CKD

New Products

Regulator for process gases

PGM Series

Ultra stable process realized by high precision pressure/ flow rate adjustment

CKD Corporation

CC-1596A

Taking process control to a new level

Regulator for process gases

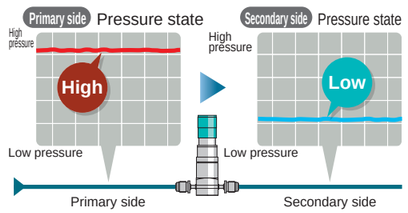
PGM Series

CKD's process gas regulators boast industry-leading sealing performance, hysteresis, and repeatability. Achieves a stable process through high-precision pressure/flow rate adjustment of supply gas.

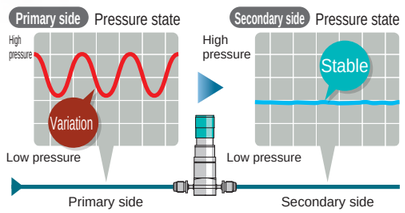
HIGH PRECISION CONTROL OF PROCESS GAS IN ETCHING / FILM DEPOSITION APPARATUS

Usage case

Pressure control / depressurization

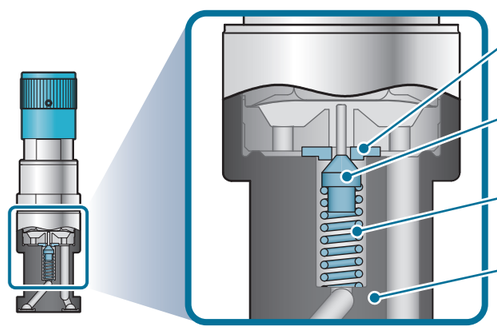


Pressure stabilization



High corrosion / High quality material

- High corrosion-resistant material
- Electropolishing / ultra-precision machining / ultra-precision cleaning



Seat	PFA
Poppet	SUS316L
Spring	SUS316
Body	SUS316L

Can also be changed to different highly corrosion-resistant materials

Optimum design

- Reduced sliding parts to the limit
- Optimized diaphragm structure
- Material optimization for smooth operation

High-spec materials and design realize actual durability of more than 3 million cycles

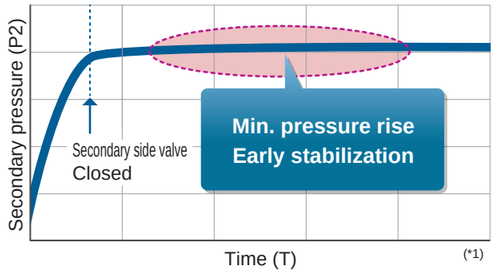
Ensures high controllability and high cleanliness even after long-term use

High sealability

Contributes to process stabilization

- Optimal design of valve seat and ultra-precise machining
- Minimizes leakage (outflow) to the secondary side when the valve is closed

*1: Secondary pressure rise image assuming valve closing operation in which the secondary pressure is maintained at flow rate 0.

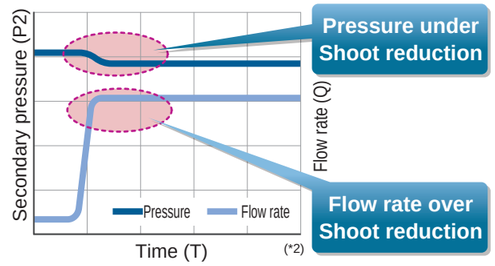


High micro flow rate controllability

Achieves stable and smooth operation

- Optimized design of valve seat shape
- Stable control even at very small flow rates

*2: Pressure fluctuation image when controlled with a flow rate of 10sccm.

