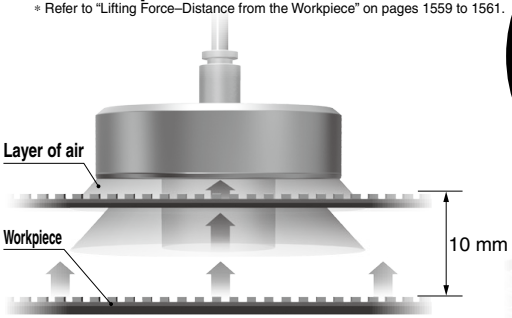
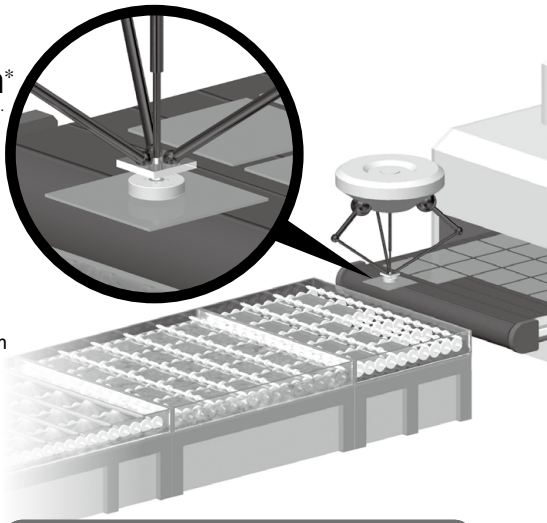
Non-contact Gripper

- **Assist in non-contact workpiece transfer.**
- **Max workpiece suction distance: 10 mm***

* Refer to "Lifting Force–Distance from the Workpiece" on pages 1559 to 1561.





Since there is a layer of air between the workpiece and gripper, non-contact suction is possible.

● Two types are available.

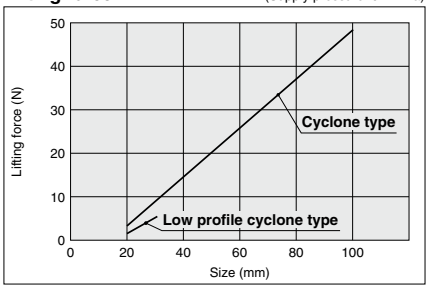
■ Cyclone Type

High lift

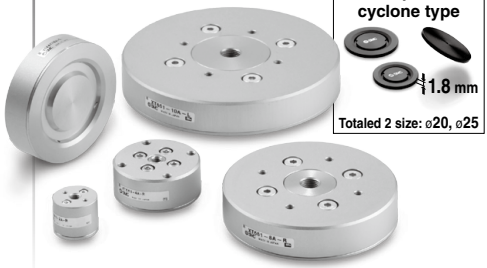
- **High lifting force: Max. 44 N***

* Outer body diameter: ø100

Lifting force (Supply pressure: 0.4 MPa)



- **Totaled 5 size: ø20/ø40/ø60/ø80/ø100**

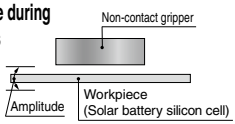


■ Bernoulli Type

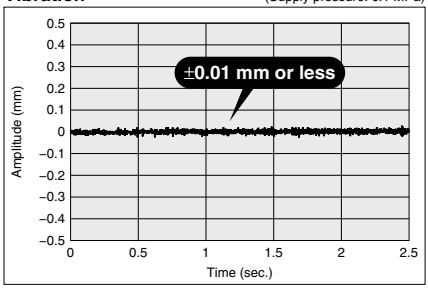
Vibration reducing

- **Amplitude of the workpiece during gripping: ±0.01 mm* or less**

* Solar battery silicon cell (□125 mm, t = 250 µm)
* In SMC conditions (How to calculate: Page 1551)



Vibration (Supply pressure: 0.1 MPa)

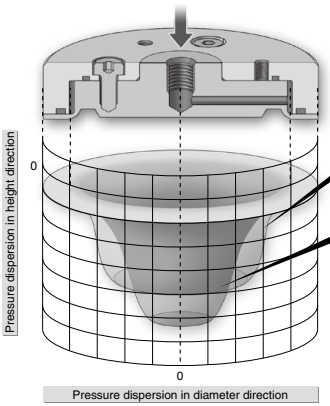


- **Totaled 6 size: ø40/ø60/ø80/ø100/ □120/□150**

Series XT661

■ Cyclone Type

High lift | Low air consumption | Body material: Al



Non-contact gripper
Large vacuum area, even pressure dispersion

Conventional SMC cyclone method
Small vacuum area, higher vacuum in the central part

Original groove-channel design allows cyclone effect with

large suction area and even pressure dispersion!

Outer body diameter (mm)	ø20	ø40	ø60	ø80	ø100
Air consumption [L/min (ANR)]	77	148	148	148	258
Lifting force (N)	4.3	14	21	26	44

Supply pressure: 0.4 MPa

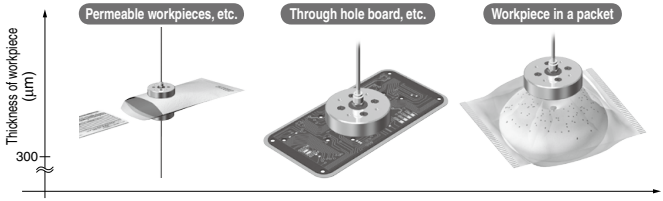
Working Principle

Air is discharged in the whirling direction.

● Cyclone Type

Air from the supply port is blown off from the nozzle on the concave suction surface side, creating a whirlwind flow. The whirlwind flow is discharged to the atmosphere from the gap between the non-contact gripper and the workpiece.
As a result, a vacuum zone is created inside the spiral flow due to the cyclone effect, enabling the workpiece to be lifted without physical contact. The action of the centrifugal force of the spiral flow allows a greater lifting force to be generated.

● Various workpiece suction methods are available.



● Grease-free

● Can be disassembled and cleaned the inside.

