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# Compliance Light

In addition to automatically aligning errors with the position of workpiece insertion, Compliance Light can be used for press fitting processes.

Compliance Light  
CPL70F (parallel type)

Mounting plate

Flat type air hand  
AFDPG-8



\* Please purchase the installation plate separately.

- Improves process during workpiece insertion and press fitting
- Lightweight and compact
- 2 types: Parallel and swing
- High rigidity and withstand load capacity  
The parallel type can be used as a press fitting base
- 4 size variations
  - 34 mm [1.339 in.],  54 mm [2.126 in.],
  - 70 mm [2.756 in.],  90 mm [3.543 in.]

**NEW** Greater retaining force supports high-speed conveyance by robots

**NEW** Increased variations!

**Specifications of the improved retaining force**

- More than double the retaining force compared to standard specifications
- Perfect for high-speed conveyance



CPLH90F

**Clean system specifications**

- Class 5 equivalent cleanliness



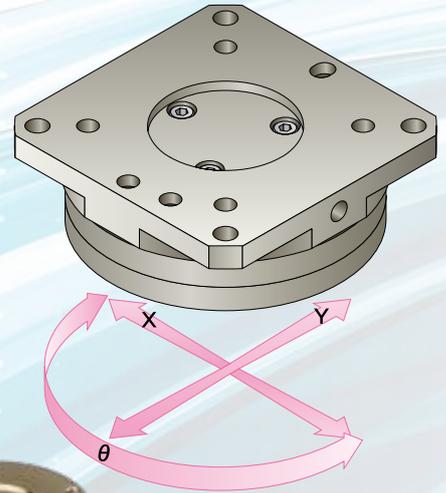
CS-CPL90F

# Parallel type

Range of movement: X, Y, and  $\theta$

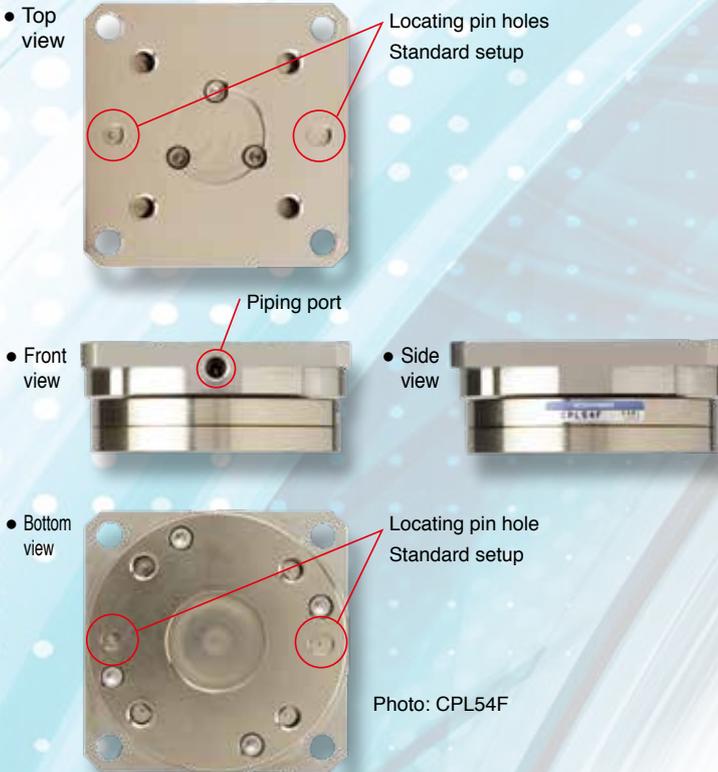
The parallel type corrects positional errors when **inserting workpieces and press fitting**, and when handling workpieces in the X, Y, and  $\theta$  axes.

- In addition to being perfect for automatically aligning error with the workpiece insertion, the parallel type can be used as a press fitting pedestal
- Perfect for robot hands due to its lightweight design
- Parallel type with a range of movement of X, Y, and  $\theta$
- High rigidity and withstand load
- No centripetal force can be selected for all variations (Option: -N)



**Improved withstand load capacity**

The parallel type can be used as a pedestal for press fitting processes

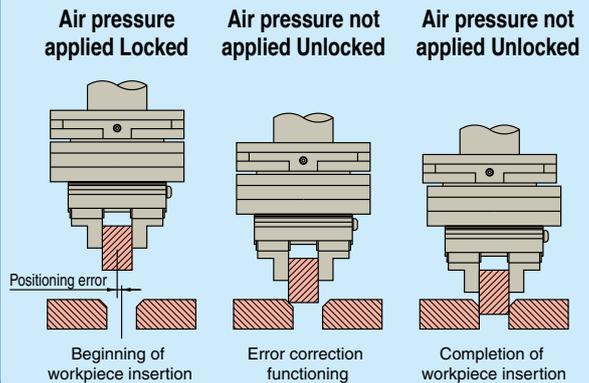


**Explanation of operation**

- When applying air pressure  
Steel balls for positioning are pressed by the internal piston so that the unit and plate maintain a centered position.
- When not applying air pressure (if with centripetal force)  
The centripetal force of the restraining rings in the unit and plate maintain the center by acting in the directions of the X, Y, and  $\theta$  axes.

**Glossary**

Centripetal force: For Compliance Light, the restraining rings provide a force of 3 to 5 N [0.674 to 1.124 lbf.] (when movement is 0.5 mm [0.02 in.]) that acts to maintain the center. This force is called "centripetal force".



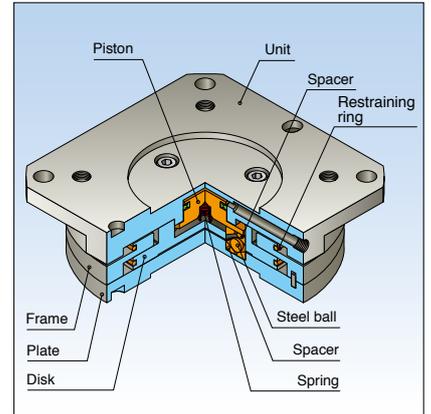
**Variations**

- Standard specifications CPL□F
- NEW** Specifications of the improved retaining force CPLH□F
- NEW** Clean system specifications CS-CPL□F

Size	□34mm	□54mm	□70mm	□90mm
Standard specifications	○	○	○	○
Specifications of the improved retaining force	●	●	●	●
Clean system specifications	●	●	●	●



P=0.5MPa	CPL34F	CPL54F	CPL70F	CPL90F
•Retaining force while applying air pressure	7 N	18 N	42 N	67 N
•Maximum load capacity	1kg	2kg	4kg	6kg
•Size variations	□34mm	□54mm	□70mm	□90mm

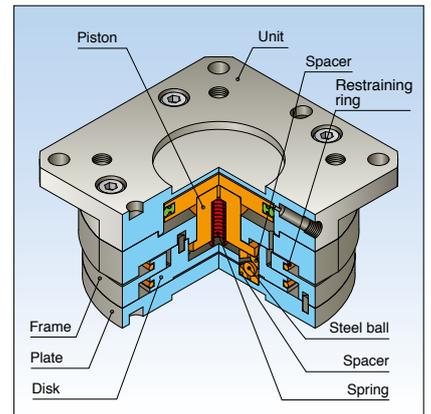


\* Retaining force, according to Koganei measuring methods (reference value)



- **More than double** the retaining force when applying air pressure compared to standard specifications
- Perfect for the high-speed conveyance by robots due to greater retaining force

P=0.5MPa	CPLH34F	CPLH54F	CPLH70F	CPLH90F
•Retaining force while applying air pressure	24 N	64 N	115 N	140 N
•Maximum load capacity	1kg	2kg	4kg	6kg
•Size variations	□34mm	□54mm	□70mm	□90mm

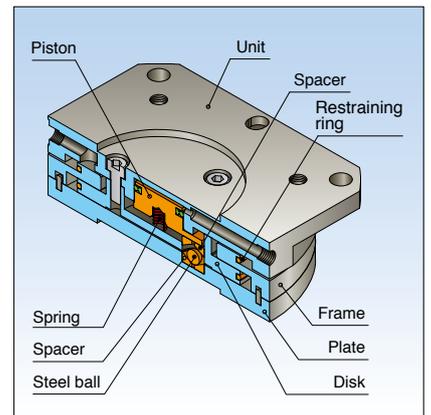


\* Retaining force, according to Koganei measuring methods (reference value)



- Just add a dust collection port and use clean grease to be perfect for use in clean rooms!
- Class **5 equivalent** cleanliness (FED-STD Class 100 equivalent)

P=0.5MPa	CS-CPL34F	CS-CPL54F	CS-CPL70F	CS-CPL90F
•Retaining force while applying air pressure	7 N	18 N	42 N	67 N
•Maximum load capacity	1kg	2kg	4kg	6kg
•Size variations	□34mm	□54mm	□70mm	□90mm



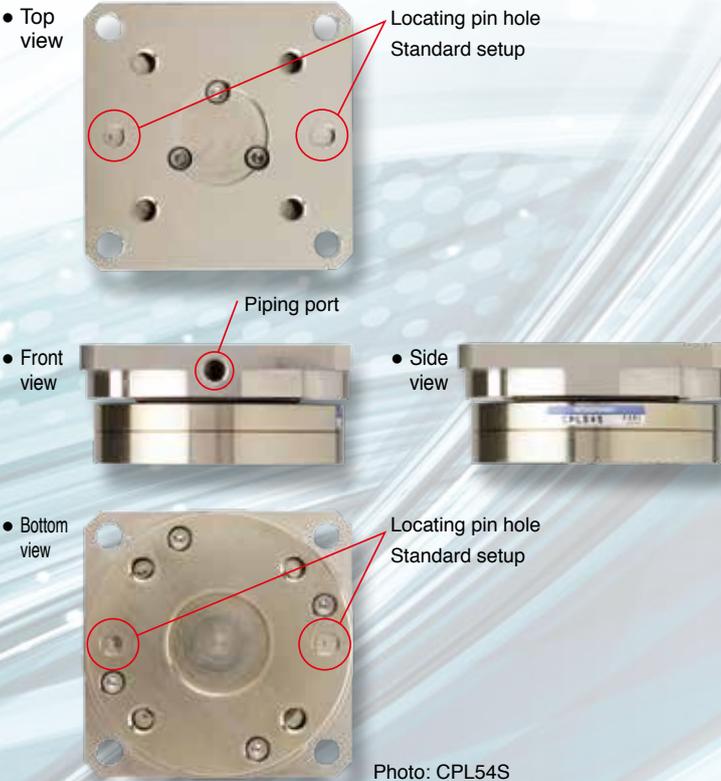
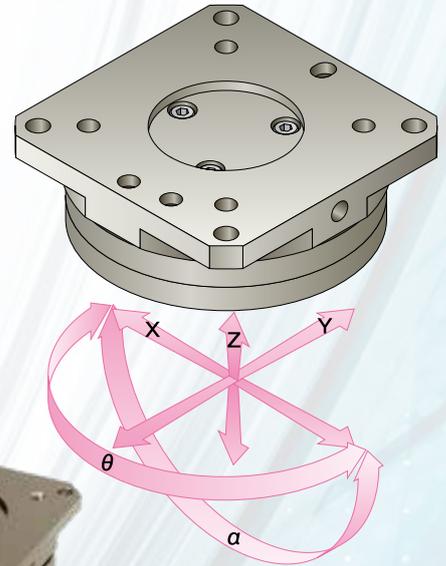
\* Retaining force, according to Koganei measuring methods (reference value)

# Swing type

Range of movement: X, Y, Z,  $\theta$ , and  $\alpha$

The swing type corrects positional errors when **inserting workpieces and press fitting**, and when handling workpieces in the **X, Y, Z,  $\theta$ , and  $\alpha$**  axes.

- Perfect for automatically aligning error with the workpiece insertion
- Perfect for robot hands due to its lightweight design
- Swing type with a range of movement of X, Y, Z,  $\theta$ , and  $\alpha$
- No centripetal force can be selected for all variations (Option: -N)

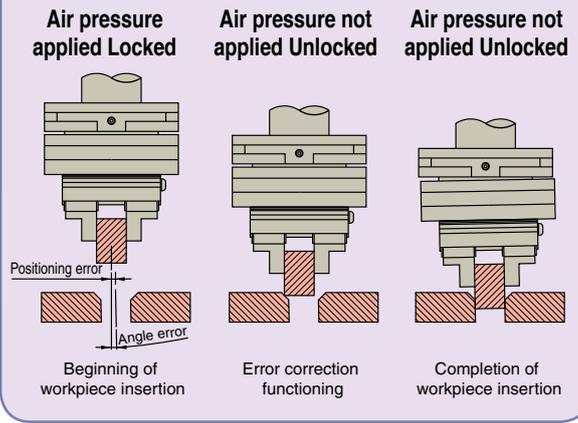


### Explanation of operation

- When applying air pressure  
Steel balls for positioning are pressed by the internal piston so that the unit and plate maintain a centered position.
- When not applying air pressure (if with centripetal force)  
The centripetal force of the restraining rings in the unit and plate maintain the center by acting in the directions of the X, Y,  $\theta$ , and  $\alpha$  axes. The direction of the Z axis operates as a buffer via springs.

### Glossary

Centripetal force: For Compliance Light, the restraining rings provide a force of 3 to 5 N [0.674 to 1.124 lbf.] (when movement is 0.5 mm [0.02 in.]) that acts to maintain the center. This force is called "centripetal force".



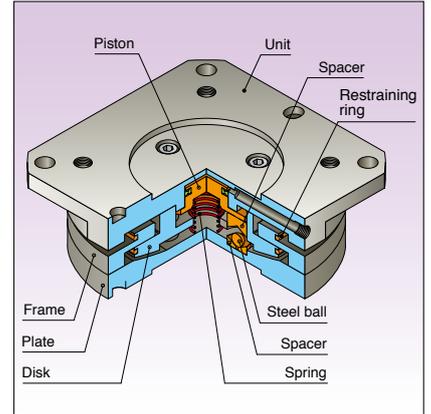
### Variations

Standard specifications CPL□S	
<b>NEW</b> Specifications of the improved retaining force CPLH□S	
<b>NEW</b> Clean system specifications CS-CPL□S	

Size	□34mm	□54mm	□70mm	□90mm
Standard specifications	○	○	○	○
Specifications of the improved retaining force	●	●	●	●
Clean system specifications	●	●	●	●



P=0.5MPa	CPL34S	CPL54S	CPL70S	CPL90S
•Retaining force while applying air pressure	7 N	20 N	38 N	60 N
•Maximum load capacity	1kg	2kg	4kg	6kg
•Size variations	□34mm	□54mm	□70mm	□90mm

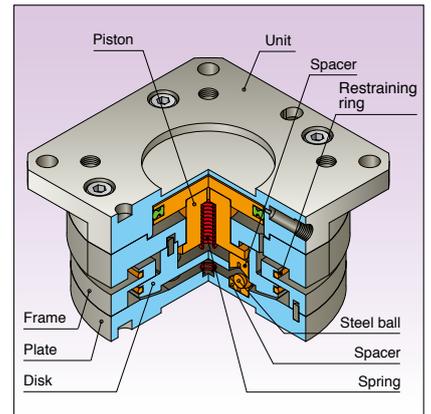


\* Retaining force, according to Koganei measuring methods (reference value)



- **More than double** the retaining force when applying air pressure compared to standard specifications
- Perfect for the high-speed conveyance by robots due to greater retaining force

P=0.5MPa	CPLH34S	CPLH54S	CPLH70S	CPLH90S
•Retaining force while applying air pressure	24 N	64 N	115 N	145 N
•Maximum load capacity	1kg	2kg	4kg	6kg
•Size variations	□34mm	□54mm	□70mm	□90mm

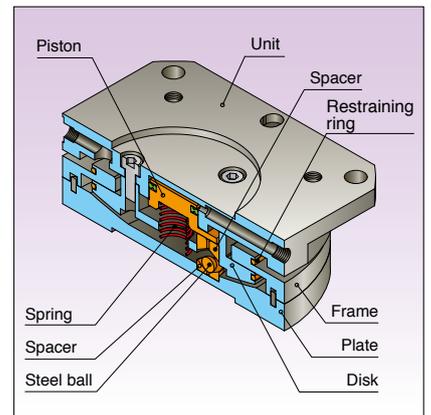


\* Retaining force, according to Koganei measuring methods (reference value)



- Just add a dust collection port and use clean grease to be perfect for use in clean rooms!
- Class **5 equivalent** cleanliness (FED-STD Class 100 equivalent)

P=0.5MPa	CS-CPL34S	CS-CPL54S	CS-CPL70S	CS-CPL90S
•Retaining force while applying air pressure	7 N	20 N	38 N	60 N
•Maximum load capacity	1kg	2kg	4kg	6kg
•Size variations	□34mm	□54mm	□70mm	□90mm



\* Retaining force, according to Koganei measuring methods (reference value)

Before selecting and using the product, please read all the Safety Precautions carefully to ensure proper product use. The Safety Precautions shown below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets beforehand. Follow the Safety Precautions for: ISO4414 (Pneumatic fluid power—Recommendations for the application of equipment to transmission and control systems), JIS B 8370 (Pneumatic system regulations)

The directions are ranked according to degree of potential danger or damage: “DANGER!”, “WARNING!”, “CAUTION!”, and “ATTENTION!”

 <b>DANGER</b>	Expresses situations that can be clearly predicted as dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 <b>WARNING</b>	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 <b>CAUTION</b>	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in light or semi-serious injury. It could also result in damage or destruction of assets.
 <b>ATTENTION</b>	While there is little chance of injury, this content refers to points that should be observed for appropriate use of the product.

**■ This product was designed and manufactured as parts for use in General Industrial Machinery.**

- In the selection and handling of the equipment, the system designer or other person with fully adequate knowledge and experience should always read the Safety Precautions, Catalog, Owner’s Manual and other literature before commencing operation. Making mistakes in handling is dangerous.
- After reading the Owner’s Manual, Catalog, etc., always place them where they can be easily available for reference to users of this product.
- If transferring or lending the product to another person, always attach the Owner’s Manual, Catalog, etc., to the product where they are easily visible, to ensure that the new user can use the product safely and properly.
- The danger, warning, and caution items listed under these “Safety Precautions” do not cover all possible cases. Read the Catalog and Owner’s Manual carefully, and always keep safety first.

 **DANGER**

- Do not use the product for the purposes listed below:
  1. Medical equipment related to maintenance or management of human lives or bodies.
  2. Mechanical devices or equipment designed for the purpose of moving or transporting people.
  3. Critical safety components in mechanical devices.
 This product has not been planned or designed for purposes that require advanced stages of safety. It could cause injury to human life.
- Do not use the product in locations with or near dangerous substances such as flammable or ignitable substances. This product is not explosion-proof. It could ignite or burst into flames.
- When mounting the product and workpiece, always firmly support and secure them in place. Dropping or falling the product or improper operation could result in injury.
- Never attempt to remodel the product. It could result in abnormal operation leading to injury.
- Never attempt inappropriate disassembly, or assembly of the product relating to its basic inner construction, or to its performance or functions. It could result in injury.
- Do not splash water on the product. Spraying it with water, washing it, or using it underwater could result in malfunction of the product leading to injury.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. In addition, do not make any adjustments to the interior or to the attached mechanisms (disconnection of piping tubes).  
The actuator can move suddenly, possibly resulting in injury.

