Floating system/glass float module

Alignment floating pad **GFM-A**

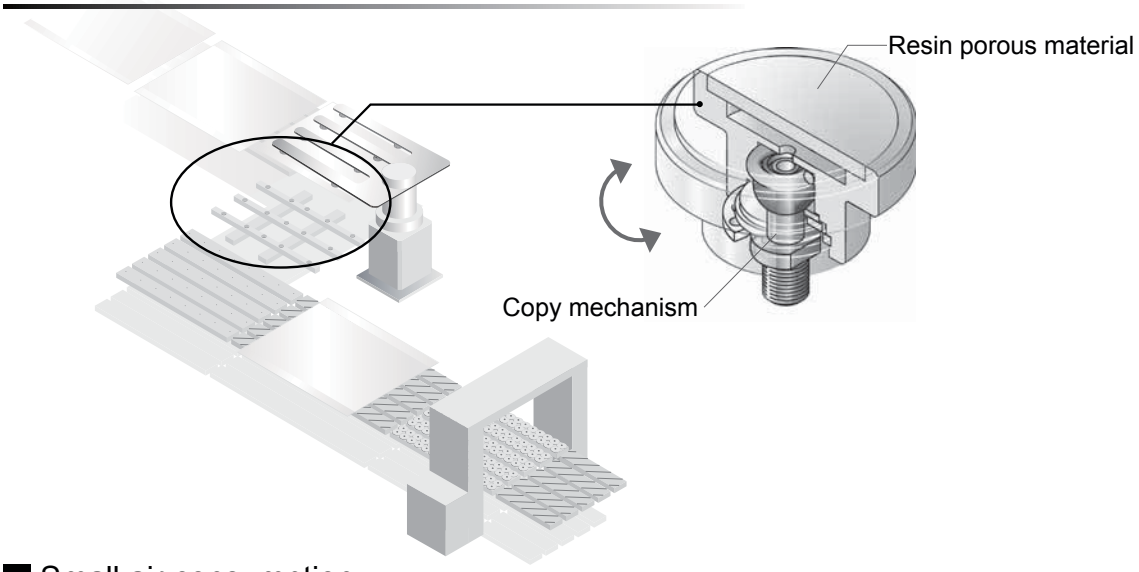
Head swinging type freely handles deflections.

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

RoHS

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

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



■ Small air consumption

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

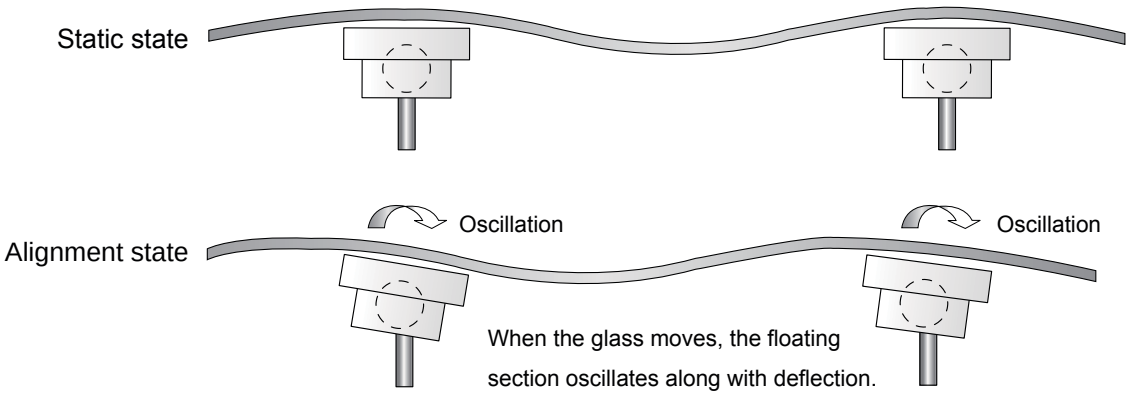
* Based on CKD test of GFM-A

■ 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 1.1.1 to 1.6.2)
Working pressure kPa	Floating	80 to 200
	Suction	-90 to -60
Ambient temperature °C		5 to 40
Temperature for transport and storage °C		-10 to 60
Mounting orientation		Porous material surface facing up only
Load Note 1 N		1 to 5
Air consumption Note 1 ℓ/min.		10 or less
Suction holding force N		5 or less (suction surface vertical)
Port size		M5
Weight g		Approx. 15

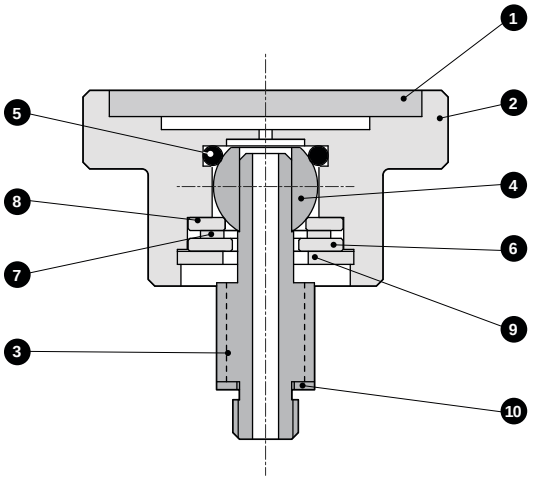
Note 1: This value applies at supply air pressure 100kPa.

How to order

GFM - A

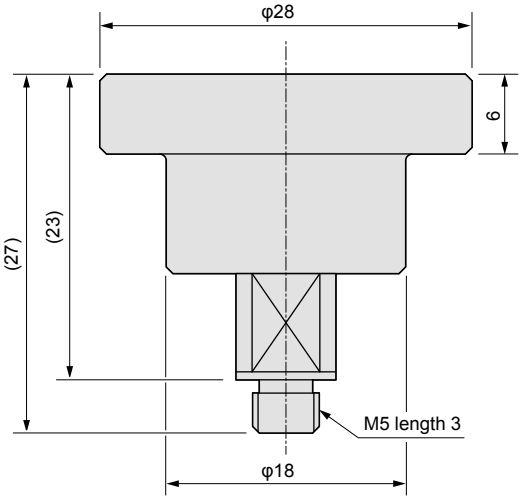
Model no.

Internal structure and parts list



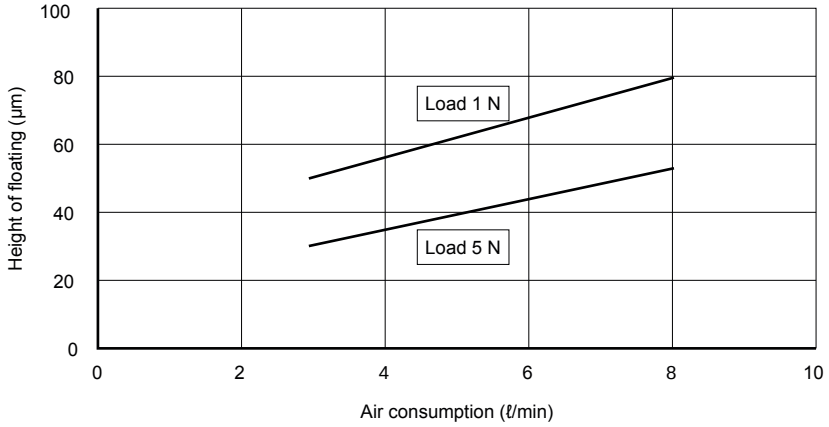
No.	Parts name	Material	Remarks
1	Porous material	Polyphenylene sulfide	With carbon fiber
2	Body	Polyphenylene sulfide	With carbon fiber
3	Shaft	Stainless steel	
4	Steel ball	Stainless steel	
5	O ring	Nitrile rubber	
6	Metal washer	Stainless steel	
7	Wave washer	Stainless steel	
8	Metal washer	Iron steel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