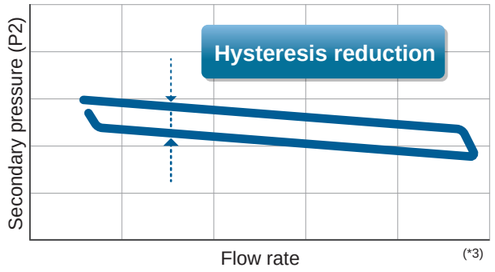


Hysteresis reduction

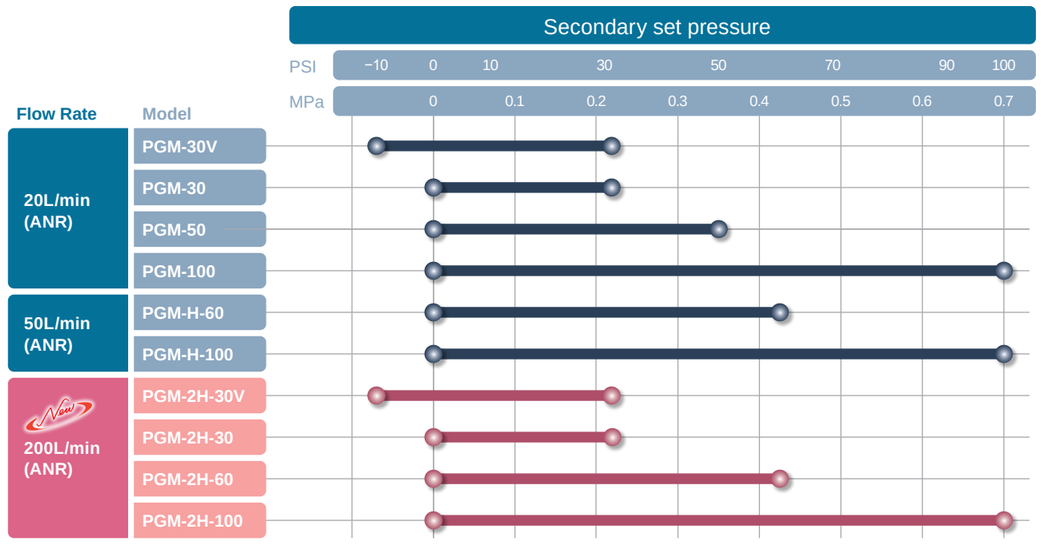
Goals pressure is met securely

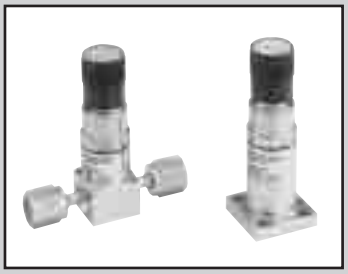
- High-quality materials
- Ultra-precise machining

*3: Secondary → when flow rate is increased or decreased.



Diverse product lineup

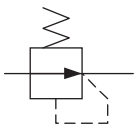




Regulator for process gases

PGM Series

Specifications

Item	PGM-	30V	30	50	–	100
	PGM-H-	–	–	–	60	100
	PGM-2H-	30V	30	–	60	100
Working fluid		Inert gas/process gas				
Max. working pressure MPa		1.0				
Set pressure MPa		-0.07 to 0.21	0 to 0.21	0 to 0.35	0 to 0.42	0 to 0.7
Fluid temperature °C		PGM/PGM-H : -5 to 40 PGM-2H : 20 to 50				
Valve seat leakage Pa·m3/s(He)		PGM/PGM-H : 1.0×10^{-8} or less PGM-2H : 2.0×10^{-8} or less				
External leakage Pa·m3/s(He)		2.8×10^{-12} or less				
Proof pressure MPa		1.5				
Ambient temperature °C		PGM/PGM-H : -5 to 40 PGM-2H : 20 to 50				
Storage ambient temperature °C		-5 to 60 (PGM-2H only)				
Surface treatment of gas contact parts		Electrolytic polishing specification				
Connection		Various integrated interfaces supported (PGM-*-1, 2, 3, 4, 5) (PGM-2H-*-6, 7) 1/4″JXR fitting (connectable to VCR fitting) (PGM-*-4R, 4RM, 4MF, 4FM) 3/8″JXR fitting (connectable to VCR fitting) (PGM-2H-*-6R, 6RM, 6MF, 6FM)				
Weight kg		0.39 (PGM-*-4)				
JIS symbol						

How to order

PGM - H - 60 - 4R - ( )

Model No.

Ⓐ Flow rate series

Ⓑ Secondary set pressure

Ⓒ Fitting: Connection/ integrated: Body size (sealing method)

Ⓓ Option

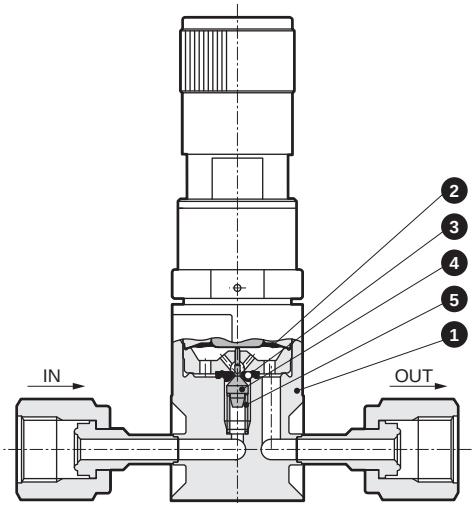
Ⓐ Flow rate series		
Blank	H	2H
20 L/min	50 L/min	200 L/min