 **WARNING**

- Do not use the product in excess of its specification range. Such use could result in product breakdowns, functions to stop, and damage. or drastically reduce the operating life.
- Before supplying air to the product and before starting operation, always conduct a safety check of the area of machine operation. Unintentional supply of air or electricity could possibly result in injury caused by contact with moving parts.
- Always check the catalog and other reference materials for correct product piping. Improper piping creates the risk of damage to and abnormal operation of the actuator.

- Do not throw the product into fire.  
The product could explode and/or release toxic gases.
- Do not sit on the product, place your foot on it, or place other objects on it.  
Accidents such as falling could result in injury. Dropping or toppling the product may result in injury, or it might also damage or break it, resulting in abnormal or erratic operation, runaway, etc.
- When conducting any kind of operation for the product, such as maintenance, inspection, repair, or replacement, always turn off the air supply completely and confirm that residual pressure inside the product or in piping connected to the product is zero before proceeding.  
In particular, be aware that residual air will still be in the air compressor or air storage tank. The actuator could abruptly move if residual air pressure remains inside the piping, causing injury.
- Do not use the actuator for equipment whose purpose is absorbing the shocks and vibrations of mechanical devices. It could break and possibly result in injury or in damage to mechanical devices.
- Use within the maximum load capacity. Using the product beyond the maximum load capacity may damage equipment or cause personal injury.
- Use safety circuits or system designs to prevent damage to machinery or injury to personnel when the machine is shut down due to emergency stop or electrical power failure.
- In initial operations after the equipment has been idle for 48 hours or more, or has been in storage, there is a possibility that contacting parts may stick, resulting in equipment operation delays or sudden movements. For these initial operations, always run a test operation before use to check that operating performance is normal.
- Do not use the product near the ocean, in direct sunlight, near mercury vapor lamps, or near equipment that generates ozone. Deterioration of rubber parts caused by ozone may reduce performance and functions or stop functions.
- Because Koganei products may be used under a wide variety of conditions, decisions concerning conformance with a particular system should be made upon the careful evaluation by the person in charge of system design. Assurances concerning expected system performance and safety are the responsibility of the designer who decides system conformity. Be sure to use the latest catalogs and technical materials to study and evaluate specification details, to consider the possibility of machine breakdown, and to configure a system that ensures fail-safe safety and reliability.

## Safety Precautions (Air Cylinders and General Actuators)

- Do not use the product in locations subject to direct sunlight (ultraviolet radiation), in locations with dust, salt, or iron particles, or in locations with media and/or ambient atmosphere that include organic solvents, phosphate ester type hydraulic oil, sulfur dioxide gas, chlorine gas, acids, etc. Such uses could lead to loss of functions within a short period, sudden degradation in performance, or reduced operating life. For details on materials used in the product, refer to the description of materials used in major parts.

### CAUTION

- When installing the product, leave room for adequate working space around it. Failure to ensure adequate working space will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- Do not scratch, dent, or deform the actuator by climbing on the product, using it as a scaffold, or placing objects on top of it. It could result in damaged or broken a product that results in operation shutdown or degraded performance.
- Always post an“operations in progress”sign for installations, adjustments, or other operations, to avoid unintentional supplying of air, electrical power, etc. Such accidental supplies may cause electric shock or sudden activation of the product that could result in physical injury.
- Using extremely dry air with a dew point lower than -20°C [-4°C], may affect the quality of the lubricating oil used. This creates the risk of degraded performance, loss of function, or other problems.

### ATTENTION

- When considering the possibility of using this product in situations or environments not specifically noted in the Catalog or Owner's Manual, or in applications where safety is an important requirement such as in an airplane facility, combustion equipment, leisure equipment, safety equipment, and other places where human life or assets may be greatly affected, take adequate safety precautions such as an application with enough margins for ratings and performance or failsafe measure.  
Be sure to consult us about such applications.
- Use a protective cover, etc., to ensure that human bodies do not come into direct contact with the operating portion of mechanical devices, etc.
- Do not control in a way that would cause workpieces to fall during power failure.  
Take control measures so that they prevent the workpieces, etc., from falling during power failure or emergency stop of the mechanical devices.
- When handling the product, wear protective gloves, safety glasses, safety shoes, etc., to keep safety.
- When the product can no longer be used, or is no longer necessary, dispose of it appropriately as industrial waste.
- Pneumatic equipment can exhibit degraded performance and function over its operating life. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
- For inquiries about the product, contact your nearest Koganei sales office or Koganei overseas department. The address and telephone number is shown on the back cover of this catalog.

### OTHERS

- Always observe the following items.
  1. When using this product in pneumatic systems, always use genuine KOGANEI parts or compatible parts (recommended parts).  
When conducting maintenance and repairs, always use genuine KOGANEI parts or compatible parts (recommended parts).  
Always observe the required methods.
  2. Do not attempt inappropriate disassembly or assembly of the product relating to basic configurations, or its performance or functions.

Koganei cannot be responsible if these items are not properly observed.

### Warranty and General Disclaimer

1. Warranty Period  
The warranty period for Koganei products is 1 year from the date of delivery.  
\*However, some products have a 2-year warranty; contact your nearest Koganei sales office or the Koganei overseas department for details.
2. Scope of Warranty and General Disclaimer
  - (1) When a product purchased from Koganei or from an authorized Koganei distributor or agent malfunctions during the warranty period in a way that is attributable to Koganei's responsibility, Koganei will repair or replace the product free of charge. Even if a product is still within the warranty period, its durability is determined by its operation cycles and other factors. Contact your nearest Koganei sales office or the Koganei overseas department for details.
  - (2) The Koganei product warranty covers individual products. Therefore, Koganei is not responsible for incidental losses (repair of this product, various expenses required for replacement, etc.) caused by breakdown, loss of function, or loss of performance of Koganei products.
  - (3) Koganei is not responsible for any losses or for any damages to other machinery caused by breakdown, loss of function, or loss of performance of Koganei products.
  - (4) Koganei is not responsible for any losses due to use or storage of the product in a way that is outside of the product specifications prescribed in Koganei catalogs and instruction manuals, and/or due to actions that violate the mounting, installation, adjustment, maintenance or other safety precautions.
  - (5) Koganei is not responsible for any losses caused by breakdown of the product due to factors outside the responsibility of Koganei, including but not limited to fire, natural disaster, the actions of third parties, and intentional actions or errors by the purchaser.

## Handling Instructions and Precautions



### General precautions

#### Piping

Before performing piping work on the product, thoroughly flush the inside of the pipes (blow out with compressed air). Machining chips, sealing tape, rust and other debris remaining from the piping work may result in air leaks and malfunctions. The dust collection port for the clean system specifications is a counterbore connection port. When piping and mounting, make sure that the connection port for the lock is correct.

#### Air supply

1. Use air as the medium. For the use of any other medium, consult your nearest Koganei sales office.
2. Air used for the product should be clean air that contains no degraded compressor oil, etc. Install an air filter (filtration of 40  $\mu\text{m}$  or less) near the product to remove collected liquid or dust. Also drain the air filter periodically. If liquid or dust gets into the product, it may cause defective operation.

#### Lubrication

1. The cylinder can be used without lubrication, however, if lubrication, such as a lubricator, is used, use turbine oil type 1 (ISO VG32) or an equivalent. Avoid using spindle oil or machine oil.
2. Never apply lubrication to the sliding parts of the swing type. Doing so may cause defective operation.
3. Do not apply lubricants in clean system specifications. Applying lubrication may cause malfunctions.

#### Environment

1. Cover the unit when using it in locations where it might be subject to excessive dust, dripping water, dripping oil, etc.
2. Do not use the product in environments which may be corrosive. Using the cylinder in these types of environments may result in damage or defective operation.
3. Do not use it in excessively dry conditions.
4. Do not use the cylinder if the ambient temperature is over 60°C [140°F], doing so may result in damage or defective operation. Also, consider anti-freezing measures if the temperature is less than 5°C [41°F], because moisture may freeze and result in damage or defective operation.

#### Handling

1. Confirm that there is no residual pressure in the product before starting maintenance work.
2. Displacement should not exceed the allowed range of movement in any direction. It could result in damaged or broken a product that results in operation shutdown or degraded performance.
3. To lock or unlock the function for error correction (compliance), switch between applying and not applying air pressure. When inserting or pushing, do so in an unlocked state with no air pressure applied. When moving, do so in a locked state with air pressure applied. Moreover, install a shock absorber, etc., where the movement comes to a standstill to ensure as smooth a stop as possible. Sudden stops may cause the lock to disengage, and reduce the centripetal accuracy.
4. Use within the range for the maximum load capacity. Using this unit while exceeding the maximum load capacity may cause wear or degradation to the sliding parts.
5. The value for the allowable load is a static load. Treat it as a temporary load in a stationary state. Ensure that there are sufficient allowances if the unit is subjected to impacts. When press fitting, use a load of 1/10 or less of the value for the allowable load.
6. The parallel type can also be used in a lower position. When using it in a lower position, use it on the center of the product and do not allow it to hang over. The mounted load should be less than the maximum load capacity.
7. The center position when pressure is applied to the plate and the

- center position when pressure is not applied may be misaligned.
8. Mount the product so that the center of gravity of the mounted load falls within the plate's external diameter, and do not operate with an overhanging load. Doing so may cause wear or degradation to the sliding parts.
9. For each product that does not have centripetal force (-N), the retaining force and the retaining moment are the same as the values indicated on the graph.

#### Installing

1. Use this unit in a horizontal position when no air pressure is applied (unlocked). The mounting surface should be flat. If the cylinder twists or bends when mounted, not only will it be inaccurate, but there may be air leaks and defective operation.
2. Note that if the product's mounting surface is scratched or dented it can adversely affect flatness.
3. Be sure that the unit and the mounting bolts are strong enough.
4. In cases where loosening of screws due to impact and/or vibration may be a factor, consider looseness prevention measures. Be careful that adhesive spreads out evenly. If the adhesive gets into the product, it may cause defective operation.
5. Be careful that error correction (compliance) is not obstructed by piping and wiring when mounting hands, etc., to the mounting surface.

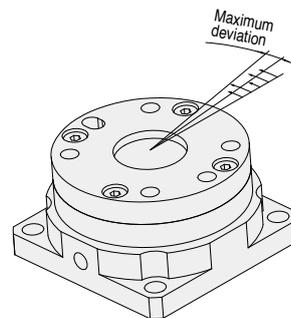
#### Repeatability

Move the plate, with no load and no air pressure applied, in any direction and measure the position at which the plate stops after applying air. Measure this 10 times and calculate the maximum deviation. The repeatability is the value with  $\pm$  appended to 1/2 of the calculated maximum deviation.

#### Repeatable angle accuracy

##### Unidirectional repeatability

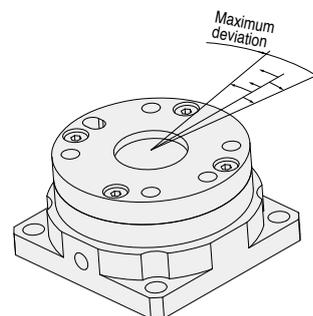
Rotate the plate, with no load and no air pressure applied, in the same direction and measure the angle at which the plate stops after applying air. Measure this 10 times and calculate the maximum deviation. The repeatable angle accuracy is the value with  $\pm$  appended to 1/2 of the calculated maximum deviation.



Unidirectional repeatability

##### Bidirectional repeatability

Rotate the plate, with no load and no air pressure applied, laterally and measure the angle at which the plate stops after applying air. Measure this 10 times and calculate the maximum deviation. The repeatable angle accuracy is the value with  $\pm$  appended to 1/2 of the calculated maximum deviation.



Bidirectional repeatability

# Handling Instructions and Precautions

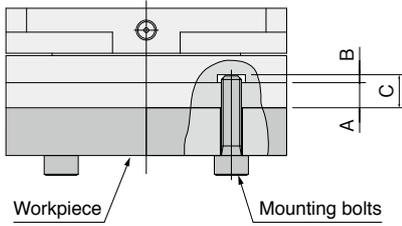
## Tightening torque

### Fittings

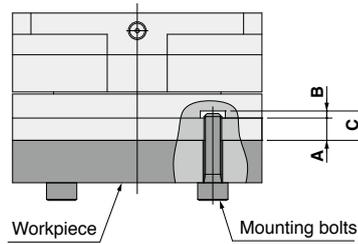
Screw size	Tightening torque <b>N·m [ft·lbf]</b>
M3×0.5	0.7 [0.516]
M5×0.8	1.0 ~ 1.5 [0.738 ~ 1.106]

### Mounting a workpiece

Standard specifications and clean system specifications

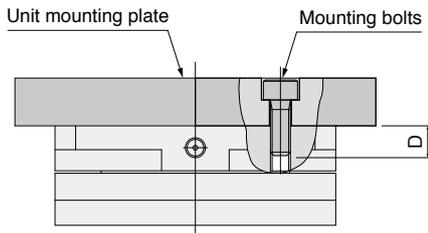


Specifications of the improved retaining force

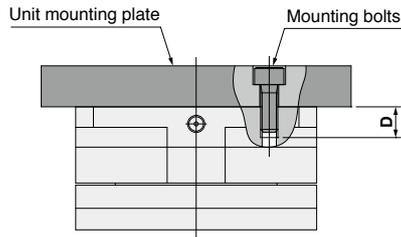


### Installing the main unit

Standard specifications and clean system specifications



Specifications of the improved retaining force



Type	Model	Bolt	Maximum tightening torque ( <b>N·m [ft·lbf]</b> )	<b>A</b> (mm [in.])	<b>B</b> (mm [in.])	<b>C</b> (mm [in.])	<b>D</b> (mm [in.])
Parallel type	CPL34F	M3×0.5	0.63 [0.465]	4.3 [0.169]	1 [0.039]	5.3 [0.209]	6 [0.236]
	CPLH34F						
	CS-CPL34F						
	CPL54F	M5×0.8	3 [2.213]	5.2 [0.205]	1.5 [0.059]	6.7 [0.264]	7 [0.276]
	CPLH54F						10 [0.394]
	CS-CPL54F						7 [0.276]
	CPL70F	M5×0.8	3 [2.213]	6.3 [0.248]	1.5 [0.059]	7.8 [0.307]	8 [0.315]
	CPLH70F						11 [0.433]
	CS-CPL70F						8 [0.315]
	CPL90F	M6×1	5.2 [0.205]	7 [0.276]	2 [0.079]	9 [0.354]	9 [0.354]
CPLH90F	14 [0.551]						
CS-CPL90F	9 [0.354]						
Swing type	CPL34S	M3×0.5	0.63 [0.465]	4.8 [0.189]	1 [0.039]	5.8 [0.228]	6 [0.236]
	CPLH34S						
	CS-CPL34S						
	CPL54S	M5×0.8	3 [2.213]	6.7 [0.264]	1.5 [0.059]	8.2 [0.323]	7 [0.276]
	CPLH54S						10 [0.394]
	CS-CPL54S						7 [0.276]
	CPL70S	M5×0.8	3 [2.213]	7.8 [0.307]	1.5 [0.059]	9.3 [0.366]	8 [0.315]
	CPLH70S						11 [0.433]
	CS-CPL70S						8 [0.315]
	CPL90S	M6×1	5.2 [0.205]	9.5 [0.374]	2 [0.079]	11.5 [0.453]	9 [0.354]
CPLH90S	14 [0.551]						
CS-CPL90S	9 [0.354]						

## Cleanliness Evaluation (Compliance Light)

Cleanliness evaluation methods for current clean specification pneumatic equipment are not defined by JIS or other standards.

Because of this, Koganei devises its own independent measurement methods for cleanliness and evaluates accordingly.

### 1. Samples being measured (with suction from the dust collection port)

Parallel type	Load	Swing type	Load
<b>CS-CPL34F</b>	0.4kg	<b>CS-CPL34S</b>	0.4kg
<b>CS-CPL54F</b>	0.8kg	<b>CS-CPL54S</b>	0.8kg
<b>CS-CPL70F</b>	1.1kg	<b>CS-CPL70S</b>	1.1kg
<b>CS-CPL90F</b>	1.1kg	<b>CS-CPL90S</b>	1.1kg

### 2. Measurement procedure

#### 2-1 Checking the volume of dust emission in the measurement system

Particles are measured in the clean bench (Figure 1) for 9 minutes without operating the samples in the clean bench (background measurement).

This confirms that, under the background measurement conditions, the number of particles measures 0 (zero).

#### 2-2 Actual measurement

The samples are operated for 36 minutes and the total value of dust emission is measured for the latter 18 minutes.

#### 2-3 Re-confirmation

The measurements in 2-1 are done again to re-check the dust emission in the clean bench.

#### 2-4 Measurement value conversion

The total value of dust emission measured in the latter 18 minutes of 2-2 is converted to the value per 10 operations.

### 3. Measurement conditions

- Operating frequency: 1 Hz (air supply to compliance light ON-OFF)
- Applied air pressure: 0.5 MPa
- Suction conditions: Micro ejector: ME05

Primary side: 0.5 MPa air pressure applied

Usable tubes:  $\phi$  6

- Particle counter used

Suction flow: 28.3  $\ell$  /min (ANR) [1.000 ft<sup>3</sup>/min (SCFM)]

Diameter of measured particles: 0.1  $\mu$ , 0.2  $\mu$ , 0.3  $\mu$ , 0.5  $\mu$ , 0.7  $\mu$ , 1.0  $\mu$

# Cleanliness Evaluation (Compliance Light)

## 4. Measurement results

- Measurement results after one million sample operations (with suction from the dust collection port)

Parallel type: CS-CPL34F, CS-CPL54F, CS-CPL70F, CS-CPL90F

Swing type: CS-CPL34S, CS-CPL54S

Dust emission in the products above could not be confirmed.

Swing type: Volume of dust emission for CS-CPL70S, CS-CPL90S

The following graph shows the results.

Note: The results of dust emission in the graph are actual values measured under Koganei standards, and are not intended to be guaranteed values.