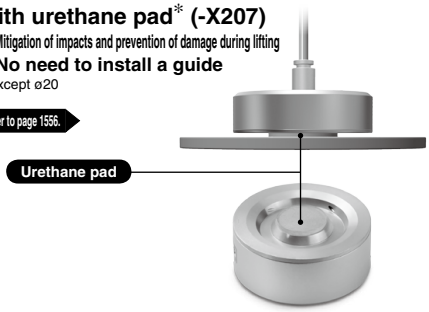
● Made to Order

With urethane pad* (-X207)

- Mitigation of impacts and prevention of damage during lifting
- No need to install a guide

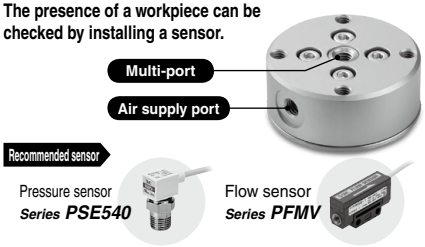
* Except ø20

Refer to page 1556.



With multi-port (-X211)

The presence of a workpiece can be checked by installing a sensor.



For the method of selecting and using a sensor, refer to the operation manual.

■ Low Profile Cyclone Type (-X260)

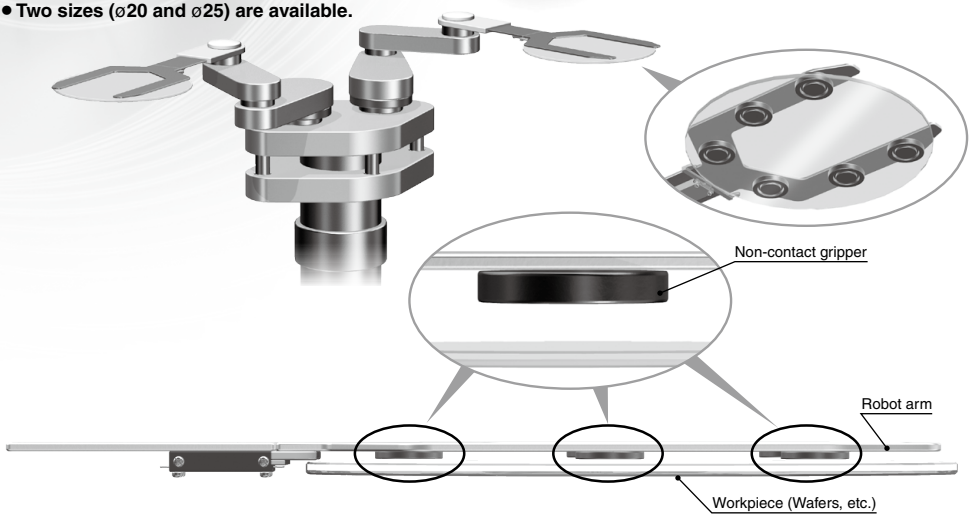
Low profile | Made to Order

Thickness: 1.8 mm
Weight: Approx. 1.3 g*
* Outer body diameter: ø20

Outer body diameter (mm)	ø20	ø25
Air consumption [L/min (ANR)]	31	31
Lifting force (N)	1.4	2

Supply pressure: 0.4 MPa

- **Can be mounted on the end of the robot arm.**
- **Two sizes (ø20 and ø25) are available.**



● Mounting

Apply adhesive to the surface on the air supply port side of the non-contact gripper, and mount the gripper on the equipment.
(Be careful that the adhesive does not obstruct the air supply port.)

■ Bernoulli Type

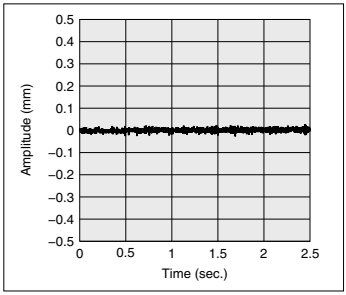
Vibration reducing type | Body material: Resin

Original groove-channel design allows the Bernoulli effect with

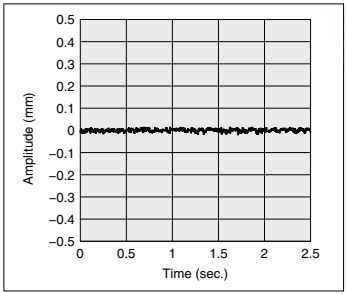
suppressing the amplitude of the workpiece during gripping!

● Reduced amplitude of the workpiece

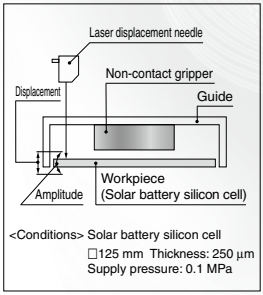
Size: □120



Size: ø100



How to calculate



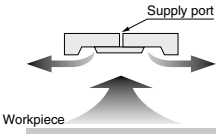
<Conditions> Solar battery silicon cell
□125 mm Thickness: 250 µm
Supply pressure: 0.1 MPa

Outer body diameter (mm)	ø40	ø60	ø80	ø100	□120	□150
Air consumption [L/min (ANR)]	98	98	98	156	291	291
Lifting force (N)	2.2	4.1	5.1	7.8	17	14

Supply pressure: 0.4 MPa

Working Principle

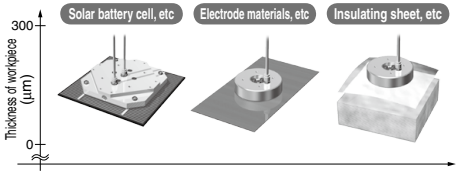
Air is discharged radially.



● Bernoulli Type

Air from the supply port is blown off radially from the nozzle on the convex suction surface side.
The radial flow is discharged to the atmosphere from the gap between the non-contact gripper and the workpiece, and the air between the non-contact gripper and the workpiece is pulled in the peripheral direction. As a result, a vacuum zone is generated in the center, enabling the workpiece to be lifted without physical contact.
Also, the original groove-channel design allows the air to be discharged radially, thus suppressing ripples caused by pulsations and whirlwind flow, and enabling the amplitude of the workpiece to be minimized.

● Various workpiece suction methods are available.



● Reduction of rotation load * No directionality of whirlwind air

● Standardization of multi-port* * Except ø40

● Grease-free

● Can be disassembled and cleaned the inside.

