attach the terminal box cover.

-MEMO-

Chapter 8. Specifications

■ Specifications

Gas types: Natural gas, LPG (propane, butane) (without condensation) *1

Maximum operating pressure: 50 kPa

Leakage amount: 40ml/h or less (GV-A100, 200)

60 ml/h or less (GV-A300)

(when 50 kPa is applied, for both internal leaks and external leaks)

Flow rate adjustment range:

- Approx. 20 to 100% of the maximum flow rate

The indicator on the upper part of the coil enables visual inspections (default setting: 100%).

- Initial flow rate adjustment: Approx. 0 to 70%

Slow opening type only (default setting: 0%)

Valve opening time: 1 second or less (quick opening type)

Approx. 10 seconds or less (slow opening type)

Valve closing time: 1 second or less

Allowable ambient temperature: -20 °C to +60 °C (without condensation)

Allowable storage temperature: -20 °C to +40 °C (without condensation)

Standards compliance: EN161 – class A group 2

Rated supply voltage: 100 Vac, 50/60 Hz / 200 Vac, 50/60 Hz

(depending on the model)

Allowable supply voltage: +10%/-15% of the rated supply voltage

Cable ground: M20×1.5 (supplied)

Applicable wire: Max. ϕ 2.5 mm (AWG12 recommended)

Power consumption:

Model number	100 Vac	200 Vac
GV-A100	25 W (26 VA) *	25 W (26 VA) *
GV-A200	36W (40 VA) *	40W (44 VA) *
GV-A300	36W (40VA) *	40W (44 VA) *

* These VA are reference values.

(Power consumption increases by 20% in -20 degree C.)

Protection class: IP65 (except for electrical wire ports)

Valve opening/closing conditions for slow opening type:

After a break, 20 seconds* or more are required before the next opening operation. (time required for the damper to return to its original position)

POC switch contact rating: 12 to 30 Vdc, 2 to 100 mA *2

Using No.2 terminal of the POC switch is prohibited in case of slow-open types.

POC switch lifespan: 200,000 operations

Operation lifespan: The operation lifespan per valve unit is compliant with EN 13611 and EN 161.

Model number	Lifespan *	
	Number of operations (in times)	Number of years (in years)
GV-A100	500,000	10
GV-A200, 300	200,000	10

* Whichever is smaller

Prolonged operation at high temperatures can result in premature wear of rubber materials and an operation lifespan shorter than the above values.

Valve housing: Aluminum alloy

Valve sealing material: NBR

Dedicated pipe flange screw: Rp (parallel female threads for ISO7-1 pipe)

*1 This device is intended for use with the indicated flammable gases.
It is not recommended for use with air.

*2 The maximum ratings according to the switch manufacturer are 125 Vac / 30 Vdc, 0.1 A (resistive load), but usage at 12–30 Vdc, 2–100 mA is recommended because of the low-current gold switch contacts.

Mass: It is the mass of the valve unit combined with the threaded flange.

The conditions are as follows.

Single valve: Slow opening type with POC switch

Double valve: (Upstream) Quick opening type

(Downstream) Slow opening type

(Upstream/Downstream) Both with POC switch.

Model number	Connection port diameter	Mass [kg]	
		Single valve	Double valve
GV-A100	10A (Rp 3/8)	1.8	3.2
	15A (Rp 1/2)	1.8	3.2
	20A (Rp 3/4)	1.9	3.2
	25A (Rp 1)	1.8	3.2
GV-A200	25A (Rp 1)	4.3	7.6
	32A (Rp 1 1/4)	4.2	7.5
	40A (Rp 1 1/2)	4.3	7.6
	50A (Rp 2)	4.1	7.5
GV-A300	40A (Rp 1 1/2)	5.6	9.5
	50A (Rp 2)	5.5	9.4
	65A (Rp 2 1/2)	5.2	9.1

Note 1. The mass of the quick opening type is approximately 0.2 kg lighter than that of the slow opening type.

Note 2. The mass of the non-POC switch type is approximately 0.1 kg lighter than that of the POC switch type. (In the case of the double-valve configuration, it is approximately 0.2 kg lighter.)