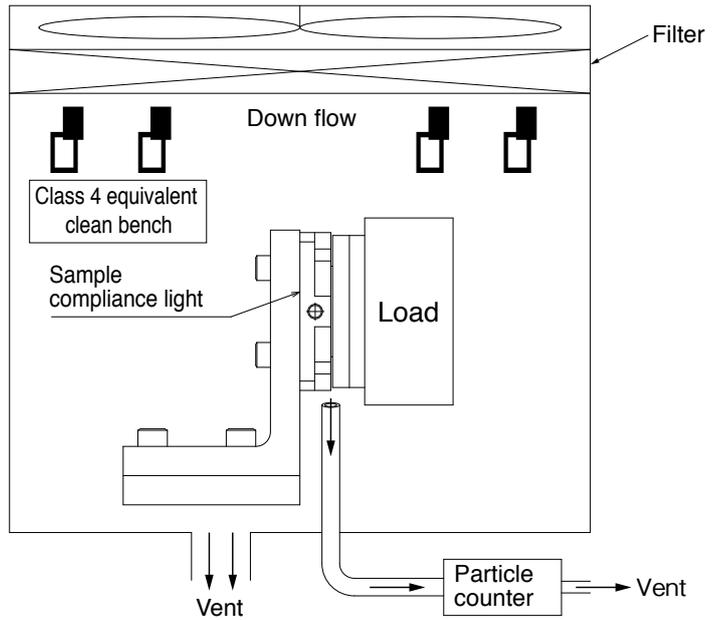
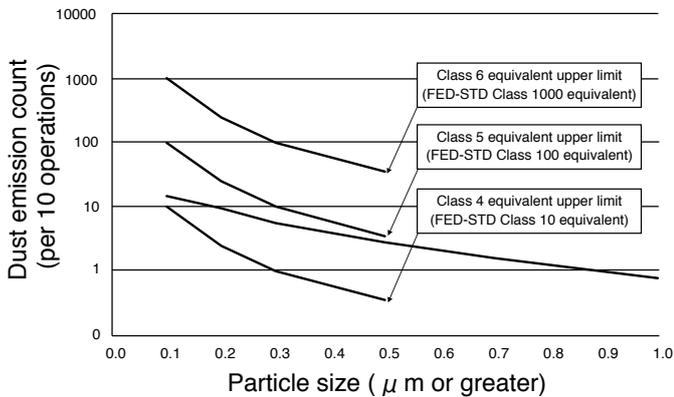


Figure 1: Outline of particle measuring device

### ● CS-CPL70S

CS-CPL70S

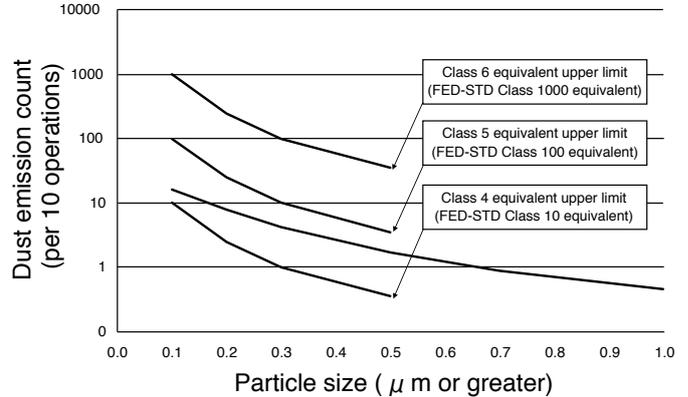
Dust emission of each particle size (per 10 operations)



### ● CS-CPL90S

CS-CPL90S

Dust emission of each particle size (per 10 operations)



# Compliance Light

## Standard specifications Parallel type



### Specifications

Item	Basic type	CPL34F	CPL34F-N	CPL54F	CPL54F-N	CPL70F	CPL70F-N	CPL90F	CPL90F-N		
		Bore size	mm [in.]	6 [0.236]		10 [0.394]		16 [0.630]		20 [0.787]	
Dimensions	mm [in.]	□34 [□1.339]		□54 [□2.126]		□70 [□2.756]		□90 [□3.543]			
Height	mm [in.]	18 [0.709]		22 [0.866]		25 [0.984]		28 [1.102]			
Mass	g [oz.]	42 [1.482]		130 [4.6]		250 [8.8]		460 [16.2]			
Operating type		Single acting type									
Media		Air									
Operating pressure range	MPa [psi.]	0.2 to 0.7 [29.000 to 101.500]									
Proof pressure	MPa [psi.]	1.05 [152.250]									
Operating temperature range	°C [°F]	0 to 60 [0 to 140.000]									
Diameter of connection port	mm [in.]	M3×0.5 [0.02]			M5×0.8 [0.031]						
Lubrication	Cylinder part	Not required									
	Sliding part	Not required									
Maximum load capacity	kg [lb.]	1 [2.205]		2 [4.410]		4 [8.820]		6 [13.230]			
Movement range	X - Y	mm [in.]		±0.5 [0.02]		±1 [0.039]		±1.5 [0.059]		±2 [0.079]	
	θ (twisting)	°		±3		±4					
Centripetal force (when movement is 0.5 mm) <sup>Note1</sup>	N [lbf.]	3 [0.674]	0 [0]	5 [1.124]	0 [0]	5 [1.124]	0 [0]	3 [0.674]	0 [0]		
Repeatability <sup>Note2</sup> (in the direction of X and Y)	P=0.5MPa mm [in.]	±0.05 [0.002]									
Repeatable angle accuracy <sup>Note3</sup> (in the direction of θ)	P=0.5MPa	±0.05 [0.002] (unidirectional repeatability)						±0.05 [0.002] (unidirectional repeatability)			
	Degrees	±0.2 [0.008] (bidirectional repeatability)						±0.1 [0.004] (bidirectional repeatability)			
Withstand load <sup>Note5</sup>	Pushing direction N [lbf.]	1580 [355]		2840 [638]		5150 [1158]		6670 [1499]			
	Pulling direction N [lbf.]	840 [188.8]		1480 [333]		2980 [670]		4880 [1097]			

Note 1: Centripetal force: Indicates the force, with no load and no air pressure applied, that maintains the center position via the restraining ring.

Note 2: Repeatability: The maximum deviation of the position at which the plate, with no load and no air pressure applied, stops when air has been applied after moving it in any direction. For details, see page ⑦.

Note 3: Repeatable angle accuracy

Unidirectional repeatability

The maximum deviation of the angle at which the plate, with no load and no air pressure applied, stops when air has been applied after rotating it in the same direction. For details, see page ⑦.

Bidirectional repeatability

The maximum deviation of the angle at which the plate, with no load and no air pressure applied, stops when air has been applied after rotating laterally. For details, see page ⑦.

Note 4: The center position when air pressure is applied to the plate and the center position when air pressure is not applied may be misaligned.

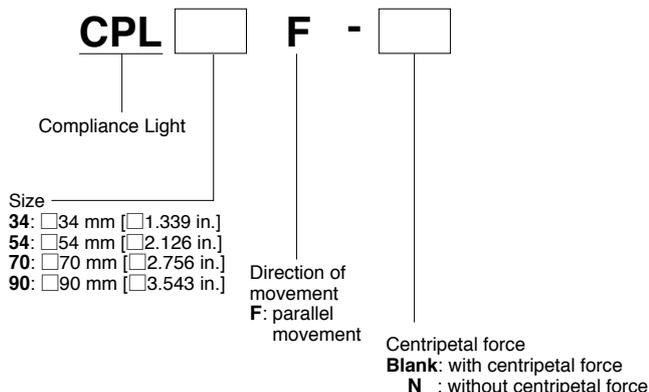
Note 5: When press fitting, use a load of 1/10 or less of the value for the allowable load. For details, see page ⑦.

Note 6: Mount the product so that the center of gravity of the mounted load falls within the plate's external diameter, and do not operate with an overhanging load.

Note 7: For the Handling Instructions and Precautions, see page ⑦.

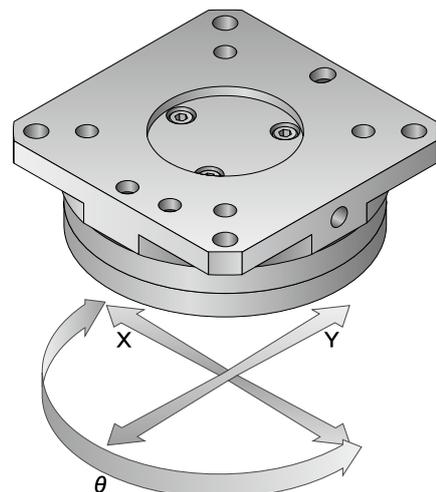
### Order Codes

#### • Parallel type

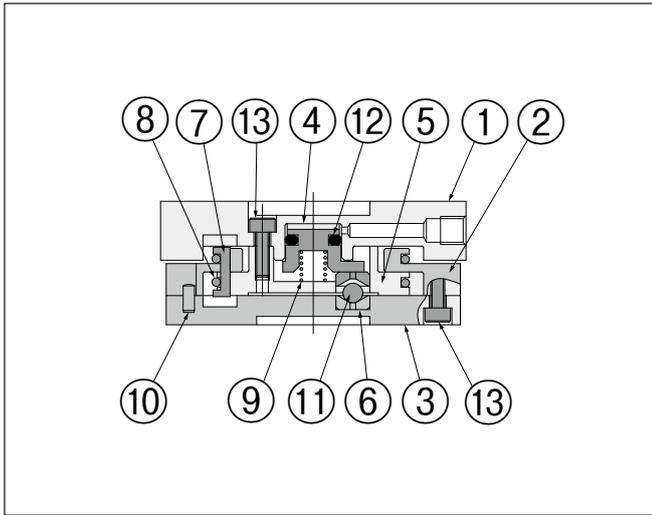


### Direction of movement

#### • X, Y, and θ axes



## Inner construction



## Major parts and materials

No.	Model Name	CPL34F	CPL54F	CPL70F	CPL90F
		①	Unit	Aluminum alloy (electroless nickel plated)	
②	Frame	Aluminum alloy (electroless nickel plated)			
③	Plate	Aluminum alloy (electroless nickel plated)			
④	Piston	Aluminum alloy (anodized)			
⑤	Disk	Aluminum alloy (special anti-abrasion treated)			
⑥	Spacer	Stainless steel (heat-treated)			
⑦	Alignment pin	Stainless steel (heat-treated)			
⑧	Restraining ring	Stainless steel			
⑨	Spring	Stainless steel			
⑩	Parallel pin	Stainless steel			
⑪	Steel ball	Steel			
⑫	Seal	Synthetic rubber (NBR)			
⑬	Bolt	Stainless steel			

## Graph (reference values)

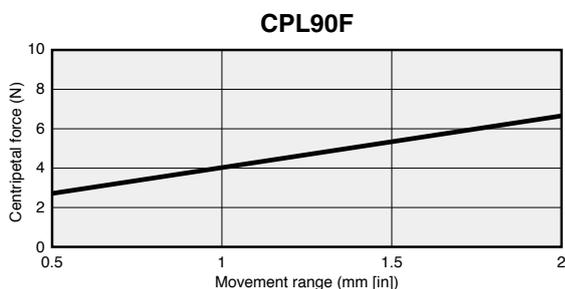
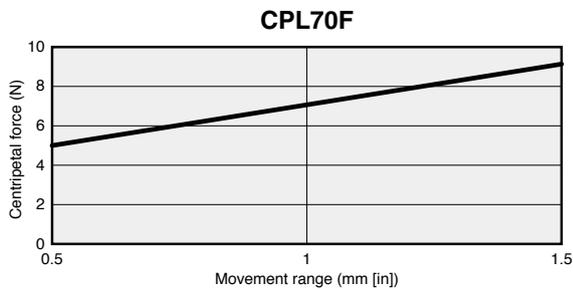
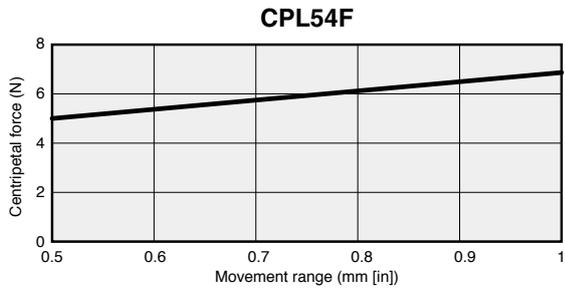
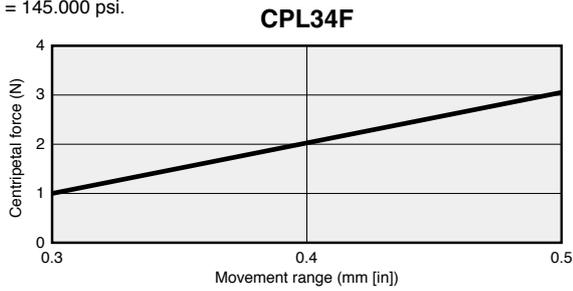
### • Centripetal force

\* Centripetal force: Force that maintains the center position via the restraining ring in a condition in which no load and no air pressure is applied.

1N = 0.225 lbf.

1mm = 0.039 in.

1 MPa = 145.000 psi.

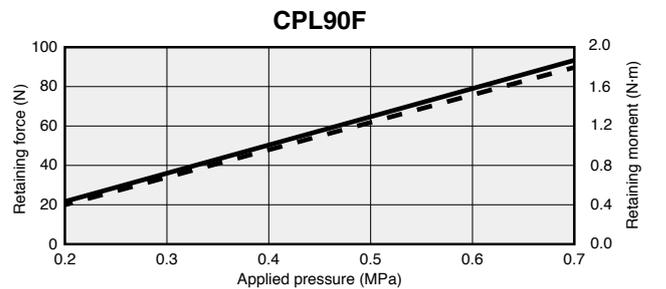
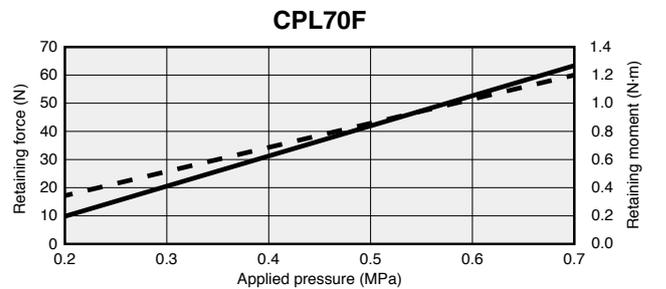
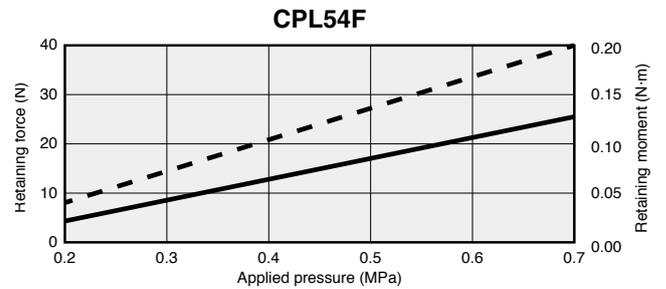
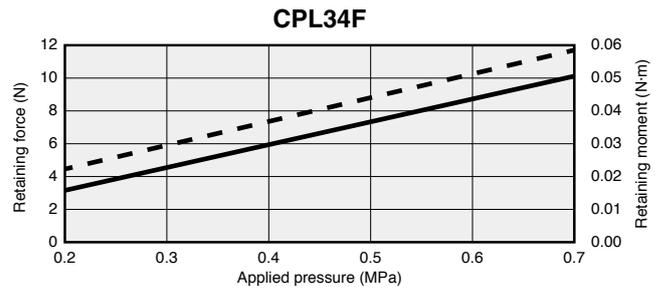


### • Retaining force, Retaining moment

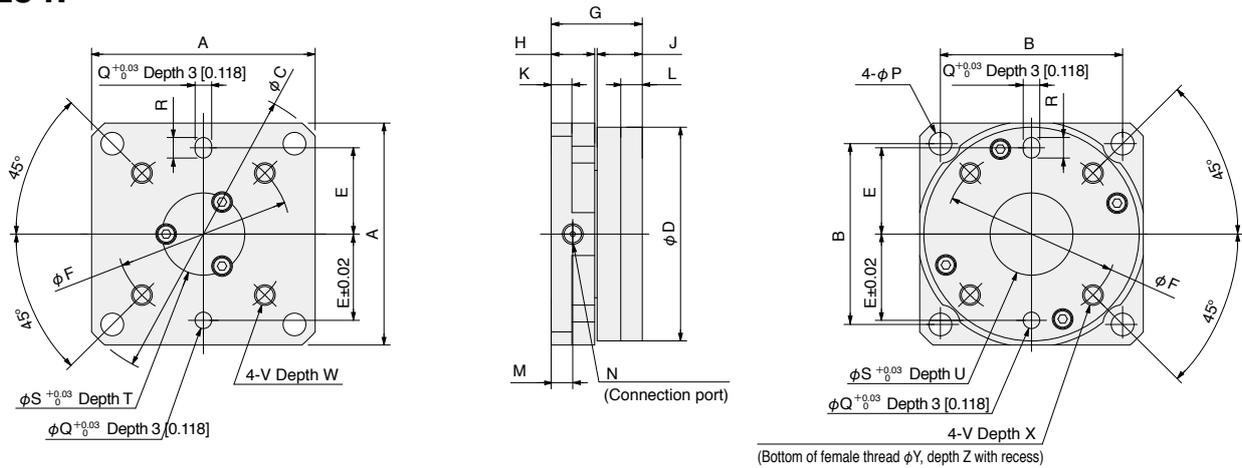
— Retaining force  
- - - Retaining moment

\* Retaining force: Force that maintains the center position of the X and Y directions when air pressure is applied

\* Retaining moment: Force that maintains the center position of the θ direction when air pressure is applied



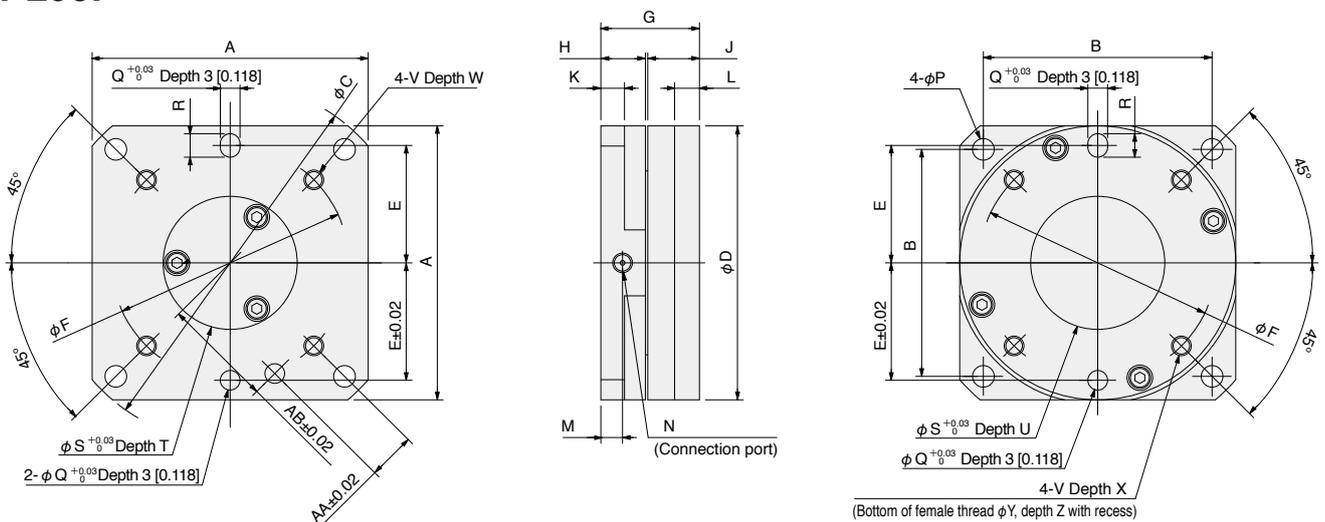
# CPL34F CPL54F



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CPL34F		34 [1.339]	28 [1.102]	46 [1.811]	32 [1.260]	13 [0.512]	26 [1.024]	18 [0.709]	8.9 [0.350]	8.7 [0.343]	4 [0.157]	4.3 [0.169]	4.9 [0.193]	M3×0.5 [0.020]	3.4 [0.134]	3 [0.118]	4 [0.157]
CPL54F		54 [2.126]	44 [1.732]	72 [2.835]	52 [2.047]	21 [0.827]	42 [1.654]	22 [0.866]	10.5 [0.413]	10.9 [0.429]	5 [0.197]	5.2 [0.205]	5.2 [0.205]	M5×0.8 [0.031]	5.5 [0.217]	4 [0.157]	5 [0.197]

Model	Code	S	T	U	V	W	X	Y	Z
CPL34F		12 [0.472]	2 [0.079]	1.5 [0.059]	M3×0.5 [0.020]	6 [0.236]	4.3 [0.169]	4 [0.157]	1 [0.039]
CPL54F		20 [0.787]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	7 [0.276]	5.2 [0.205]	6 [0.236]	1.5 [0.059]

