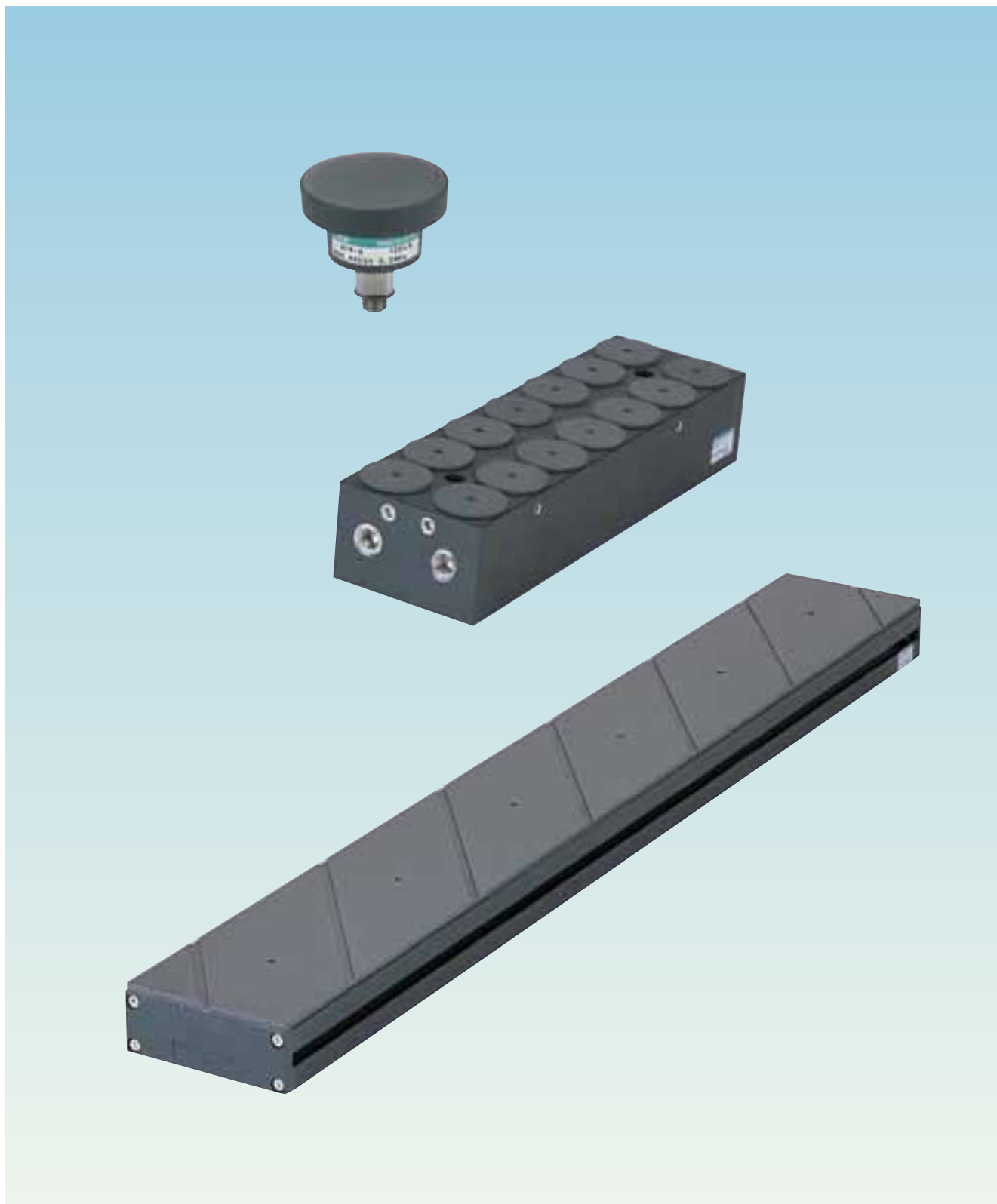


Glass float module GFM Series

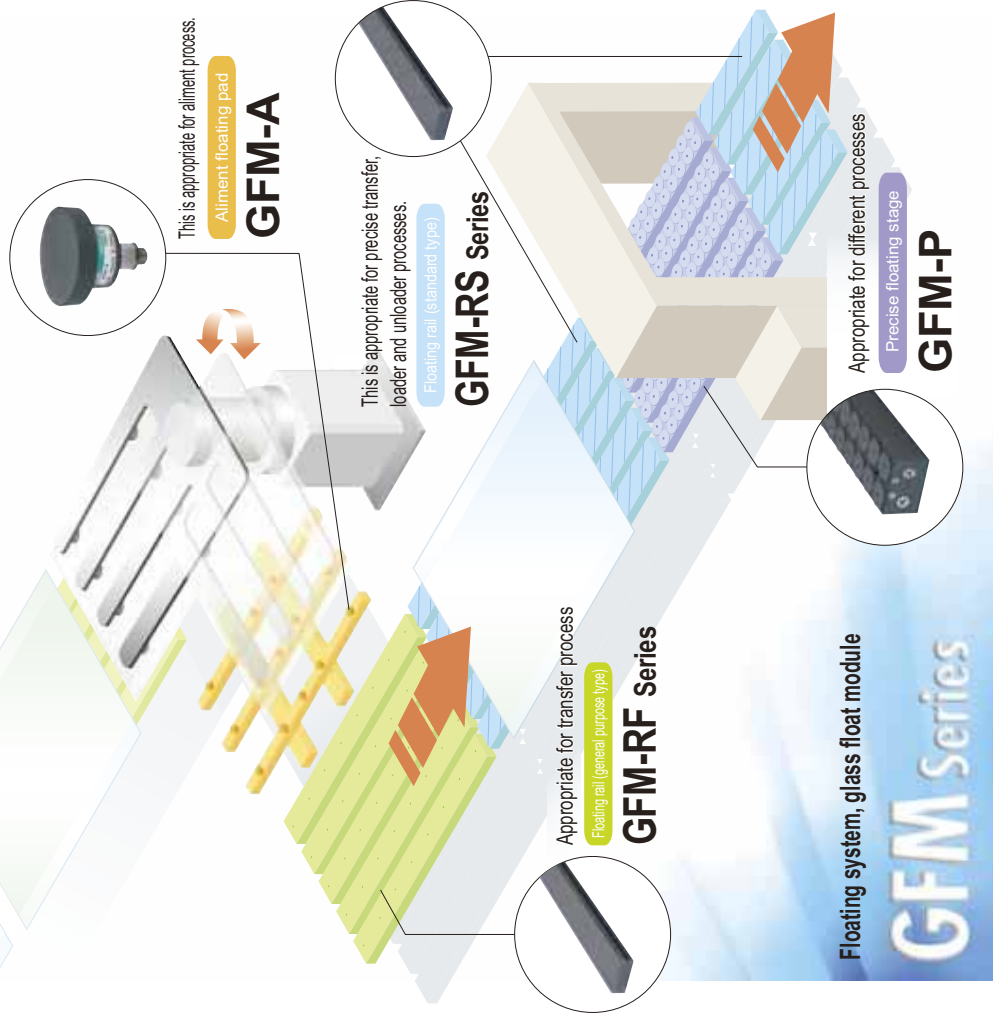
GLASS FLOAT MODULE



Revolution in manufacturing lines to achieve

Innovation in the glass conveying; a clean, non-contact and damage-free process achieved
Advanced CKD Glass Float Module, GFM Series
 Using new materials, a high quality floating system is achieved, dramatically reducing air consumption, and suppressing static electricity and particle generations.

This product is appropriate for different applications matching normal and precise circuit board floating, including glass board conveying to inspection processes.



defect-free and high yield production

Non-contact, stable and precise floating

A new porous material realizes the stable floating, and reduces air consumption.

Static electricity of workpiece prevented

Static electricity is suppressed with a new antistatic material.

Clean level: Class 10[※]

Particles in floating air is suppressed with a new porous material.
 ※GFM Series, CKD test

This is appropriate for sensitive inspection.

Due to diffused reflection-free black body, workpieces are easily checked.

Great variety of applications

Proposing the best pneumatic components for floating.

GFM Series products

Series variation	Applications	Floating (μm)	Air consumption: l/min. (abs) (0.1MPa) ^{*1}	Page
GFM-A	Positioning	10μm and over	3	1
GFM-RF Series	Conveying	250μm and over	20	3
GFM-RS Series	Loader and unloader	150μm and over	20	3
GFM-P	Processes	30μm ^{*2}	2 3	7

*1 This flow is for reference.

*2 The number will change based on combination of positive and negative pressure flows.



Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanical 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 in handling.

2 Use this product in accordance of specifications.

This product must be used within its stated specifications. It must not be modified or machined.

This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.

(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment, or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.

② Use for applications where life or assets could be adversely affected, and special safety measures are required.

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

ISO4414, JIS B8370 (pneumatic system rules)

JFPS2008 (principles for pneumatic cylinder selection and use)

Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

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

① Inspect and service the machine and devices after confirming safety of the entire system related to this product.


② Note that there may be hot or charged sections even after operation is stopped.


③ 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 enough attention to possible water leakage and leakage of electricity.


④ 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 on the pages below to prevent accidents.

■ The safety cautions 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, or when there is a high degree of emergency to a warning.

 **WARNING:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

 **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. In any case, important information that must be observed is explained.

Disclaimer