■ Flow rate characteristics (flow rate at 15°C, 101.325 kPa)

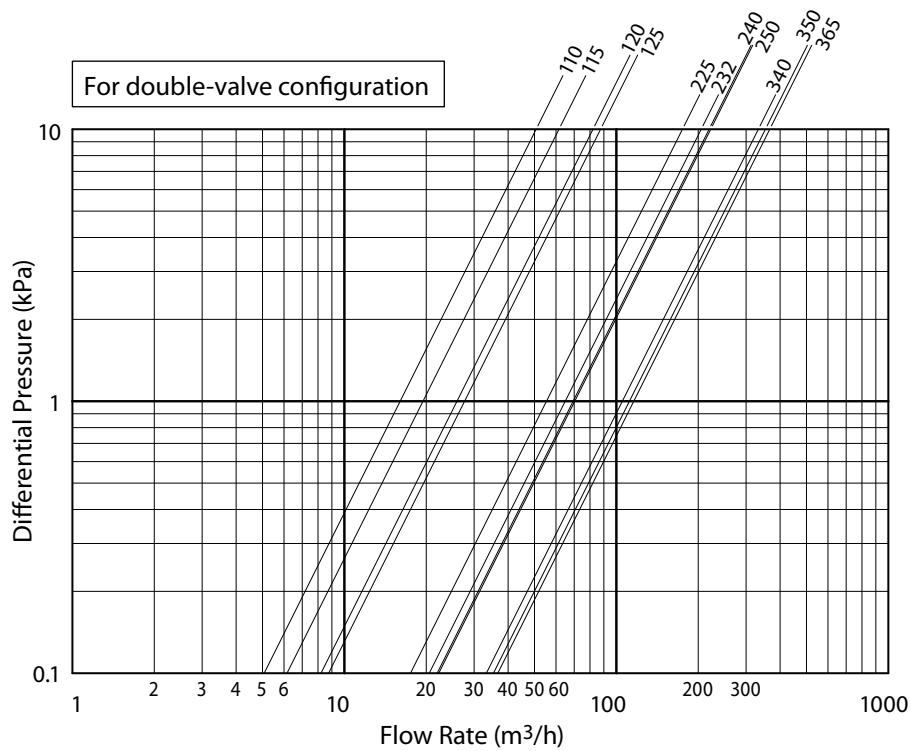
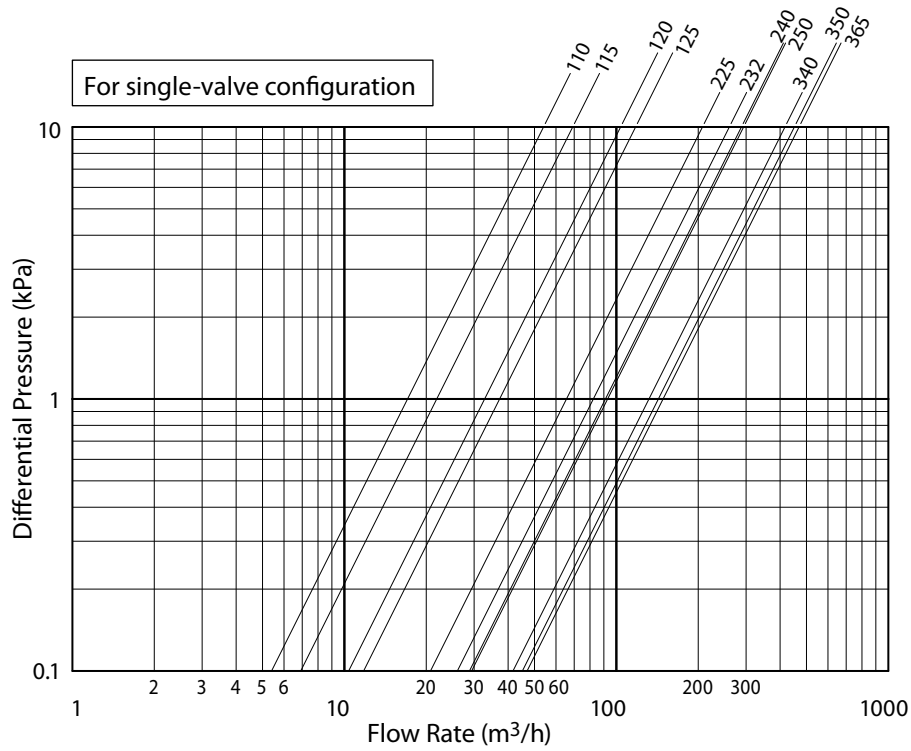
For single-valve configuration