Related Products

General Air

Mist Separator → **AM** (Filtration degree: 0.3 μm)

Regulator → **AR** **ARM10**

2 Port Valve → **VXZ** **VQ20**

Oil-free Air

Membrane Air Dryer → **IDG**

Super Mist Separator → **AME** (Filtration degree: 0.01 μm)

Odor Removal Filter → **AMF** (Filtration degree: 0.01 μm)

Regulator → **AR-X2400** (Oil-free) **ARM10** (Oil-free)

2 Port Valve → **VXZ** (Other option/Oil-free) **VQ2-X2** (Oil-free)

Clean Air

Clean room production
Parts washed
Double packing/Shipping

For details, refer to the SMC website.
http://www.smcworld.com

Clean Regulator → **SRH**

2 Port Valve → **LVA**

Clean Air Filter → **SFD** **SF**

Clean Air Module → **LLB** **Modularizes the flow switch, regulator, pressure switch, 2 port valve and filter.** (Filtration degree: 0.01 μm)

Series XT661
Model Selection

Selection Procedure

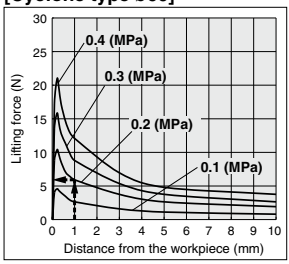
1 Check the workpiece and operating conditions.

1) Check the kind of workpiece and also its size and weight.
2) Check the guide corresponding to the transfer method of the workpiece and "Selection" (Page 1555).
   At the same time, check the distance between the workpiece to be set and the non-contact gripper.
3) Check the supply pressure applied to the non-contact gripper.

2 Check the lifting force.

1) Clarify the lifting force corresponding to the distance between the workpiece and the non-contact gripper for each supply pressure.

[Cyclone type ø60]



<How to read the graph>

Example: For the case of "Cyclone type ø**60**," a supply pressure of **0.2 MPa**, a workpiece mass of **50 g (0.49 N)**, and a **1 mm** distance between the workpiece and the non-contact gripper

<Checking procedure>

From the "Cyclone type ø**60**" graph, check the lifting force from the intersection of a **1 mm** distance between the workpiece and non-contact gripper and a supply pressure of **0.2 MPa**. Then, extend a horizontal line from this point to the vertical axis to obtain the lifting force.

2) Multiply the final lifting force by a safety factor and decide the temporary lifting force. Obtain the temporary lifting force by using the following equation. (Note: The temporary lifting force is the lifting force that has been set after taking into account the safety factor used for selecting a non-contact gripper.)

$$F = f \times (1/t)$$ **F: Temporary lifting force (N) f: Lifting force (N) t: Safety factor ··· 2 or more**

3) Compare the final lifting force and workpiece mass, and determine the size and number of non-contact grippers such that **the temporary lifting force** ≥ **workpiece mass**.

<Checking procedure>

If **the temporary lifting force** ≥ **workpiece mass**, the gripper can be used under these conditions.

If **the temporary lifting force** < **workpiece mass**, either increase the size of the non-contact gripper, or increase the number of grippers to be used.

Obtain the required number of grippers from the following equation.

$$N = (9.8 \times W/1000)/(1/F) \cdots$$ Rounding up to the nearest higher integer **N: Q'ty (pcs.) W: Workpiece mass (g) F: Temporary lifting force (N) 9.8: Gravitational acceleration (m/s^2)**

3 Determine the layout of the non-contact grippers.

<Checking procedure>

Determine the positions of the non-contact grippers according to the number of grippers to be used, taking into account the balance of the workpiece.

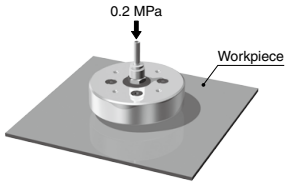
If the balance of the workpiece is poor during lifting, either increase the size of the non-contact gripper, or increase the number of grippers to be used.

* The above shows selection procedures for general non-contact grippers; thus, they will not be applicable for all grippers. Customers are required to conduct a test on their own and to select the size of the non-contact grippers and the non-contact grippers to be used based on the test results.

Selection Examples of Non-contact Gripper

Selection example 1 For small workpiece

- **Workpiece size: □100 x Plate thickness 3 mm**
- **Workpiece mass: 300 g**
- **Distance from the workpiece: 1 mm**
- **Supply pressure: 0.2 MPa**



(1) Check the workpiece and operating conditions.

1) Workpiece size: **□100 x Plate thickness 3 mm**
   Workpiece mass: **300 g**
2) Guide: On the top of the workpiece by means of an external stopper
   Distance from the workpiece: **1 mm**
3) Supply pressure: **0.2 MPa**

(2) Check the lifting force.

1) From the graph (lifting force–distance from the workpiece), check the lifting force at a supply pressure of **0.2 MPa** and a **1 mm** distance between the workpiece and the non-contact gripper for each size.

   XT661-2A: 0.8 N XT661-4A: 3.8 N XT661-6A: 5.9 N
   XT661-8A: 7.5 N XT661-10A: 14.4 N

2) Calculate the temporary lifting force using a safety factor of **2**.

   XT661-2A: F = f x (1/t) = 0.8 x (1/2) = 0.4 N
   XT661-4A: F = f x (1/t) = 3.8 x (1/2) = 0.9 N
   XT661-6A: F = f x (1/t) = 5.9 x (1/2) = 2.95 N
   XT661-8A: F = f x (1/t) = 7.5 x (1/2) = 3.75 N
   XT661-10A: F = f x (1/t) = 14.4 x (1/2) = 7.2 N

3) Confirm the relationship "temporary lifting force ≥ workpiece mass".
   Convert the workpiece mass (g) into a force (N).

   300 g → 300 x 9.8/1000 = 2.94 N

   For a workpiece mass of **300 g (2.94 N)**

   XT661-8A: Temporary lifting force 3.75 N ≥ Workpiece mass 300 g (2.94 N)
   XT661-10A: Temporary lifting force 7.2 N ≥ Workpiece mass 300 g (2.94 N)

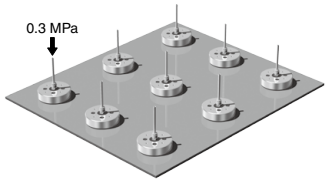
In this case, the relationship "temporary lifting force ≥ workpiece mass" is obtained.
For this workpiece, select the **XT661-8A**.
The number of grippers to be used is **one**.

(3) Determine the layout of the non-contact grippers.

1) Install the grippers at the center of gravity (center) of the workpiece, and confirm that there is no problem with the balance of the workpiece during lifting.

