

CKD

极板

Components

THE  
K I · W A · M I



Components Report ①

CKD Corporation

CC-1112AA 3

## Friction

### When surface friction is eliminated...

- ⇒ Small thrust forces
- ⇒ Minute thrust forces
- ⇒ Even with no feedback

Control is possible



Alignment  
LBC-R Series

### When friction becomes constant...

- ⇒ Few stick-slips
- ⇒ Few thrust force fluctuations

Fine speed cylinder



## Friction

### Going beyond pneumatic components to contribute to FA innovation

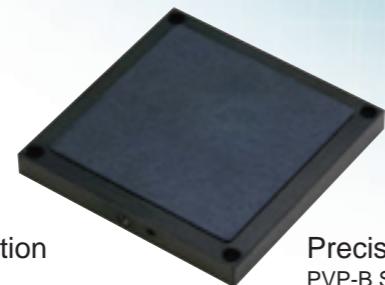
Our obsession to go to extremes excels us in specific areas

## Material

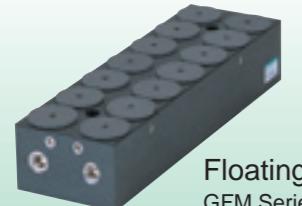
### By using a porous medium...

- ⇒ Whole surface suction
- ⇒ Floating

Conveyance becomes possible.



Precise suction  
PVP Series



Floating  
GFM Series



Air fiber

### By using magnetic force...

- ⇒ Thrust force becomes constant
- ⇒ No maintenance
- ⇒ Extremely low dust generation



FSM-X



Buffer  
FBU2 Series



Pickup (Buffer)  
AFB-P Series

## Magnet

## Size

### By reducing size,

- ⇒ Installation in tight spaces become possible



Buffer & Rotary  
alignment  
AFB-RB Series

# LBC Series

Adapting a non-contact air bearing mechanism, a soft actuator with a zero sliding resistance air braking system is realized.

## High precision linear control

Because sliding resistance is zero, high precision linear control of load is possible by using an electropneumatic regulator (EV-FL).

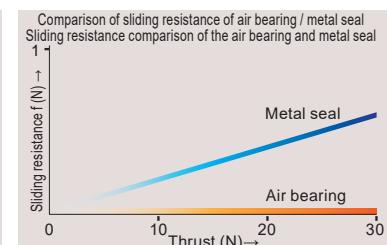
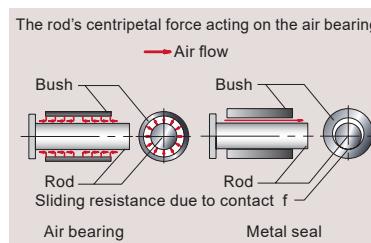
## Soft touch

Soft touch of workpieces is made possible by controlling load with a minute thrust force of 0.01N. No impulse is applied. No scratches are made.

## Optimal load control

The optimal load can be applied to work according to the purpose and use.

The actuator enables sensitive and precise load control when combined with electro pneumatic regulator (EV).

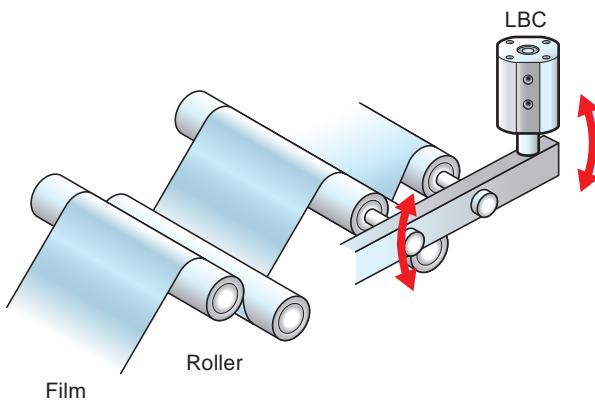


## Specification

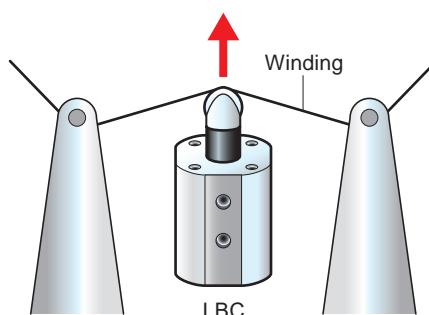
Item	LBC-01	LBC-05	LBC-30
Working fluid	Compressed air (0.3 $\mu\text{m}$ filter is used, no oil or moisture content)		
Working pressure (MPa)	Air bearing port 0.3 to 0.5 Thrust port 0.002 to 0.1		
Thrust force range (N)	0.02 to 1.0	0.1 to 5.0	0.6 to 31.4

## Application examples

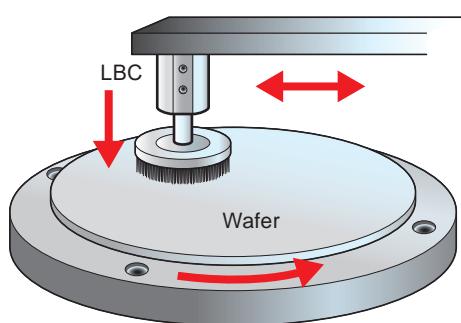
### Tension control of film



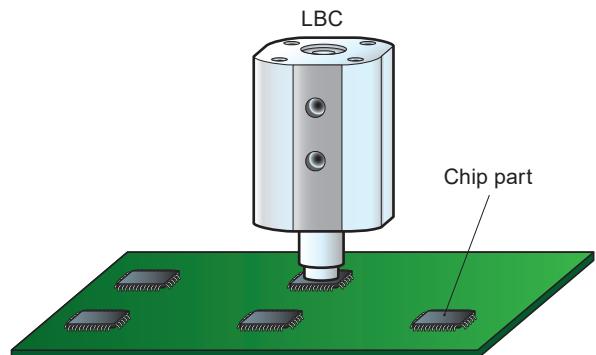
### Tension control of coil winding



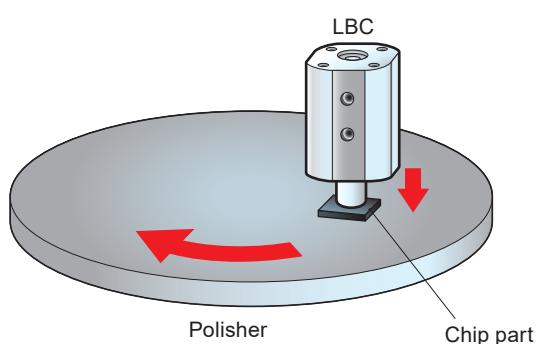
Wafer cleaning (for scrubbers)