Model number	Connection port diameter	Flow rate (m ³ /h) at differential pressure of 0.25 kPa		Cv value
		Specific gravity 0.65	Specific gravity 1.53	
GV-A100	10A (Rp 3/8)	8.5	5.6	5.8
	15A (Rp 1/2)	10.9	7.1	7.5
	20A (Rp 3/4)	16.4	10.7	11.2
	25A (Rp 1)	18.6	12.1	12.7
GV-A200	25A (Rp 1)	32.8	21.4	22.4
	32A (Rp 1 1/4)	41.1	26.8	28.1
	40A (Rp 1 1/2)	45.6	29.7	31.2
	50A (Rp 2)	46.4	30.3	31.7
GV-A300	40A (Rp 1 1/2)	65.9	43.0	45.0
	50A (Rp 2)	71.4	46.5	48.8
	65A (Rp 2 1/2)	74.3	48.4	50.8

For double-valve configuration

Model number	Connection port diameter	Flow rate (m ³ /h) at differential pressure of 0.25 kPa		Cv value
		Specific gravity 0.65	Specific gravity 1.53	
GV-A100	10A (Rp 3/8)	8.0	5.2	5.5
	15A (Rp 1/2)	9.7	6.3	6.7
	20A (Rp 3/4)	13.0	8.5	8.9
	25A (Rp 1)	13.8	9.0	9.5
GV-A200	25A (Rp 1)	27.7	18.0	18.9
	32A (Rp 1 1/4)	32.4	21.1	22.2
	40A (Rp 1 1/2)	34.7	22.6	23.7
	50A (Rp 2)	35.2	22.9	24.0
GV-A300	40A (Rp 1 1/2)	52.6	34.3	35.9
	50A (Rp 2)	55.8	36.4	38.2
	65A (Rp 2 1/2)	57.9	37.7	39.6

The graph assumes a specific gravity of 0.65, temperature of 15 °C, and pressure of 101.325 kPa.



External Dimensions

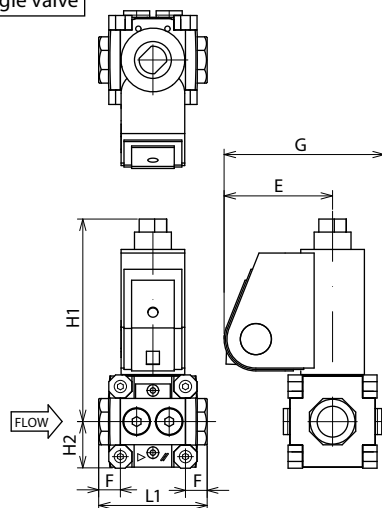
Model number	Connection port diameter	Dimensions (mm)									
		L1	L2	F *1	E	H1	H2	H3	H4	H5	G *2
GV-A100	10A (Rp 3/8)	75	120	15	75	143	32	208	161	226	109
	15A (Rp 1/2)	91	136	23							
	20A (Rp 3/4)										
	25A (Rp 1)										
GV-A200	25A (Rp 1)	128	196	30	85	170	47	235	191	256	134
	32A (Rp1 1/4)										
	40A (Rp1 1/2)										
	50A (Rp 2)										
GV-A300	40A (Rp1 1/2)	155	238	36	85	180	59	245	201	266	142
	50A (Rp 2)										
	65A (Rp2 1/2)										

*1 Threaded flanges (F) are sold separately.

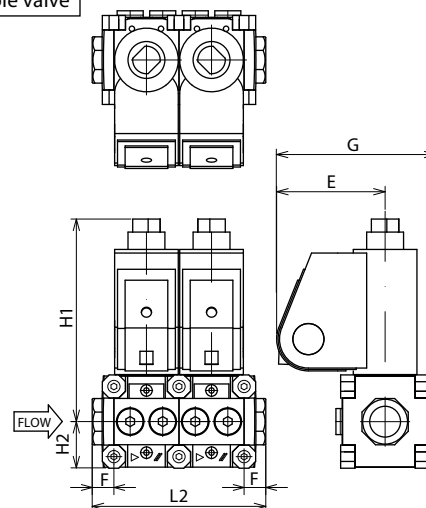
*2 Dimension G was calculated based on the data provided by the manufacturer.