Code	Description	PGM	PGM-H	PGM-2H
Ⓑ Secondary set pressure				
30V	-0.07 to 0.21MPa [-10 to 30psi]	●		●
30	0 to 0.21MPa [0 to 30psi]	●		●
50	0 to 0.35MPa [0 to 50psi]	●		
60	0 to 0.42MPa [0 to 60psi]		●	●
100	0 to 0.7MPa [0 to 100psi]	●	●	●
Ⓒ Fitting: Connection/integrated: Body size (sealing method)				
4R	1/4" JXR female fitting	●	●	
4RM	1/4" JXR male fitting	●	●	
4MF	1/4" JXR male → female fitting	●	●	
4FM	1/4" JXR female → male fitting	●	●	
6R	3/8" JXR female fitting			●
6RM	3/8" JXR male fitting			●
6MF	3/8" JXR male → female fitting			●
6FM	3/8" JXR female → male fitting			●
1	□1.125" (1.125″C seal)	●	●	
2	□1.5" (1.5″C seal)	●	●	
3	□1.5" (1.5″CS seal)	●	●	
4	□1.5" (1.5″W seal)	●	●	
5	□1.125" (1.125″W seal)	●	●	
6	□1.5" (1.5" high flow C seal)			●
7	□55mm (3/8″W seal)			●
Ⓓ Option				
Blank	No option	●	●	●
S	Poppet: Hastelloy ® C-22 Spring: Ni-Co alloy	●		
P	Valve seat: PI	●		

*1: Flow rate is nominal value. Check the pressure conditions in the flow characteristics graph

*2: Contact CKD for gage port, misoperation prevention cover, and panel mount types.

Internal structure diagram and parts list



Gas contacting parts material

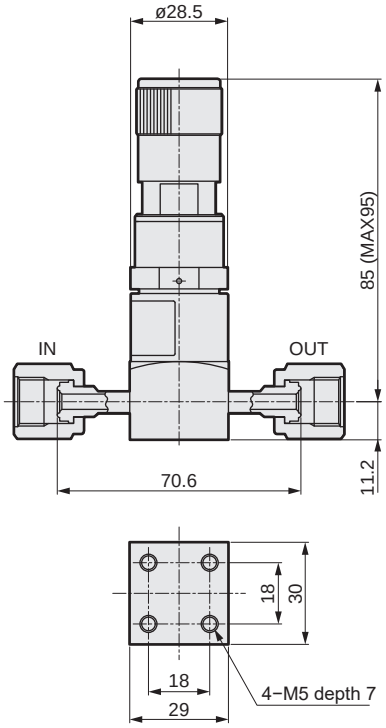
Part No.	Part name	Material
❶	Body	SUS316L
❷	Diaphragm	Hastelloy ® C-22
❸	Seat	PFA or PI (option)
❹	Poppet	SUS316L or Hastelloy ® C-22 (option)
❺	Spring	SUS316 or Ni-Co alloy (option)

Hastelloy ® is a registered trademark of Haines International, Inc.

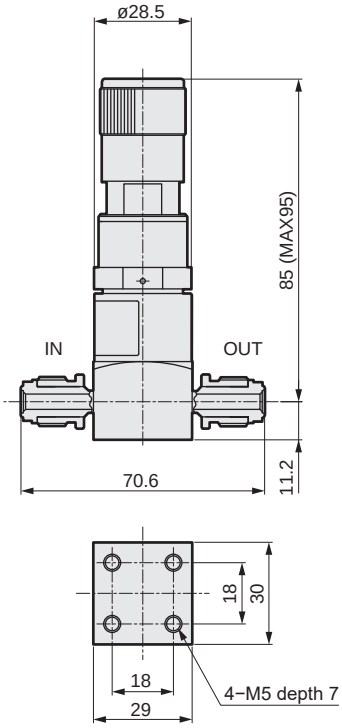
Dimensions

Note: Flow path direction is indicated with an arrow on the body.

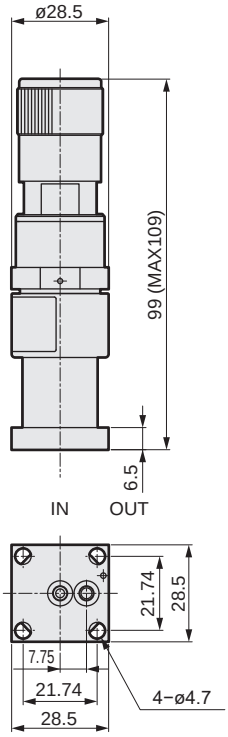
●PGM-*-4R
(1/4" JXR female fitting)