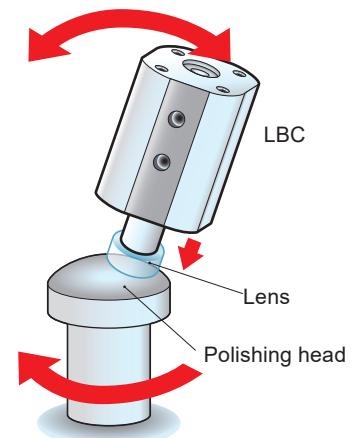
Chip part assembly (for bonding equipment)



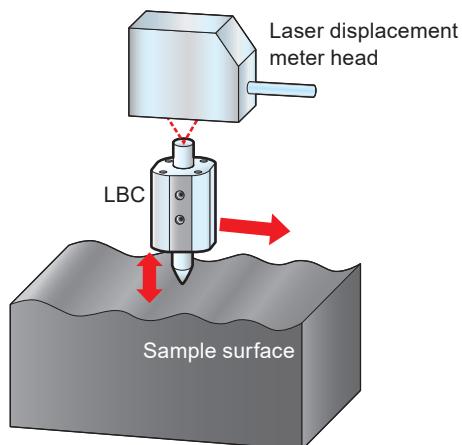
Polishing and finishing of semiconductor parts



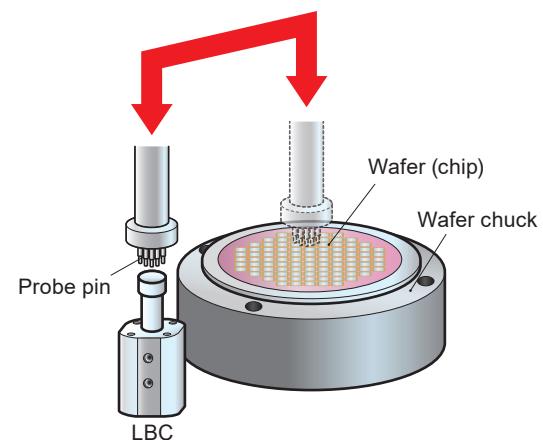
Lens polishing and finishing



Measuring probe for surface scanning



Needle head height detection in semiconductor testers



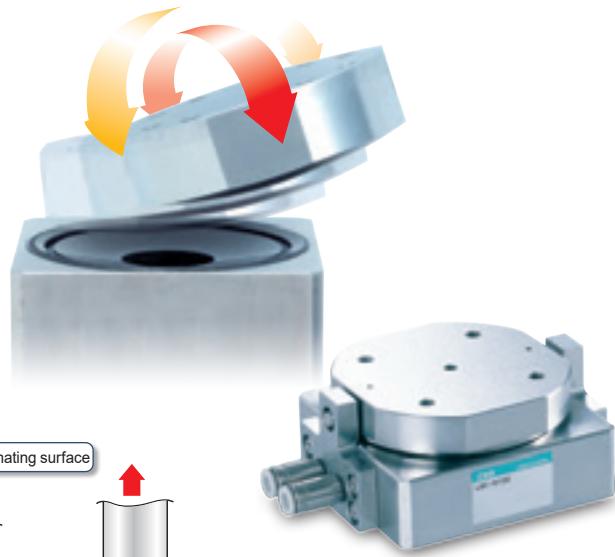
# LBC-R Series

Friction

Our Air gyro enables parallel adjustments. It demonstrates its ability to correct in parallel, adjust automatically, and reduce workloads.

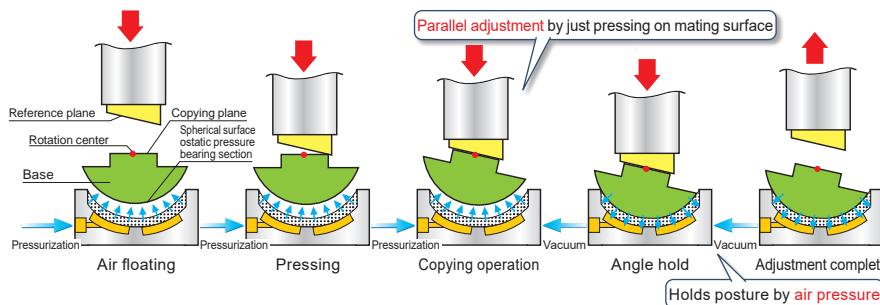
## Instant parallel adjustments

By pressing surfaces against each other, which are desired to be in parallel, adjustment through conforming is completed within a few seconds. Automation is possible.  
(\*Under our company's test conditions)



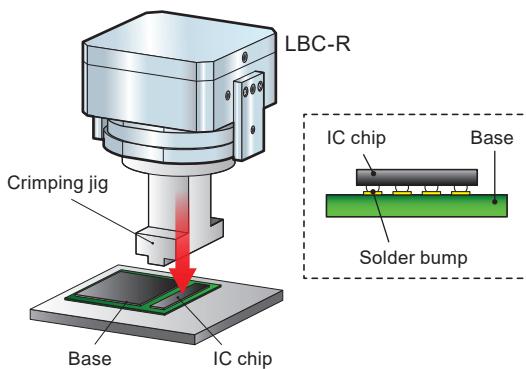
## High precision copying without relying on experts

"Copying" refers to the method of using spherical surfaces to be aligned to the work surface by static pressure and using air pressure bearings to make it float. They support high precision parallel adjustments (Parallelism 2  $\mu$ m) with no friction or abrasion.