Selection example 2 For large workpiece

- **Workpiece size: 2200 x 2500 x 0.7 mm**
- **Workpiece mass: 9.7 kg**
- **Distance from the workpiece: 0.8 mm**
- **Supply pressure: 0.3 MPa**



(1) Check the workpiece and operating conditions.

1) Workpiece size: **2200 x 2500 x 0.7 mm**
   Workpiece mass: **9700 g**
2) Guide: On the end of the workpiece
   Distance from the workpiece: **0.8 mm**
3) Supply pressure: **0.3 MPa**

(2) Check the lifting force.

1) From the graph (lifting force–distance from the workpiece), check the lifting force at a supply pressure of **0.3 MPa** and a **0.8 mm** distance between the workpiece and the non-contact gripper for each size.

   XT661-10A: 22.4 N

2) Calculate the temporary lifting force using a safety factor of **2**.

   XT661-10A: F = f x (1/t) = 22.4 x (1/2) = 11.2 N

3) Confirm the relationship "temporary lifting force ≥ workpiece mass".
   Convert the workpiece mass (g) into a force (N).

   9700 g → 9700 x 9.8/1000 = 95.06 N

   XT661-10A: Temporary lifting force 11.2 N < Workpiece mass 9700 g (95.06 N)

In this case, the relationship "temporarily lifting force ≥ workpiece mass" is not obtained, so multiple grippers must be used. Obtain the number of grippers to be used from the following equation.

N = (9.8 x W/1000)/(1/F) = (9.8 x 9700/1000)/(1/11.2) = 9
⋯ Rounding up to the nearest higher integer

For this workpiece, select the **XT661-10A**.
The number of grippers to be used is **nine**.

(3) Determine the layout of the non-contact grippers.

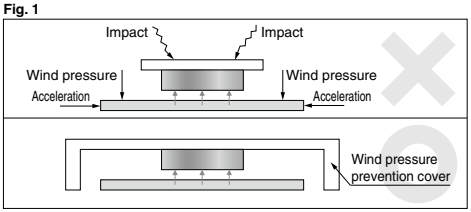
1) Adequately take into account the center of gravity and deflection of the workpiece, and then install nine non-contact grippers for a well-balanced hold.
   (∗ If a deflection occurs, the lifting force will decrease.)

Selection

Acceleration/Wind pressure/Impact

When transferring the workpiece, take into account not only the workpiece mass, but also acceleration, wind pressure and impact as well. (Refer to Fig. 1.) Particular care must be taken in the case of a flat plate that has a large area. It is necessary to adopt measures such as the installation of a wind pressure prevention cover. Also, even if the relationship **temporary lifting force ≥ workpiece mass** is adequate, select a larger size that provides a degree of margin. The stability of the lift with respect to acceleration, wind pressure and impact generally increases in proportional to the diameter.

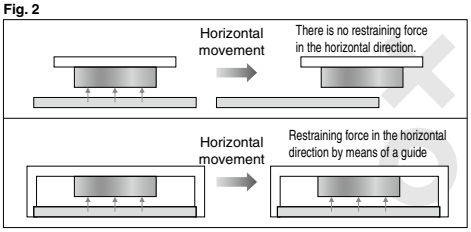
Fig. 1



Horizontal force

A non-contact gripper does not produce a restraining force that prevents horizontal movement of the workpiece. It is necessary to install a guide at the end of the workpiece. (Refer to Fig. 2.)

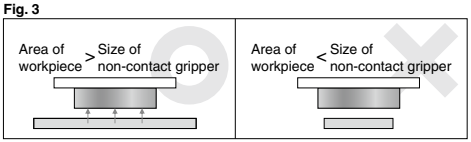
Fig. 2



Size of the non-contact gripper and workpiece

Use a non-contact gripper that has an area of less than that of the workpiece. If the area of the gripper is greater than that of the workpiece, a vacuum zone will not occur, so a lifting force will not be generated. (Refer to Fig. 3.)

Fig. 3



Balance of the workpiece

Install the non-contact gripper at a position such that a moment is not created from the workpiece. (Refer to Fig. 4.) Also, when lifting a flat plate that has a large area with multiple non-contact grippers, install the grippers in such a way that they are well balanced with respect to the workpiece mass. (Refer to Fig. 5.)

Fig. 4

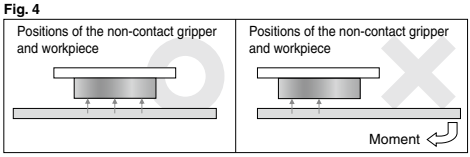
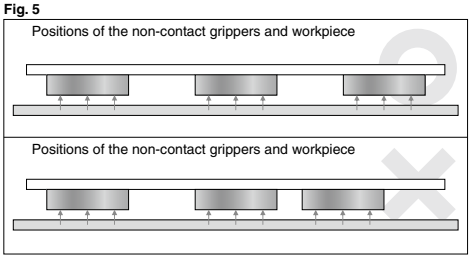


Fig. 5



Mounting orientation

The basic mounting direction of the gripper is horizontal. If the gripper is mounted obliquely or vertically, it must also install a guide and use an adequate safety factor (2 or more).

Precautions for Each Kind of Workpiece

Workpiece with holes

Depending on the size and distribution of the hole, it may be impossible to lift the workpiece. To ensure that the workpiece is lifted, the total area of the holes versus the suction area (aperture ratio) must be **1% or less**. However, the lifting force will be reduced, so it is necessary to use an appropriate supply pressure and an adequate safety factor.

Workpiece that has concave/convex surfaces

Depending on the size of the concave/convex surfaces, it may be impossible to lift the workpiece. It is necessary to use an appropriate supply pressure and an adequate safety factor according to the workpiece mass.

Thin workpiece

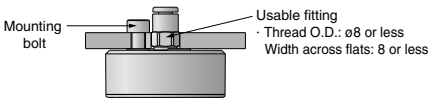
If the supply pressure is higher than the necessary value, the workpiece may be deformed or damaged due to the lifting force. There is also a possibility of the workpiece vibrating. To prevent this, do not set the supply pressure higher than necessary.

Soft workpiece

As soft workpieces are easy to deform, there is a tendency for the workpiece to touch the bottom of the non-contact gripper. Please be aware that the workpiece may touch the gripper before using.

Other Precautions

Regarding the **XT661-2A**, there is a limit to the size of the fitting for the supply port that can be used. Use a fitting whose connection thread O.D. is ø8 or less and whose width across flats is 8 or less. If greater sizes than these are used, the fitting may interfere with the head of the mounting bolt.