1. CKD cannot be held liable for any business interruption, loss of profit, personal injury, delay cost, or any other ancillary or indirect loss, cost, or damage resulting from the use of or faults in the use of CKD products.

2. CKD cannot be held responsible for the following damage:

① Damage resulting from failure of CKD parts due to fire from reasons not attributable to CKD, or by intentional or negligence of a third party or customer.

② When a CKD product is assembled into customer equipment, damage that could have been avoided if customer equipment were provided with functions and structure, etc., generally accepted in the industry.

③ Damage resulting from use exceeding the scope of specifications provided in CKD catalogs or instruction manuals, etc., or from actions not following precautions for installation, adjustment, or maintenance, etc.

④ Damage resulting from production modifications not approved by CKD, or from faults due to combination with other software or other connected devices.



Safety precautions

Always read this section before starting use.

Glass float module GFM Series

Design & Selection

1. Common

WARNING

- Use the product within the specifications range.
Do not use the product with exceeding the specifications range, otherwise a porous material could be damaged.
- Avoid installation outdoors such as where high powder dust or direct sunlight contact with the product.
Do not use the product where corrosive or combustible gas contact with. Do not absorb such gases.
- This product is used with compressed air. Do not use other fluids.
- Do not machine the product additionally. Accuracy or strength could drop because of machining distortion, etc.

CAUTION

- Use dry clean compressed air Grade 1.6.2 -- solid particles: 0.1 μm ; pressure dew point: 10°C; oil concentration: 0.1 mg/m^3 .
(Based on compressed air quality grade; JIS B8392-1: 2000)
<Use of CKD dryer D Series or inline clean filter FCS Series is recommended.>

2. Swing type GFM-A

WARNING

- Pay attention when turning using the pad fixed with screws.
Screws could loosen during turning and cause problems.
- When vacuuming and moving a part, note acceleration, impact, and wind pressure.
The vacuumed part could drop off during movement.

3. Rail type GFM-R*/precision type GFM-P

CAUTION

- Separately prepare a connection bracket to match your system's installing dimensions.
(Separate bracket kits are available, so contact CKD for details.).
- Product installing threads pass through the air path, so air could leak from them.
<Only GFM-R Series>
This is prevented by using the installing bracket kit.

Export

CAUTION

- Products in this catalog include some subject to Export Trade Control Ordinances, indicated on each page. Observe laws and regulations when exporting these parts or devices containing these parts.

Installation & Adjustment

1. Common

⚠ WARNING

- Before starting, check that load and joint connections are not loose or abnormal.
- Confirm that the device runs properly before using.
After installing, repairing, or modifying the product, conduct a function inspection and confirm that the product is correctly installed.
- Confirm that there is no machine interference and that the actuation system is normal.
Provide sufficient safety measures for this device so that the workpiece and this product do not interfere when the workpiece is moving.