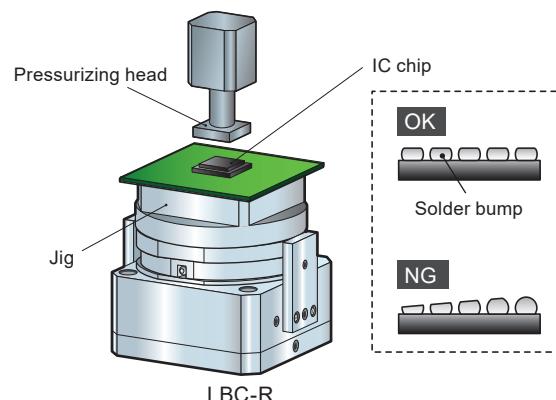


## Application examples

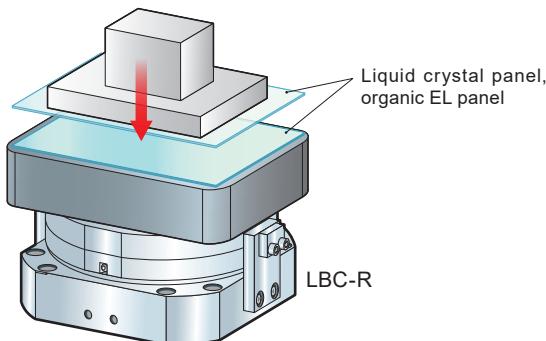
### Flip chip bonder: Crimping head angle adjustment



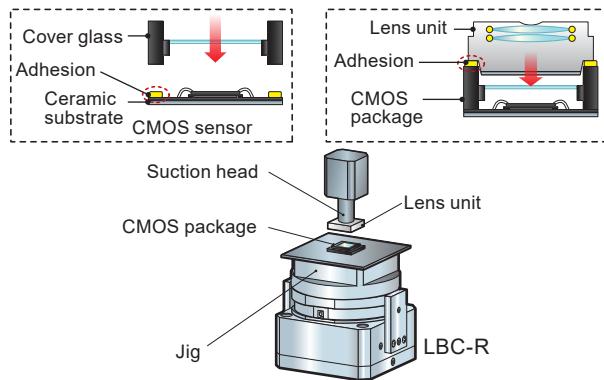
### Bump leveler: Pressurizing head angle adjustment



### Laminating equipment: Laminating FPD panels



### CMOS package assembly: Camera module assembly



# Fine speed cylinder Series

With a special sliding mechanism, smooth and low speed operation without stick-slips is achieved.

## Super-low speed down to 1 mm/sec

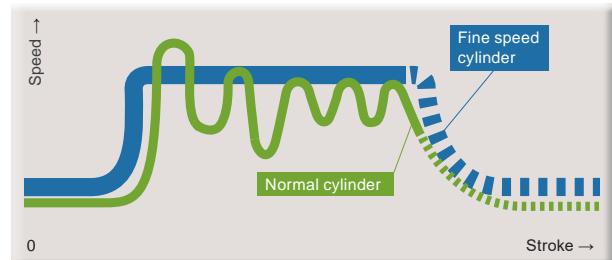
Stable speeds with no stick-slips.

## Soft movement at both ends

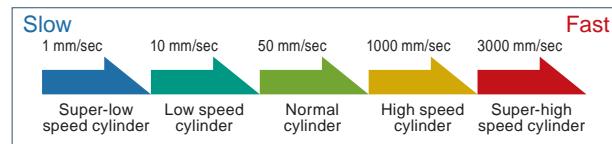
Smooth start and stop even at the beginning and ends of the stroke.

## Same dimensions

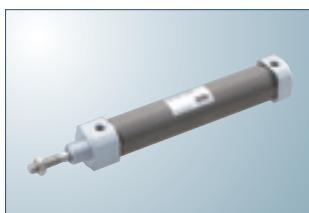
All models have the same dimensions as the standard models.



## Speed reference of cylinder



## Product lineup



Pencil cylinder  
[SCPD3-F]



Super compact cylinder  
[SSD2-F]



Compact direct cylinder  
[MDC2-F]



Table-shape rotary actuator  
[GRC-F]



Small compact cylinder  
[MSD-F]



Linear slide cylinder  
[LCR-F]



Super twin rod cylinder  
[STR2-F]



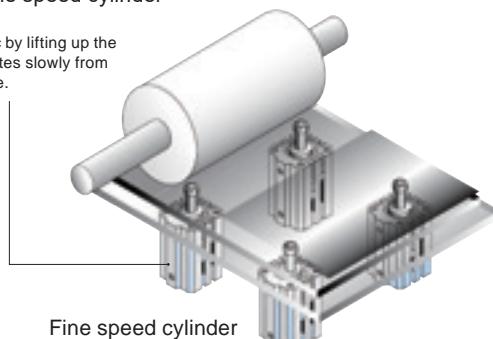
Super mount cylinder  
[SMG-F]

## Application examples

### Rubbing device

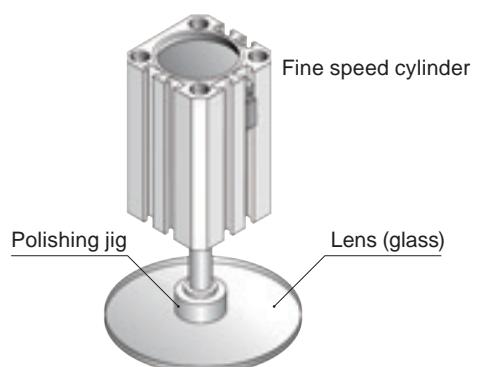
Use the fine speed cylinder as a lifter

Prevent static by lifting up the glass substrates slowly from the work table.