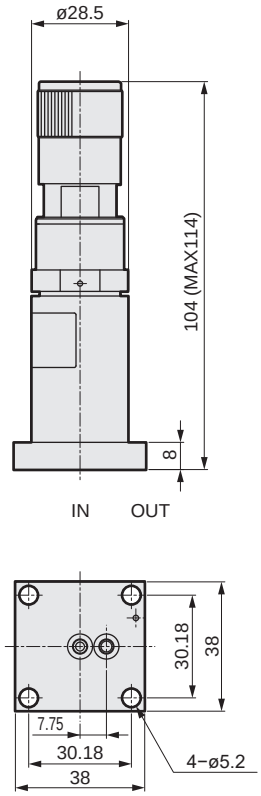
●PGM-*-4RM
(1/4" JXR male fitting)



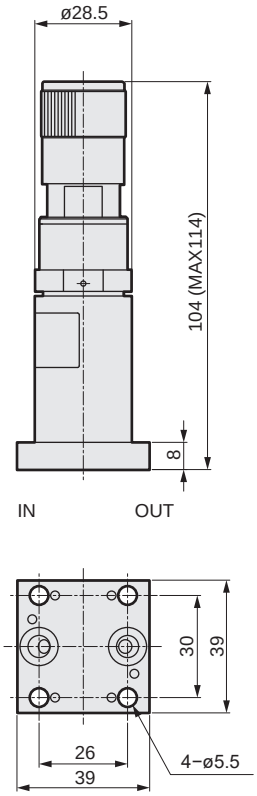
●PGM-*-1
(1.125" C seal)



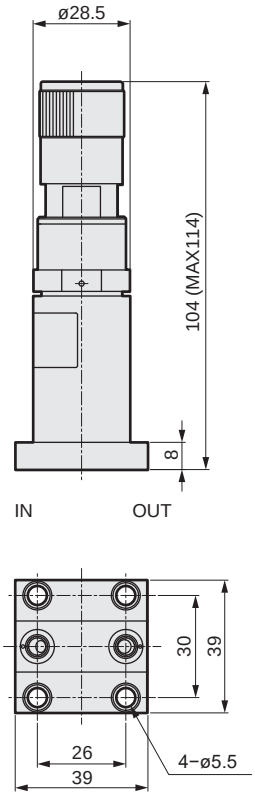
●PGM-*-2
(1.5" C seal)



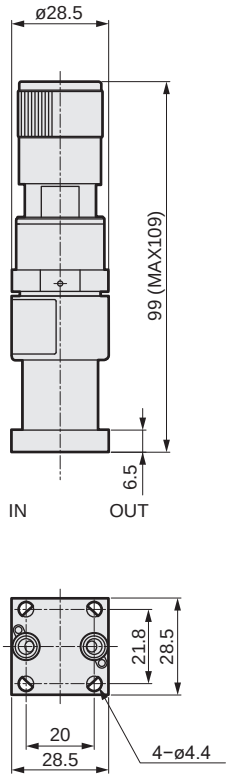
●PGM-*-3
(1.5" CS seal)



●PGM-*-4
(1.5" double seal)

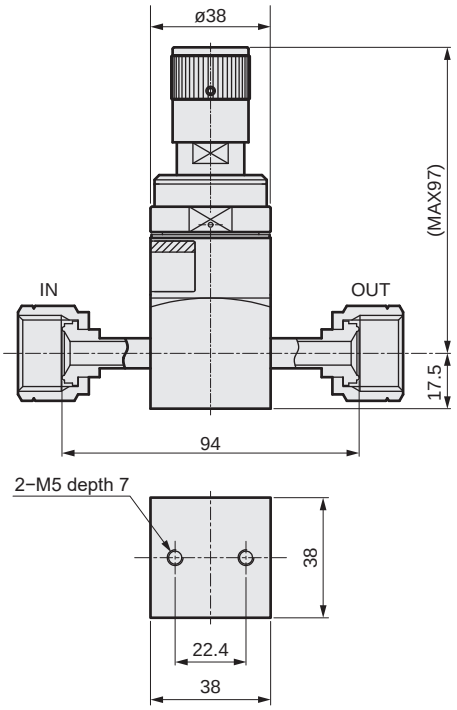


●PGM-*-5
(1.125" double seal)