# CPL70F CPL90F



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CPL70F		70 [2.756]	58 [2.283]	92 [3.622]	70 [2.756]	30 [1.181]	60 [2.362]	25 [0.984]	11.3 [0.445]	13.1 [0.516]	6 [0.236]	6.3 [0.248]	5.5 [0.217]	M5×0.8 [0.031]	5.5 [0.217]	5 [0.197]	6 [0.236]
CPL90F		90 [3.543]	74 [2.913]	116 [4.600]	90 [3.543]	40 [1.575]	80 [3.150]	28 [1.102]	12.8 [0.504]	14.5 [0.571]	6 [0.236]	7 [0.276]	5.6 [0.220]	M5×0.8 [0.031]	6.6 [0.260]	6 [0.236]	7 [0.276]

Model	Code	S	T	U	V	W	X	Y	Z	AA	AB
CPL70F		34 [1.339]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	8 [0.315]	6.3 [0.248]	7 [0.276]	1.5 [0.059]	12 [0.472]	28 [1.102]
CPL90F		50 [1.969]	2.5 [0.098]	1.5 [0.059]	M6×1 [0.039]	9 [0.354]	7 [0.276]	7 [0.276]	2 [0.079]	12 [0.472]	38 [1.496]

# Compliance Light

## Specifications of the improved retaining force Parallel type



### Specifications

Item	Basic type	CPLH34F	CPLH34F-N	CPLH54F	CPLH54F-N	CPLH70F	CPLH70F-N	CPLH90F	CPLH90F-N
		Bore size	mm [in.]	16 [0.630]		25 [0.984]		40 [1.575]	
Dimensions	mm [in.]	□34 [□1.339]		□54 [□2.126]		□70 [□2.756]		□90 [□3.543]	
Height	mm [in.]	25 [0.984]		31 [1.220]		36 [1.417]		41 [1.614]	
Mass	g [oz.]	65 [2.29]		190 [6.70]		380 [13.40]		710 [25.04]	
Operating type		Single acting type							
Media		Air							
Operating pressure range	MPa [psi.]	0.2 to 0.7 [29.000 to 101.500]							
Proof pressure	MPa [psi.]	1.05 [152.250]							
Operating temperature range	°C [°F]	0 to 60 [0 to 140.000]							
Diameter of connection port	mm [in.]	M3×0.5 [0.02]			M5×0.8 [0.031]				
Lubrication	Cylinder part	Not required							
	Sliding part	Not required							
Maximum load capacity	kg [lb.]	1 [2.205]		2 [4.410]		4 [8.820]		6 [13.230]	
Movement range	X - Y	±0.5 [0.02]		±1 [0.039]		±1.5 [0.059]		±2 [0.079]	
	θ (twisting)	±3		±4					
Centripetal force (when movement is 0.5 mm) <sup>Note1</sup>	N [lbf.]	3 [0.674]	0 [0]	5 [1.124]	0 [0]	5 [1.124]	0 [0]	3 [0.674]	0 [0]
Repeatability <sup>Note2</sup> (in the direction of X and Y)	P=0.5MPa mm [in.]	±0.05 [0.002]							
Repeatability angle <sup>Note3</sup> (in the direction of θ)	P=0.5MPa Degrees	±0.1 [0.004] (bidirectional repeatability)			±0.05 [0.002] (bidirectional repeatability)				
Withstand load <sup>Note5</sup>	Pushing direction	1580 [355]		2840 [638]		5150 [1158]		6670 [1499]	
	Pulling direction	840 [188.8]		1480 [333]		2980 [670]		4880 [1097]	

Note 1: Centripetal force: Indicates the force, with no load and no air pressure applied, that maintains the center position via the restraining ring.

Note 2: Repeatability: The maximum deviation of the position at which the plate, with no load and no air pressure applied, stops when air has been applied after moving it in any direction. For details, see page ⑦.

Note 3: Repeatability angle accuracy: bidirectional repeatability

The maximum deviation of the angle at which the plate, with no load and no air pressure applied, stops when air has been applied after rotating laterally. For details, see page ⑦.

Note 4: The center position when air pressure is applied to the plate and the center position when air pressure is not applied may be misaligned.

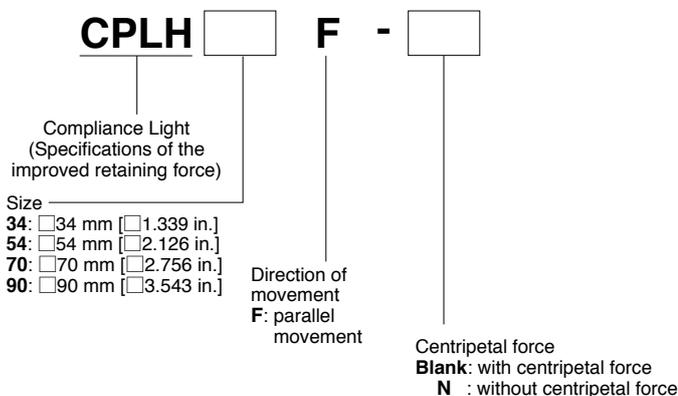
Note 5: When press fitting, use a load of 1/10 or less of the value for the allowable load. For details, see page ⑦.

Note 6: Mount the product so that the center of gravity of the mounted load falls within the plate's external diameter, and do not operate with an overhanging load.

Note 7: For the Handling Instructions and Precautions, see page ⑦.

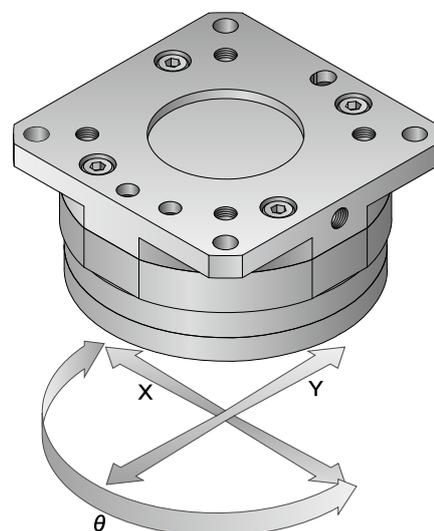
### Order Codes

#### • Specifications of the improved retaining force, parallel type

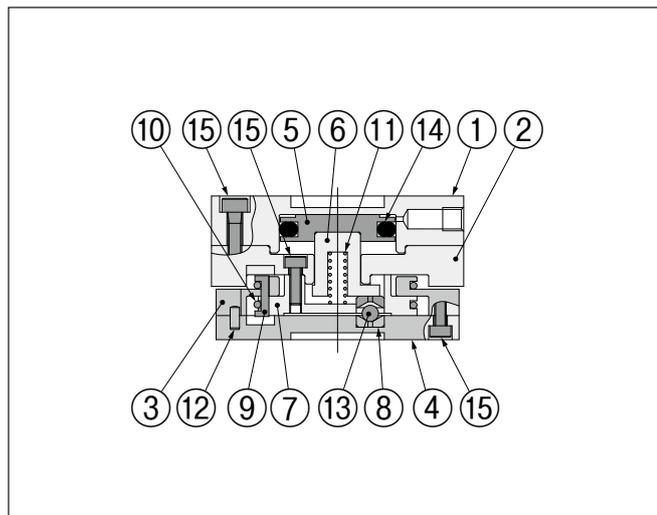


### Direction of movement

#### • X, Y, and θ axes



## Inner construction



## Major parts and materials

No.	Model		CPLH34F	CPLH54F	CPLH70F	CPLH90F
	Name					
①	Unit		Aluminum alloy (electroless nickel plated)			
②	Unit connection		Aluminum alloy (electroless nickel plated)			
③	Frame		Aluminum alloy (electroless nickel plated)			
④	Plate		Aluminum alloy (electroless nickel plated)			
⑤	Piston		Aluminum alloy (anodized)			
⑥	Lock piston		Steel (electroless nickel plated)			
⑦	Disk		Aluminum alloy (special anti-abrasion treated)			
⑧	Spacer		Stainless steel (heat-treated)			
⑨	Alignment pin		Stainless steel (heat-treated)			
⑩	Restraining ring		Stainless steel			
⑪	Spring		Piano wire			
⑫	Parallel pin		Stainless steel			
⑬	Steel ball		Steel			
⑭	Seal		Synthetic rubber (NBR)			
⑮	Bolt		Stainless steel			

## Graph (reference values)

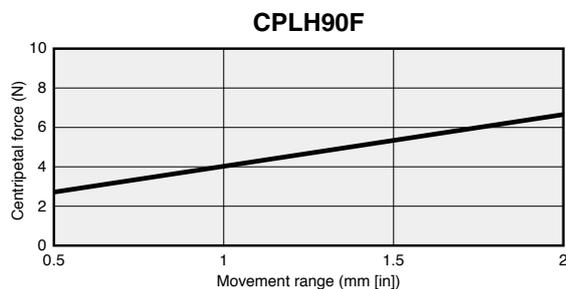
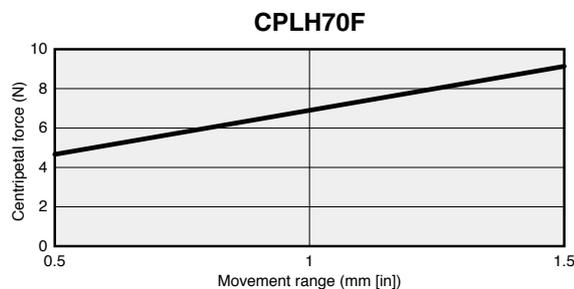
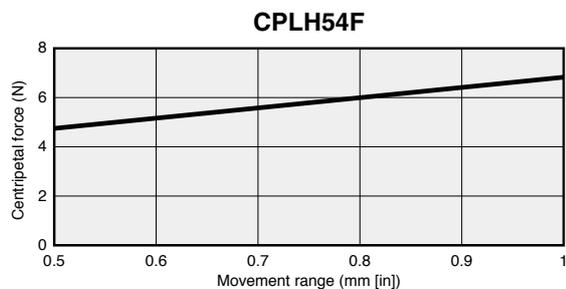
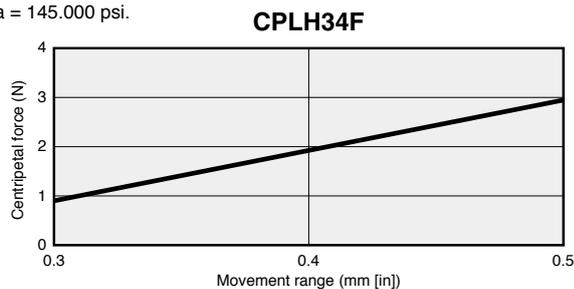
### • Centripetal force

\* Centripetal force: Force that maintains the center position via the restraining ring in a condition in which no load and no air pressure is applied.

1N = 0.225 lbf.

1mm = 0.039 in.

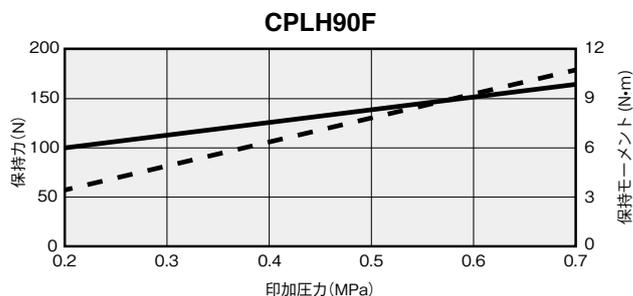
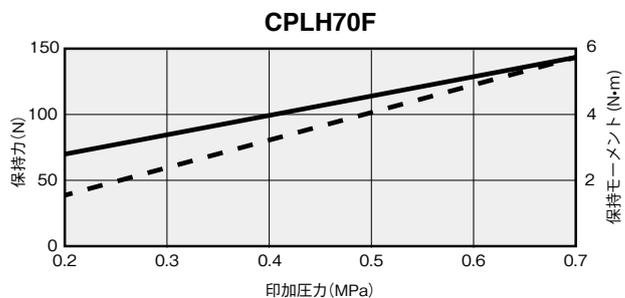
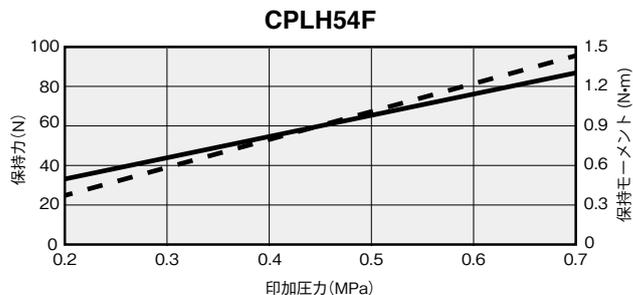
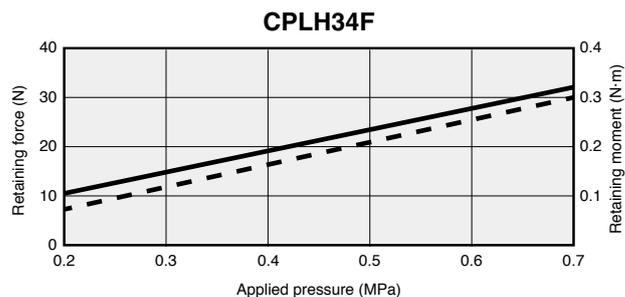
1 MPa = 145,000 psi.



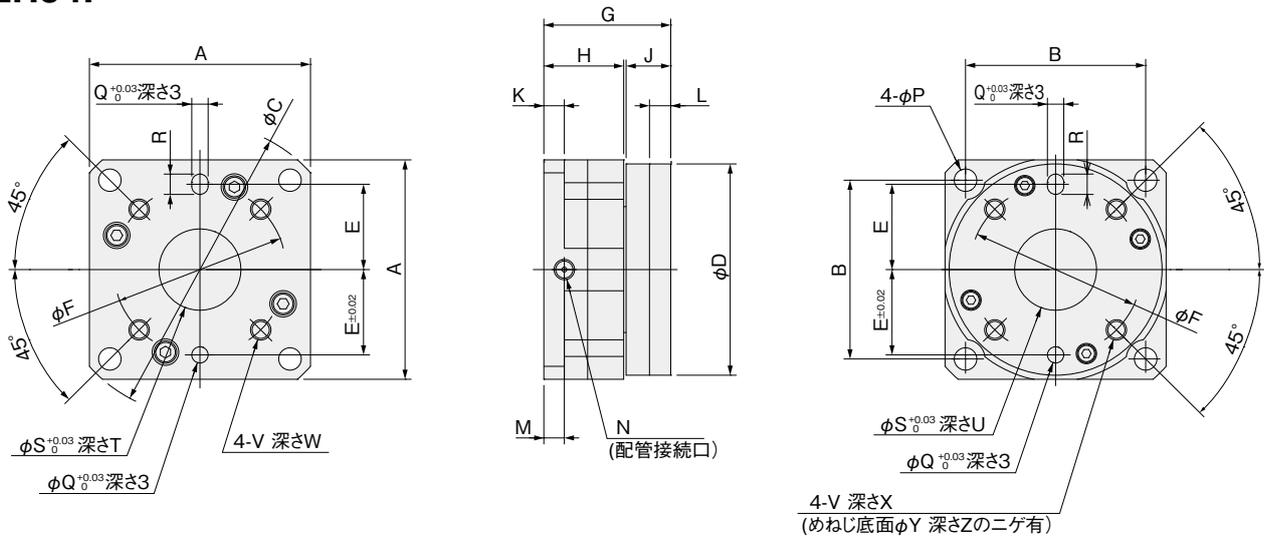
### • Retaining force, Retaining moment

\* Retaining force: Force that maintains the center position of the X and Y directions when air pressure is applied

\* Retaining moment: Force that maintains the center position of the θ direction when air pressure is applied



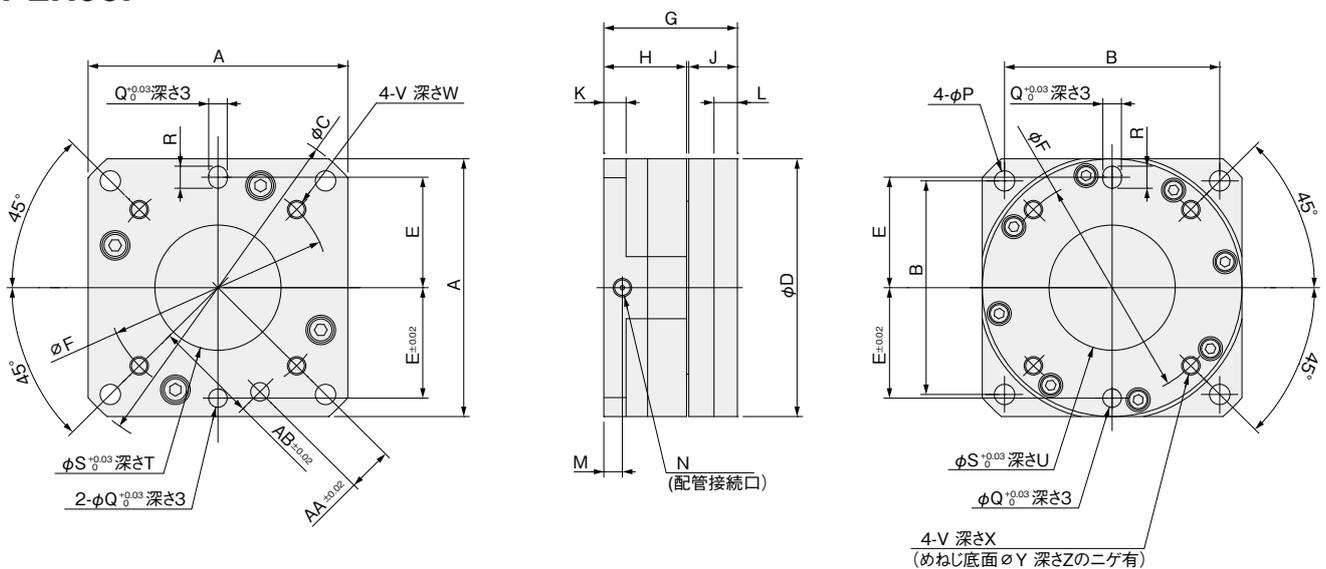
**CPLH34F**  
**CPLH54F**



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CPLH34F		34 [1.339]	28 [1.102]	46 [1.811]	32 [1.260]	13 [0.512]	26 [1.024]	25 [0.984]	15.9 [0.626]	8.7 [0.343]	4 [0.157]	4.3 [0.169]	4.8 [0.199]	M3×0.5 [0.020]	3.4 [0.134]	3 [0.118]	4 [0.157]
CPLH54F		54 [2.126]	44 [1.732]	72 [2.835]	52 [2.047]	21 [0.827]	42 [1.654]	31 [1.220]	19.5 [0.768]	10.9 [0.429]	5 [0.197]	5.2 [0.205]	5 [0.197]	M5×0.8 [0.031]	5.5 [0.217]	4 [0.157]	5 [0.197]

Model	Code	S	T	U	V	W	X	Y	Z
CPLH34F		12 [0.472]	2 [0.079]	1.5 [0.059]	M3×0.5 [0.020]	6 [0.236]	4.3 [0.169]	4 [0.157]	1 [0.039]
CPLH54F		20 [0.787]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	10 [0.394]	5.2 [0.205]	6 [0.236]	1.5 [0.059]