Dimensions

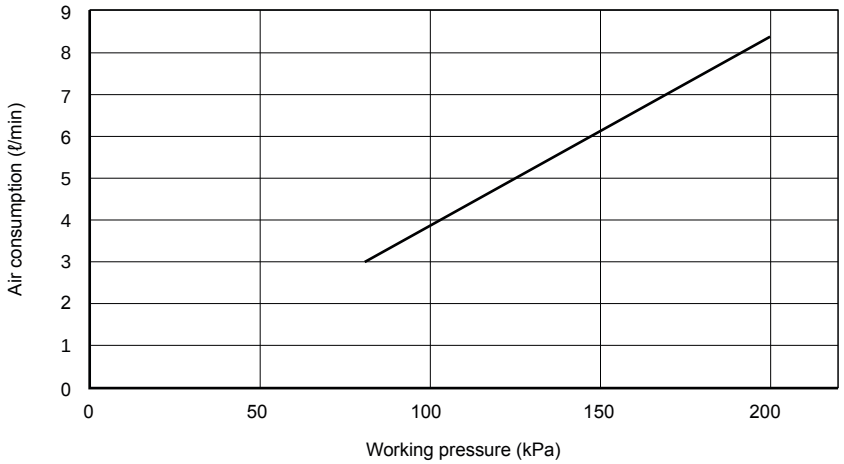


1 Height of floating (reference data)

Air consumption - height of floating



Working pressure - air consumption

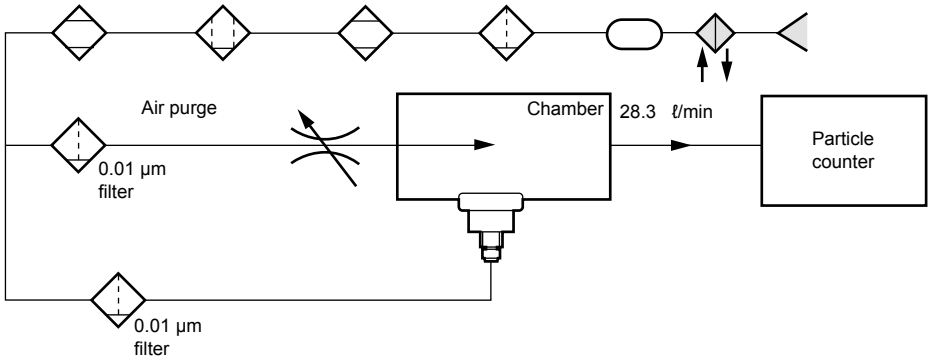


2 Dust generation (reference data)

[Measuring method]

① Install test sample on chamber.
② Supply air.
③ Measure the quantity of particles generated when air is flown continuously.

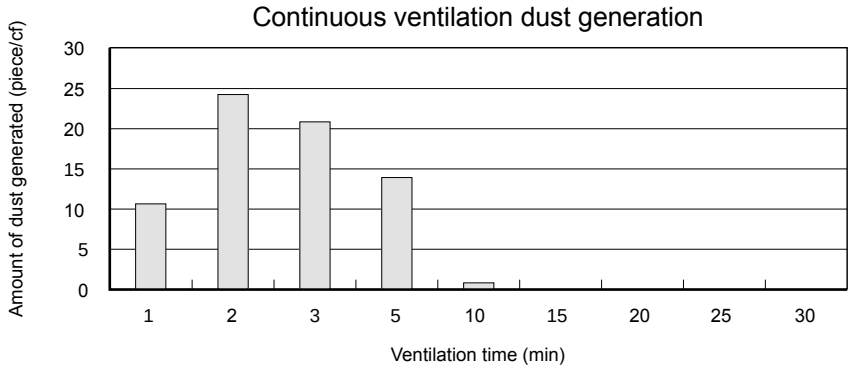
[Test circuit]



[Measuring instrument]

Particle counter	: Laser dust monitor
Minimum measurable particle diameter	: 0.1 μm
Suction rate	: 28.3 ℓ/min

[Results]



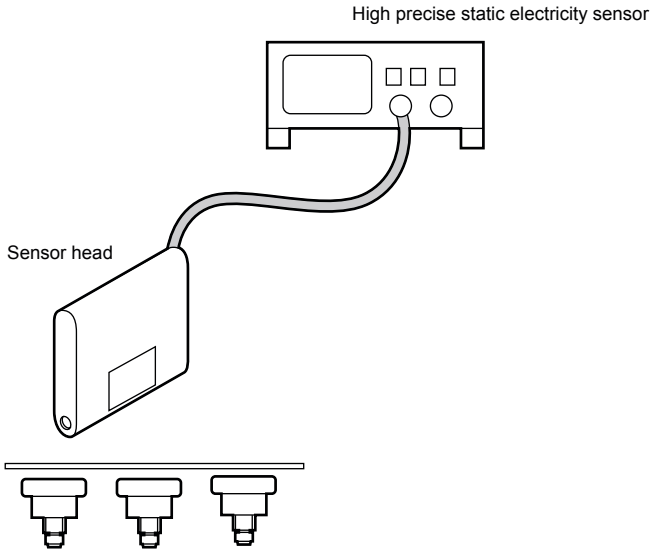
Note: Amount of dust generation includes larger than 0.5 μm particle diameter

3 Change of static electricity amount (reference data)

[Measuring method]

① Install sensor head at the center of glass.
② Measure the static electricity amount (voltage) while air supplying.

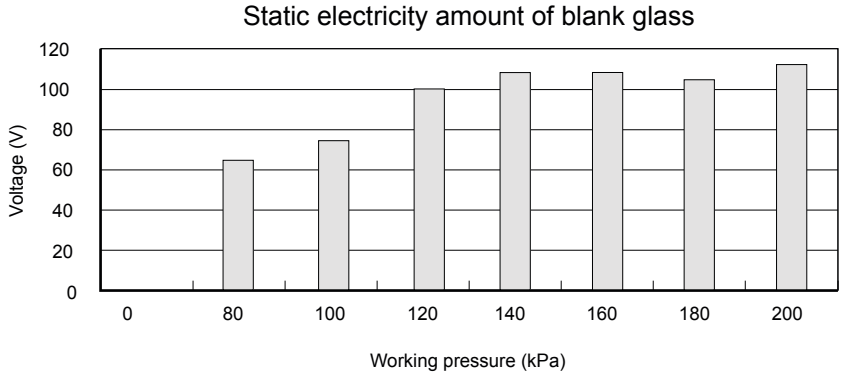
[Test circuit]



[Measuring instrument]

Static electricity amount measurement: high precise static electricity measure (non-contact type)

[Results]



MEMO

Floating system, glass float module

High floating rail **GFM-T** Series

- Floating amount: more than 250 μm
- Main purpose: high floating transport

RoHS

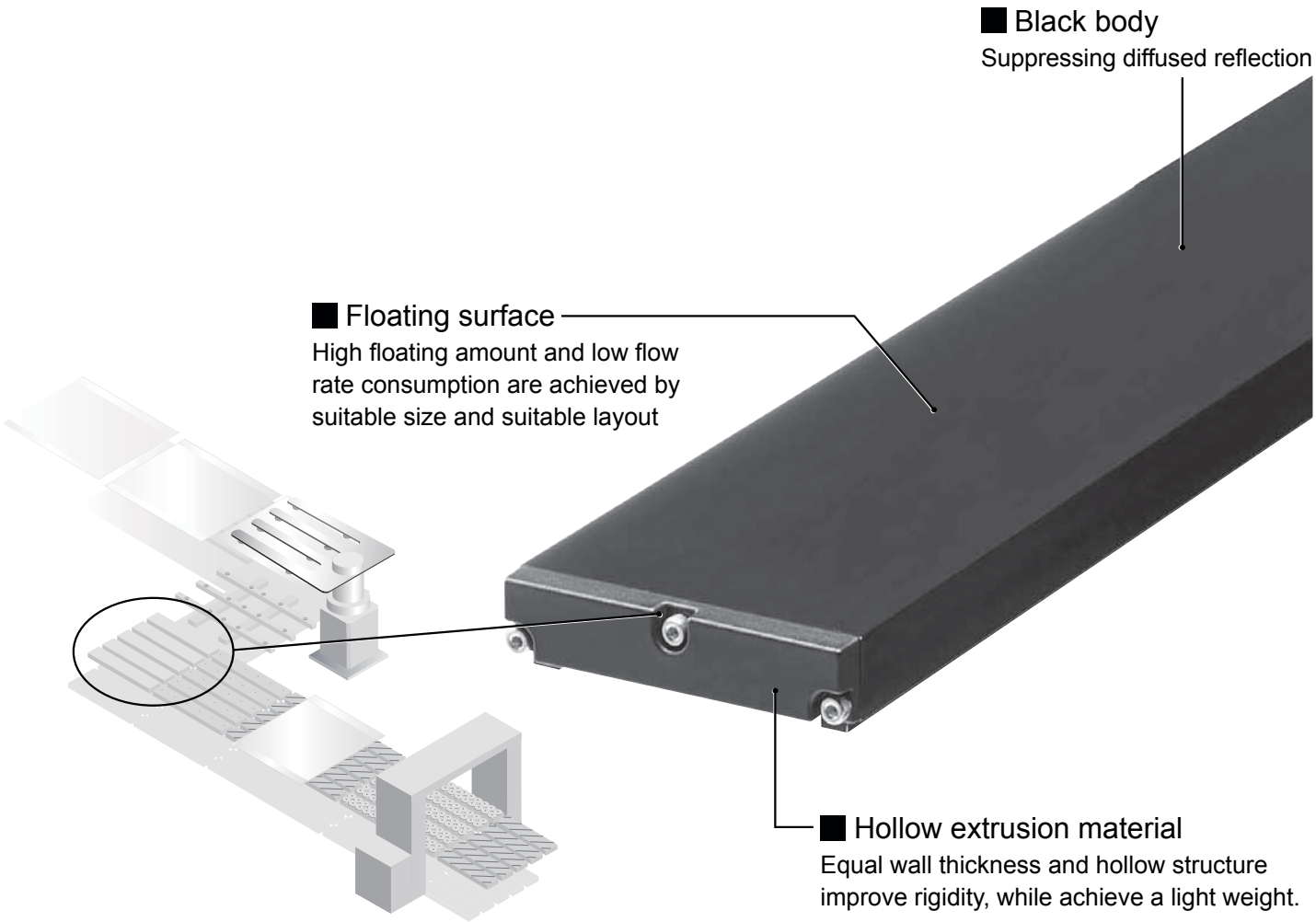
Unique design which takes advantage of know how about air pressure technology through long experience enables high floating non-contact transportation.