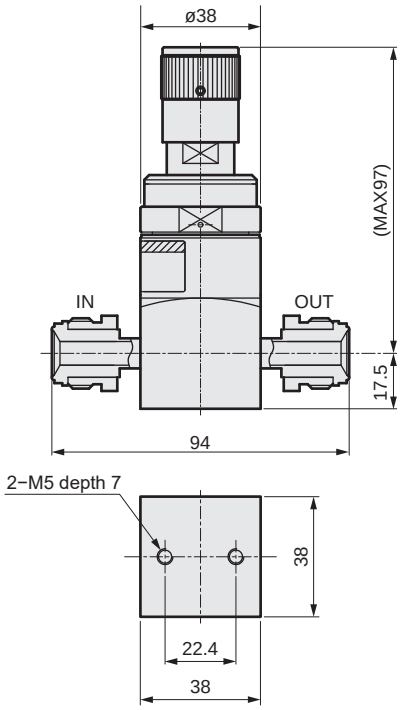


Dimensions

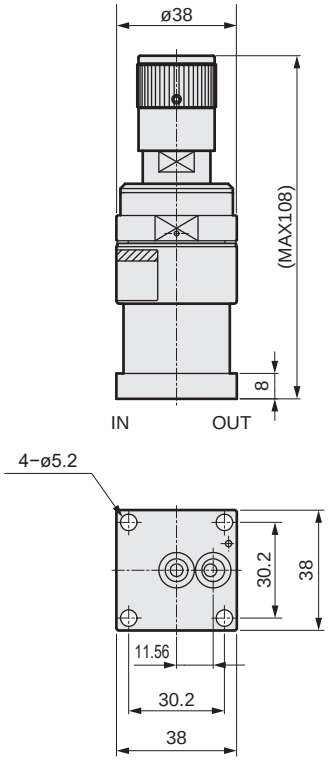
●PGM-2H-:-6R
(3/8" JXR female fitting)



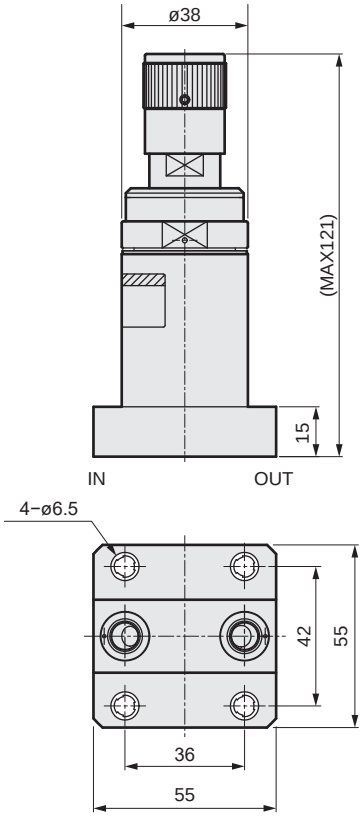
●PGM-2H-:-6RM
(3/8" JXR male fitting)



●PGM-2H-:-6
(1.5" high flow C seal)



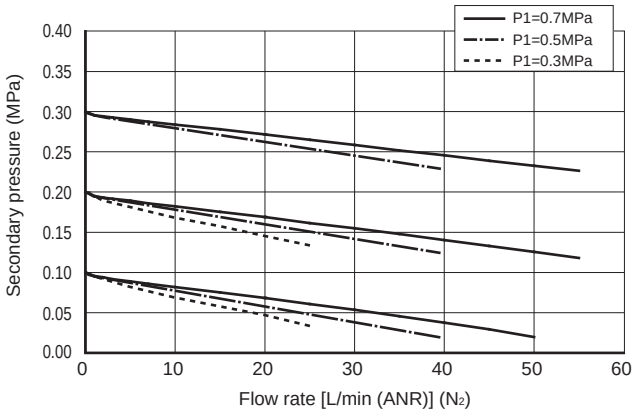
●PGM-2H-:-7
(3/8" double seal)