**CPLH70F**  
**CPLH90F**



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CPLH70F		70 [2.756]	58 [2.283]	92 [3.622]	70 [2.756]	30 [1.181]	60 [2.362]	36 [1.417]	22.3 [0.878]	13.1 [0.516]	6 [0.236]	6.3 [0.248]	5 [0.197]	M5×0.8 [0.031]	5.5 [0.217]	5 [0.197]	6 [0.236]
CPLH90F		90 [3.543]	74 [2.913]	116 [4.600]	90 [3.543]	40 [1.575]	80 [3.150]	41 [1.614]	25.8 [1.016]	14.5 [0.571]	6 [0.236]	7 [0.276]	5.5 [0.217]	M5×0.8 [0.031]	6.6 [0.260]	6 [0.236]	7 [0.276]

Model	Code	S	T	U	V	W	X	Y	Z	AA	AB
CPLH70F		34 [1.339]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	11 [0.433]	6.3 [0.248]	7 [0.276]	1.5 [0.059]	12 [0.472]	28 [1.102]
CPLH90F		50 [1.969]	2.5 [0.098]	1.5 [0.059]	M6×1 [0.039]	14 [0.551]	7 [0.276]	7 [0.276]	2 [0.079]	12 [0.472]	38 [1.496]

# Compliance Light

## Clean system specifications Parallel type



### Specifications

Item	Basic type	CS-CPL34F	CS-CPL34F-N	CS-CPL54F	CS-CPL54F-N	CS-CPL70F	CS-CPL70F-N	CS-CPL90F	CS-CPL90F-N
		Bore size	mm [in.]	6 [0.236]		10 [0.394]		16 [0.630]	
Dimensions	mm [in.]	□34 [□1.339]		□54 [□2.126]		□70 [□2.756]		□90 [□3.543]	
Height	mm [in.]	18 [0.709]		22 [0.866]		25 [0.984]		28 [1.102]	
Mass	g [oz.]	42 [1.482]		130 [4.6]		250 [8.8]		460 [16.2]	
Operating type		Single acting type							
Media		Air							
Operating pressure range	MPa [psi.]	0.2 to 0.7 [29.000 to 101.500]							
Proof pressure	MPa [psi.]	1.05 [152.250]							
Operating temperature range	°C [°F]	0 to 60 [0 to 140.000]							
Diameter of connection port	mm [in.]	M3×0.5 [0.02]			M5×0.8 [0.031]				
Lubrication	Cylinder part	No							
	Sliding part	No							
Maximum load capacity	kg [lb.]	1 [2.205]		2 [4.410]		4 [8.820]		6 [13.230]	
Movement range	X – Y mm [in.]	±0.5 [0.02]		±1 [0.039]		±1.5 [0.059]		±2 [0.079]	
	θ (twisting) °	±3		±4					
Centripetal force (when movement is 0.5 mm) <sup>Note1</sup>	N [lbf.]	3 [0.674]	0 [0]	5 [1.124]	0 [0]	5 [1.124]	0 [0]	3 [0.674]	0 [0]
Repeatability <sup>Note2</sup> (in the direction of X and Y)	P=0.5MPa mm [in.]	±0.05 [0.002]							
Repeatable angle accuracy <sup>Note3</sup> (in the direction of θ)	P=0.5MPa Degrees	±0.2 [0.008] (bidirectional repeatability)						±0.1 [0.004] (bidirectional repeatability)	
Withstand load <sup>Note5</sup>	Pushing direction N [lbf.]	1580 [355]		2840 [638]		5150 [1158]		6670 [1499]	
	Pulling direction N [lbf.]	840 [188.8]		1480 [333]		2980 [670]		4880 [1097]	
Dust collection port	mm [in.]	M3×0.5 [0.02]			M5×0.8 [0.031]				
Cleanliness		Class 5 equivalent (When vacuum sucked via the dust collection port. Based on Koganei standards.)							

Note 1: Centripetal force: Indicates the force, with no load and no air pressure applied, that maintains the center position via the restraining ring.

Note 2: Repeatability: The maximum deviation of the position at which the plate, with no load and no air pressure applied, stops when air has been applied after moving it in any direction. For details, see page 7.

Note 3: Repeatable angle accuracy: bidirectional repeatability

The maximum deviation of the angle at which the plate, with no load and no air pressure applied, stops when air has been applied after rotating laterally. For details, see page 7.

Note 4: The center position when air pressure is applied to the plate and the center position when air pressure is not applied may be misaligned.

Note 5: When press fitting, use a load of 1/10 or less of the value for the allowable load. For details, see page 7.

Note 6: Mount the product so that the center of gravity of the mounted load falls within the plate's external diameter, and do not operate with an overhanging load.

Note 7: For the Handling Instructions and Precautions, see page 7.

### Order Codes

#### • Clean system specifications, parallel type

**CS-CPL**  **F** -

Compliance Light  
(Clean system specifications)

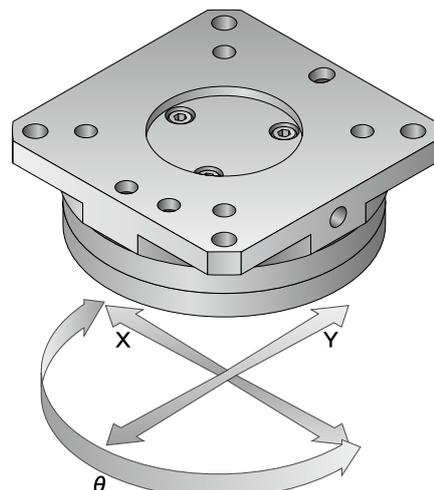
Size  
34: □34 mm [□1.339 in.]  
54: □54 mm [□2.126 in.]  
70: □70 mm [□2.756 in.]  
90: □90 mm [□3.543 in.]

Direction of movement  
**F**: parallel movement

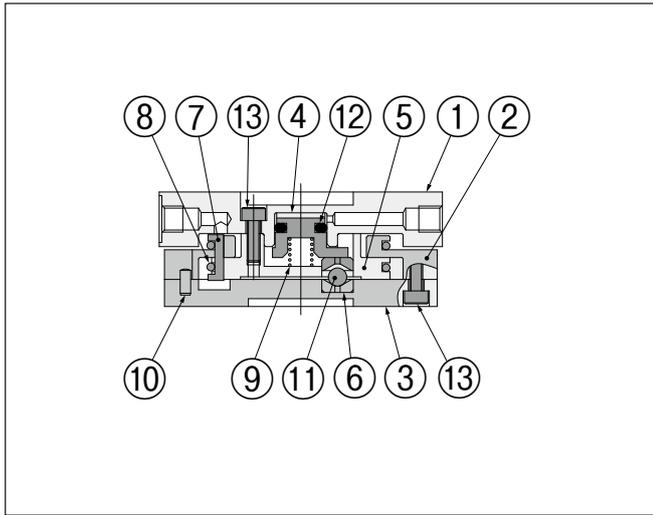
Centripetal force  
**Blank**: with centripetal force  
**N**: without centripetal force

### Direction of movement

#### • X, Y, and θ axes



## Inner construction



## Major parts and materials

No.	Model Name	CS-CPL34F	CS-CPL54F	CS-CPL70F	CS-CPL90F
		①	Unit	Aluminum alloy (electroless nickel plated)	
②	Frame	Aluminum alloy (electroless nickel plated)			
③	Plate	Aluminum alloy (electroless nickel plated)			
④	Piston	Aluminum alloy (anodized)			
⑤	Disk	Aluminum alloy (special anti-abrasion treated)			
⑥	Spacer	Stainless steel (heat-treated)			
⑦	Alignment pin	Stainless steel (heat-treated)			
⑧	Restraining ring	Stainless steel			
⑨	Spring	Stainless steel			
⑩	Parallel pin	Stainless steel			
⑪	Steel ball	Steel			
⑫	Seal	Synthetic rubber (NBR)			
⑬	Bolt	Stainless steel			

## Graph (reference values)

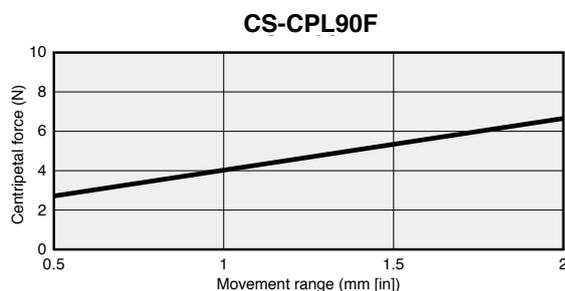
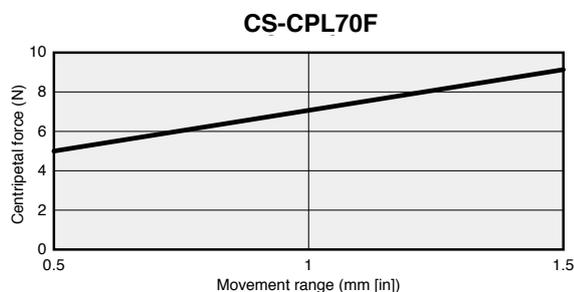
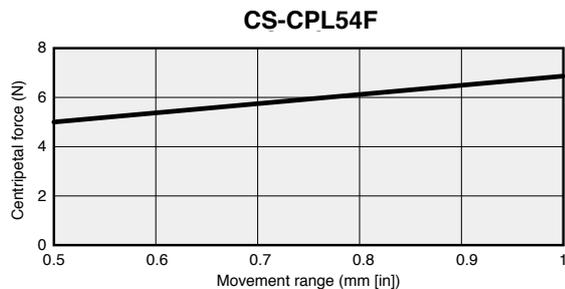
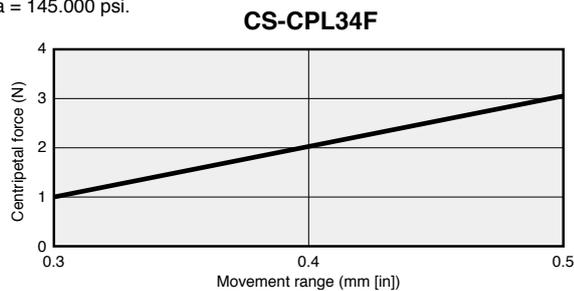
### • Centripetal force

\* Centripetal force: Force that maintains the center position via the restraining ring in a condition in which no load and no air pressure is applied.

1N = 0.225 lbf.

1mm = 0.039 in.

1 MPa = 145,000 psi.

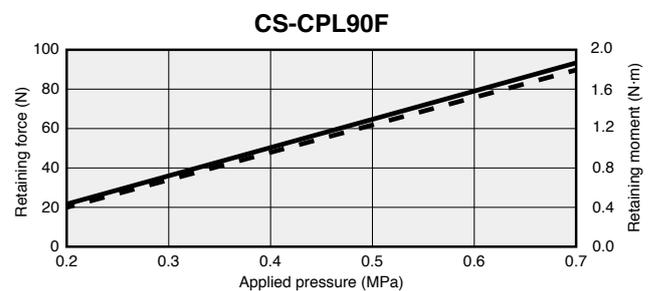
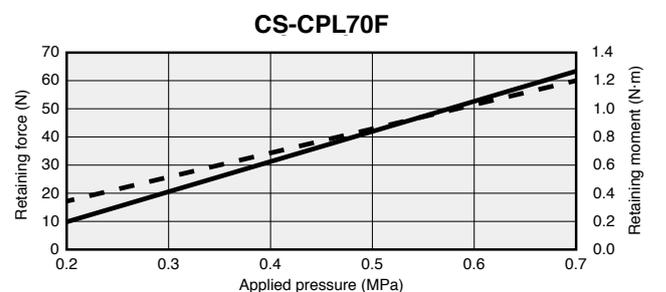
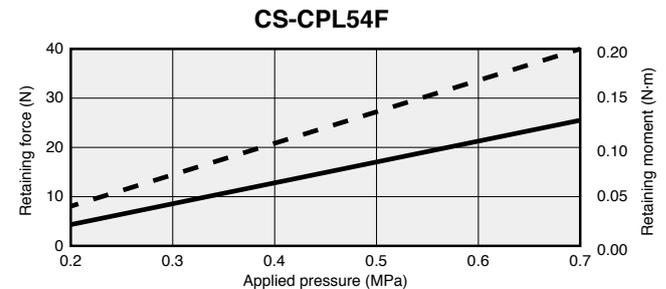
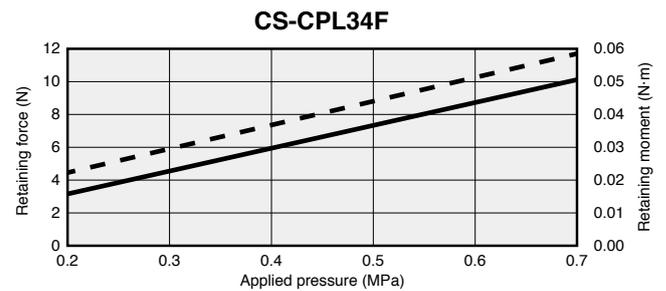


### • Retaining force, Retaining moment

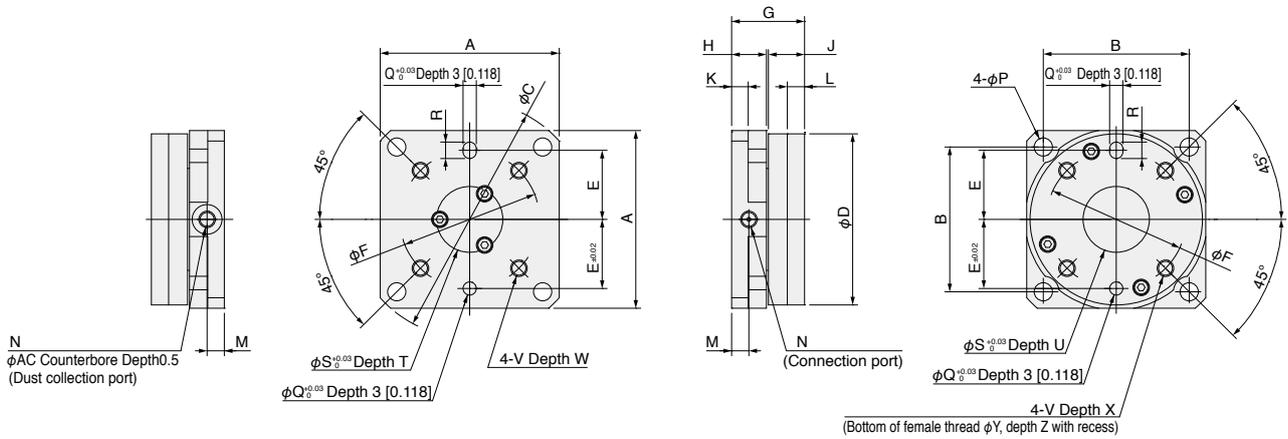
— Retaining force  
- - - Retaining moment

\* Retaining force: Force that maintains the center position of the X and Y directions when air pressure is applied

\* Retaining moment: Force that maintains the center position of the θ direction when air pressure is applied



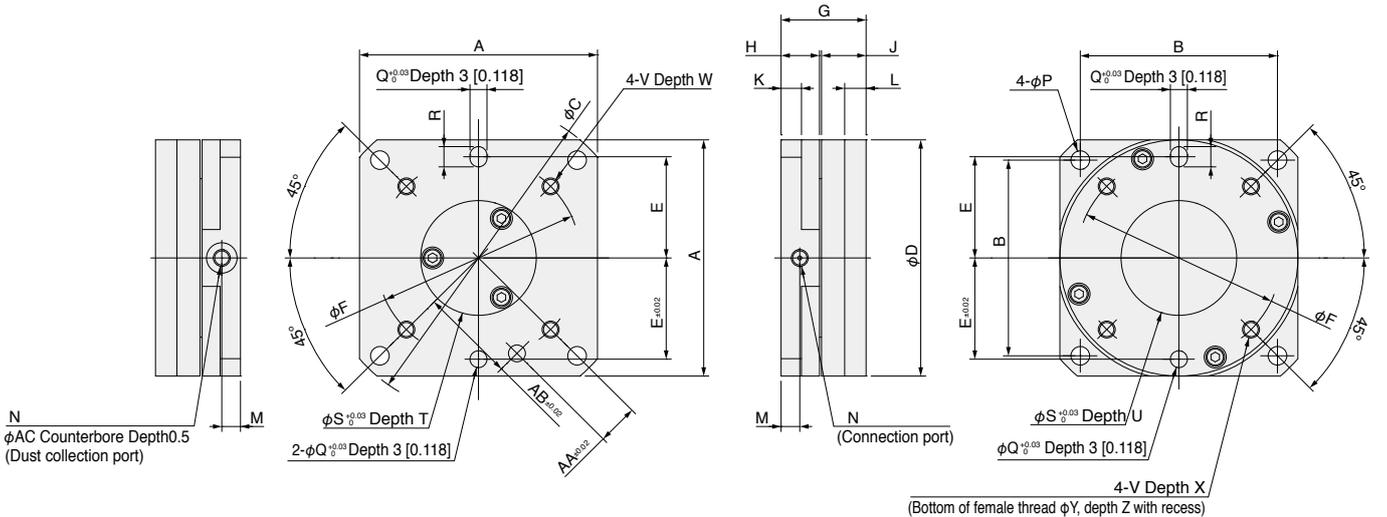
**CS-CPL34F**  
**CS-CPL54F**



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CS-CPL34F		34 [1.339]	28 [1.102]	46 [1.811]	32 [1.260]	13 [0.512]	26 [1.024]	18 [0.709]	8.9 [0.350]	8.7 [0.343]	4 [0.157]	4.3 [0.169]	4.9 [0.193]	M3×0.5 [0.020]	3.4 [0.134]	3 [0.118]	4 [0.157]
CS-CPL54F		54 [2.126]	44 [1.732]	72 [2.835]	52 [2.047]	21 [0.827]	42 [1.654]	22 [0.866]	10.5 [0.413]	10.9 [0.429]	5 [0.197]	5.2 [0.205]	5.2 [0.205]	M5×0.8 [0.031]	5.5 [0.217]	4 [0.157]	5 [0.197]

Model	Code	S	T	U	V	W	X	Y	Z	AC
CS-CPL34F		12 [0.472]	2 [0.079]	1.5 [0.059]	M3×0.5 [0.020]	6 [0.236]	4.3 [0.169]	4 [0.157]	1 [0.039]	6 [0.236]
CS-CPL54F		20 [0.787]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	7 [0.276]	5.2 [0.205]	6 [0.236]	1.5 [0.059]	9 [0.354]

**CS-CPL70F**  
**CS-CPL90F**



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CS-CPL70F		70 [2.756]	58 [2.283]	92 [3.622]	70 [2.756]	30 [1.181]	60 [2.362]	25 [0.984]	11.3 [0.445]	13.1 [0.516]	6 [0.236]	6.3 [0.248]	5.5 [0.217]	M5×0.8 [0.031]	5.5 [0.217]	5 [0.197]	6 [0.236]
CS-CPL90F		90 [3.543]	74 [2.913]	116 [4.600]	90 [3.543]	40 [1.575]	80 [3.150]	28 [1.102]	12.8 [0.504]	14.5 [0.571]	6 [0.236]	7 [0.276]	5.6 [0.220]	M5×0.8 [0.031]	6.6 [0.260]	6 [0.236]	7 [0.276]

Model	Code	S	T	U	V	W	X	Y	Z	AA	AB	AC
CS-CPL70F		34 [1.339]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	8 [0.315]	6.3 [0.248]	7 [0.276]	1.5 [0.059]	12 [0.472]	28 [1.102]	9 [0.354]
CS-CPL90F		50 [1.969]	2.5 [0.098]	1.5 [0.059]	M6×1 [0.039]	9 [0.354]	7 [0.276]	7 [0.276]	2 [0.079]	12 [0.472]	38 [1.496]	9 [0.354]

# Compliance Light

## Standard specifications Swing type



### Specifications

Item	Basic type		CPL34S	CPL34S-N	CPL54S	CPL54S-N	CPL70S	CPL70S-N	CPL90S	CPL90S-N	
	Bore size	mm [in.]		6 [0.236]		10 [0.394]		16 [0.630]		20 [0.787]	
Dimensions	mm [in.]		□34 [□1.339]		□54 [□2.126]		□70 [□2.756]		□90 [□3.543]		
Height	mm [in.]		19 [0.748]		24 [0.945]		28 [1.102]		32 [1.260]		
Mass	g [oz.]		43 [1.517]		136 [4.8]		260 [9.2]		490 [17.3]		
Operating type	Single acting type										
Media	Air										
Operating pressure range	MPa [psi.]	0.2 to 0.7 [29.000 to 101.500]									
Proof pressure	MPa [psi.]	1.05 [152.250]									
Operating temperature range	°C [°F]	0 to 60 [0 to 140.000]									
Diameter of connection port	mm [in.]	M3×0.5 [0.020]				M5×0.8 [0.031]					
Lubrication	Cylinder part	Not required									
	Sliding part	No									
Maximum load capacity	kg [lb.]	1 [2.205]		2 [4.410]		4 [8.820]		6 [13.230]			
Movement range	X - Y	mm [in.]	±0.5 [0.020]		±1 [0.039]		±1.5 [0.059]		±2 [0.079]		
	Z	mm [in.]	-0.5 [-0.020]		-0.5 [-0.02]		-0.7 [-0.028]		-1.0 [-0.039]		
	$\theta$ (twisting)	°	±3				±4				
	$\alpha$ (inclination)	Swing angle Incline angle	°	±0.5				±1			
			±1.4				±0.7				
Centripetal force (when movement is 0.5 mm) <sup>Note1</sup>	N [lbf.]	3 [0.674]	0 [0]	5 [1.124]	0 [0]	5 [1.124]	0 [0]	3 [0.674]	0 [0]		
Repeatability <sup>Note2</sup> (in the direction of X and Y)	P=0.5MPa	mm [in.]	±0.05 [0.002]								
Repeatability angle accuracy <sup>Note3</sup> (in the direction of $\theta$ )	P=0.5MPa	Degrees	±0.01 [0.004] (unidirectional repeatability)		±0.1 [0.004] (unidirectional repeatability)						
			±0.3 [0.012] (bidirectional repeatability)		±0.2 [0.008] (bidirectional repeatability)						
Withstand load <sup>Note5</sup>	Pushing direction	N [lbf.]	1580 [355]		2840 [638]		5150 [1158]		6670 [1499]		
	Pulling direction	N [lbf.]	840 [188.8]		1480 [333]		2980 [670]		4880 [1097]		

Note 1: Centripetal force: Indicates the force, with no load and no air pressure applied, that maintains the center position via the restraining ring.