■ CKD original design

Fluid technology accumulated over the years by CKD is applied.
High floating amount is achieved with low consuming flow rate

■ Easy installation

Saved steps on installation by bracket-less direct piping and direct mounting structure.
It helps to reduce installation man hour for long distance transporting line.



Specifications

Descriptions	GFM-T-500	GFM-T-750	GFM-T-1000
Product size (L×W×H) mm	500 × 100 × 25	750 × 100 × 25	1000 × 100 × 25
Working fluid	Clean compressed air (grade 1.6.2)		
Operating ambient temperature °C	5 to 40		
Temperature for transport and storage °C	-10 to 60		
Working pressure (positive pressure) MPa	0 to 0.2		
Air consumption Note 1 ℓ/min	100 or less		
Height of floating Note 2 μm	250 or more		
Weight kg	Approx. 1.7	Approx. 2.5	Approx. 3.3

Note 1: This indicates the air consumption flow when 0.1 MPa supply.
Note 2: 0.1 MPa supply. This is the value for when a 0.7 mm thick glass is floating. Use this as reference for floating height.

How to order

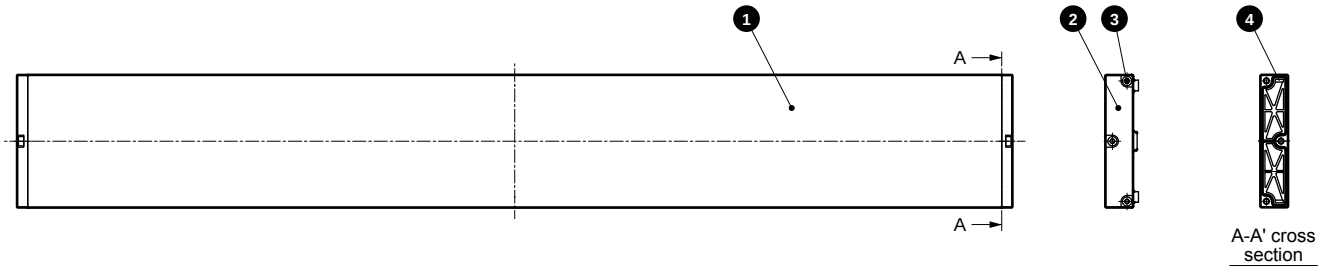
GFM - T - 500

Model no.

Ⓐ Product length

Descriptions
Ⓐ Product length (mm)
500
750
1000

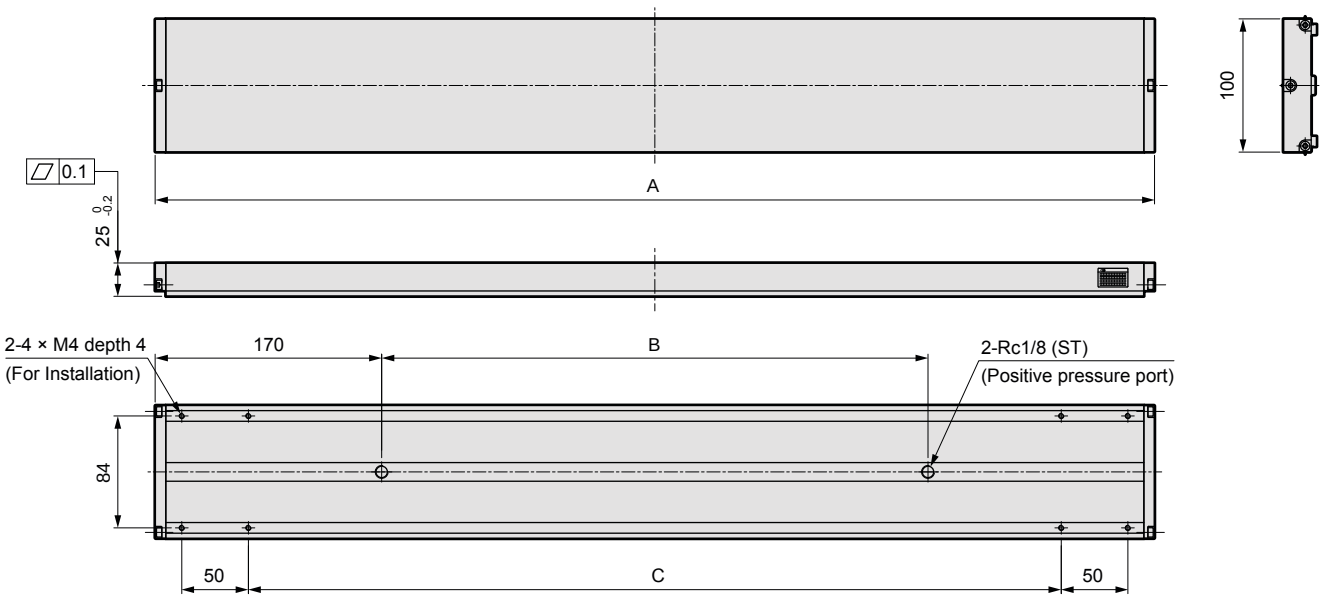
Appearance and parts list



No.	Parts name	Material	Remarks
1	Body	Aluminum alloy	Black alumite *
2	Lid	Polyamide with glass fiber	
3	Hexagon socket head cap screw	Stainless steel	
4	Gasket	Nitrile butylene rubber	

* Sometimes white stripes appear in the product's appearances. They are generated during production process, and they have no influence on product's performance.

Dimensions



Model no.	A	B	C
GFM-T-500	500	160	360
GFM-T-750	750	410	610
GFM-T-1000	1000	660	860

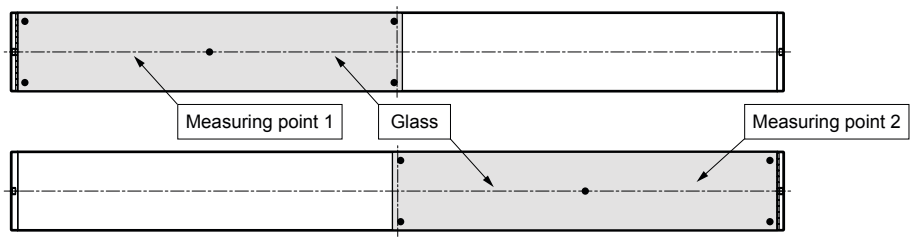
Technical data

● Height of floating

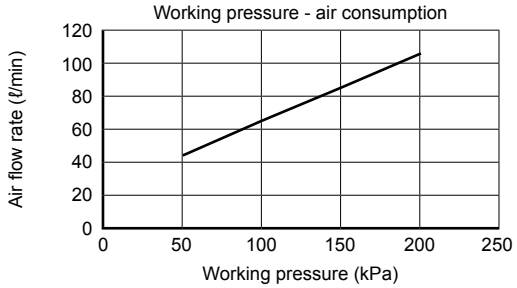
[Measuring method]

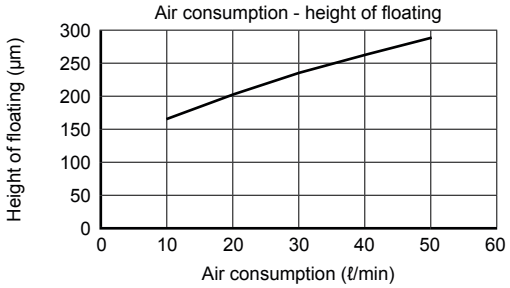
① Set the glass surface when inlet air pressure is zero as base point (zero).
② Supply air and float the glass, then measure the displacement amount.