Fine speed cylinder

### Lens (glass) polishing (pressing force constant control)



# FBU2 Series

A newly invented buffering unit using magnetic suction forces. Soft contact and stable pressing force eliminate damage to the workpiece. The most suitable for damage-free handling of small-size devices and fragile works.

## Constant pressing force

When the embedded magnets in the movable and fixed axes are shifted, diagonal lines of magnetic forces are formed, and then a force is generated to try and return to the axis direction.

## Compact and light-weight (FBU2 series)

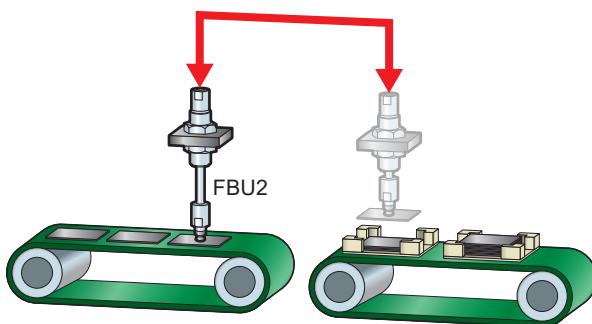
There are only two component parts: a moving part and a fixed part. Therefore, it became possible to reduce the size and make it ultra-lightweight (5g or lower). In addition, because the moving part mass is small, soft-touch for work and shock reduction becomes possible.

## Clean and long-life

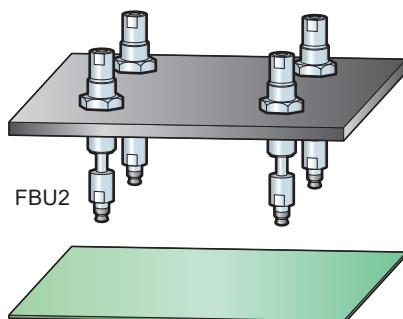
Compared to the metal spring method, the amount of dust raised is extremely small because the movable contact area is small and does not have metal contact. In addition, because the thrust force occurs by magnetic power, there is no stress like in metal springs. As a result, long life and stable performance are achieved.

## Application examples

### Lamination transfer



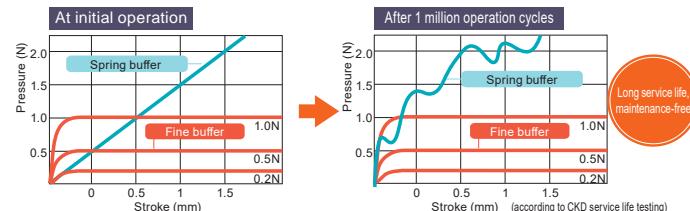
### PCB/Flexible circuit board transfer



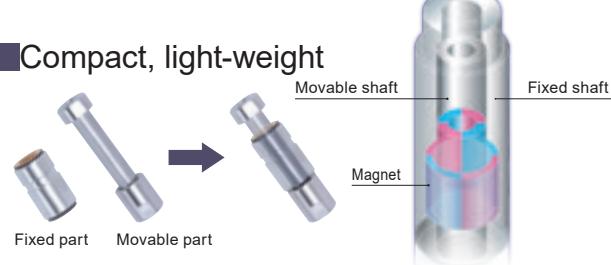
## Versatile application

It enables various usages including Pick & Place or the conveyance of parts through vacuum suction, pressing of workpieces and insertion of parts.

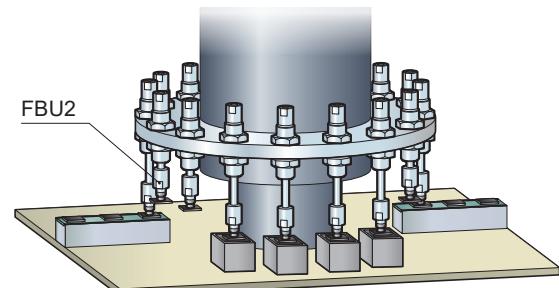
### Pressing force characteristics



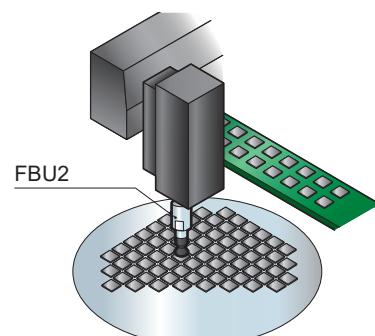
### Compact, light-weight



### Chip inspection equipment



### Electronic device suction transfer



**Variation**

	Outer diameter	Generic type	Pressing force (N)	Stroke (mm)	Tail piece shape			Head piece shape										
			0.2	0.5	1.0	2	6	16	No hole	M3	M4	M5	M6	No hole	M3	M4	M5	M6
Light-weight FBU2-7	ø7 h7	S Standard				●	●	●	●	●	●	●	●	●	●	●	●	
	M8×0.75	H High precision				●	●	●	●	●	●	●	●	●	●	●	●	
		HV Internal channel system High precision				●	●	●	●	●	●	●	●	●	●	●	●	
Standard FBU2-12	ø12 h7	S Standard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	M12×1	H High precision	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		HV Internal channel system High precision	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Generic FBU2-SU	M12×1	- Standard only	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

**Active Fine Buffer**

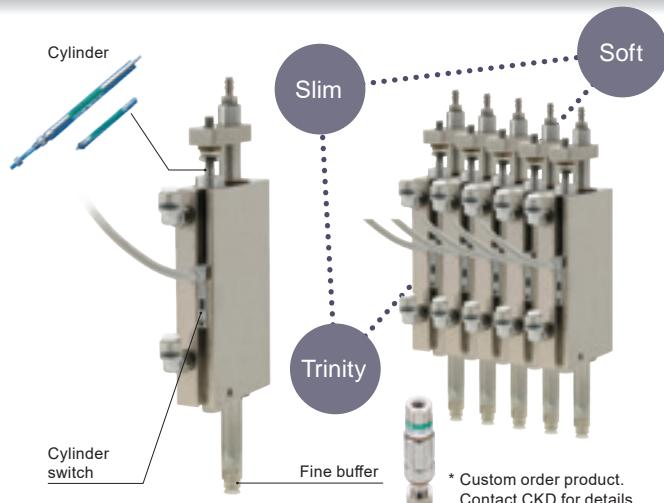
# AFB Series

**Pneumatic cylinder drive Fine Buffer**

## AFB-P Series

An all-in-one product with compact, lightweight multiple heads.