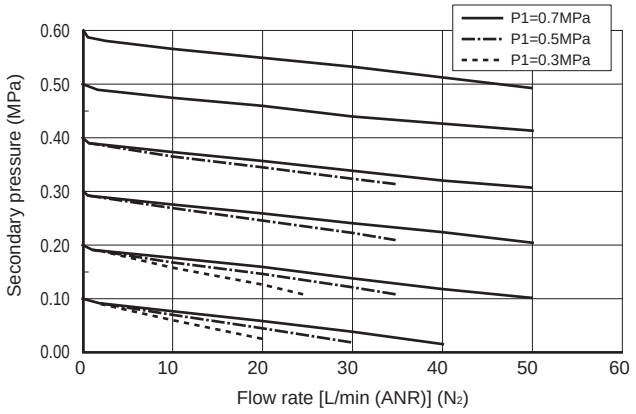
Flow Rate Characteristics

* CKD test data

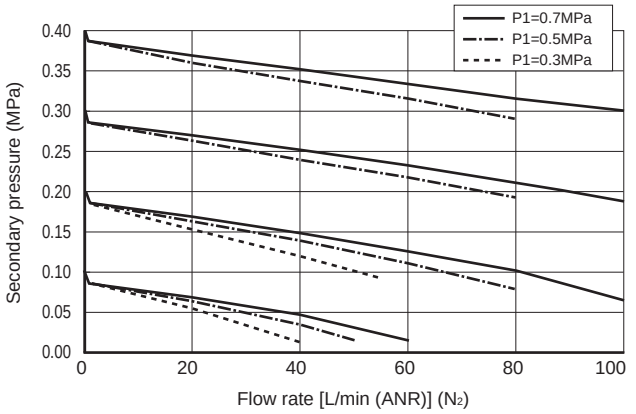
● PGM-30V, 30, 50



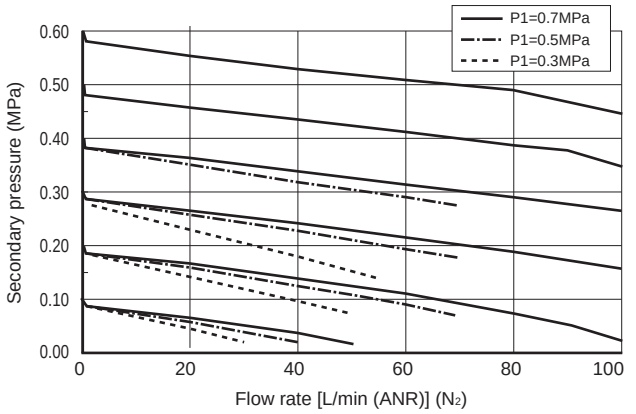
● PGM-100



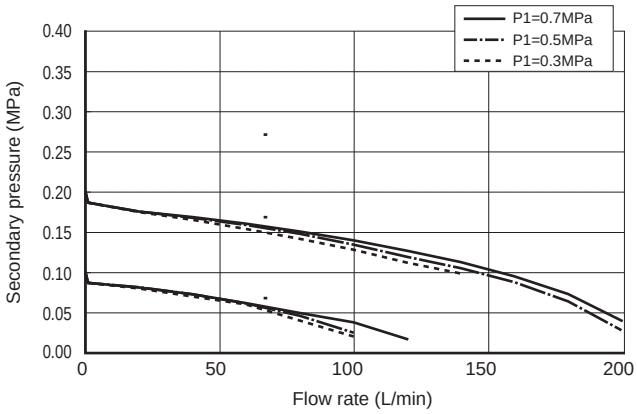
● PGM-H-60



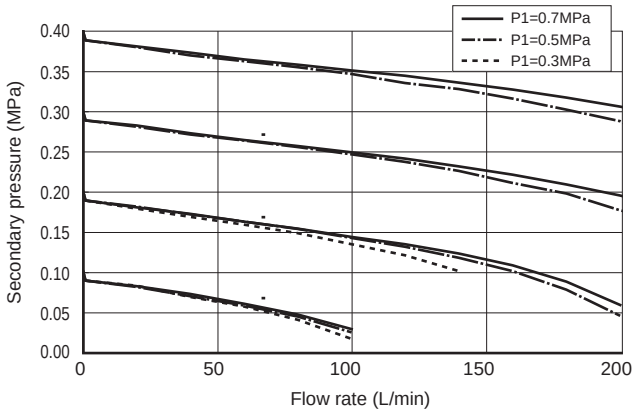
● PGM-H-100



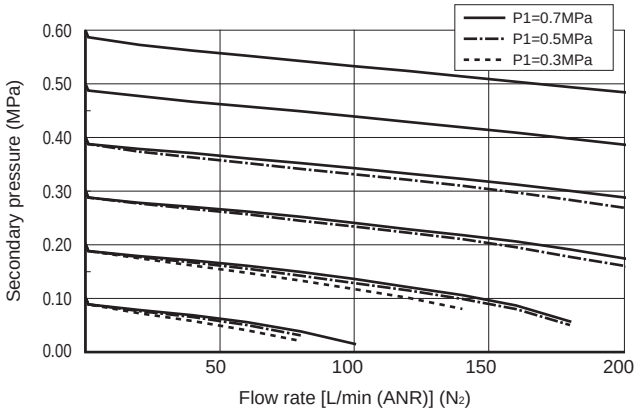
● PGM-2H-30V, 30



● PGM-2H-60



● PGM-2H-100



Safety Precautions

Be sure to read this section before use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.
It is important to select, use, handle and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience.

2 Use this product in accordance with specifications.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product.
This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments.
(Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

❶ Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
❷ Use for applications where life or assets could be significantly affected, and special safety measures are required.