Sample : GFM-T-1000
Height of floating : The minimum value of displacement amounts among 10 measuring points (refer below for the measuring points)
Glass size : t0.7 × 100 × 500

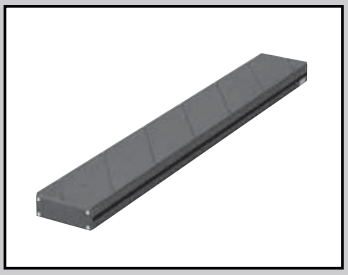


[Results]





MEMO



Floating system/glass float module

Floating rail GFM-R$^{F}_{S}$ Series

● Floating: 150 μm and over ● Main applications: transport

Custom order RoHS

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

■ 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.

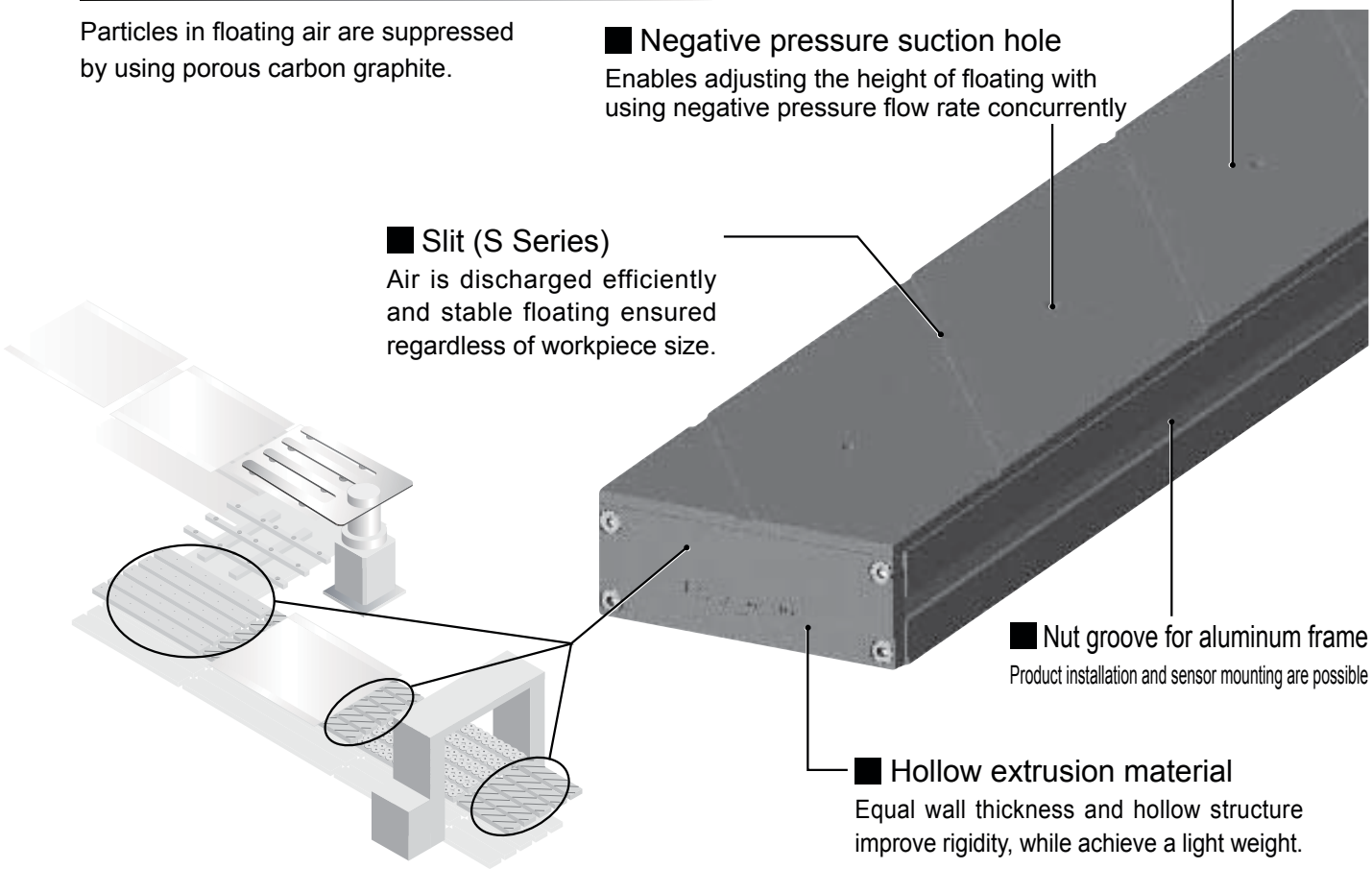
■ Low particle occurrence

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

■ Black body
Suppressing diffused reflection

■ Negative pressure suction hole
Enables adjusting the height of floating with using negative pressure flow rate concurrently

■ 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-RF-500	GFM-RS-750 GFM-RF-750	GFM-RS-1000 GFM-RF-1000
Product size (L×W×H) mm		501 × 102 × 40	751 × 102 × 40	1001 × 102 × 40
Floating surface size (L × W) mm		500 × 100	750 × 100	1000 × 100
Working fluid		Clean compressed air (grade 1.1.1 to 1.6.2)		
Operating ambient temperature °C		5 to 40		
Temperature for transport and storage °C		-10 to 60		
Working pressure	Positive pressure MPa	0 to 0.2		
	Negative pressure kPa	-50 to 0		
Air consumption Note 1 ℓ/min		Approx. 12	Approx. 18	Approx. 24
Height of floating Note 2 µm		Approx. 150 (GFM-RS)/approx. 250 (GFM-RF)		
Weight kg		Approx. 1.8	Approx. 2.7	Approx. 3.6

Note 1: This indicates the air consumption flow when 0.1 MPa supply. Air consumption varies with the workpiece state and required floating rate. Use this as a guide for calculating the flow rate.
Note 2: 0.1 MPa supply. 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

- GFM: Model no.
- RS: Ⓐ Form of surface
- 500: Ⓑ Floating surface length

Symbol	Descriptions
Ⓐ Form of surface	
RS	With slit
RF	Without slit
Ⓑ Floating surface length (mm)	
500	
750	
1000	

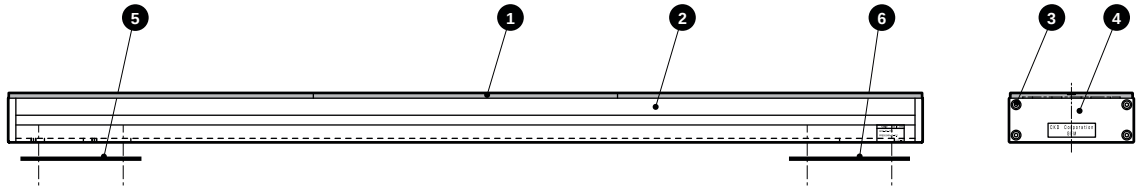
* Sometimes white stripes appear in the product's appearances. They are generated during production process, and they have no influence on product's performance.

Bracket kit discrete model No.

GFM - R - B

* Refer to page 14 for the details of bracket kit.