⚠ CAUTION

- Do not take the product out of the packing bag until just before piping.
Foreign matter entering from the piping port could cause problems.
- When piping, flush pipes with air to remove foreign matter, swarf, etc.
- Read the instruction manual before use.
Familiarize yourself with details before using the product.
- Remove foreign matter from the installation surface or installation section by wiping with ethanol or scouring with air, etc.

2. Swing type GFM-A

⚠ WARNING

- The porous section of this product tilts. To prevent interference with the workpiece, provide sufficient device safety measures, such as positioning this product away from the workpiece before the workpiece rises or before and after vacuuming.

⚠ CAUTION

- When fixing the product in place, use an M5 screw for connecting the pipe at the lower end of the product, and tighten with the appropriate torque.
Use the across flat when tightening.
[Tightening torque: 1.0 to 1.5 (N·m)]
If transporting the system after installing, check that torque is appropriate after installing the device.
- Due to the product structure, the porous surface may rise and fall slightly when the air supply is turned on and off.
Note workpiece floating and movement before and after vacuuming for this device.

3. Rail GFM-R*, precision GFM-P

⚠ WARNING

- This product's carbon graphite is brittle and could break or scatter pieces on impact, resulting in injury.

⚠ CAUTION

- Tighten the product's M screws with the appropriate torque.

Port thread	Tightening torque (N·m)
M4	0.5 to 0.6
M5	1.0 to 1.5

- Do not use joints similar to small joints -- barbed or clamp joints -- when piping this product. The effective sectional area is small and flow may not be sufficient.

During Use & Maintenance

1. Common

WARNING

- Refer to the instruction manual and conduct careful maintenance and inspection.
Incorrect handling could result in device or system damage or operation faults.

CAUTION

- Conduct daily inspections and regular inspections to ensure that maintenance control is done correctly.
Insufficient maintenance could lower product functions, shorten product life, or result in damage or incorrect operations.
- Stop use if leakage increases or if the device does not function correctly.
After installing, repairing, or modifying the product, conduct an appropriate function inspection and confirm that the product is installed correctly.
- Release residual pressure before installing or removing the product.
- When suspending use for a long time, place the product in a polyethylene bag and store it in a clean dry environment.
- To ensure that product operation is optimum, conduct the following regular inspection once or twice a year.
 - ① Check external leakage.
 - ② Decrease of floating performance
 - ③ Check appearance defectives (scratch, porous material defect or contamination on the surface) confirmation



Floating system/glass float module

Alignment floating pad GFM-A

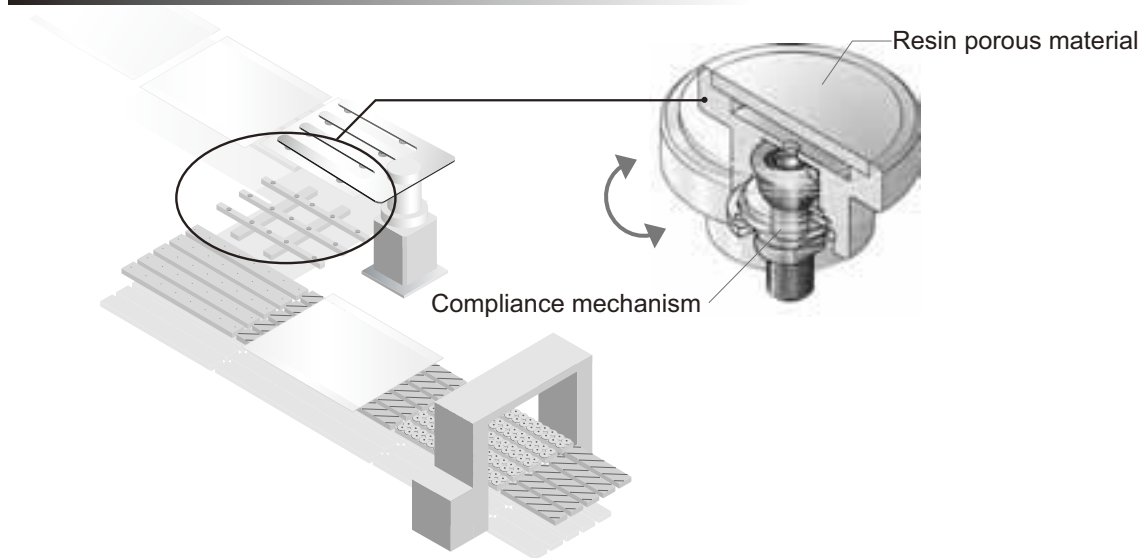
Swinging head type freely handles deflections.

● Reference floating: 10 μm and over ● Main applications: Alignment

Products subject to export trade control ordinances

The new resin porous material and CKD's original compliance mechanism enables deflections to be aligned.

■ CKD original "resin porous material + compliance mechanism" are provided. (PAT.P)



■ Small air consumption

Due to a porous material, the air consumption flow reduced to 1/2*.

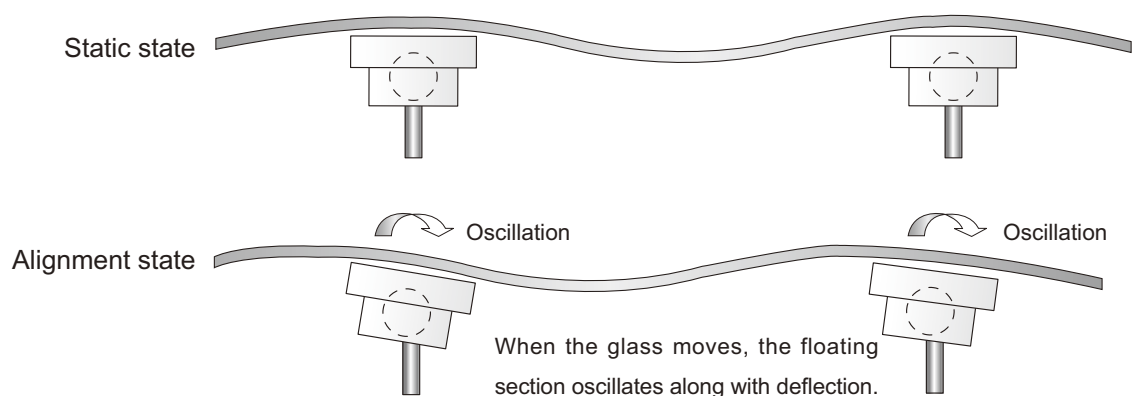
* Based on CKD test of GFM-A

■ Antistatic

Static electricity is suppressed by antistatic resin porous material.