Quick opening type, without POC switch

Single valve

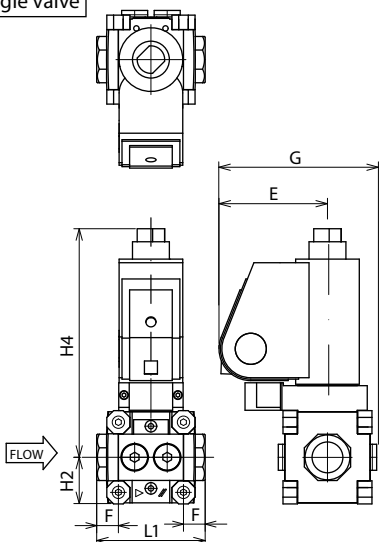


Double valve

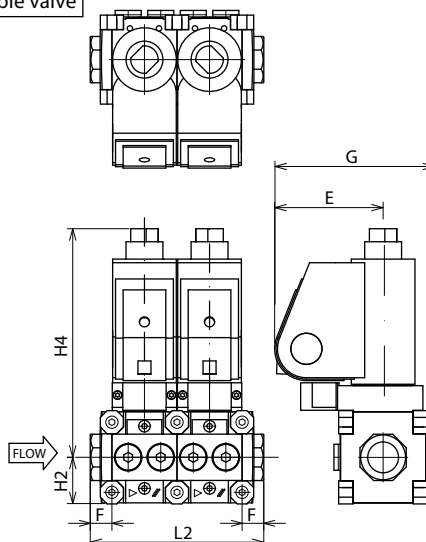


Quick opening type, with POC switch

Single valve

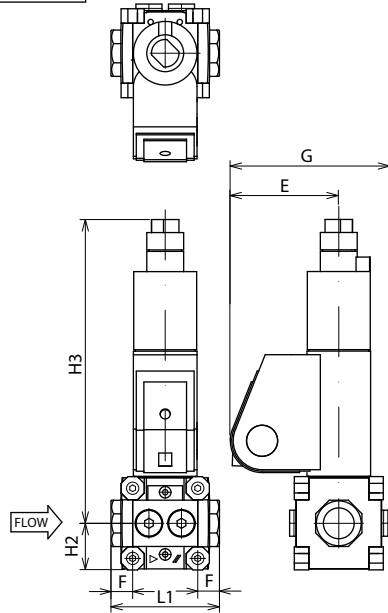


Double valve

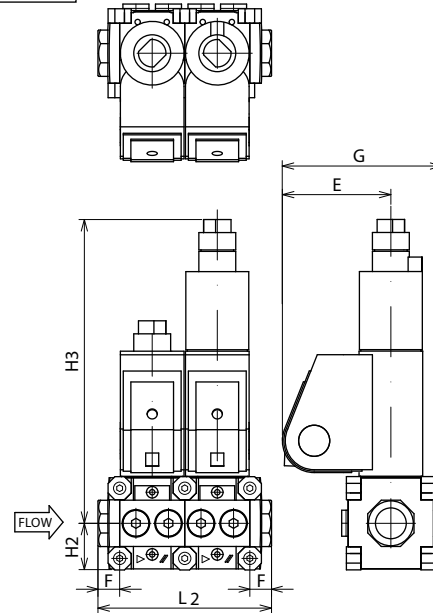


● Slow opening type, without POC switch

Single valve

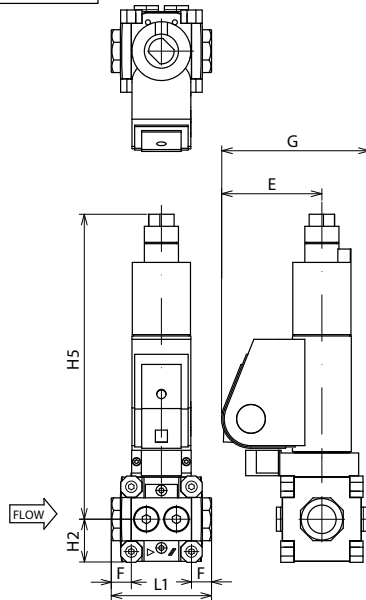


Double valve

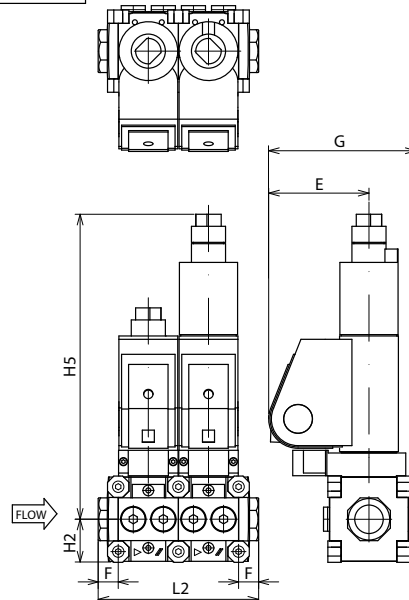


● Slow opening type, with POC switch

Single valve



Double valve



Appendix

About European Standards

The GV-A high-performance gas solenoid valve for industrial applications has an individual certificate number, CE-0063BO1580, and complies with the requirements of the following product directives:

EN 161 (extract)

Automatic shut-off valves for gas burners and gas appliances

EN 13611 (extract)

Safety and control devices for gas burners and gas burning appliances - General requirements

● Sealing (closure) force requirements

Table 1

Valve	Test pressure (mbar)	Maximum leakage rate
Class A	150	See values in table 2 for internal leak-tightness
Class B	50	
Class C	10	

● Internal and external leaks

Table 2

Nominal inlet size DN	Maximum leakage rate (cm ³ /hr of air)	
	Internal leak-tightness	External leak-tightness
DN<10	20	20
10<DN≤25	40	40
25<DN≤80	60	60
80<DN≤150	100	60
DN<150	150	60

Supply Pressure of Town Gas

Extracts from The index of safety technology of industrial gas combustion equipment by the Japan Gas Association (Jan. 2009)

Table 1 Classification of supply pressure

Classification	Supply pressure
Low pressure *	The supply gas pressure specified in the general gas supply agreement by individual town gas operators See Table 2.
Intermediate pressure	Supply pressure that is above the maximum supply pressure specified in the general gas supply agreement but below 0.1 MPa (gauge pressure).
Medium pressure	Supply pressure of 0.1 MPa or more but less than 1 MPa

* The Gas Business Act defines any pressure below 0.1 MPa as low pressure, any pressure of 0.1 MPa or more but below 1 MPa as medium pressure, and any pressure of 1 MPa or more as high pressure.

Table 2 Examples of supply gas pressure specified in the general gas supply agreement