When using a non-contact gripper, install a guide as well.

Provide a guide in accordance with the applications and/or configuration of a workpiece with reference to the following installation examples.

Reasons for installing a guide

■Holding a workpiece

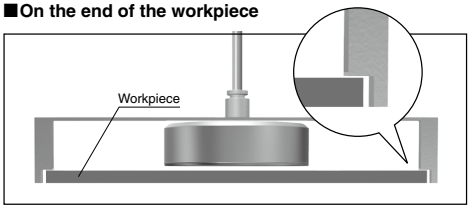
A non-contact gripper does not produce a restraining force that prevents horizontal movement of the workpiece.
Install a guide at the end of the workpiece in order to hold the workpiece.

■Preventing physical contact

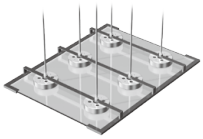
Depending on the operating conditions, the workpiece may touch the gripper. To prevent such contact, install a guide that maintains a certain distance between the gripper and the workpiece.

Installation examples

■On the end of the workpiece

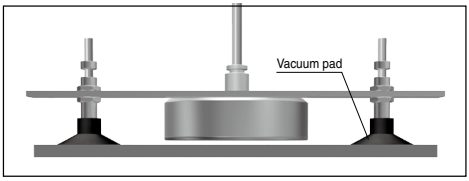


By installing a guide at the end of the workpiece, the contact area can be kept as small as possible.

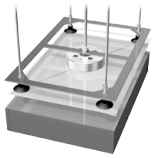


When using multiple non-contact grippers

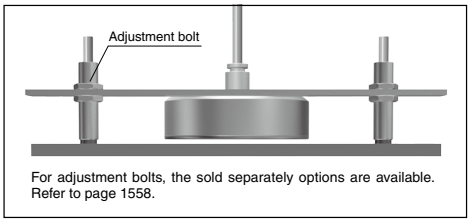
■On the top of the workpiece (Use in combination with vacuum pads.)



Determine the position of the workpiece using vacuum pads. When transferring the workpiece, use a gripper as well.
This ensures contact with the workpiece to be minimized during transferring.



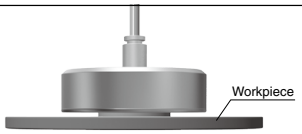
■On the top of the workpiece (External stopper)



For adjustment bolts, the sold separately options are available.
Refer to page 1558.

The adjustment bolts make the distance between the non-contact gripper and workpiece adjustable.
The guide comes with a bumper to ensure the impact to be minimized and also prevent a damage during lifting the workpiece.

■With urethane pad



Note) When using a guide with a urethane pad, refer to the lifting force–distance from the workpiece on page 1559. Then as a guide, set the lifting force corresponding to the distance of 1.0 mm between the non-contact gripper and workpiece.

Use the gripper in a contacted condition by means of a urethane pad. This will eliminate the need for a guide.

Non-contact Gripper
Series XT661

How to Order

Cyclone type

XT661 – 2A – R

Outer body diameter: ø

2A	20 mm
4A	40 mm
6A	60 mm
8A	80 mm
10A	100 mm

Direction of whirling air

R	Clockwise
L	Counterclockwise

Low profile cyclone type

XT661 – 2A – R – X260

Outer body diameter: ø

2A	20 mm
3A	25 mm

Direction of whirling air

R	Clockwise
L	Counterclockwise

Bernoulli type

XT661 – 4C – X321

Outer body diameter: ø

4C	39 mm
6C	59 mm
8C	79 mm
10C	99 mm

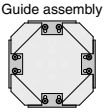
Bernoulli type

XT661 – 120E – X322 □

Body size: □

120E	120 mm
150E	150 mm

Accessory

Nil	A	B
None	Guide assembly 	Adjustment bolt assembly 

Specifications

	2A	4A	6A	8A	10A
Outer body diameter (mm)	ø20	ø40	ø60	ø80	ø100
Piping port size	M5 x 0.8			Rc 1/8	
Fluid	Air*				
Operating pressure	0.01 to 0.5 MPa				
Proof pressure	0.75 MPa				
Ambient and operating temperature	–5 to 60°C (no freezing)				
Grease	Grease-free				
Body material	A2017				
Weight (g)	12.5	49	114	206	310

* Air purification rating: JIS B 8392-1 (ISO8573-1) Quality Degree 4, 4, 2 or more

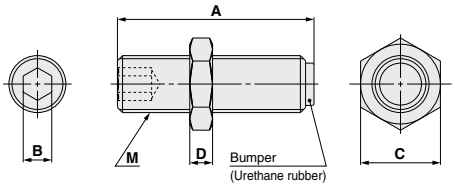
	2A	3A
Outer body diameter (mm)	ø20	ø25
Piping port size	ø1.6	
Fluid	Air*	
Operating pressure	0.01 to 0.5 MPa	
Proof pressure	0.75 MPa	
Ambient and operating temperature	–5 to 40°C (no freezing)	
Grease	Grease-free	
Body material	A2017	
Weight (g)	1.33	2.13

* Use adhesive to mount the gripper.
* Air purification rating: JIS B 8392-1 (ISO8573-1) Quality Degree 4, 4, 2 or more

	4C	6C	8C	10C	120E	150E
Outer body diameter (mm)	ø39	ø59	ø79	ø99	□120	□150
Piping port size	M5 x 0.8			Rc 1/8		
Fluid	Air*					
Operating pressure	0.01 to 0.4 MPa					
Proof pressure	0.6 MPa					
Ambient and operating temperature	–5 to 40°C (no freezing)					
Grease	Grease-free					
Body material	PBT					
Weight (g)	26	55	108	170	260	410

* Air purification rating: JIS B 8392-1 (ISO8573-1) Quality Degree 4, 4, 2 or more

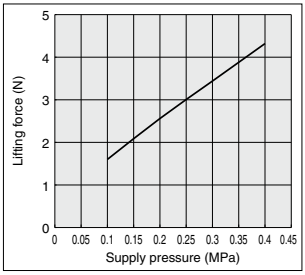
Sold Separately Options: External Stopper (Order Separately)