■ Freely handle deflections

Non-contact floating is possible while tracking deflections on large glass substrates. (Image)



Specifications

Descriptions		GFM-A
Working fluid		Clean compressed air (grade 1.6.2)
Working pressure range kPa	Floating	80 to 200
	Suction	-90 to -60
Ambient temperature °C		5 to 40
Mounting attitude		Facing porous material plane top only
Load	N Note 1	1 to 5
Air consumption ℓ/min. Note 1		10 or less
Suction holding force	N	5 or less (suction surface vertical)
Port size		M5
Weight	g	Approx. 15

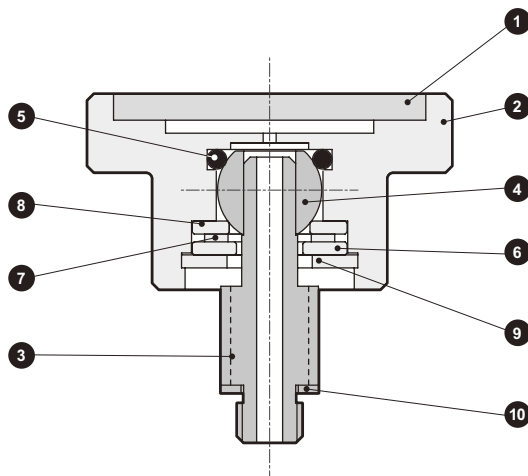
Note 1: This value applies at supply air pressure 100kPa.

How to order

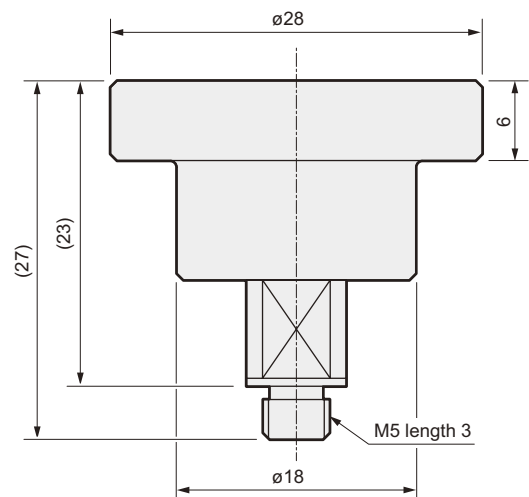


Model no.

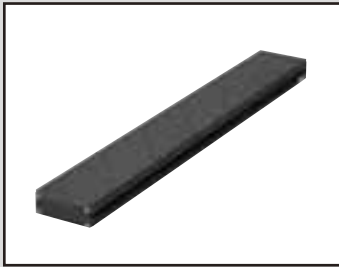
Internal structure and parts list



Dimensions



No.	Parts name	Material	Remarks
1	Porous material	Polyphenylene sulfide	With carbon fiber
2	Body	Polyphenylene sulfide	With carbon fiber
3	Shaft	Stainless steel	
4	Steel ball machined	Stainless steel	
5	O ring (S-7)	Nitrile rubber	
6	Metal washer	Stainless steel	
7	Wave washer for automobile	Stainless steel	
8	Metal washer	Iron steel	Electroless nickeling
9	C type snap ring for hole	Stainless steel	
10	Gasket	Nitrile rubber, steel	



Floating system/glass float module

Floating rail **GFM-R^F** Series

- Floating: 150 μm and over
- Main applications: Transfer

Custom order

The new carbon graphite porous material and CKD's original design enables highly accurate floating transfer.

■ CKD original design (PAT.P)

Fluid technology accumulated over the years by CKD is applied.
A floating surface that floats accurately is realized.

■ Antistatic

Using porous carbon graphite prevents static electricity.
Floating air entering porous material flows slowly and keeps the workpiece from being charged.

■ Stable floating

By incorporating porous material and optimally positioning the air path, stable floating is possible over a wide area.

■ Low particle occurrence

Particles in floating air are suppressed by using porous carbon graphite.

■ Black body

Suppressing diffused reflection

■ Negative pressure suction hole

Use with a negative pressure flow rate is possible.

■ Slit (S Series)