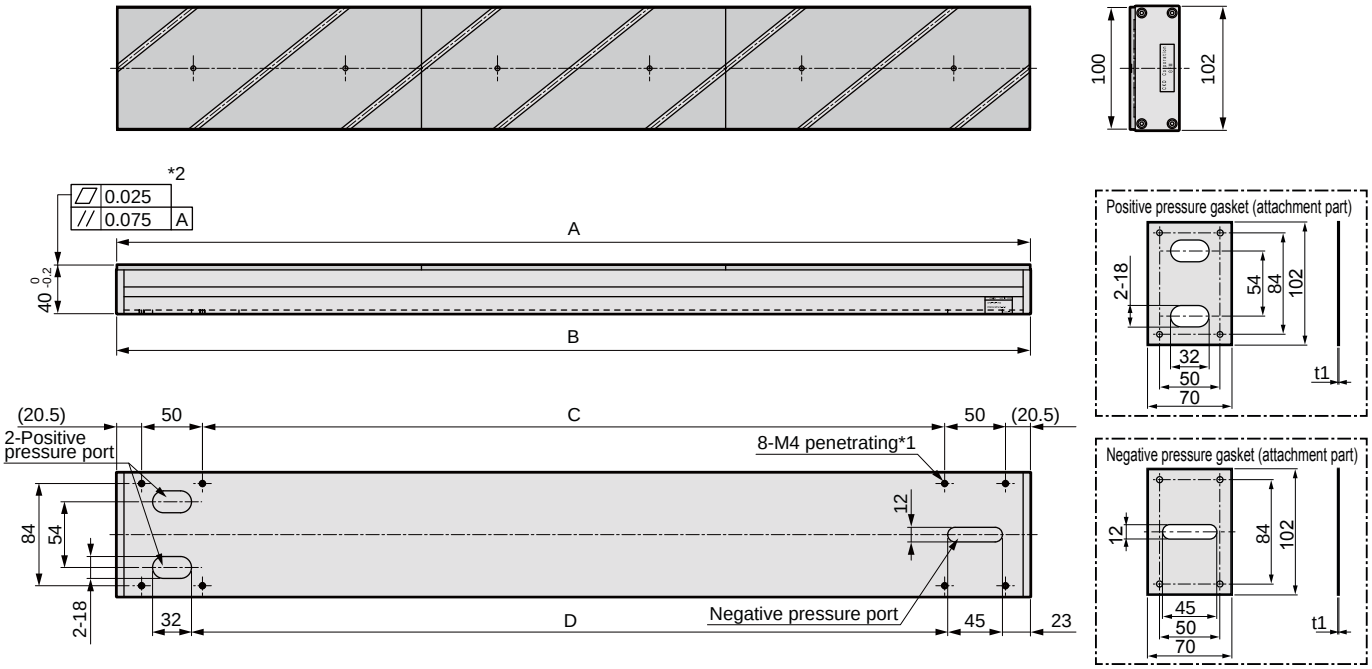
Appearance and parts list



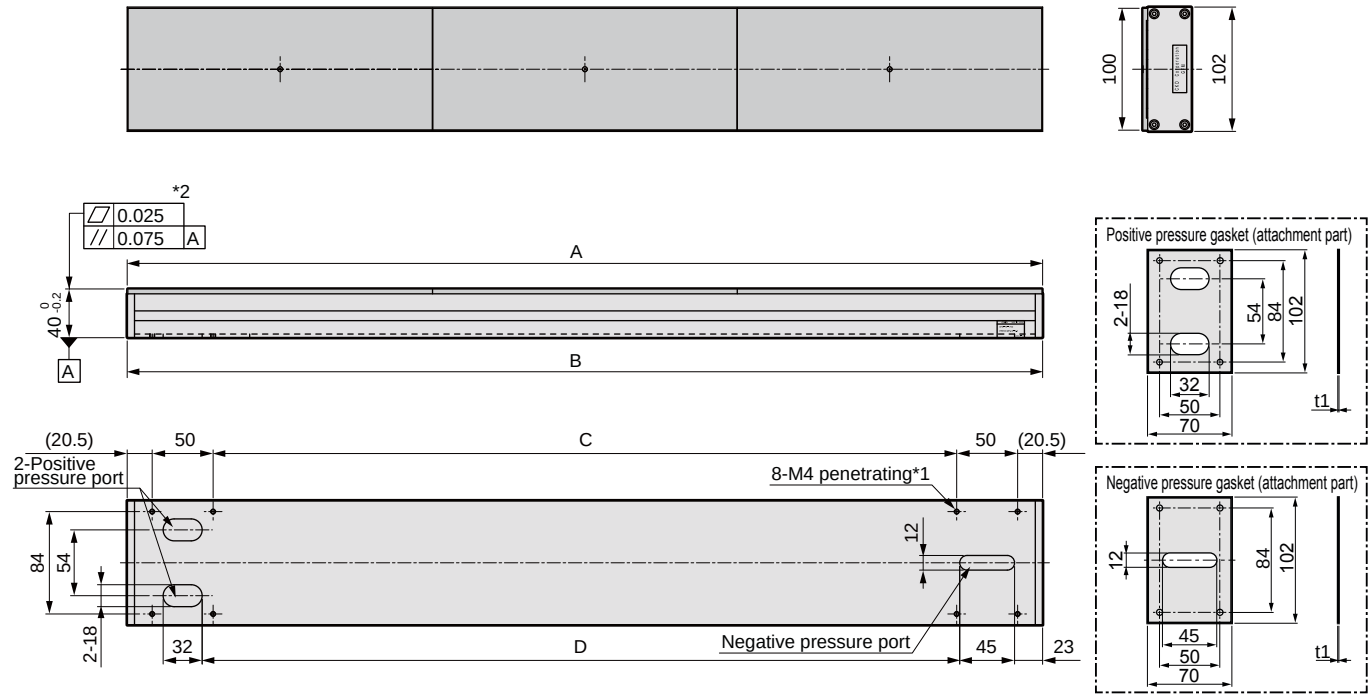
No.	Parts name	Material	Remarks
1	Porous material	Carbon graphite	
2	Base	Aluminum alloy	Black alumite treatment *
3	Hexagon socket head cap screw	Stainless steel	
4	Lid	ABS resin	
5	Positive pressure gasket	NBR	Accessories
6	Negative pressure gasket	NBR	Accessories

Dimensions

● With slit GFM-RS



● Without slit GFM-RF



*1: Pass through the positive pressure port

2: Value measured at 25°C constant temperature. Accuracy varies in an atmosphere other than 25°C. Flatness 0.05 mm, 0.1 mm parallelism for GFM-R-1000.

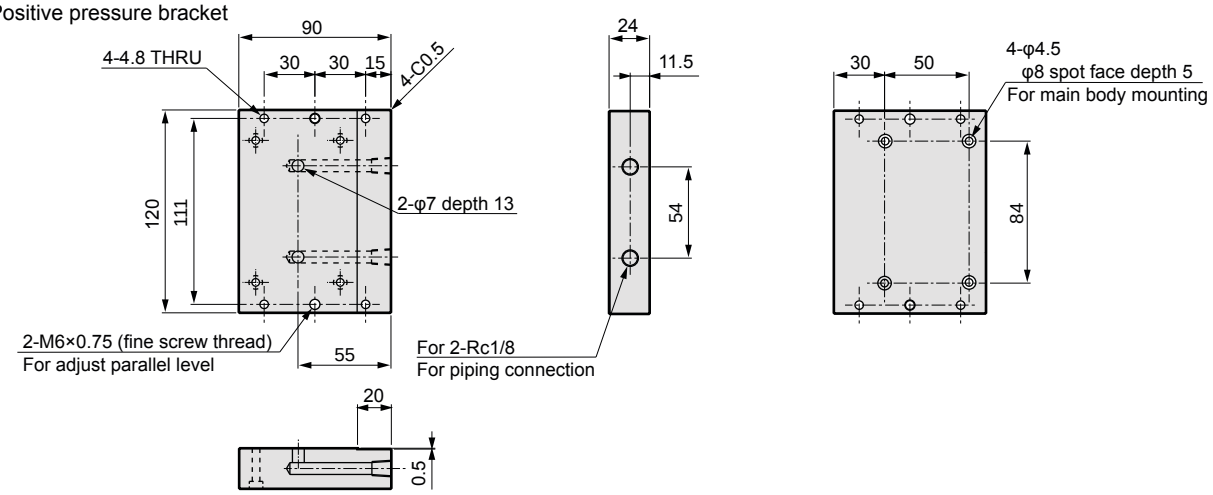
Model no.	A	B	C	D
GFM-R*-500	500	501	360	371.5
GFM-R*-750	750	751	610	621.5
GFM-R*-1000	1000	1001	860	871.5

Dimensions (bracket kit)

● Model no.: GFM-R-B

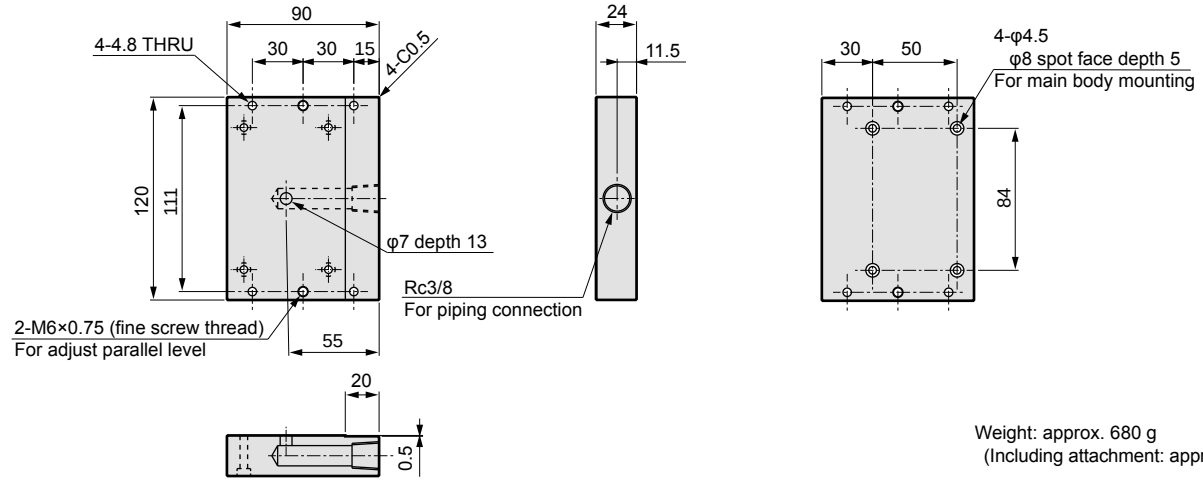
(Contents of kit: positive pressure bracket, negative pressure bracket, hexagon socket head cap bolt × 8, gasket for screws × 8)