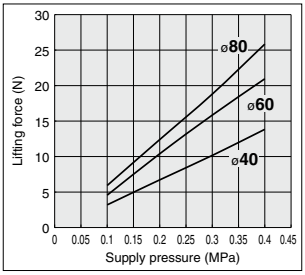
Model	Adjustment range (mm)	A	B	C	D	M
MXQ-A627	5	16.5	2.5	7	3	M5 x 0.8
MXQ-A627-X11	15	26.5				
MXQ-A827	5	16.5	3	8	3.5	M6 x 1
MXQ-A827-X11	15	26.5				
MXQ-A827-X12	25	36.5				
MXQ-A1227	5	20	4	12	4	M8 x 1
MXQ-A1227-X11	15	30				
MXQ-A1227-X12	25	40				
MXQ-A1627	5	24.5	5	14	4	M10 x 1
MXQ-A1627-X11	15	34.5				
MXQ-A1627-X12	25	44.5				
MXQ-A2027	5	27.5	6	17	5	M12 x 1.25
MXQ-A2027-X11	15	37.5				
MXQ-A2027-X12	25	47.5				
MXQ-A2527	5	32.5	6	19	6	M14 x 1.5
MXQ-A2527-X11	15	42.5				
MXQ-A2527-X12	25	52.5				

Lifting Force [Cyclone Type]

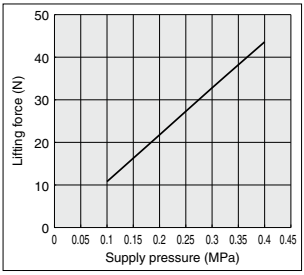
Size: ø20



Size: ø40/ø60/ø80

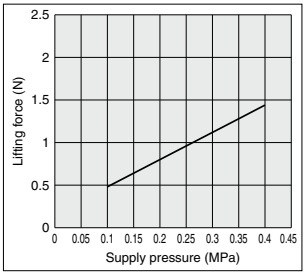


Size: ø100

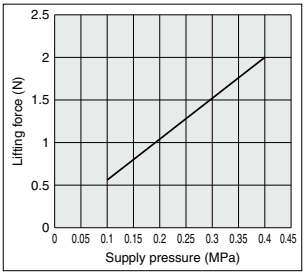


Lifting Force [Low Profile Cyclone Type]

Size: ø20

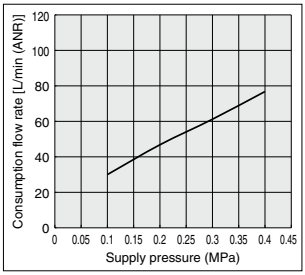


Size: ø25

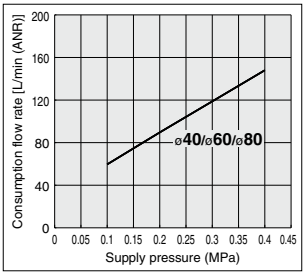


Air Consumption [Cyclone Type]

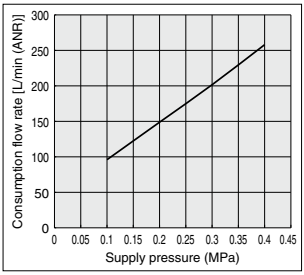
Size: ø20



Size: ø40/ø60/ø80

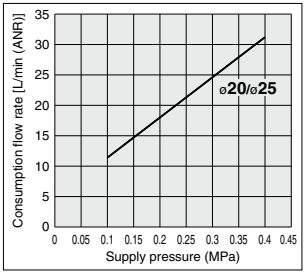


Size: ø100



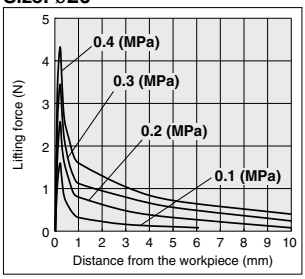
Air Consumption [Low Profile Cyclone Type]

Size: ø20/ø25

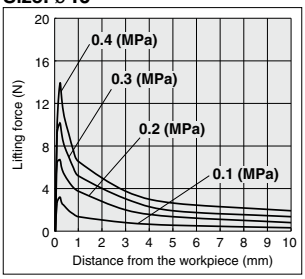


Lifting Force–Distance from the Workpiece [Cyclone Type]

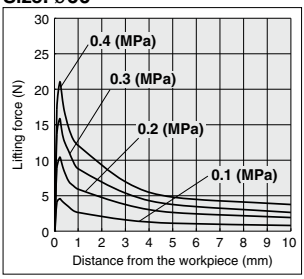
Size: ø20



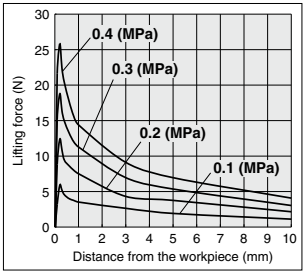
Size: ø40



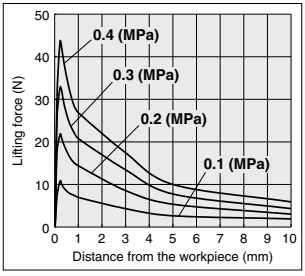
Size: ø60



Size: ø80

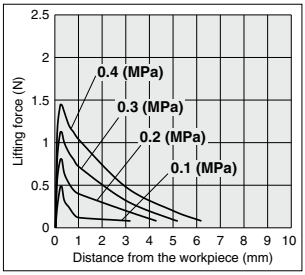


Size: ø100

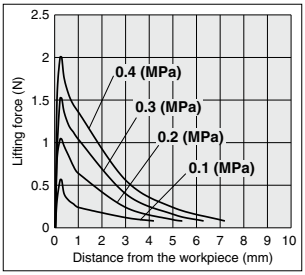


Lifting Force–Distance from the Workpiece [Low Profile Cyclone Type]

Size: ø20

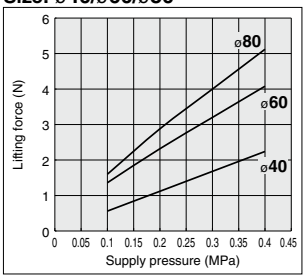


Size: ø25

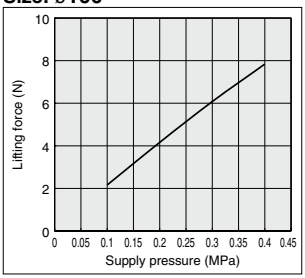


Lifting Force [Bernoulli Type]