- A magnetic spring buffer, air cylinder and cylinder switch are integrated into one.
- Thin and space saving. Use of manifolds with a tight pitch is possible.
- Low dust generation, long service life, constant pressure and soft touch with a built-in magnetic spring buffer.

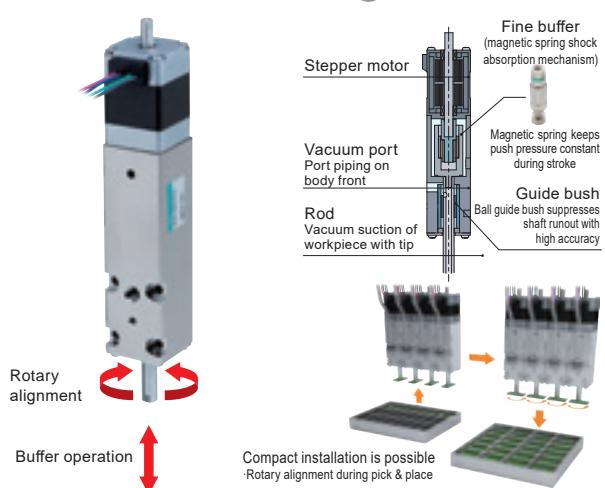
**Motor drive Fine Buffer**

## AFB-RB Series

A motor and a magnetic spring buffer are integrated into one, handling both rotation and buffer operation.

An all-in-one product with compact, lightweight multiple heads.

- Compact, arranged with a tight pitch.
- Low dust generation, long service life, constant pressure and soft touch with a built-in magnetic spring buffer.



# UP/EH/PG/CG Series

Air fiber

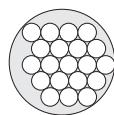
## UP/EH Series

### Energy saving and space saving

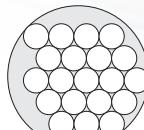
Ultra small size with outer diameter of  $\phi 1.8 \times$  internal diameter of  $\phi 1.2$ . Significantly reduce piping space. In addition, small piping volume leads to energy savings.



Air fiber  
 $\phi 1.8 \times 20: 80\text{mm}^2$



Original product  
 $\phi 3.2 \times 20: 253\text{mm}^2$



Original product  
 $\phi 4.0 \times 20: 396\text{mm}^2$



One-touch coupling for Air fiber

## PG/CG Series

### Prevention of static and dust adherence

The Air fiber (UP Series) has anti-static properties which prevent static buildup and dust adherence.

### One-touch attaching and detaching

Attaching and detaching are done by only pressing the push ring of the coupling and inserting/removing the tube. Easier attaching and detaching compared to existing products. In addition, corrosion resistance is improved by introducing polypropylene (PP) resin for resin material as standard.

### ■ Variation of models

Model	Variation	Series	Tube material properties	Color
Air fiber	Standard specification	UP Series	Urethane (antistatic)	7 Colors
	Clean specification	EH Series	Special polyolefin	2 Colors

Variation	Series	Material properties	Variation
One-touch coupling	Standard specification	PG Series	Copper Alloy + Electroless nickel plating, PP
	Clean specification	CG Series	Stainless (degrease), PP

# FSM-X Series

Ultra small, thinnest at 8mm.  
 Further space saving with head separation!!  
 Check absorption and desorption of minute semiconductor chips.  
 (Filter clogging, nozzle crushing can be detected.)



## Ultra small and light-weight

Space saving by separation of sensor head. Sensor head alone is reduced 52% compared to the existing volume ratio, and is the most lightweight in the industry with a mass of 4g, and is the thinnest in the industry with a width of 8mm.

## Works as a stand-alone sensor head

Now compatible with just the sensor head (without coupling).

## Affluent flow rate range

With just an ultra-small body, the following 8 types of flow rates are available from small to large (10L/min).

Bi-directional flow:  $\pm 0.5, \pm 1, \pm 5, \pm 10$ L/min

Unidirectional flow: 0.5, 1, 5, 10L/min

## Enabled two-way flow measurement

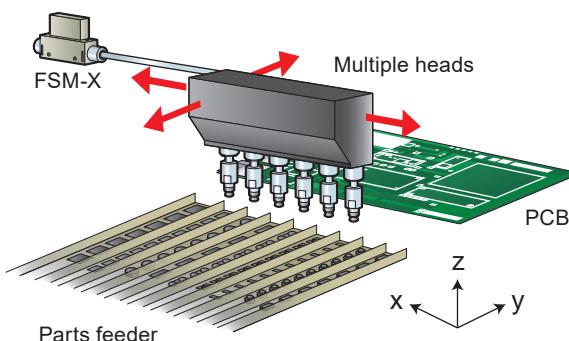
In addition to the bi-directional flow rate detection, a uni-directional type is also available.