Gas group Gas pressure	6A	12A, 13A
Maximum pressure	2.2 kPa	2.5 kPa
Minimum pressure	0.7 kPa	1.0 kPa

Explanation of Terminology

Valve unit

Unit consisting of the valve body, the coil used to operate the valve, the terminal box for wiring to supply power to the coil, etc. It does not include accessories such as the pipe flanges and their bolts.

Upstream valve unit

Of two valve units in a double-valve configuration, the one that is in the upstream position.

Downstream valve unit

Of two valve units in a double-valve configuration, the one that is in the downstream position.

Damper unit

A unit specific to the slow opening type. It prolongs the valve opening time and is located on the upper part of the coil.

POC switch

Abbreviation of “proof of closure switch,” a closure-assurance device that is defined in ISO 23511.

This switch is built into a safety shutoff valve and operates only after the valve is closed completely. Since it is built into the valve by the manufacturer, it cannot be added or adjusted at the operating site. The switch in this device uses gold contacts.

Strainer

A filter that prevents foreign substances and impurities in the gas from entering the valve.

C_V

The flow coefficient of the valve, used to indicate its pressure and flow rate characteristics. In addition to C_V , there is also a “ K_V ” indicator. C_V is mainly used in the United States, while K_V is more common in Europe. Azbil uses C_V .

$$C_V = 1.17 \times K_V$$

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Revision History of CP-SP-1356E

Printed	Edn	Revised pages	Description
Feb. 2012	1		
June 2020	2	13 24 C4	Do not use No.2 terminal of the POC switch in case of slow-open types were added. Using No.2 terminal of the POC switch is prohibited in case of slow-open types were added. Terms and Conditions were changed (to version No. AAS-511A-014-10). http → https
Nov. 2020	3	27	Table changed.

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products.

You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (system products, field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. Warranty period and warranty scope

1.1 Warranty period

Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.