3 Observe organization standards and regulations, etc., related to the safety of device design and control, etc.

ISO4414, JIS B 8370 (Pneumatics fluid power - General rules and safety requirements for systems and their components)
JFPS2008 (Principles for pneumatic cylinder selection and use)
Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of all systems related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn OFF the energy source (air supply or water supply), and turn OFF power to the facility.Discharge any compressed air from the system, and pay attention to possible water leakage and leakage of electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe warnings and cautions in the following pages to prevent accidents.

■ The precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

⚠ DANGER:	When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, and when there is a high degree of emergency to a warning.
⚠ WARNING:	If handled incorrectly, a dangerous situation may occur, resulting in death or serious injury.
⚠ CAUTION:	When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation.
Every item provides important information and must be observed.

Warranty

1 Warranty period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

2 Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

1) Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or the Instruction Manual.
2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
3) Failure not caused by the product.
4) Failure caused by use not intended for the product.
5) Failure caused by modifications/alterations or repairs not carried out by CKD.
6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
7) Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.
Note: For details on the durability and consumable parts, contact your nearest CKD sales office.

3 Compatibility check

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

components for process gases

Safety Precautions

Be sure to read this section before use.
Refer to "Dry Fine system/high purity gas control system components" (catalog No.CB-035A) for general precautions for process gas Components.

Regulator for process gases PGM Series

Design/selection

⚠ WARNING

■Output pressure exceeding the regulator's set pressure could result in damage or faulty operation of the secondary side devices. Be sure to install a safety device.

■When installing, ensure that the piping is performed so that the flow of the fluid is consistent with the direction of the arrow.

When using the product

1. Safety Precautions

⚠ CAUTION

■Before supplying gas to this product, completely loosen the pressure adjustment knob in the counterclockwise direction (DEC).

■Open the inlet side supply valve slowly and operate so as to be able to close it immediately if there is abnormal pressure rise or leakage.

■After supplying inlet side pressure, check that there is no outflow.

■Do not use as a residual pressure exhaust valve.

■Outlet pressure may wobble violently with metallic noises during use. (vibration phenomenon) After confirming this phenomenon, immediately close the inlet supply valve and cease use.

2 . Operation mode

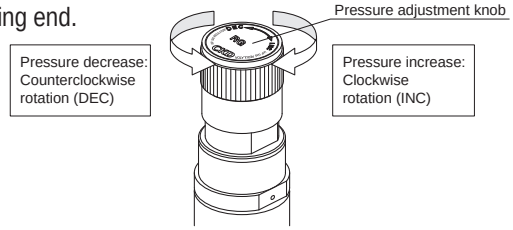
⚠ CAUTION

■Turning the pressure control knob clockwise (INC) raises the set pressure.

■When gas is flowing, turning the pressure control knob counterclockwise (DEC) decreases the set pressure.

■Since this product does not have a relief function, gas must be vented when not flowing.

■When turning (closing) the pressure adjustment knob counterclockwise, be careful not to apply further force from the rotating end.



3 . Outflow check method

⚠ CAUTION

(1)Open the inlet side gas supply valve slowly and supply inlet pressure.

(2)Close the valve on the outlet and inlet sides, leave it for at least 10 minutes and check whether the outlet pressure has risen.

(3)Rotate the pressure adjustment knob clockwise, adjust the outlet pressure within the adjusted pressure range, leave it for at least 10 minutes after the outlet pressure stabilizes, and check whether the outlet pressure has risen.

(4)In and above, outflow is taking place when the outlet pressure continues to rise.

■If outflow is confirmed, stop using the gas immediately, vent the gas, purge as necessary, remove the product, and replace the parts.

4 . Airtight check method

⚠ CAUTION

Product inlet side

(1)After confirming that the pressure adjustment knob of this product has been turned fully in the counterclockwise direction, supply clean inert gas (N2, Ar, etc.) to the inlet side of the product.

(2)After inlet pressure stabilizes, close the inlet side supply valve.

(3)If the inlet pressure decreases gradually over time from the above state, leakage as far as the product is conceivable. (Given that there is no outflow.)

Product outlet side

(1)After confirming that the pressure adjustment knob of this product has been turned fully in the counterclockwise direction, supply clean inert gas (N2, Ar, etc.) to the inlet side of the product.

(2)Close the valve on the outlet side of the product and set the pressure with the pressure adjustment knob.

(3)When the inlet / outlet pressure stabilizes, completely close the inlet side supply valve of the product.

(4)If there are large fluctuations in inlet / outlet pressure over time from the above state, leakage from the product outlet side is conceivable. (Given that there is no outflow.)

■If leakage is confirmed, stop using the gas immediately, vent the gas, purge as necessary, remove the product, and replace the parts.