• Positive pressure bracket



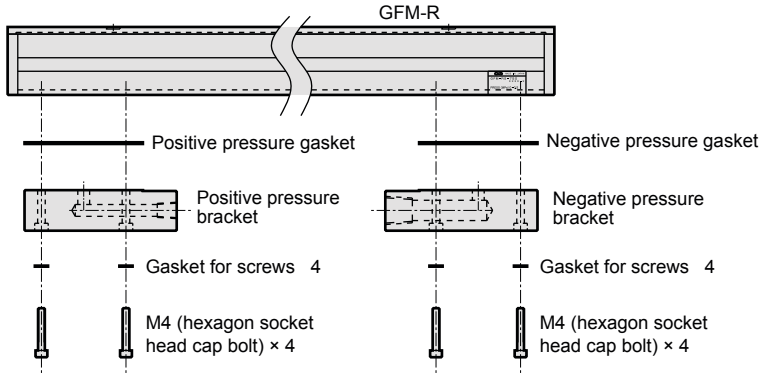
Weight: approx. 680 g
(Including attachment: approx. 20 g)

• Negative pressure bracket



Weight: approx. 680 g
(Including attachment: approx. 20 g)

• Examples of bracket kit mounting



1 Height of floating

[Measuring method]

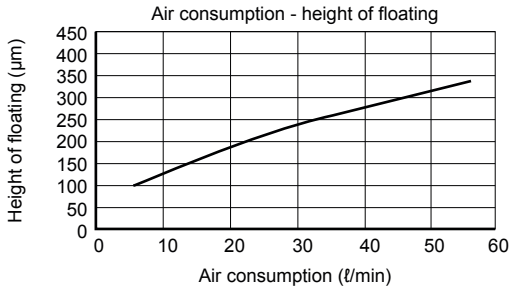
① Set the glass surface when inlet air pressure is zero as base point (zero point).
② Float the glass, then measure the displacement amount.

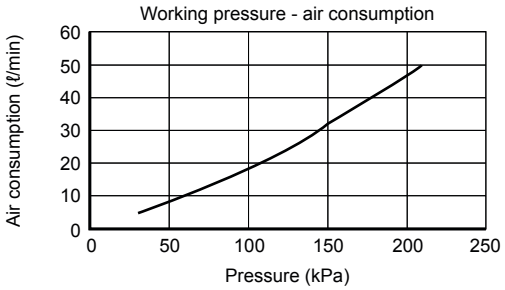
Height of float : The minimum value of displacement amounts among 18 measuring points
(Refer to measurement method of floating flatness for 18 measurement points)
Glass size : t0.7 × 100 × 400

[Results]

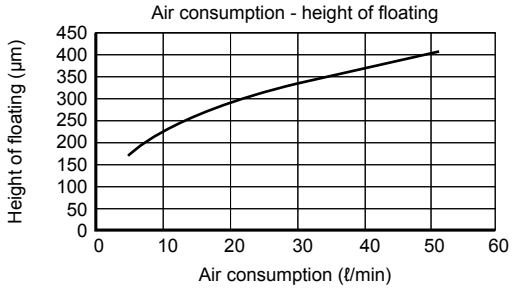
Negative pressure condition: 0 kPa

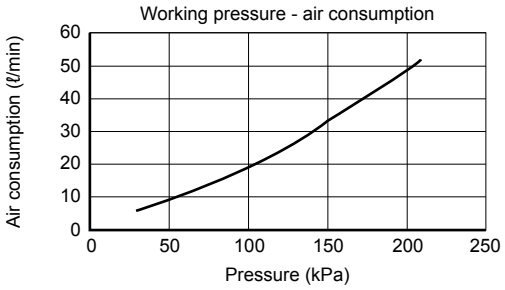
■ With slit type (GFM-RS-750)





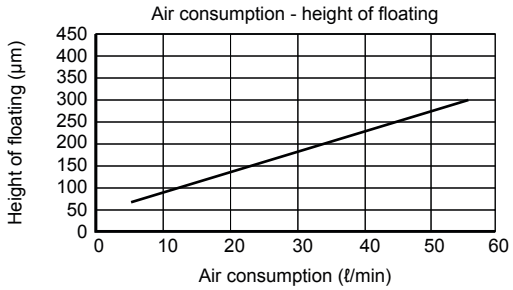
■ Without slit type (GFM-RF-750)

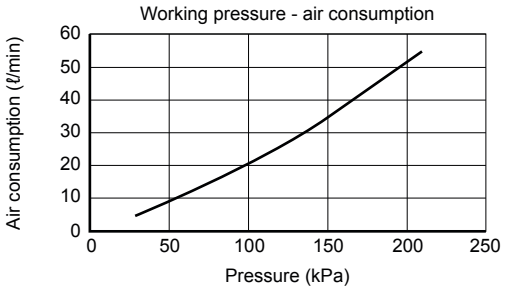




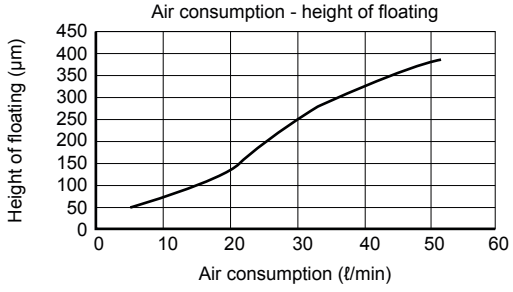
Negative pressure condition: -0.8 kPa

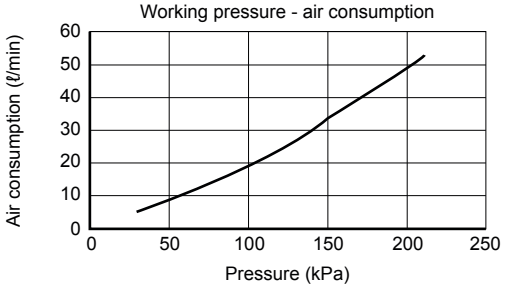
■ With slit type (GFM-RS-750)





■ Without slit type (GFM-RF-750)





2 Flatness of floating

[Measuring method]

① Set the glass surface when inlet air pressure is zero as base point (zero point).
② Float the glass, then measure the displacement amount.
③ Measure at 9 points when the glass is at position A.
④ Measure at 9 points when the glass is at position B.

Flatness of float: (max-min) value of displacement amounts among 18 measuring points

Glass size : t0.7-100 × 400

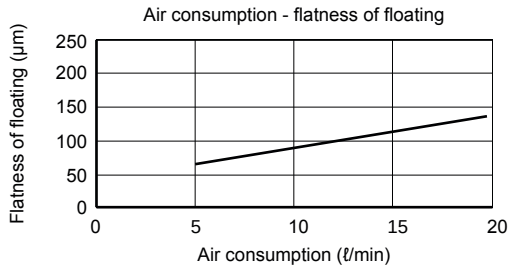
[Measuring instrument]

Laser displacement meter: specular type (for transparent body measurement)

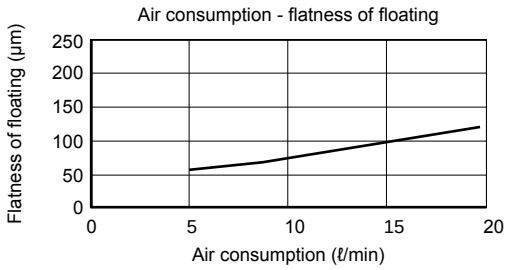
[Results]

■ With slit type (GFM-RS-750)