Note 2: Repeatability: The maximum deviation of the position at which the plate, with no load and no air pressure applied, stops when air has been applied after moving it in any direction. For details, see page ⑦.

Note 3: Repeatability angle accuracy: bidirectional repeatability

The maximum deviation of the angle at which the plate, with no load and no air pressure applied, stops when air has been applied after rotating laterally. For details, see page ⑦.

Note 4: The center position when air pressure is applied to the plate and the center position when air pressure is not applied may be misaligned.

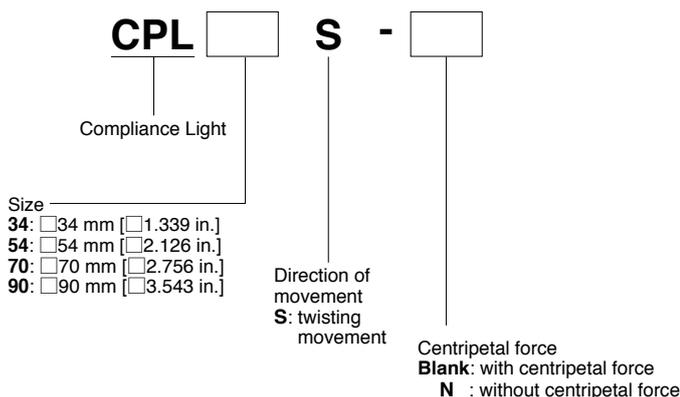
Note 5: When press fitting, use a load of 1/10 or less of the value for the allowable load. For details, see page ⑦.

Note 6: Mount the product so that the center of gravity of the mounted load falls within the plate's external diameter, and do not operate with an overhanging load.

Note 7: For the Handling Instructions and Precautions, see page ⑦.

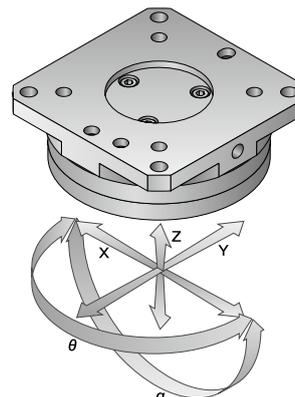
### Order Codes

#### • Swing type

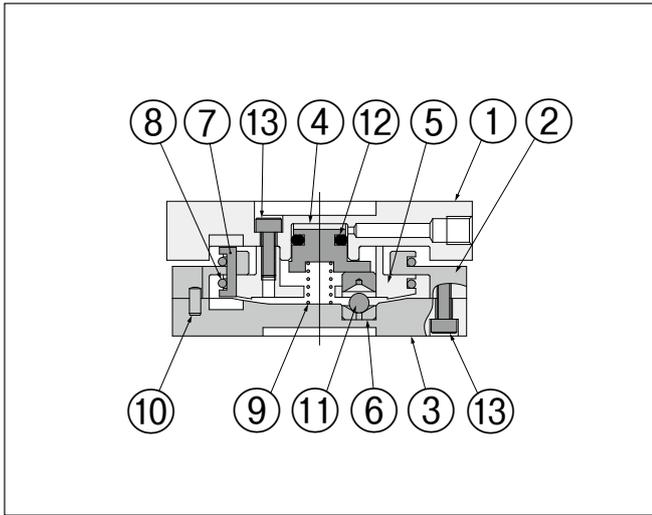


### Direction of movement

#### • X, Y, Z, $\theta$ , and $\alpha$ axes



## Inner construction



## Major parts and materials

No.	Model Name	CPL34S	CPL54S	CPL70S	CPL90S
		①	Unit		
②	Frame	Aluminum alloy (electroless nickel plated)			
③	Plate	Aluminum alloy (electroless nickel plated)			
④	Piston	Aluminum alloy (anodized)			
⑤	Disk	Aluminum alloy (special anti-abrasion treated)			
⑥	Spacer	Stainless steel (heat-treated)			
⑦	Alignment pin	Stainless steel (heat-treated)			
⑧	Restraining ring	Stainless steel			
⑨	Spring	Stainless steel	Piano wire		
⑩	Parallel pin	Stainless steel			
⑪	Steel ball	Steel			
⑫	Seal	Synthetic rubber (NBR)			
⑬	Bolt	Stainless steel			

## Graph (reference values)

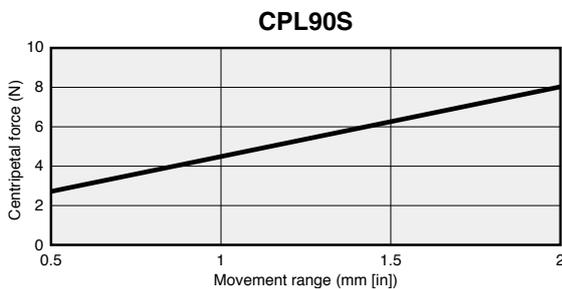
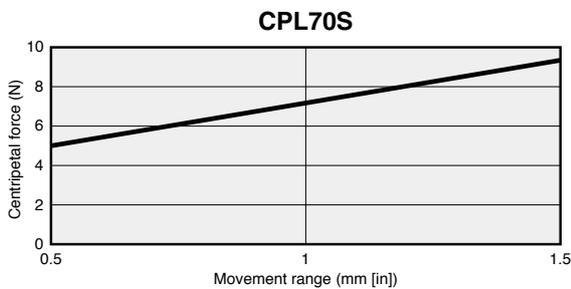
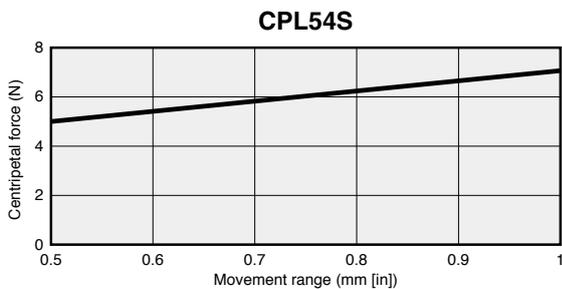
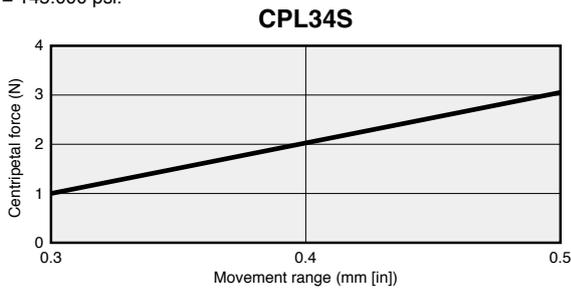
### • Centripetal force

\* Centripetal force: Force that maintains the center position via the restraining ring in a condition in which no load and no air pressure is applied.

1N = 0.225 lbf.

1mm = 0.039 in.

1 MPa = 145,000 psi.

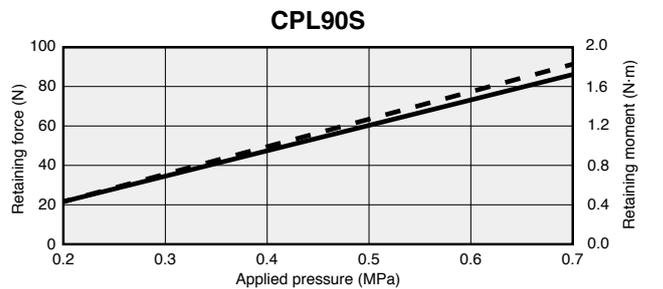
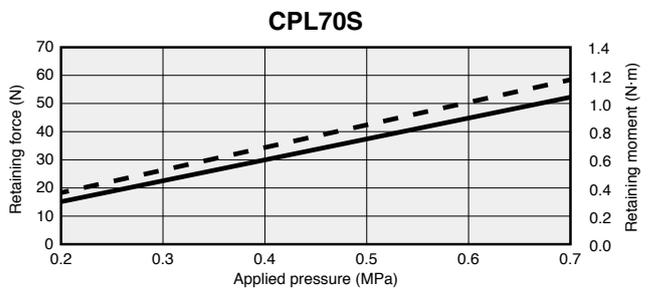
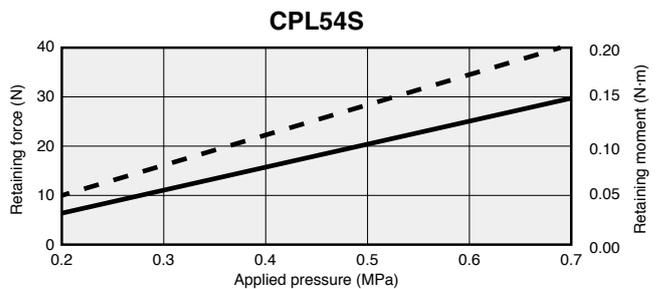
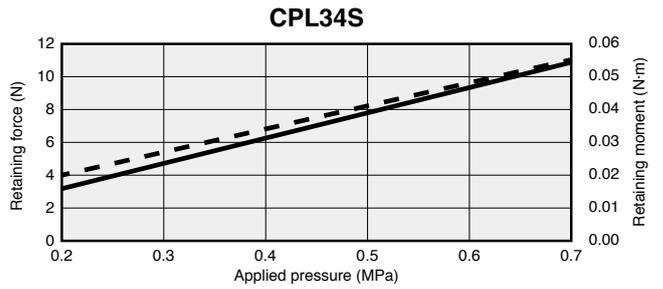


### • Retaining force, Retaining moment

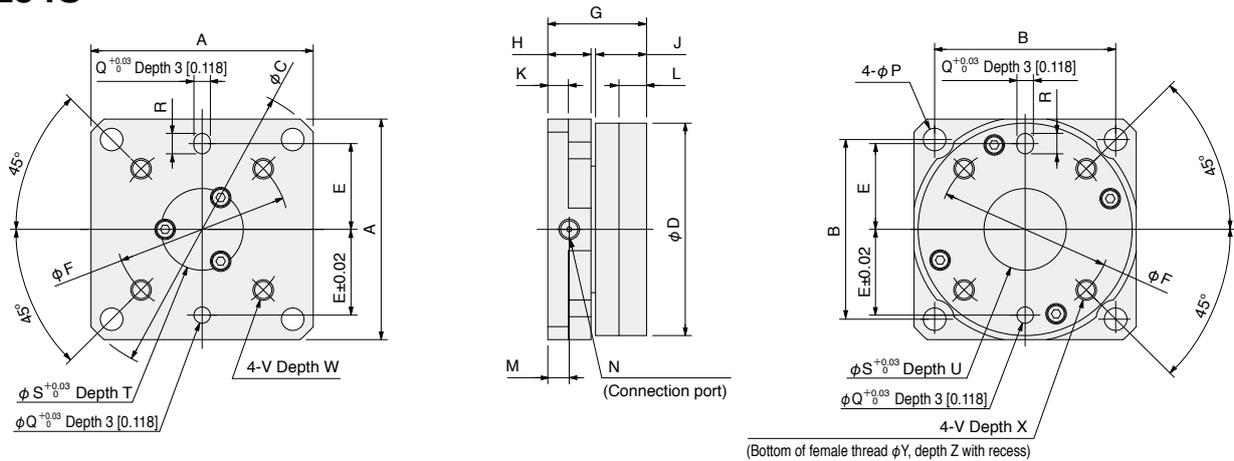
— Retaining force  
- - - Retaining moment

\* Retaining force: Force that maintains the center position of the X and Y directions when air pressure is applied

\* Retaining moment: Force that maintains the center position of the θ direction when air pressure is applied



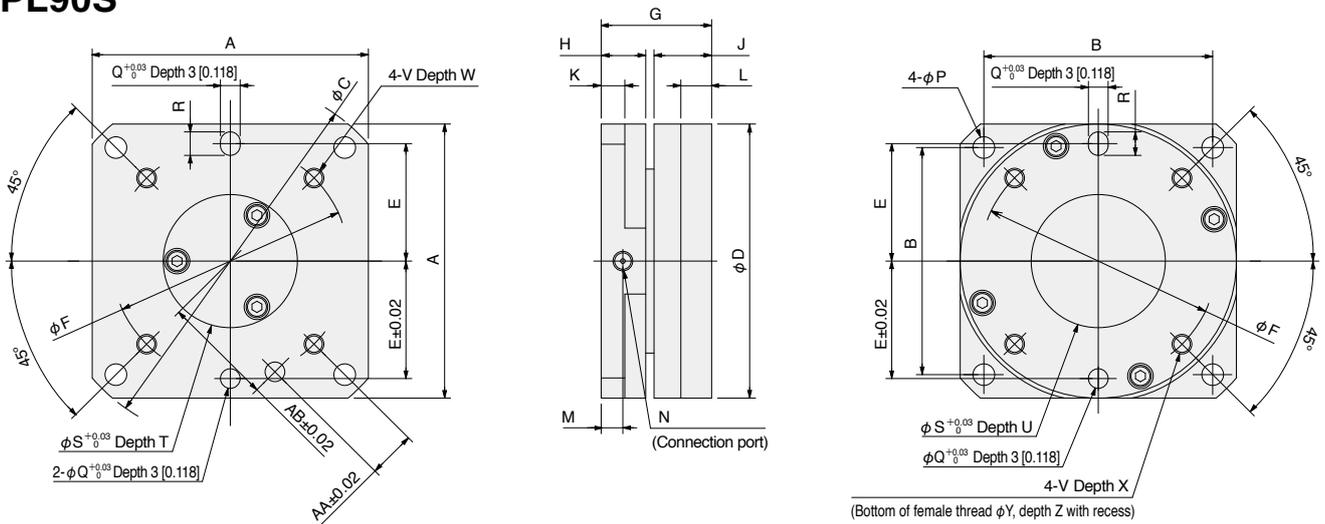
# CPL34S CPL54S



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CPL34S		34 [1.339]	28 [1.102]	46 [1.811]	32 [1.260]	13 [0.512]	26 [1.024]	19 [0.748]	8.9 [0.350]	9.2 [0.399]	4 [0.157]	4.8 [0.189]	4.9 [0.193]	M3×0.5 [0.020]	3.4 [0.134]	3 [0.118]	4 [0.157]
CPL54S		54 [2.126]	44 [1.732]	72 [2.835]	52 [2.047]	21 [0.827]	42 [1.654]	24 [0.945]	10.5 [0.413]	12.4 [0.488]	5 [0.197]	6.7 [0.264]	5.2 [0.205]	M5×0.8 [0.031]	5.5 [0.217]	4 [0.157]	5 [0.197]

Model	Code	S	T	U	V	W	X	Y	Z
CPL34S		12 [0.472]	2 [0.079]	1.5 [0.059]	M3×0.5 [0.020]	6 [0.236]	4.8 [0.189]	4 [0.157]	1 [0.039]
CPL54S		20 [0.787]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	7 [0.276]	6.7 [0.264]	6 [0.236]	1.5 [0.059]

# CPL70S CPL90S



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CPL70S		70 [2.756]	58 [2.283]	92 [3.622]	70 [2.756]	30 [1.181]	60 [2.362]	28 [1.110]	11.3 [0.445]	14.6 [0.575]	6 [0.236]	7.8 [0.307]	5.5 [0.217]	M5×0.8 [0.031]	5.5 [0.217]	5 [0.197]	6 [0.236]
CPL90S		90 [3.543]	74 [2.913]	116 [4.600]	90 [3.543]	40 [1.575]	80 [3.150]	32 [1.260]	12.8 [0.504]	17 [0.669]	6 [0.236]	9.5 [0.374]	5.6 [0.220]	M5×0.8 [0.031]	6.6 [0.260]	6 [0.236]	7 [0.276]

Model	Code	S	T	U	V	W	X	Y	Z	AA	AB
CPL70S		34 [1.339]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	8 [0.315]	7.8 [0.307]	7 [0.276]	1.5 [0.059]	12 [0.472]	28 [1.102]
CPL90S		50 [1.969]	2.5 [0.098]	1.5 [0.059]	M6×1 [0.039]	9 [0.354]	9.5 [0.374]	7 [0.276]	2 [0.079]	12 [0.472]	38 [1.496]

# Compliance Light

## Specifications of the improved retaining force Swing type



### Specifications

Item	Basic type		CPLH34S	CPLH34S-N	CPLH54S	CPLH54S-N	CPLH70S	CPLH70S-N	CPLH90S	CPLH90S-N	
	Bore size	mm [in.]		16 [0.630]		25 [0.984]		40 [1.575]		50 [1.969]	
Dimensions	mm [in.]		□34 [□1.339]		□54 [□2.126]		□70 [□2.756]		□90 [□3.543]		
Height	mm [in.]		26 [1.024]		33 [1.299]		39 [1.535]		45 [1.772]		
Mass	g [oz.]		65 [2.29]		200 [7.05]		400 [14.11]		750 [26.46]		
Operating type	Single acting type										
Media	Air										
Operating pressure range	MPa [psi.]	0.2 to 0.7 [29.000 to 101.500]									
Proof pressure	MPa [psi.]	1.05 [152.250]									
Operating temperature range	°C [°F]	0 to 60 [0 to 140.000]									
Diameter of connection port	mm [in.]	M3×0.5 [0.020]				M5×0.8 [0.031]					
Lubrication	Cylinder part	Not required									
	Sliding part	No									
Maximum load capacity	kg [lb.]	1 [2.205]		2 [4.410]		4 [8.820]		6 [13.230]			
Movement range	X - Y	mm [in.]	±0.5 [0.020]		±1 [0.039]		±1.5 [0.059]		±2 [0.079]		
	Z	mm [in.]	-0.5 [-0.020]		-0.5 [-0.02]		-0.7 [-0.028]		-1.0 [-0.039]		
	θ (twisting)	°	±3				±4				
	α (inclination)	Swing angle Incline angle	°	±0.5				±1			
°			±1.4				±0.7				
Centripetal force (when movement is 0.5 mm) <sup>Note1</sup>	N [lbf.]	3 [0.674]	0 [0]	5 [1.124]	0 [0]	5 [1.124]	0 [0]	3 [0.674]	0 [0]		
Repeatability <sup>Note2</sup> (in the direction of X and Y)	P=0.5MPa	mm [in.]	±0.05 [0.002]								
Repeatable angle accuracy <sup>Note3</sup> (in the direction of θ)	P=0.5MPa	Degrees	±0.2 [0.008] (bidirectional repeatability)		±0.1 [0.004] (bidirectional repeatability)						
Withstand load <sup>Note5</sup>	Pushing direction	N [lbf.]	1580 [355]		2840 [638]		5150 [1158]		6670 [1499]		
	Pulling direction	N [lbf.]	840 [188.8]		1480 [333]		2980 [670]		4880 [1097]		

Note 1: Centripetal force: Indicates the force, with no load and no air pressure applied, that maintains the center position via the restraining ring.