Web site visit

PC screen

Access here

URL : https://www.ckd.co.jp/semiconductor/en/

Also compatible with smartphones

CKD Semiconductor Special Site

This is a special site specialized for high cleanliness (UHP=Ultra High Purity) products used in semiconductor manufacturing processes. You can search by process name and keywords you're interested in, and you're sure to find the product you're looking for.

Related products Catalogs

Responding to high-level needs for semiconductor manufacturing process control

Dry Fine System/high purity gas control system components

Catalog No. CB-035A

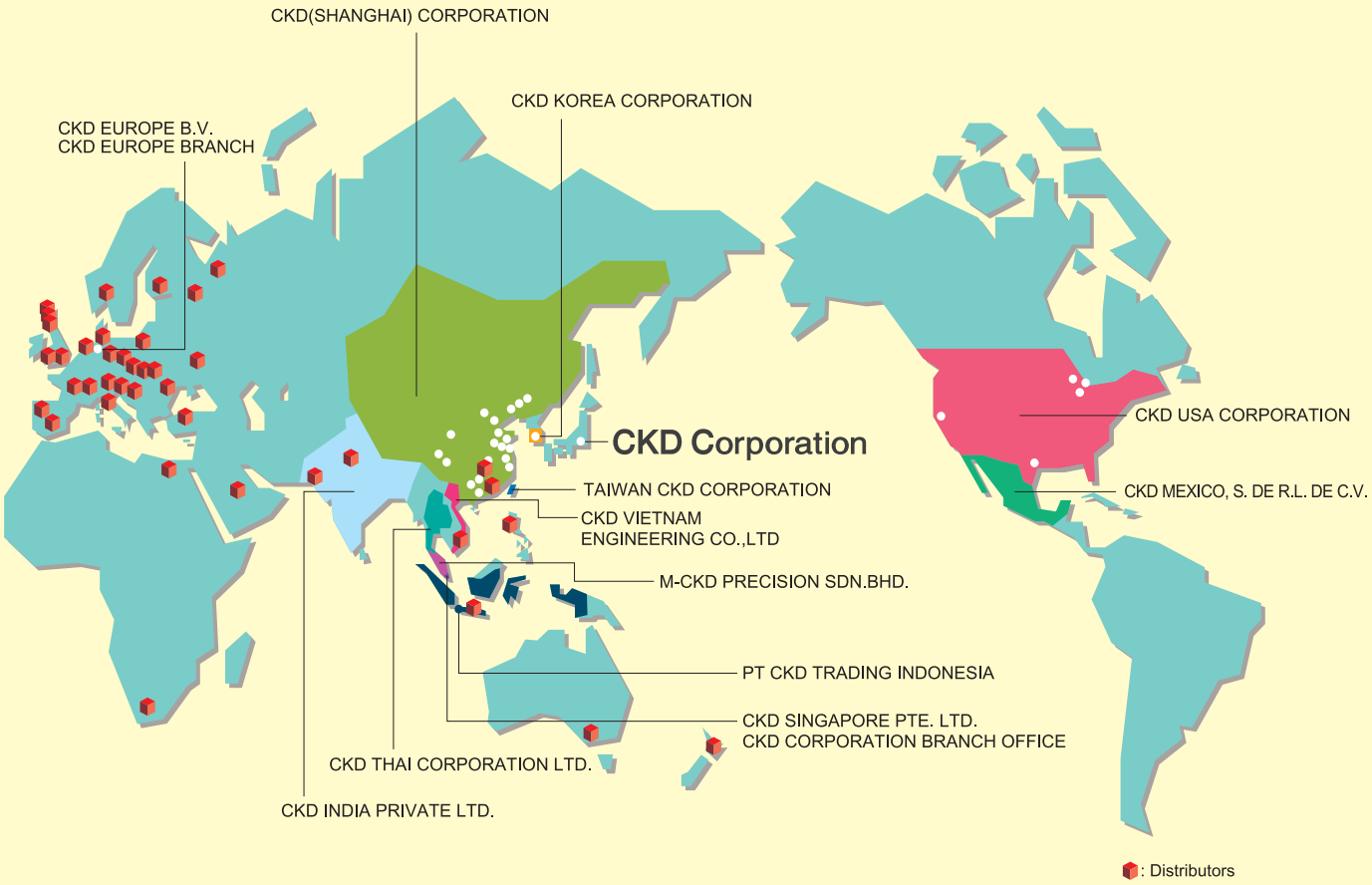
- Industry top performance and reliability
- High quality achieved by advanced spec super cleanroom and consistent production system from design to assembly/packaging
- Variety of versatile fitting variations

Components for clean room specifications

Catalog No.CB-033SA

Satisfies the various levels of clean room cleanliness in a wide range of industries

WORLD-NETWORK



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ASIA

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