Negative pressure condition: 0 kPa

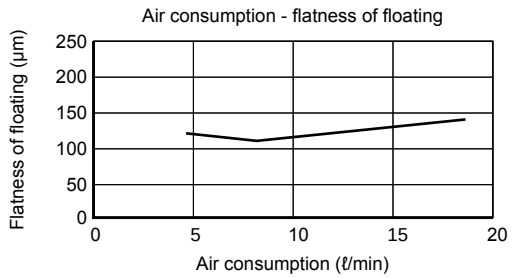


Negative pressure condition: -0.8 kPa

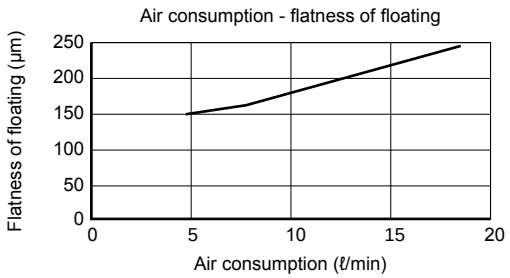


■ Without slit type (GFM-RS-750)

Negative pressure condition: 0 kPa



Negative pressure condition: -0.8 kPa

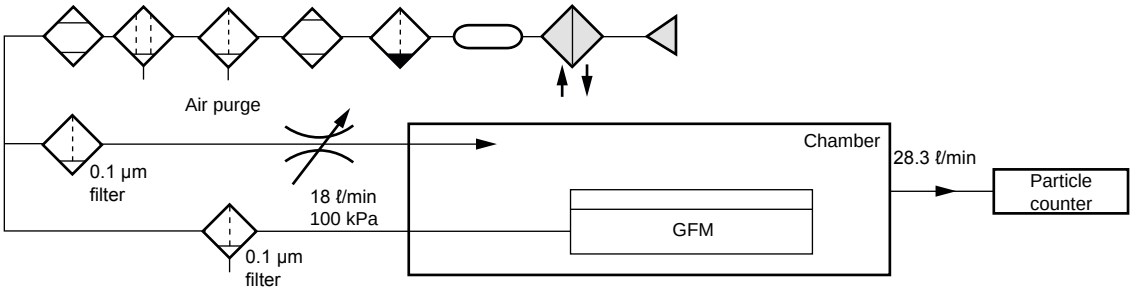


3 Amount of dust generated

[Measuring method]

① Install test sample inside the acryl made chamber.
② Supplies 100 kPa (18 - 20 ℓ/min) air
③ Measure the quantity of particles generated when air is flown continuously.

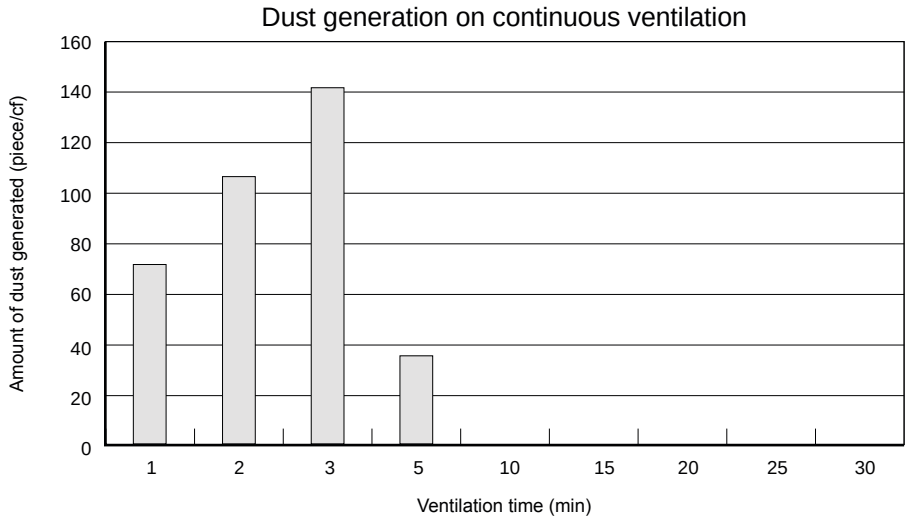
[Test circuit]



[Measuring instrument]

Particle counter	: Laser dust monitor
Min. measurable particle diameter	: 0.1 µm
Suction rate	: 28.3 ℓ/min

[Results]



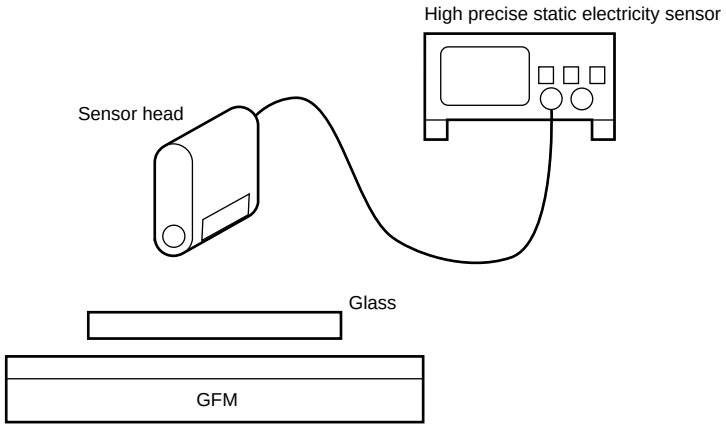
Note: Amount of dust generation includes larger than 0.5 µm particle diameter

4 Static electricity change amount (with slit)

[Measuring method]

① Install sensor head at the center of glass.
② Measure the value of static electricity amount (voltage) while air supplying.

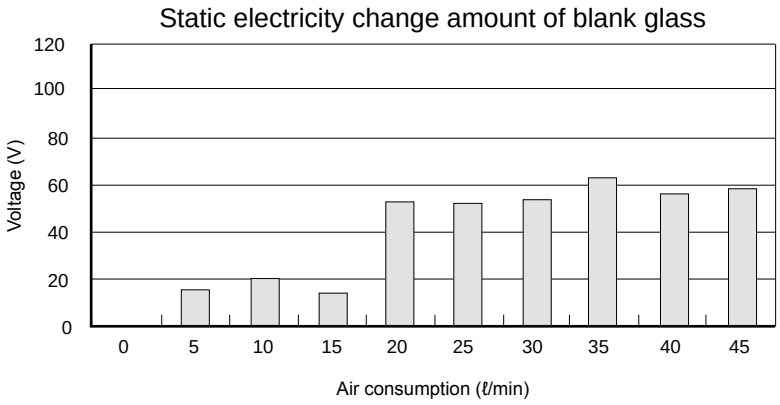
[Test circuit]

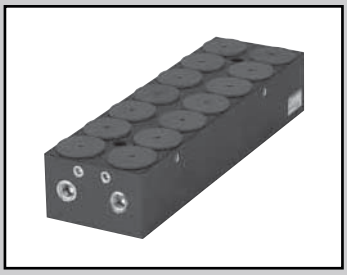


[Measuring instrument]

Static electricity amount measurement: high precise static electricity measure (non-contact type)

[Results]





Floating system/glass float module

Precise floating stage **GFM-P**

● Floating rate: 30±6 μm ● Main applications: Various inspection processes, work processes

Custom order RoHS

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.
Floating surface is shaped for highly accurate floating.

■ High accuracy

Extra-precise machining ensures superb flatness and parallelism.