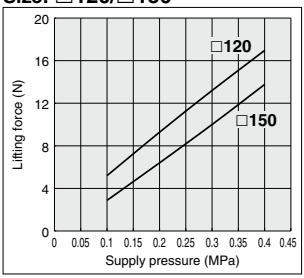
Size: ø40/ø60/ø80



Size: ø100

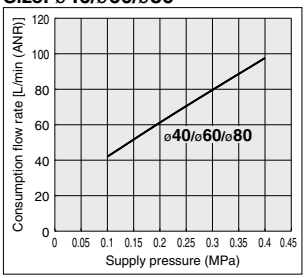


Size: □120/□150

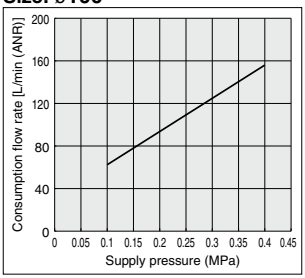


Air Consumption [Bernoulli Type]

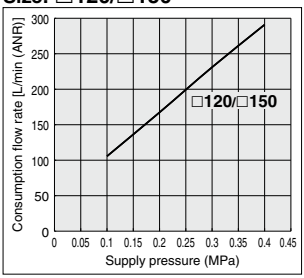
Size: ø40/ø60/ø80



Size: ø100

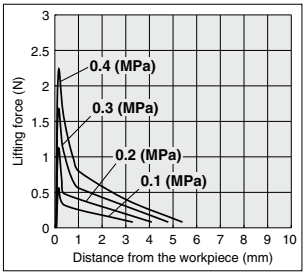


Size: □120/□150

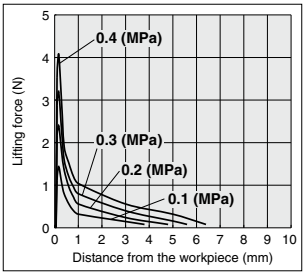


Lifting Force–Distance from the Workpiece [Bernoulli Type]

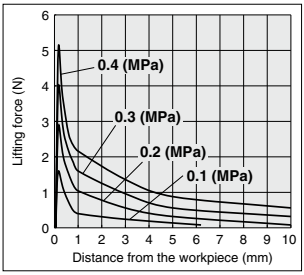
Size: ø40



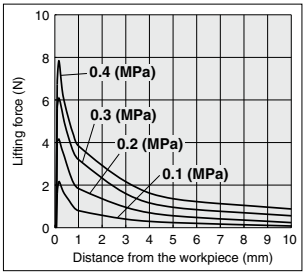
Size: ø60



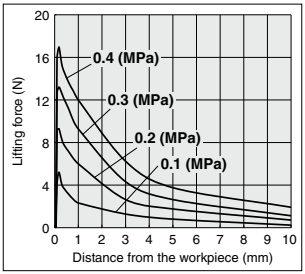
Size: ø80



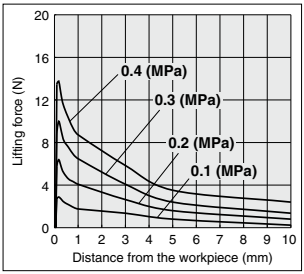
Size: ø100



Size: □120

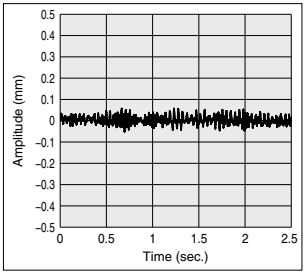


Size: □150

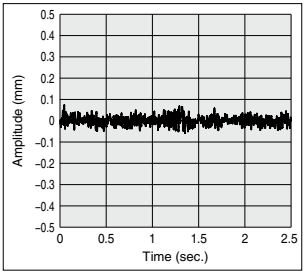


Vibration [Bernoulli Type] Supply pressure: 0.1 MPa

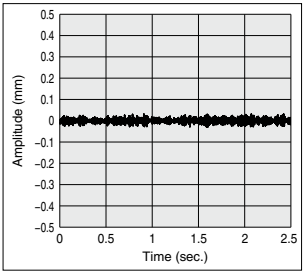
Size: ø40



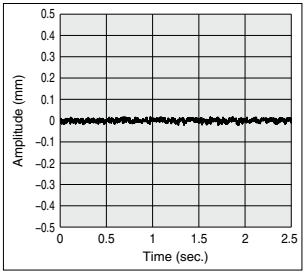
Size: ø60



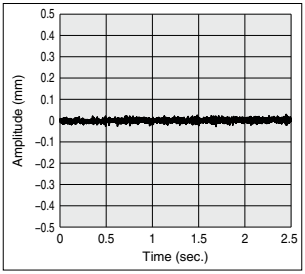
Size: ø80



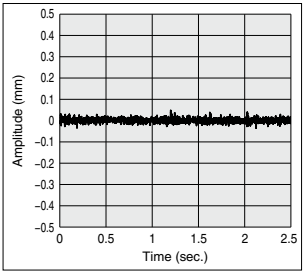
Size: ø100



Size: □120



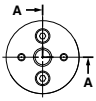
Size: □150

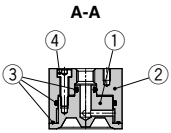


∗ □155 solar cell is used for this data only.

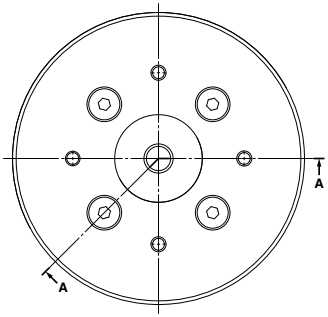
Construction [Cyclone Type]

Size: ø20





Size: ø40, ø60, ø80, ø100

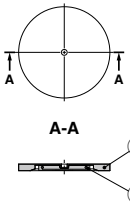


Component Parts

No.	Description	Material	Note
1	**Body (R, L)**	Aluminum alloy (Hard anodized)	XT661-2A to 10A
2	**Body M**	Aluminum alloy (Hard anodized)	
3	**O-ring**	NBR	
4	**Hexagon socket head cap screw**	Stainless steel	

Construction [Low Profile Cyclone Type]

Size: ø20, ø25

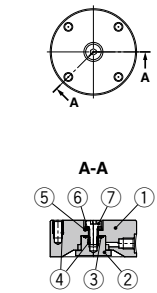


Component Parts

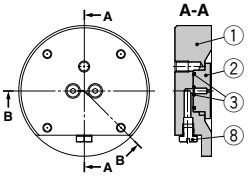
No.	Description	Material	Note
1	**Body (R, L)**	Aluminum alloy (Black hard anodized)	XT661-2A, 3A
2	**Body M**	Aluminum alloy (Black hard anodized)	