### ■ Overview

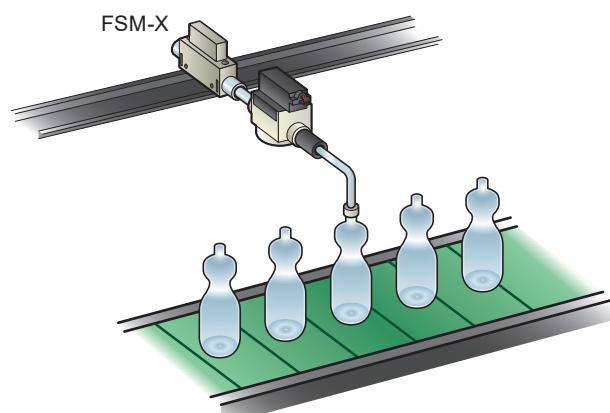
By squeezing the functions and integrating them into the device, further size and weight reduction was achieved. Installation of the sensor near the measuring section and on the tip of the moving section, improves the system's responsiveness. In addition, the bidirectional detection properties provide high value-added properties compatible in a wide range of fields.

### ■ Application examples

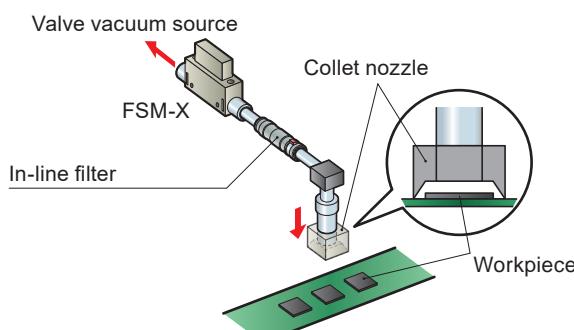
#### Chip mounter



#### Plastic (PET) bottle leakage inspection



#### Vacuum confirmation with collet nozzle



# PVP Series

CKD's proprietary sintered porous fluorine resin body with 40% porosity. It does not damage delicate workpieces such as ultra thin and soft materials, nor cause distortion or deformation due to suctioning. Perfect for high precision and highly advanced processes.

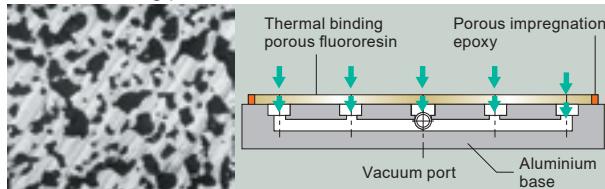
## High precision work processing

Flatness of suction surface: 2µm, Parallelism: 5µm.  
(Specification values of R36-18, C-50, and S-50-50)  
Enables high precision workpiece treatment by keeping the workpiece securely fixed.

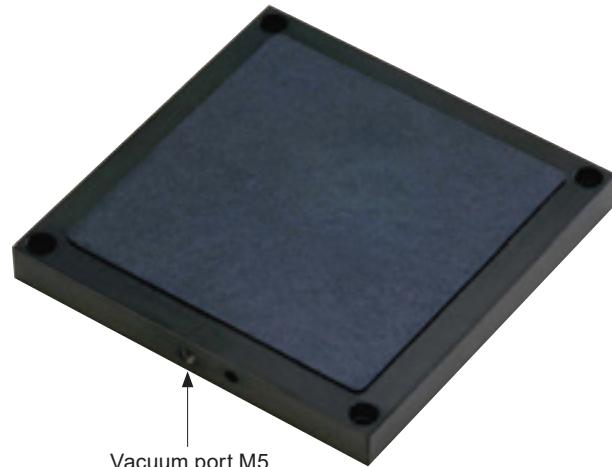
## Powerful suction

With a porosity of 40%, the whole surface can be utilized with powerful suction. However, no deformation is caused to the workpiece by the suction power.

Thermal binding porous fluororesin



## Black color suction plate



## No damage to workpiece

Hardness of suction surface is Shore D60.  
A soft contact causes no damage to the work.

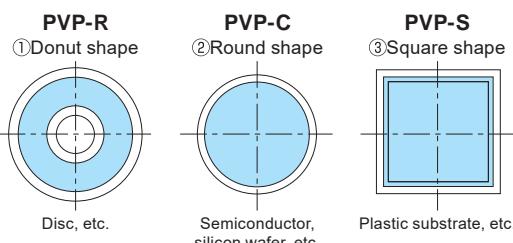
## No reflection (black color plate)

In the inspection process, the conventional white suction plate was unusable due to reflection, but by introducing the black color, reflection has been eliminated.

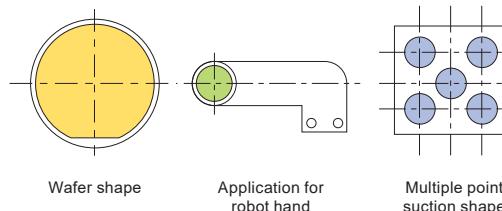
## Flexible plate shapes

3 standard plate shapes are available.  
Flexible customization of the shape according to customer's needs is available.

### Standard type



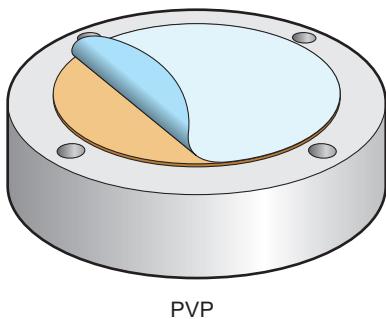
### Example of special shape order type



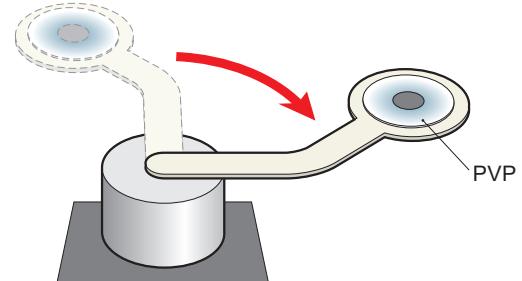
\* Please contact CKD for details on the special shape order.