■ High floating accuracy

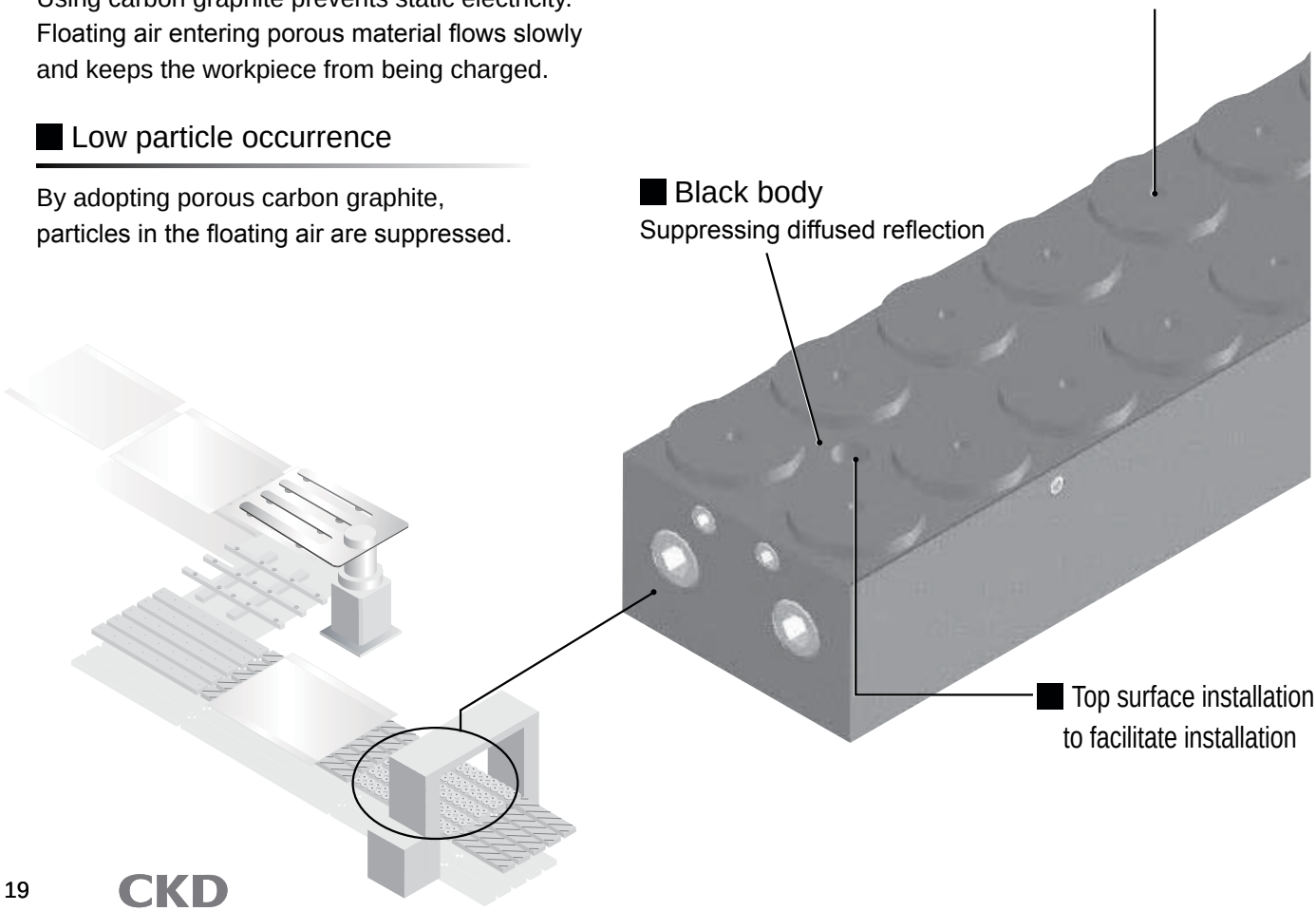
Highly accurate floating is enabled by using positive pressure and negative pressure flow.

■ 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.



Specifications

Descriptions		GFM-P
Product size (L x W x H) mm		250 x 76 x 50
Floating surface size (L x W) mm		250 x 76
Working fluid		Clean compressed air (grade 1.1.1 to 1.6.2)
Ambient temperature range °C		5 to 40
Temperature for transport and storage °C		-10 to 60
Working pressure	Positive pressure MPa	0 to 0.2
	Negative pressure kPa	-50 to 0
Floating flatness Note 1 μm		12 μm or less (30 μm floating)
Air consumption Note 2 ℓ/min.		Approx. 2 to 3
Floating height Note 3 μm		Approx. 70
Weight kg		Approx. 2.2

Note 1: The difference of the floating surface'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 air consumption when 0.1MPa supply. Air consumption 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

GFM - P

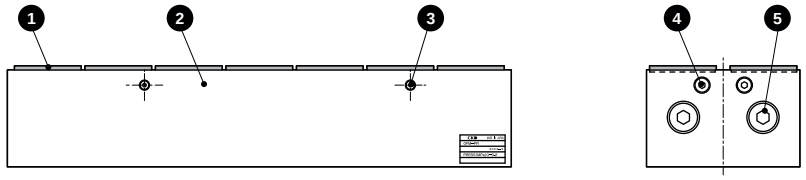
Model no.

Bracket kit discrete model No.

GFM - P - B

* Refer to page 21 for the details of bracket kit.

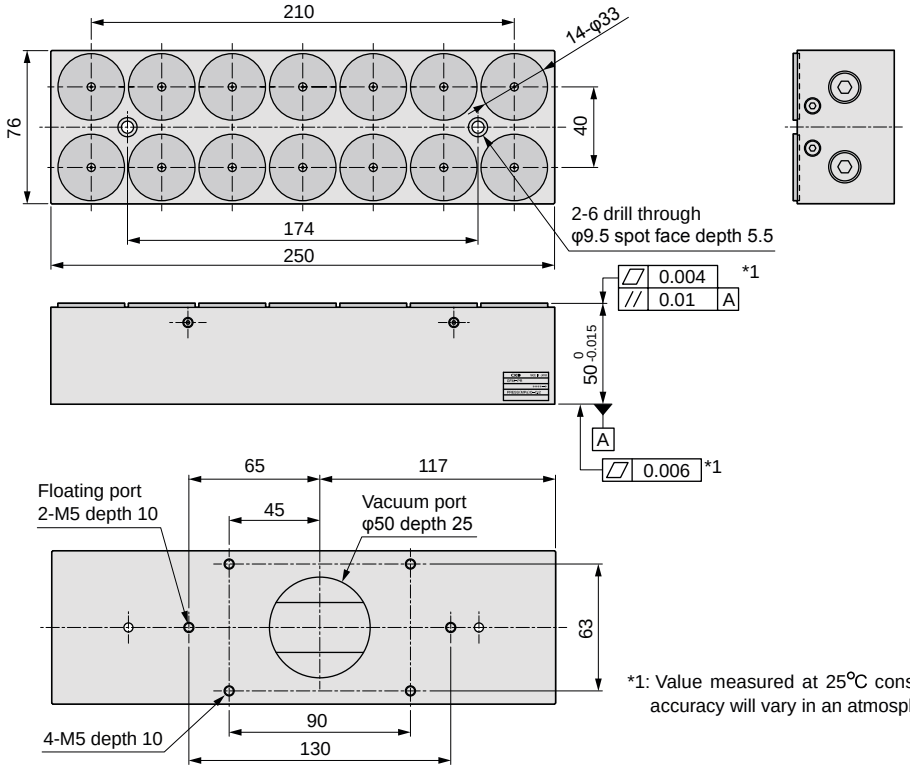
Appearance and parts list



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	

* Sometimes white stripes appear in the product's appearances. They are generated during production process, and they have no influence on product's performance.

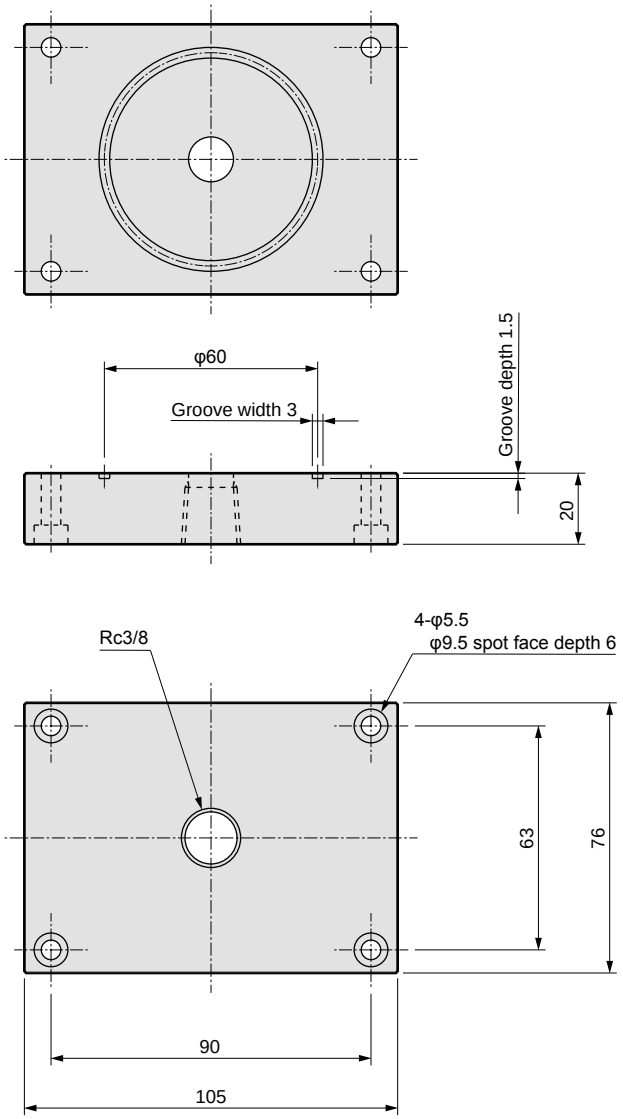
Dimensions



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

Dimensions (bracket kit)

● Model no.: GFM-P-B
(Contents of kit: bracket, O ring × 1, hexagon socket head cap bolt × 4)



Weight: Approx. 430 g
(Including attachment: approx. 20 g)

● Examples of bracket kit mounting