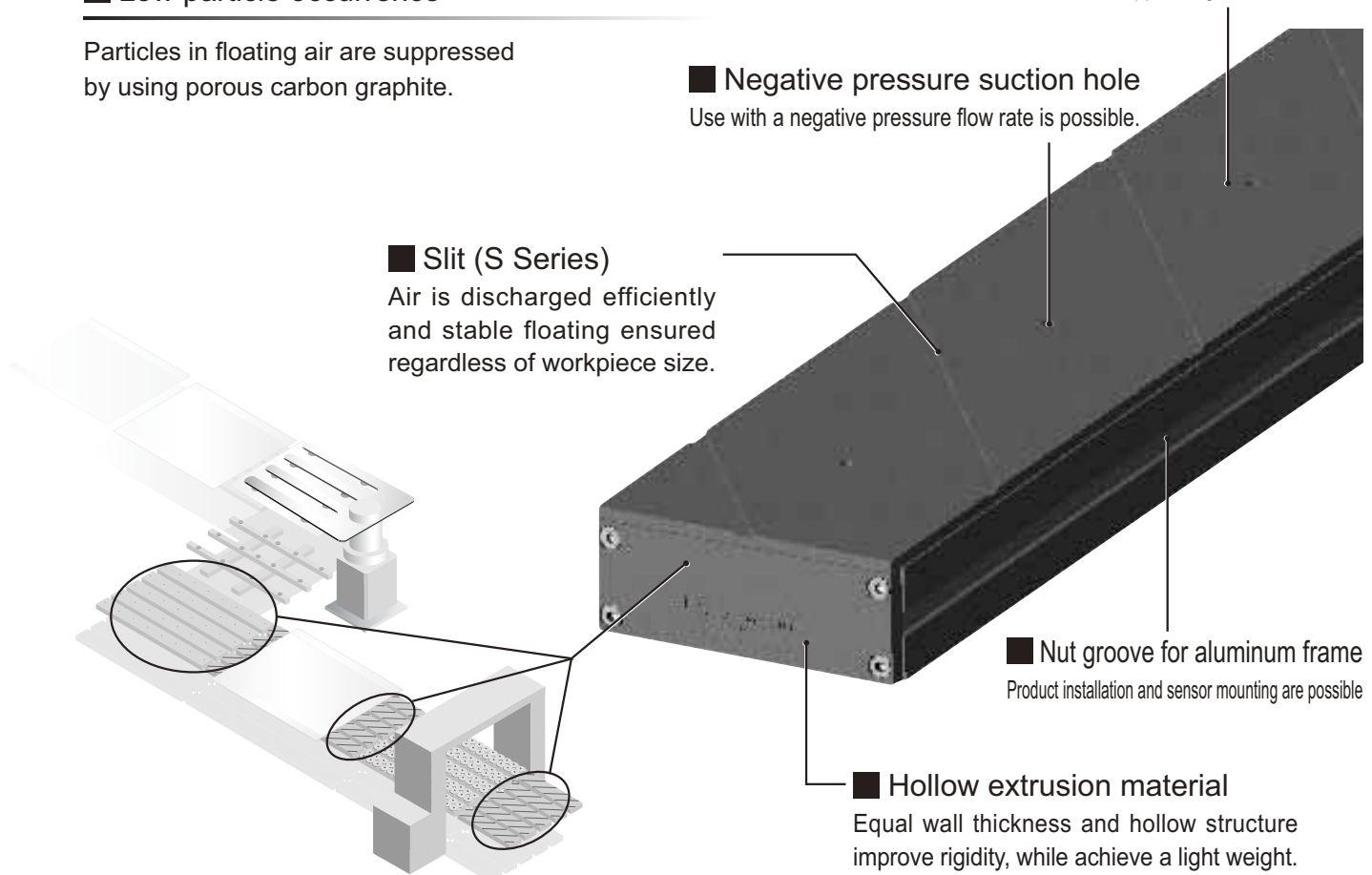
Air is discharged efficiently and stable floating ensured regardless of workpiece size.

■ Nut groove for aluminum frame

Product installation and sensor mounting are possible

■ Hollow extrusion material

Equal wall thickness and hollow structure improve rigidity, while achieve a light weight.



Specifications

Descriptions	GFM-RS-500	GFM-RS-750	GFM-RS-1000
	GFM-RF-500	GFM-RF-750	GFM-RF-1000
Product size (L x W x H) mm	501 x 102 x 40	751 x 102 x 40	1001 x 102 x 40
Floating plane size (L x W) mm	500 x 100	750 x 100	1000 x 100
Working fluid	Clean compressed air (grade 1.6.2)		
Ambient temperature range °C	5 to 40		
Working pressure range	Positive pressure MPa	0 to 0.2	
	Negative pressure kPa	-50 to 0	
Consumption flow ℓ/min. Note 1	Approx. 12	Approx. 18	Approx. 24
Floating height μm Note 2	Approx. 150 (GFM-RS)/Approx. 250 (GFM-RF)		
Weight kg	Approx. 1.9	Approx. 2.7	Approx. 3.6

Note 1: The consumption flow is indicated when 0.1MPa is supplied. Consumption flow varies with the workpiece state and required floating rate. Use this as a guide for calculating the flow rate.

Note 2: When 0.1MPa is supplied. This is the value for when a 0.7 mm thick glass is floating. Use this as reference for floating height.

How to order

GFM - RS - 500

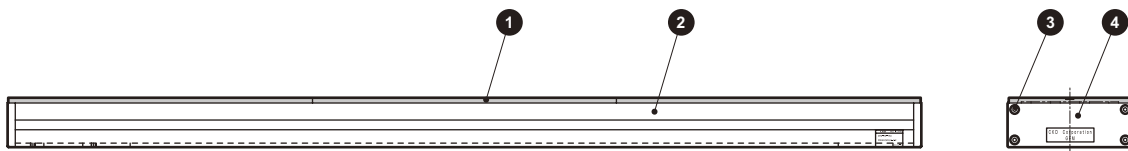
Model no.

A Surface shape

B Floating plane length

Symbol	Descriptions
A Surface shape	
RS	With slit
RF	Without slit
B Floating plane length (mm)	
500	
750	
1000	