## Application examples

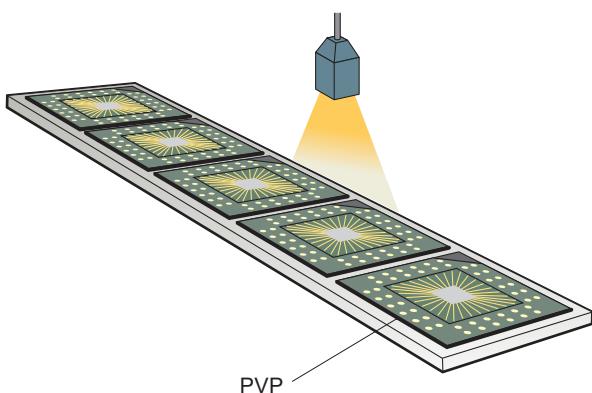
Sticking/Peeling film



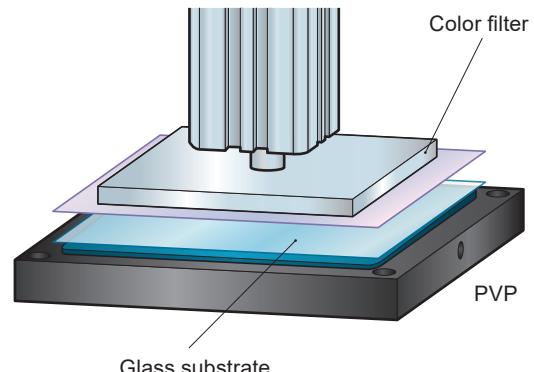
Robot hand



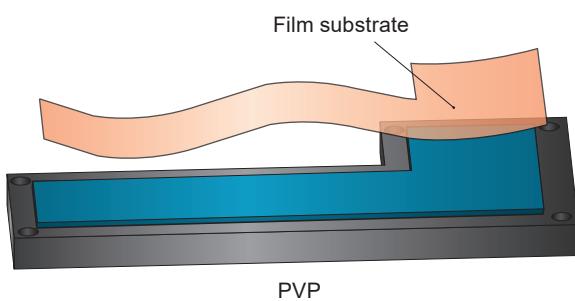
Inspection equipment



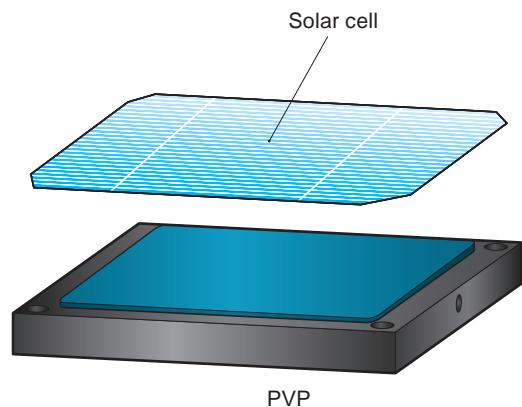
Liquid crystal glass bonding process



Film substrate transfer process



Solar cell manufacturing process

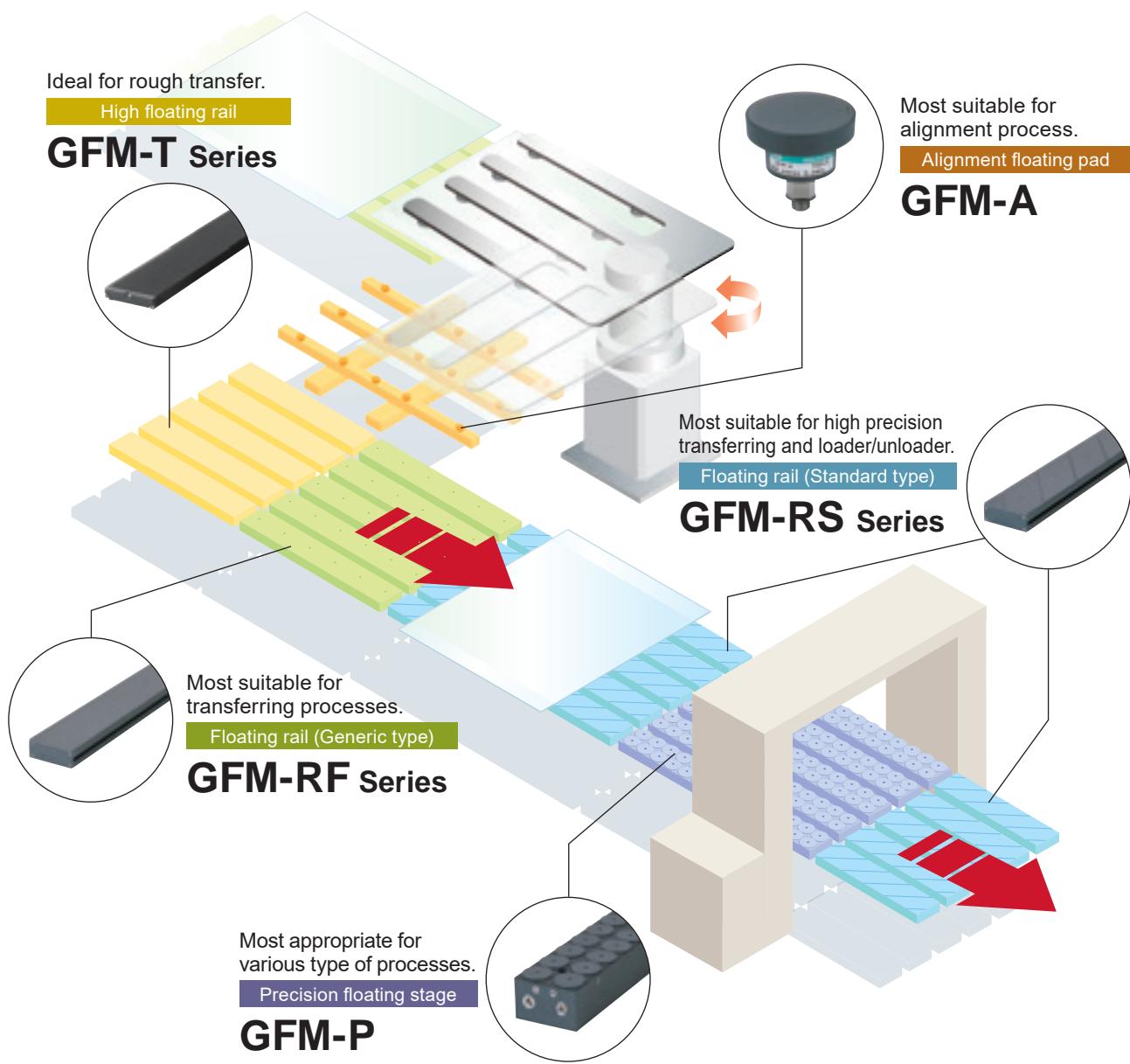


# GFM Series

## Revolution of the line Contributes to enhanced quality and yield rate

The Glass Float Module GFM Series is CKD's latest floating system for contactless, clean and damage-prevention transportation. Significantly decreased air consumption by introducing advanced materials, achieves a high quality floating system by controlling static electricity and particle generation.

Supports substrate floating applications and high-precision floating from glass substrate transfer to process/product inspection.



## Stable, contactless, high precision floating

Achieves stable floating by introducing advanced porous materials, while simultaneously reducing air consumption. (Excluding GFM-T)

## Prevention of static charge on work

Suppresses static by using new anti-static materials. (Excluding GFM-T)

## Realizes Class 10 level \*

Suppression of particles by the floating air is realized with the use of a new porous material. (Excluding GFM-T)