Note 2: Repeatability: The maximum deviation of the position at which the plate, with no load and no air pressure applied, stops when air has been applied after moving it in any direction. For details, see page ⑦.

Note 3: Repeatable angle accuracy: bidirectional repeatability

The maximum deviation of the angle at which the plate, with no load and no air pressure applied, stops when air has been applied after rotating laterally. For details, see page ⑦.

Note 4: The center position when air pressure is applied to the plate and the center position when air pressure is not applied may be misaligned.

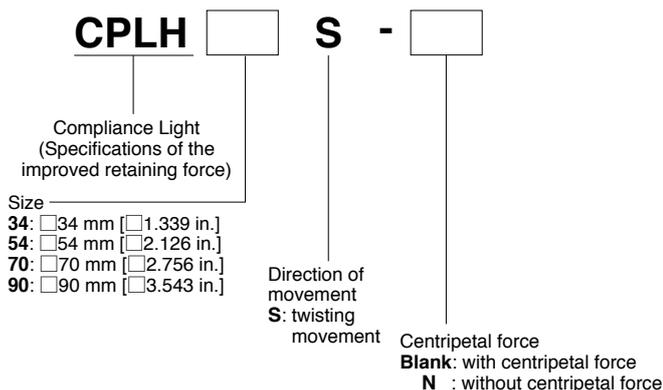
Note 5: When press fitting, use a load of 1/10 or less of the value for the allowable load. For details, see page ⑦.

Note 6: Mount the product so that the center of gravity of the mounted load falls within the plate's external diameter, and do not operate with an overhanging load.

Note 7: For the Handling Instructions and Precautions, see page ⑦.

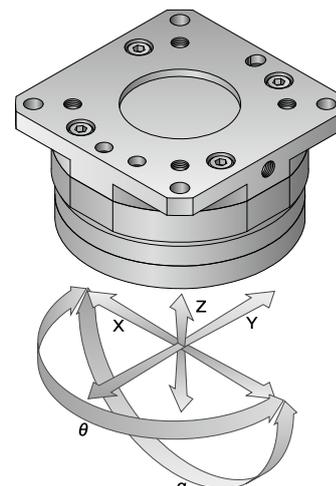
### Order Codes

#### • Specifications of the improved retaining force, swing type

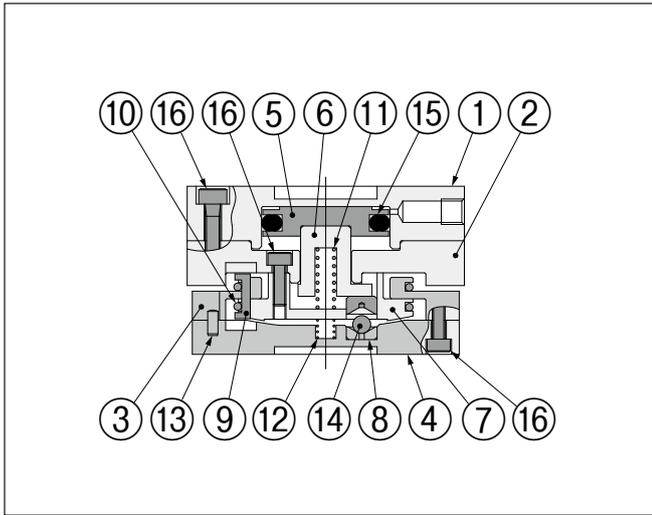


### Direction of movement

#### • X, Y, Z, θ, and α axes



## Inner construction



## Major parts and materials

No.	Model Name	CPLH34S	CPLH54S	CPLH70S	CPLH90S
①	Unit	Aluminum alloy (electroless nickel plated)			
②	Unit connection	Aluminum alloy (electroless nickel plated)			
③	Frame	Aluminum alloy (electroless nickel plated)			
④	Plate	Aluminum alloy (electroless nickel plated)			
⑤	Piston	Aluminum alloy (anodized)			
⑥	Lock piston	Steel (electroless nickel plated)			
⑦	Disk	Aluminum alloy (special anti-abrasion treated)			
⑧	Spacer	Stainless steel (heat-treated)			
⑨	Alignment pin	Stainless steel (heat-treated)			
⑩	Restraining ring	Stainless steel			
⑪	Spring	Piano wire			
⑫	Spring	Piano wire			
⑬	Parallel pin	Stainless steel			
⑭	Steel ball	Steel			
⑮	Seal	Synthetic rubber (NBR)			
⑯	Bolt	Stainless steel			

## Graph (reference values)

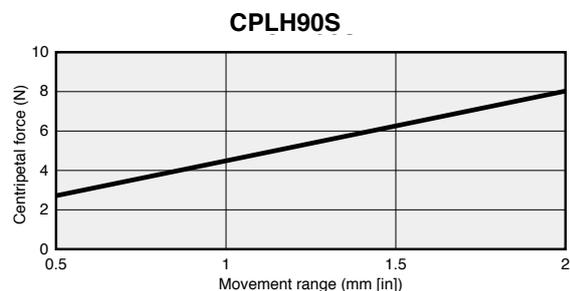
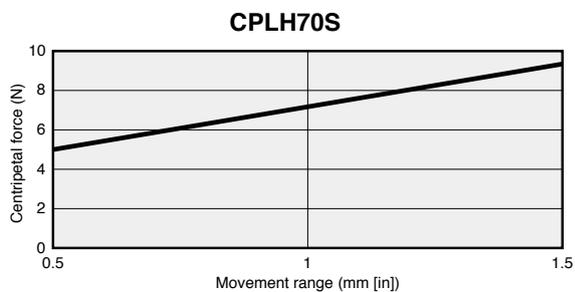
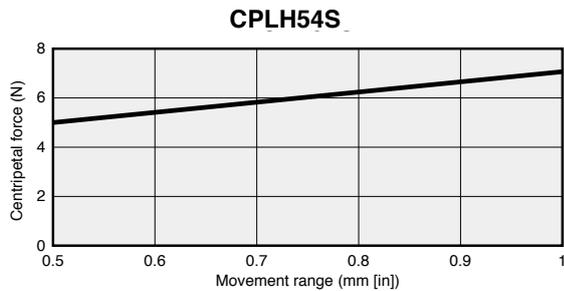
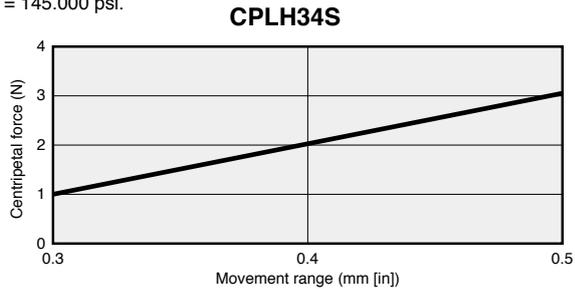
### • Centripetal force

\* Centripetal force: Force that maintains the center position via the restraining ring in a condition in which no load and no air pressure is applied.

1N = 0.225 lbf.

1mm = 0.039 in.

1 MPa = 145.000 psi.

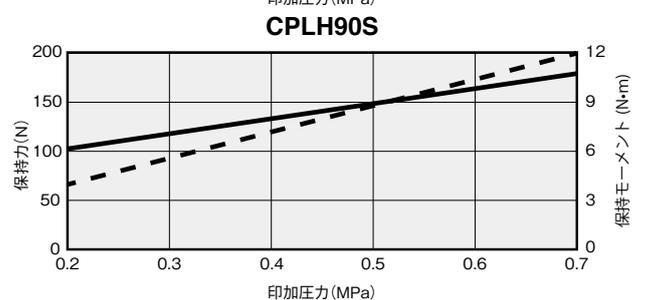
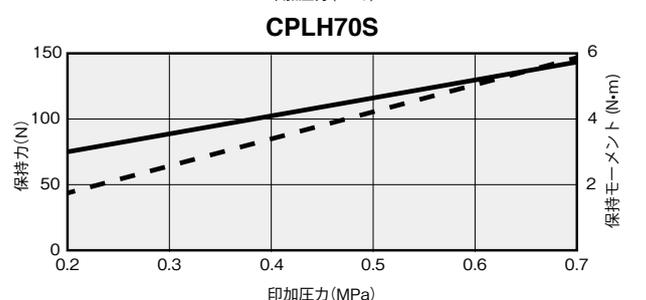
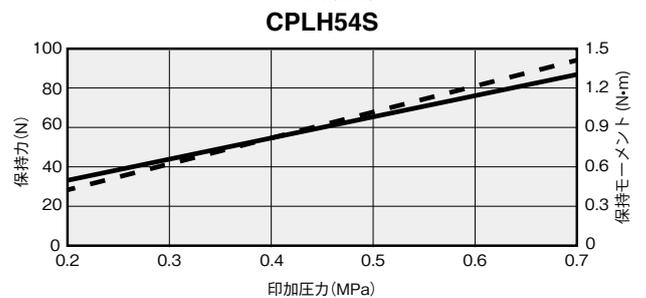
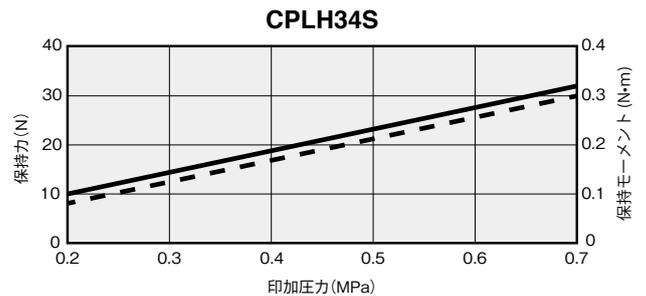


### • Retaining force, Retaining moment

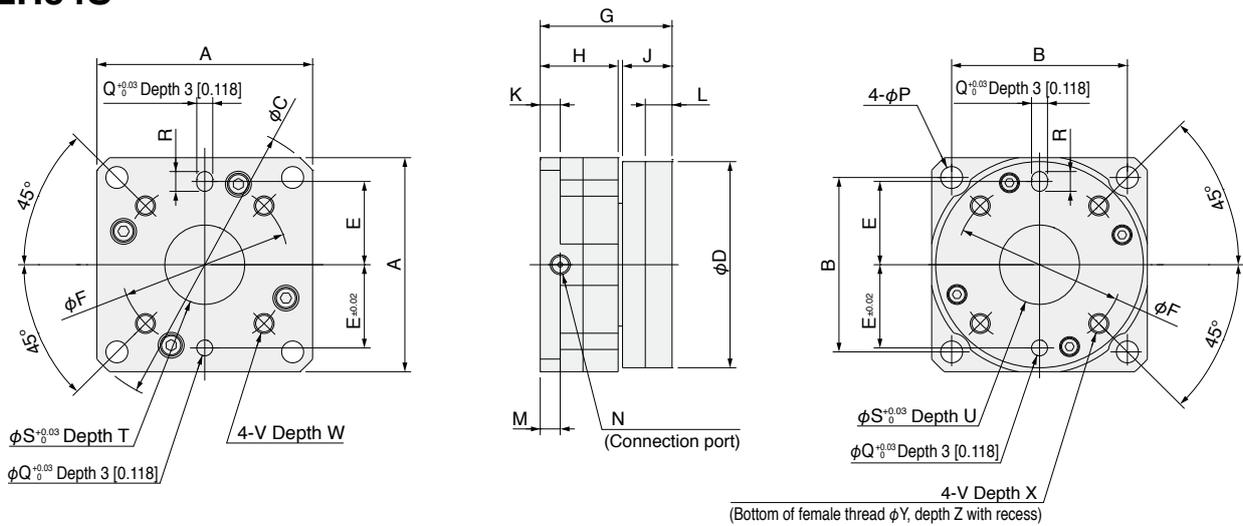
— Retaining force  
- - - Retaining moment

\* Retaining force: Force that maintains the center position of the X and Y directions when air pressure is applied

\* Retaining moment: Force that maintains the center position of the  $\theta$  direction when air pressure is applied



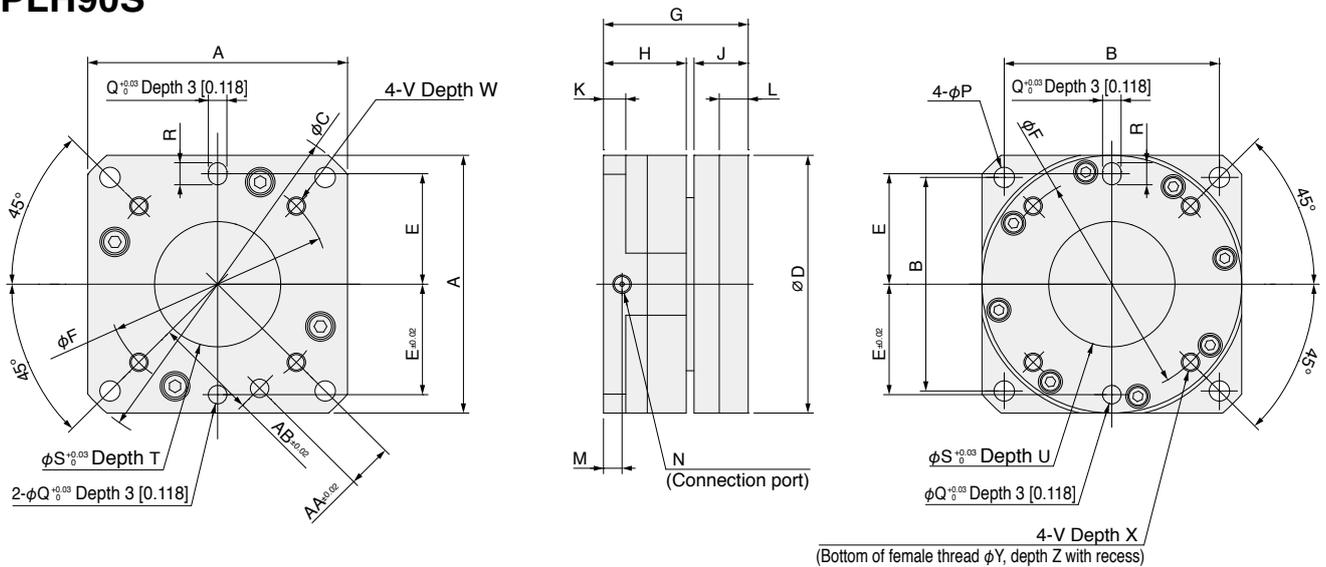
# CPLH34S CPLH54S



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CPLH34S		34 [1.339]	28 [1.102]	46 [1.811]	32 [1.260]	13 [0.512]	26 [1.024]	26 [1.024]	15.9 [0.626]	9.2 [0.399]	4 [0.157]	4.8 [0.189]	4.8 [0.189]	M3×0.5 [0.020]	3.4 [0.134]	3 [0.118]	4 [0.157]
CPLH54S		54 [2.126]	44 [1.732]	72 [2.835]	52 [2.047]	21 [0.827]	42 [1.654]	33 [1.299]	19.5 [0.768]	12.4 [0.488]	5 [0.197]	6.7 [0.264]	5 [0.197]	M5×0.8 [0.031]	5.5 [0.217]	4 [0.157]	5 [0.197]

Model	Code	S	T	U	V	W	X	Y	Z
CPLH34S		12 [0.472]	2 [0.079]	1.5 [0.059]	M3×0.5 [0.020]	6 [0.236]	4.8 [0.189]	4 [0.157]	1 [0.039]
CPLH54S		20 [0.787]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	10 [0.394]	6.7 [0.264]	6 [0.236]	1.5 [0.059]

# CPLH70S CPLH90S



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CPLH70S		70 [2.756]	58 [2.283]	92 [3.622]	70 [2.756]	30 [1.181]	60 [2.362]	39 [1.535]	22.3 [0.878]	14.6 [0.575]	6 [0.236]	7.8 [0.307]	5 [0.197]	M5×0.8 [0.031]	5.5 [0.217]	5 [0.197]	6 [0.236]
CPLH90S		90 [3.543]	74 [2.913]	116 [4.600]	90 [3.543]	40 [1.575]	80 [3.150]	45 [1.772]	25.8 [1.016]	17 [0.669]	6 [0.236]	9.5 [0.374]	5.5 [0.217]	M5×0.8 [0.031]	6.6 [0.260]	6 [0.236]	7 [0.276]

Model	Code	S	T	U	V	W	X	Y	Z	AA	AB
CPLH70S		34 [1.339]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	11 [0.433]	7.8 [0.307]	7 [0.276]	1.5 [0.059]	12 [0.472]	28 [1.102]
CPLH90S		50 [1.969]	2.5 [0.098]	1.5 [0.059]	M6×1 [0.039]	14 [0.551]	9.5 [0.374]	7 [0.276]	2 [0.079]	12 [0.472]	38 [1.496]

# Compliance Light

## Clean system specifications Swing type



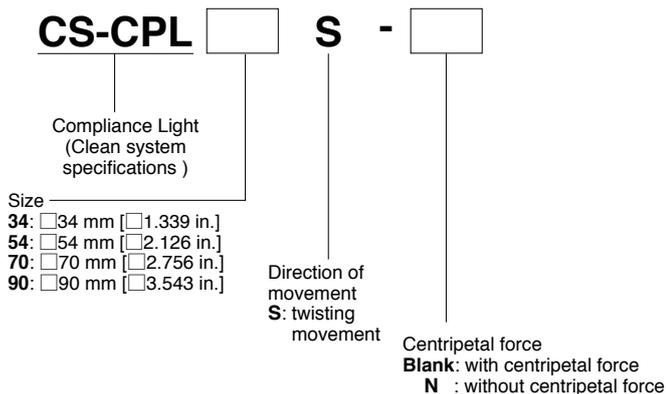
### Specifications

Item	Basic type	Single acting type								
		CS-CPL34S	CS-CPL34S-N	CS-CPL54S	CS-CPL54S-N	CS-CPL70S	CS-CPL70S-N	CS-CPL90S	CS-CPL90S-N	
Bore size	mm [in.]	6 [0.236]		10 [0.394]		16 [0.630]		20 [0.787]		
Dimensions	mm [in.]	□34 [□1.339]		□54 [□2.126]		□70 [□2.756]		□90 [□3.543]		
Height	mm [in.]	19 [0.748]		24 [0.945]		28 [1.102]		32 [1.260]		
Mass	g [oz.]	43 [1.517]		136 [4.8]		260 [9.2]		490 [17.3]		
Operating type		Single acting type								
Media		Air								
Operating pressure range	MPa [psi.]	0.2 to 0.7 [29.000 to 101.500]								
Proof pressure	MPa [psi.]	1.05 [152.250]								
Operating temperature range	°C [°F]	0 to 60 [0 to 140.000]								
Diameter of connection port	mm [in.]	M3×0.5 [0.020]				M5×0.8 [0.031]				
Lubrication	Cylinder part	No								
	Sliding part	No								
Maximum load capacity	kg [lb.]	1 [2.205]		2 [4.410]		4 [8.820]		6 [13.230]		
Movement range	X - Y	mm [in.]	±0.5 [0.020]		±1 [0.039]		±1.5 [0.059]		±2 [0.079]	
	Z	mm [in.]	-0.5 [-0.020]		-0.5 [-0.02]		-0.7 [-0.028]		-1.0 [-0.039]	
	θ (twisting)	°	±3				±4			
	α (inclination)	Swing angle Incline angle	°	±0.5				±1		
°			±1.4				±0.7			
Centripetal force (when movement is 0.5 mm) <sup>Note1</sup>	N [lbf.]	3 [0.674]	0 [0]	5 [1.124]	0 [0]	5 [1.124]	0 [0]	3 [0.674]	0 [0]	
Repeatability <sup>Note2</sup> (in the direction of X and Y)	P=0.5MPa	mm [in.]	±0.05 [0.002]							
Repeatable angle accuracy <sup>Note3</sup> (in the direction of θ)	P=0.5MPa	Degrees	±0.3 [0.012] (bidirectional repeatability)		±0.2 [0.008] (bidirectional repeatability)					
Withstand load <sup>Note5</sup>	Pushing direction	N [lbf.]	1580 [355]		2840 [638]		5150 [1158]		6670 [1499]	
	Pulling direction	N [lbf.]	840 [188.8]		1480 [333]		2980 [670]		4880 [1097]	
Dust collection port	mm [in.]	M3×0.5 [0.020]				M5×0.8 [0.031]				
Cleanliness		Class 5 equivalent (When vacuum sucked via the dust collection port. Based on Koganei standards.)								