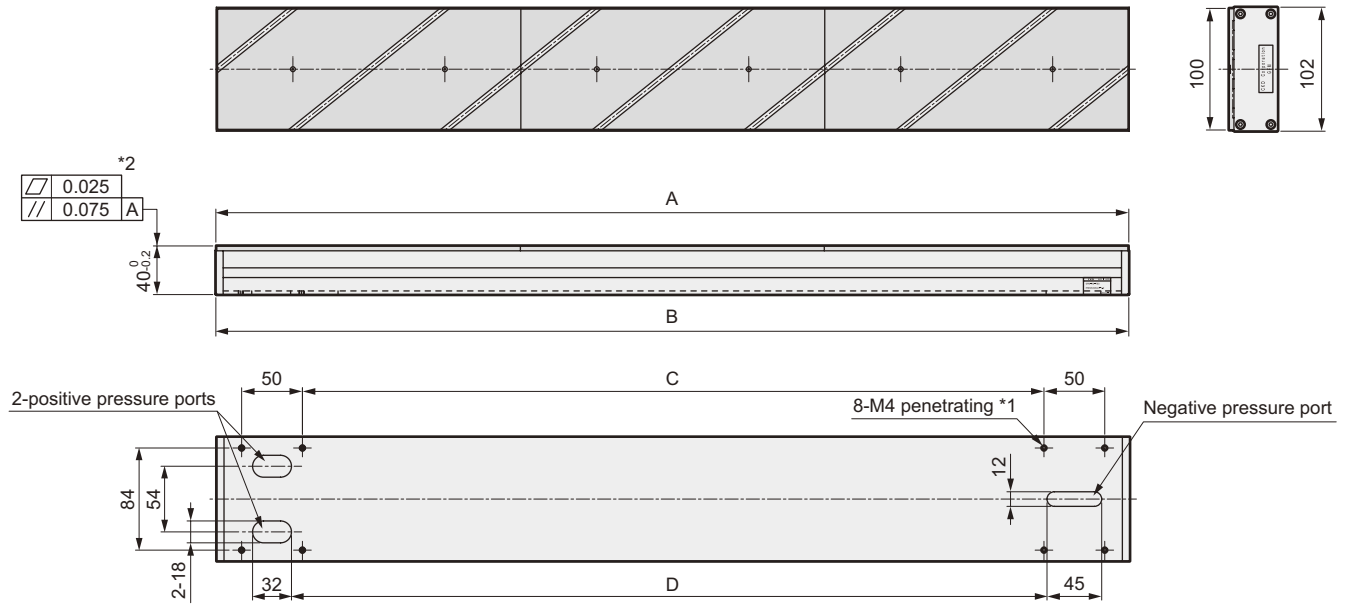
Appearance and parts list



No.	Parts name	Material	Remarks
1	Porous material	Carbon graphite	
2	Base	Aluminum alloy	Black alumite treatment
3	Hexagon socket bolt	Stainless steel	
4	Cover	ABS resin	

Dimensions

- With slit GFM-RS



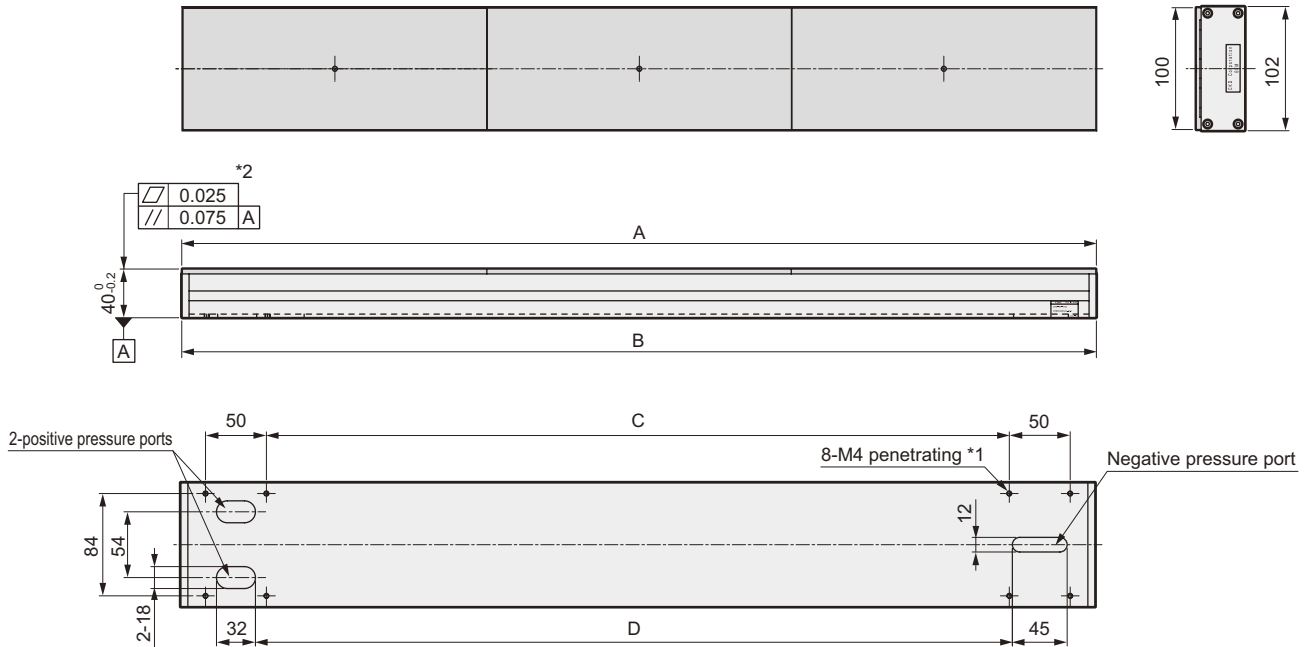
*1: Passes through the positive pressure port.

*2: Value measured at 25°C constant temperature. Accuracy varies in an atmosphere other than 25°C.
GFM-RS-1000's flatness is 0.05 and parallelism is 0.1.

Model no.	A	B	C	D
GFM-RS-500	500	501	360	371.5
GFM-RS-750	750	751	610	621.5
GFM-RS-1000	1000	1001	860	871.5

Dimensions

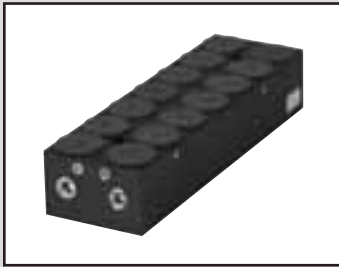
● Without slit GFM-RF



*1: Passes through the positive pressure port.

*2: Value measured at 25°C constant temperature. Accuracy varies in an atmosphere other than 25°C.
 GFM-RF-1000's flatness is 0.05 and parallelism is 0.1.

Model no.	A	B	C	D
GFM-RF-500	500	501	360	371.5
GFM-RF-750	750	751	610	621.5
GFM-RF-1000	1000	1001	860	871.5



Floating system/glass float module

Precise floating stage GFM-P

● Floating rate: $30 \pm 6 \mu\text{m}$ ● Main applications: Various inspection processes, work processes

Custom order

The new carbon graphite porous material and CKD's original design enables highly accurate floating.

■ CKD original design (PAT.P)

Fluid technology accumulated over the years by CKD is applied. A floating plane is floated highly accurately.

■ High accuracy

Extra-precise machining ensures superb flatness and parallelism.

■ High floating accuracy

Highly accurate floating is enabled by using positive pressure and negative pressure flow.

■ Antistatic

Using carbon graphite prevents static electricity. Floating air entering porous material flows slowly and keeps the workpiece from being charged.

■ Low particle occurrence

By adopting porous carbon graphite, particles in the floating air are suppressed.