1.2 Warranty scope

In the event that Azbil Corporation's product has any failure attributable to azbil during the aforementioned warranty period, Azbil Corporation shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place. Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:

- (1) Failure caused by your improper use of azbil product (noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
- (2) Failure caused for other reasons than Azbil Corporation's product;
- (3) Failure caused by any modification or repair made by any person other than Azbil Corporation or Azbil Corporation's subcontractors;
- (4) Failure caused by your use of Azbil Corporation's product in a manner not conforming to the intended usage of that product;
- (5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow Azbil Corporation to predict; or
- (6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.

Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. Ascertainment of suitability

You are required to ascertain the suitability of Azbil Corporation's product in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:

- (1) Regulations and standards or laws that your Equipment is to comply with.
- (2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
- (3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use

Although azbil is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down. You are required to provide your Equipment with safety design such as fool-proof design,*1 and fail-safe design*2 (anti-flame propagation design, etc.), whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth. Furthermore, fault avoidance,*3 fault tolerance,*4 or the like should be incorporated so that the said Equipment can satisfy the level of reliability and safety required for your use.

*1. A design that is safe even if the user makes an error.

*2. A design that is safe even if the device fails.

*3. Avoidance of device failure by using highly reliable components, etc.

*4. The use of redundancy.

3. Precautions and restrictions on application

3.1 Restrictions on application

Please follow the table below for use in nuclear power or radiation-related equipment.

	Nuclear power quality*5 required	Nuclear power quality*5 not required
Within a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Cannot be used (except for limit switches for nuclear power*7)
Outside a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Can be used

*5. Nuclear power quality: compliance with JEAG 4121 required

*6. Radiation controlled area: an area governed by the requirements of article 3 of "Rules on the Prevention of Harm from Ionizing Radiation," article 2 2 4 of "Regulations on Installation and Operation of Nuclear Reactors for Practical Power Generation," article 4 of "Determining the Quantity, etc., of Radiation-Emitting Isotopes," etc.

*7. Limit switch for nuclear power: a limit switch designed, manufactured and sold according to IEEE 382 and JEAG 4121.

Any Azbil Corporation's products shall not be used for/with medical equipment.

The products are for industrial use. Do not allow general consumers to install or use any Azbil Corporation's product. However, azbil products can be incorporated into products used by general consumers. If you intend to use a product for that purpose, please contact one of our sales representatives.

3.2 Precautions on application

you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use azbil product for any purposes specified in (1) through (6) below. Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, fault avoidance, fault tolerance, and other kinds of protection/safety circuit design on your own responsibility to ensure reliability and safety, whereby preventing problems caused by failure or nonconformity.

- (1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals
- (2) For use of specific purposes, such as:
 - * Nuclear energy/radiation related facilities
[When used outside a radiation controlled area and where nuclear power quality is not required]
[When the limit switch for nuclear power is used]
 - * Machinery or equipment for space/sea bottom
 - * Transportation equipment
[Railway, aircraft, vessels, vehicle equipment, etc.]
 - * Antidisaster/crime-prevention equipment
 - * Burning appliances
 - * Electrothermal equipment
 - * Amusement facilities
 - * Facilities/applications associated directly with billing
- (3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability
- (4) Facilities that are to comply with regulations of governmental/public agencies or specific industries
- (5) Machinery or equipment that may affect human lives, human bodies or properties
- (6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

4. Precautions against long-term use

Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification. Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.

In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used. Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc. as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals. System products, field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts. For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

Please note that the descriptions contained in any documents provided by azbil are subject to change without notice for improvement or for any other reason. For inquiries or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

8. Discontinuance of the supply of products/parts

Please note that the production of any Azbil Corporation's product may be discontinued without notice. After manufacturing is discontinued, we may not be able to provide replacement products even within the warranty period.

For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts. For system products, field instruments, we may not be able to undertake parts replacement for similar reasons.

9. Scope of services

Prices of Azbil Corporation's products do not include any charges for services such as engineer dispatch service. Accordingly, a separate fee will be charged in any of the following cases:

- (1) Installation, adjustment, guidance, and attendance at a test run
- (2) Maintenance, inspection, adjustment, and repair
- (3) Technical guidance and technical education
- (4) Special test or special inspection of a product under the conditions specified by you

Please note that we cannot provide any services as set forth above in a nuclear energy controlled area (radiation controlled area) or at a place where the level of exposure to radiation is equivalent to that in a nuclear energy controlled area.



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Specifications are subject to change without notice. (11)

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