\* Equivalent to JIS B 9920 Class 4 according to CKD testing of the GFM Series, with measurement values including particle diameters of 0.5  $\mu\text{m}$  or higher.

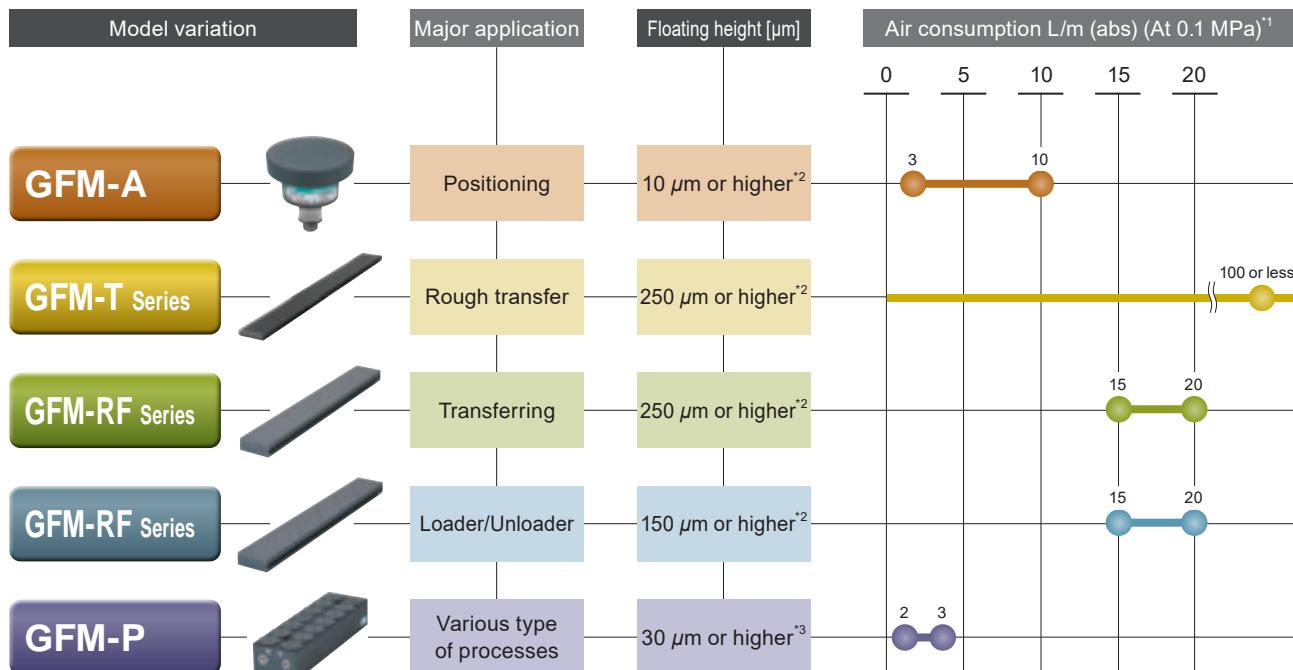
## Ideal for high-sensitivity inspection

Use of a black body eliminates irregular reflection and improves workpiece visibility.

## Abundant applications

We propose the most ideal pneumatic components for floating systems.

## Variation of models



\*1 Please consider the value as a rough estimate of the flow rate.

\*2 Please consider the value as a rough estimate of the floating height.

\*3 Numerical values will change due to the positive or negative pressure flow rate combinations.



## CKD Corporation

Website <https://www.ckd.co.jp/en/>

### ASIA

喜開理(上海)機器有限公司

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- 杭州事務所 (HANGZHOU OFFICE)
- 無錫事務所 (WUXI OFFICE)
- 昆山事務所 (KUNSHAN OFFICE)
- 蘇州事務所 (SUZHOU OFFICE)
- 南京事務所 (NANJING OFFICE)
- 合肥事務所 (HEFEI OFFICE)
- 成都事務所 (CHENGDU OFFICE)
- 武漢事務所 (WUHAN OFFICE)
- 鄭州事務所 (ZHENGZHOU OFFICE)
- 長沙事務所 (CHANGSHA OFFICE)
- 重慶事務所 (CHONGQING OFFICE)
- 西安事務所 (XIAN OFFICE)
- 廣州事務所 (GUANGZHOU OFFICE)
- 中山事務所 (ZHONGSHAN OFFICE)
- 深圳西事務所 (WEST SHENZHEN OFFICE)
- 深圳東事務所 (EAST SHENZHEN OFFICE)
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