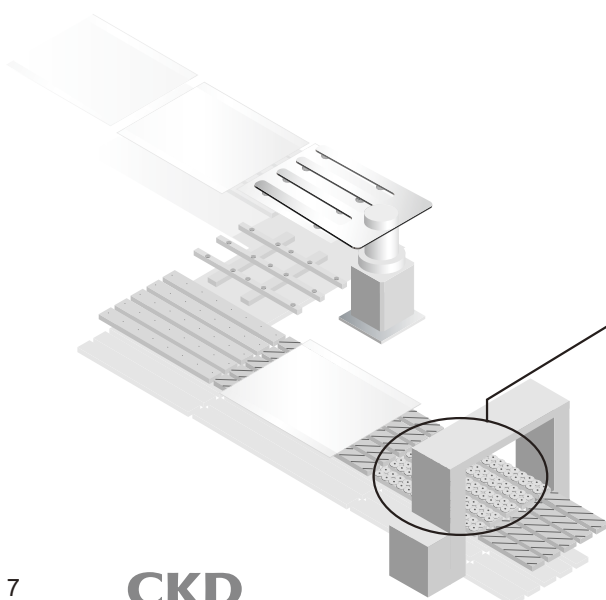
■ Negative pressure suction hole

Highly accurate floating is enabled by using positive pressure and negative pressure flow.

■ Black body

Suppressing diffused reflection

■ Top surface installation to facilitate installation



Specifications

Descriptions		GFM-P
Product size (L x W x H) mm		250 x 76 x 50
Floating plane size (L x W) mm		250 x 76
Working fluid		Clean compressed air (grade 1.6.2)
Ambient temperature range °C		5 to 40
Working pressure range	Positive pressure MPa	0 to 0.2
	Negative pressure kPa	-50 to 0
Floating flatness μm Note 1		12 μm or less (30 μm floating)
Consumption flow ℓ/min . Note 2		Approx. 2 to 3
Floating height μm Note 3		Approx. 70
Weight kg		Approx. 2.2

Note 1: The difference of the floating plane's MAX-MIN is indicated. Supply flow rate conditions vary with the workpiece state and the user's working conditions. Use this as a guide for floating flatness.

Note 2: This indicates the consumption flow when 0.1MPa supply. Consumption flow varies with the workpiece state and required floating rate. Use this as a guide for calculating the flow rate.

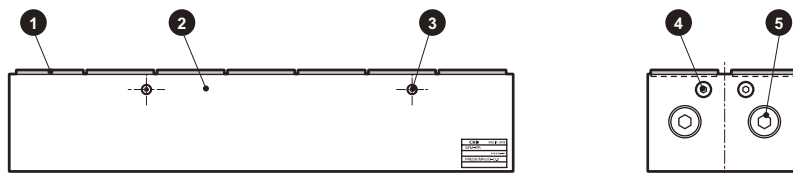
Note 3: When 0.1MPa is supplied. This is the value for when a 0.7 mm thick glass is floating. Use this as reference for floating height.

How to order



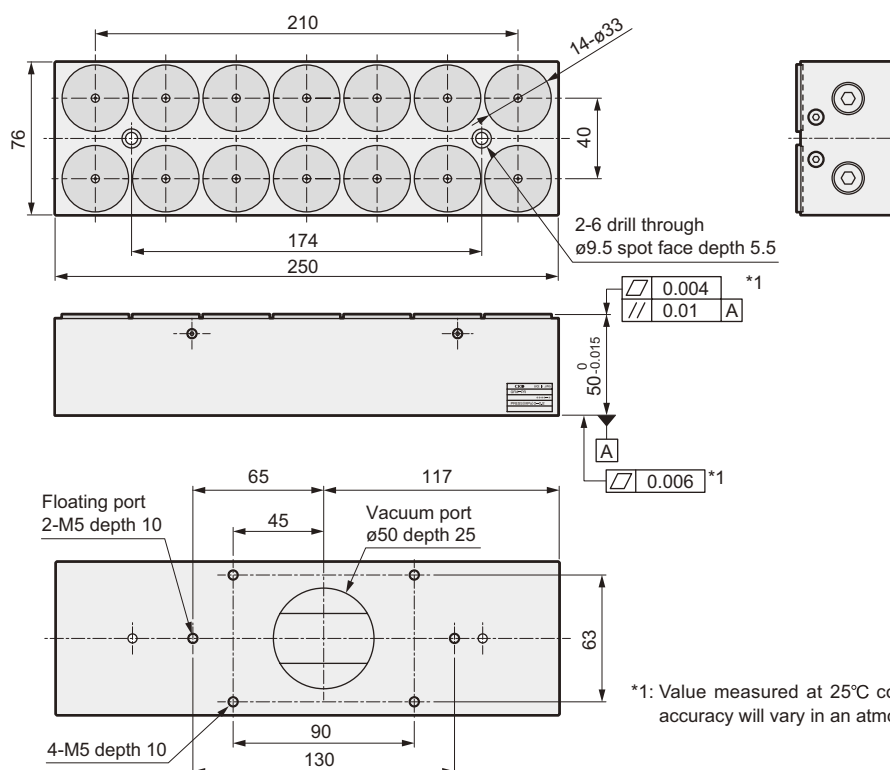
Model no.