- Note 1: Centripetal force: Indicates the force, with no load and no air pressure applied, that maintains the center position via the restraining ring.
- Note 2: Repeatability: The maximum deviation of the position at which the plate, with no load and no air pressure applied, stops when air has been applied after moving it in any direction. For details, see page ⑦.
- Note 3: Repeatable angle accuracy: bidirectional repeatability  
The maximum deviation of the angle at which the plate, with no load and no air pressure applied, stops when air has been applied after rotating laterally. For details, see page ⑦.
- Note 4: The center position when air pressure is applied to the plate and the center position when air pressure is not applied may be misaligned.
- Note 5: When press fitting, use a load of 1/10 or less of the value for the allowable load. For details, see page ⑦.
- Note 6: Mount the product so that the center of gravity of the mounted load falls within the plate's external diameter, and do not operate with an overhanging load.
- Note 7: For the Handling Instructions and Precautions, see page ⑦.

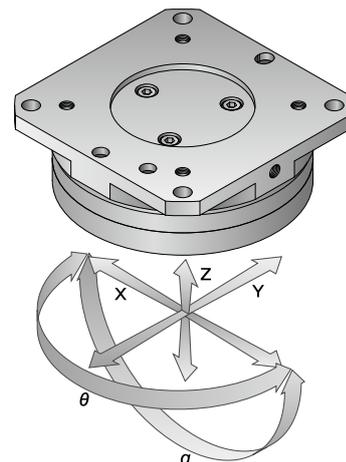
### Order Codes

- Clean system specifications, swing type

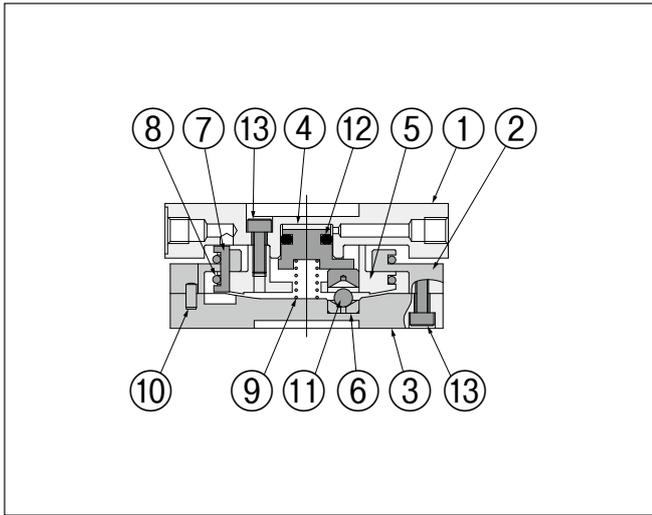


### Direction of movement

- X, Y, Z, θ, and α axes



## Inner construction



## Major parts and materials

No.	Model Name	Model			
		CS-CPL34S	CS-CPL54S	CS-CPL70S	CS-CPL90S
①	Unit	Aluminum alloy (electroless nickel plated)			
②	Frame	Aluminum alloy (electroless nickel plated)			
③	Plate	Aluminum alloy (electroless nickel plated)			
④	Piston	Aluminum alloy (anodized)			
⑤	Disk	Aluminum alloy (special anti-abrasion treated)			
⑥	Spacer	Stainless steel (heat-treated)			
⑦	Alignment pin	Stainless steel (heat-treated)			
⑧	Restraining ring	Stainless steel			
⑨	Spring	Stainless steel	Piano wire		
⑩	Parallel pin	Stainless steel			
⑪	Steel ball	Steel			
⑫	Seal	Synthetic rubber (NBR)			
⑬	Bolt	Stainless steel			

## Graph (reference values)

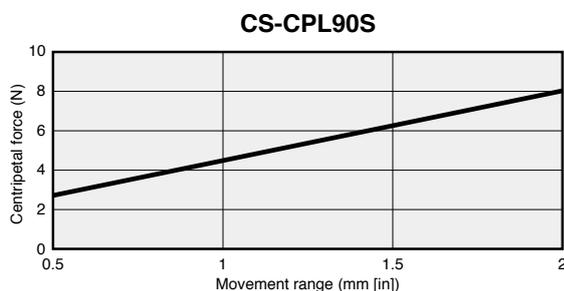
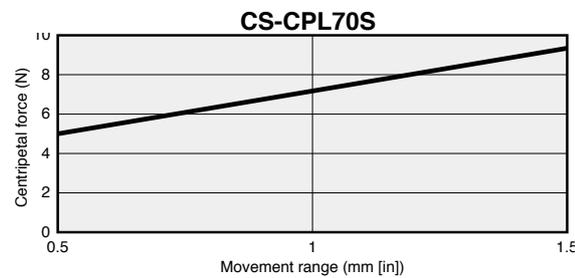
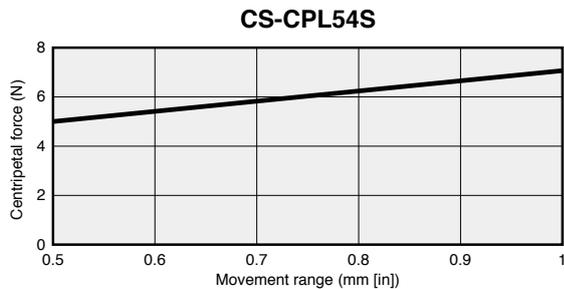
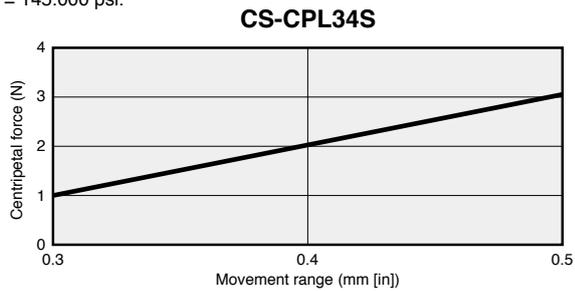
### • Centripetal force

\* Centripetal force: Force that maintains the center position via the restraining ring in a condition in which no load and no air pressure is applied.

1N = 0.225 lbf.

1mm = 0.039 in.

1 MPa = 145.000 psi.

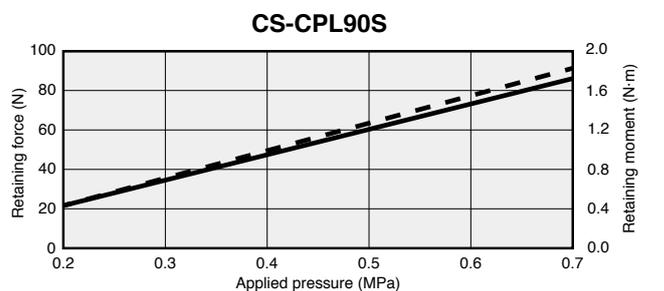
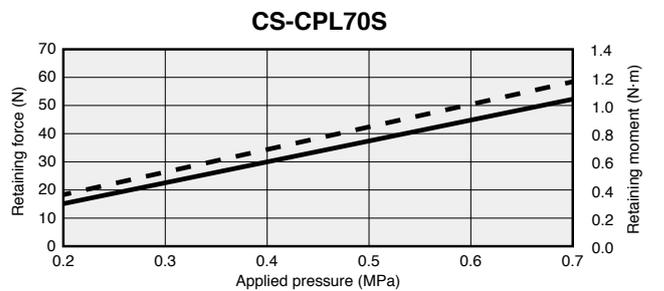
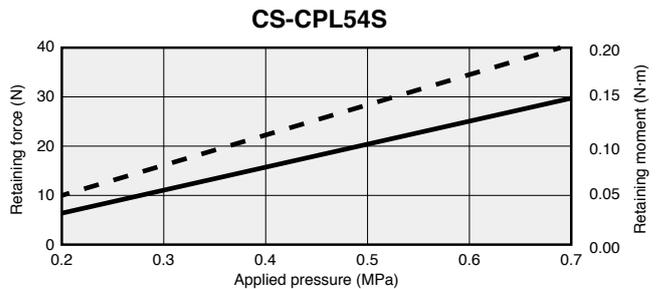
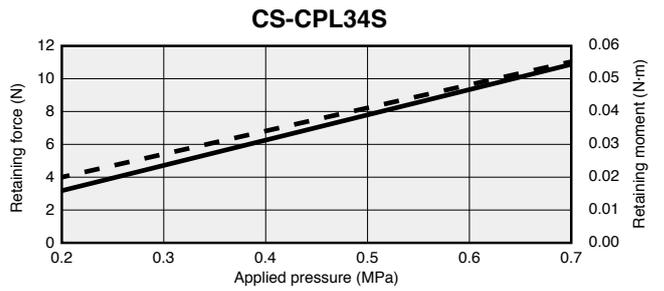


### • Retaining force, Retaining moment

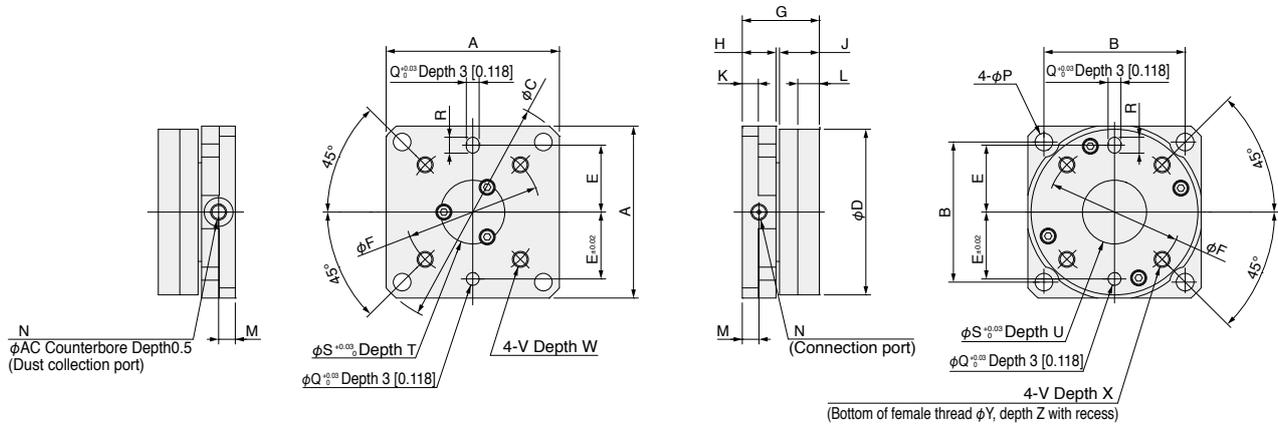
— Retaining force  
- - - Retaining moment

\* Retaining force: Force that maintains the center position of the X and Y directions when air pressure is applied

\* Retaining moment: Force that maintains the center position of the θ direction when air pressure is applied



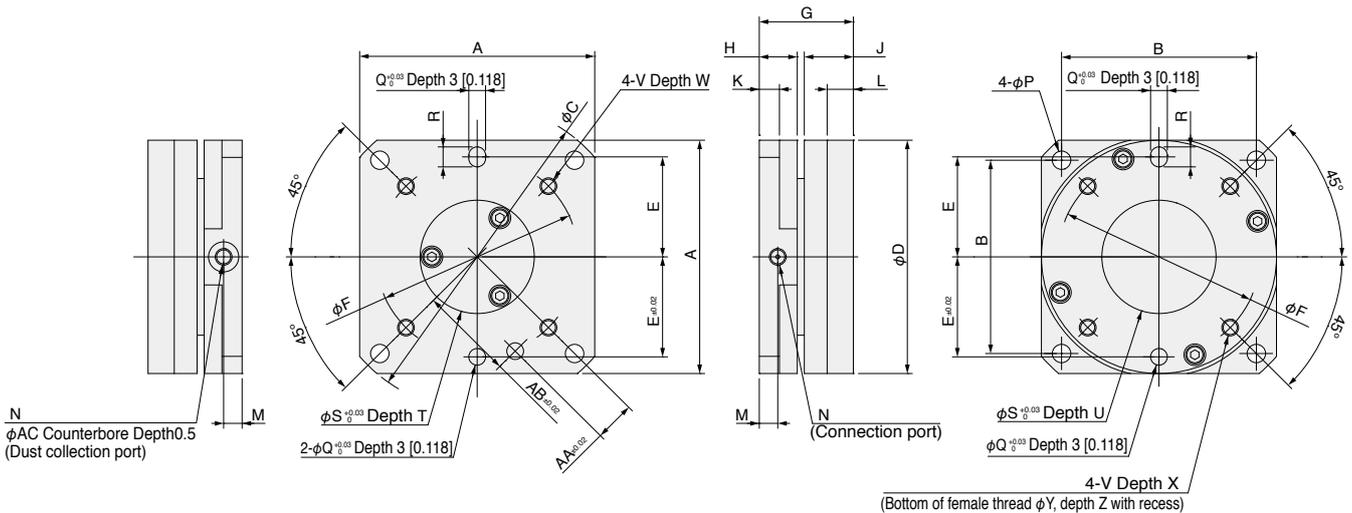
**CS-CPL34S**  
**CS-CPL54S**



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CS-CPL34S		34 [1.339]	28 [1.102]	46 [1.811]	32 [1.260]	13 [0.512]	26 [1.024]	19 [0.748]	8.9 [0.350]	9.2 [0.399]	4 [0.157]	4.8 [0.189]	4.9 [0.193]	M3×0.5 [0.020]	3.4 [0.134]	3 [0.118]	4 [0.157]
CS-CPL54S		54 [2.126]	44 [1.732]	72 [2.835]	52 [2.047]	21 [0.827]	42 [1.654]	24 [0.945]	10.5 [0.413]	12.4 [0.488]	5 [0.197]	6.7 [0.264]	5.2 [0.205]	M5×0.8 [0.031]	5.5 [0.217]	4 [0.157]	5 [0.197]

Model	Code	S	T	U	V	W	X	Y	Z	AC
CS-CPL34S		12 [0.472]	2 [0.079]	1.5 [0.059]	M3×0.5 [0.020]	6 [0.236]	4.8 [0.189]	4 [0.157]	1 [0.039]	6 [0.236]
CS-CPL54S		20 [0.787]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	7 [0.276]	6.7 [0.264]	6 [0.236]	1.5 [0.059]	9 [0.354]

**CS-CPL70S**  
**CS-CPL90S**



Model	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
CS-CPL70S		70 [2.756]	58 [2.283]	92 [3.622]	70 [2.756]	30 [1.181]	60 [2.362]	28 [1.110]	11.3 [0.445]	14.6 [0.575]	6 [0.236]	7.8 [0.307]	5.5 [0.217]	M5×0.8 [0.031]	5.5 [0.217]	5 [0.197]	6 [0.236]
CS-CPL90S		90 [3.543]	74 [2.913]	116 [4.600]	90 [3.543]	40 [1.575]	80 [3.150]	32 [1.260]	12.8 [0.504]	17 [0.669]	6 [0.236]	9.5 [0.374]	5.6 [0.220]	M5×0.8 [0.031]	6.6 [0.260]	6 [0.236]	7 [0.276]

Model	Code	S	T	U	V	W	X	Y	Z	AA	AB	AC
CS-CPL70S		34 [1.339]	2.5 [0.098]	1.5 [0.059]	M5×0.8 [0.031]	8 [0.315]	7.8 [0.307]	7 [0.276]	1.5 [0.059]	12 [0.472]	28 [1.102]	9 [0.354]
CS-CPL90S		50 [1.969]	2.5 [0.098]	1.5 [0.059]	M6×1 [0.039]	9 [0.354]	9.5 [0.374]	7 [0.276]	2 [0.079]	12 [0.472]	38 [1.496]	9 [0.354]

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# Limited Warranty

KOGANEI CORP. warrants its products to be free from defects in material and workmanship subject to the following provisions.

**Warranty Period** The warranty period is 180 days from the date of delivery.

**Koganei Responsibility** If a defect in material or workmanship is found during the warranty period, KOGANEI CORP. will replace any part proved defective under normal use free of charge and will provide the service necessary to replace such a part.

**Limitations**

- This warranty is in lieu of all other warranties, expressed or implied, and is limited to the original cost of the product and shall not include any transportation fee, the cost of installation or any liability for direct, indirect or consequential damage or delay resulting from the defects.

- KOGANEI CORP. shall in no way be liable or responsible for injuries or damage to persons or property arising out of the use or operation of the manufacturer's product.

- This warranty shall be void if the engineered safety devices are removed, made inoperative or not periodically checked for proper functioning.

- Any operation beyond the rated capacity, any improper use or application, or any improper installation of the product, or any substitution upon it with parts not furnished or approved by KOGANEI CORP., shall void this warranty.

- This warranty covers only such items supplied by KOGANEI CORP. The products of other manufacturers are covered only by such warranties made by those original manufacturers, even though such items may have been included as the components.

The specifications are subject to change without notice.

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