Appearance and parts list

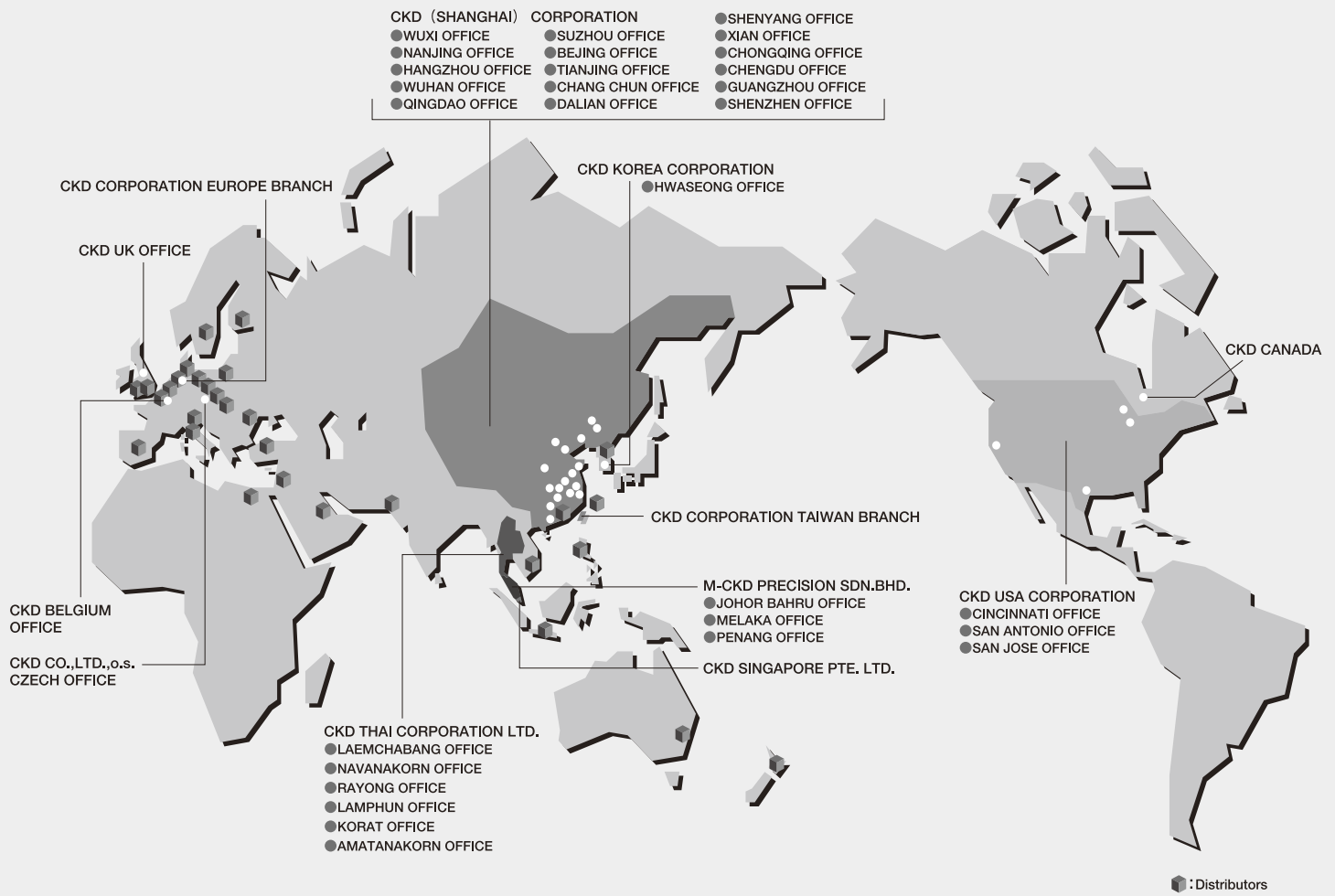


No.	Parts name	Material	Remarks
1	Porous material	Carbon graphite	
2	Base	Aluminum alloy	Black alumite treatment
3	Hexagon socket set screw	Stainless steel	
4	Hexagon socket set screw	Stainless steel	
5	Hexagon socket set screw	Stainless steel	

Dimensions



*1: Value measured at 25°C constant temperature room. The accuracy will vary in an atmosphere that deviates from 25°C.



CKD Corporation

- OVERSEAS DPT. SALES DIV. 2-250 Uji Komaki, Aichi 485-8551, Japan
- PHONE +81-(0)568-74-1338 FAX +81-(0)568-77-3461

U.S.A

CKD USA CORPORATION

● HEADQUARTERS

4080 Winnetka Avenue, Rolling Meadows, IL 60008 USA
PHONE +1-847-368-0539 FAX +1-847-788-0575

EUROPE

CKD EUROPE BRANCH

De Fruittuin 28 Hoofddorp 2132NZ The Netherlands
PHONE +31-(0)23-5541490 FAX +31-(0)23-5541491

Malaysia

M-CKD PRECISION SDN.BHD.

● HEADQUARTERS

Lot No.6,Jalan Modal 23/2, Seksyen 23, Kawasan, MIEL,
Fasa 8, 40300 Shah Alam,Selangor Darul Ehsan, Malaysia
PHONE +60-(0)3-5541-1468 FAX +60-(0)3-5541-1533

Thailand

CKD THAI CORPORATION LTD.

● SALES HEADQUARTERS-BANGKOK OFFICE

Suwan Tower, 14/1 Soi Saladaeng 1, North Sathorn Rd.,
Bangrak, Bangkok 10500 Thailand
PHONE +66-(0)2-267-6300 FAX +66-(0)2-267-6305

Singapore

CKD SINGAPORE PTE LTD.

705 Sims Drive #03-01/02, Shun Li Industrial Complex,
387384 Singapore
PHONE +65-6744-2623 FAX +65-6744-2486

Taiwan

CKD CORPORATION TAIWAN BRANCH

Rm.1405, 14F, No.96, Sec.2, Chung Shan N.Rd., Taipei,
Taiwan, R.O.C.
PHONE +886-(0)2-2523-0374 FAX +886-(0)2-2523-5081

Website <http://www.ckd.co.jp/>

China

CKD (SHANGHAI) CORPORATION

● SALES HEADQUARTERS / SHANGHAI OFFICE

Room 1903, 333 Jiujiang Road, Shanghai, 200001,
China
PHONE +86-(0)21-63602277 FAX +86-(0)21-63511661

Korea

CKD KOREA CORPORATION

Room No.1105, 11th FL, The Korea Teachers
Pention B/L. 27-2, Yoido-Dong, Youngdeungpo-Gu,
Seoul, 150-742, Korea
PHONE +82-(0)2-783-5201~5203 FAX +82-(0)2-783-5204

The goods and their replicas, or the technology and software in this catalog are subject to complementary export regulations by Foreign Exchange and Foreign Trade Law of Japan.

If the goods and their replicas, or the technology and software in this catalog are to be exported, laws require the exporter to make sure they will never be used for the development or the manufacture of weapons for mass destruction.