Construction [Bernoulli Type]

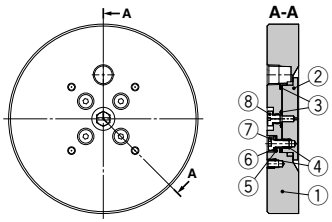
Size: ø40



Size: ø60



Size: ø80, ø100



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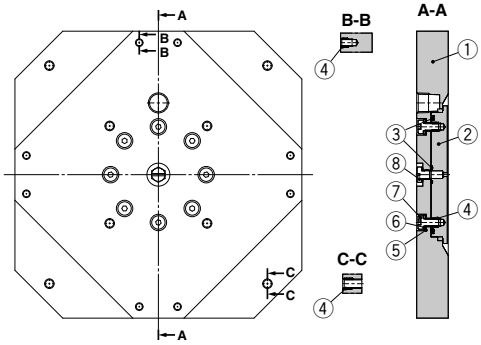
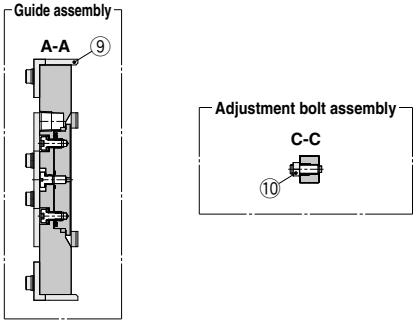


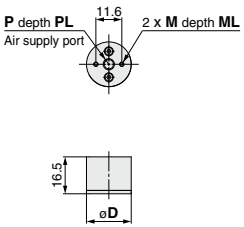


Component Parts

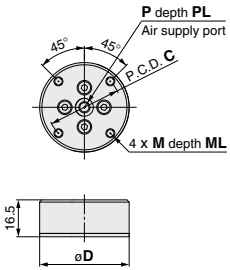
No.	Description	Material	Note
1	**Body A**	PBT resin	XT661-4C to 10C XT661-120E, 150E
2	**Body B**	PBT resin	
3	**O-ring**	NBR	
4	**Helical insert**	Stainless steel	
5	**Flat washer**	Chromium molybdenum steel (Zinc chromated)	
6	**Spring washer**	Chromium molybdenum steel (Zinc chromated)	
7	**Hexagon socket head cap screw**	Chromium molybdenum steel (Zinc chromated)	
8	**Plug**	Brass/NBR/Stainless steel	Except XT661-4C
9	**Guide assembly**	POM/Chromium molybdenum steel (Zinc chromated)	Accessories for XT661-120E, 150E
10	**Adjustment bolt assembly**	Polyurethane/Chromium molybdenum steel, mild steel (Zinc chromated)	

Dimensions [Cyclone Type]

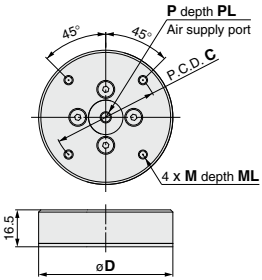
XT661-2A-(R, L)



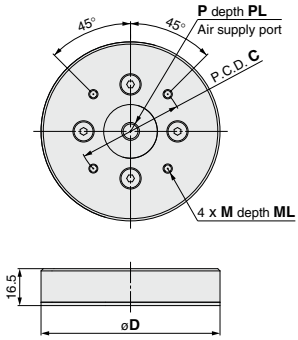
XT661-4A-(R, L)



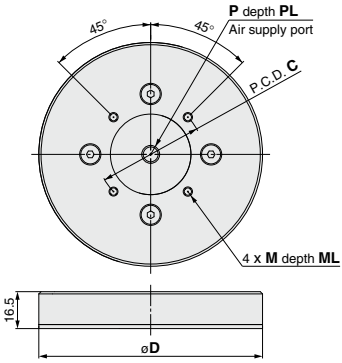
XT661-6A-(R, L)



XT661-8A-(R, L)



XT661-10A-(R, L)

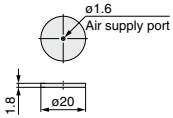


(mm)

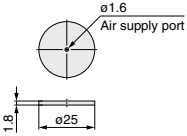
Part no.	P	PL	M	ML	C	D
XT661-2A-(R, L)	M5 x 0.8	5	M2 x 0.4	3.2	—	20
XT661-4A-(R, L)	M5 x 0.8	5	M4 x 0.7	5	32.8	40
XT661-6A-(R, L)	M5 x 0.8	5	M4 x 0.7	5	47	60
XT661-8A-(R, L)	Rc 1/8	—	M4 x 0.7	5	47	80
XT661-10A-(R, L)	Rc 1/8	—	M4 x 0.7	5	47	100

Dimensions [Low Profile Cyclone Type]

XT661-2A-(R, L)-X260

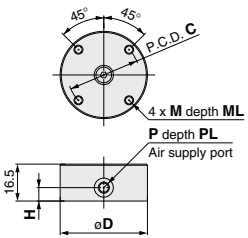


XT661-3A-(R, L)-X260

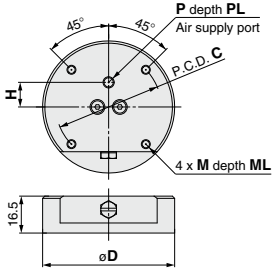


Dimensions [Bernoulli Type]

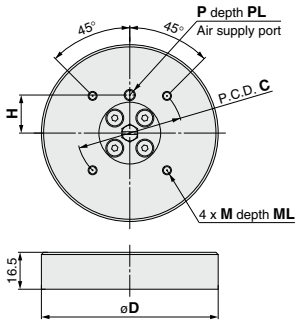
XT661-4C-X321



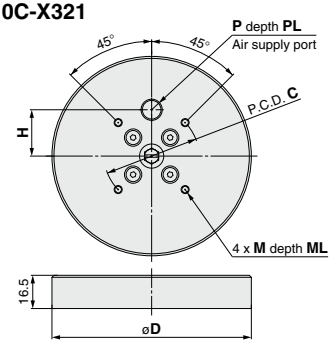
XT661-6C-X321



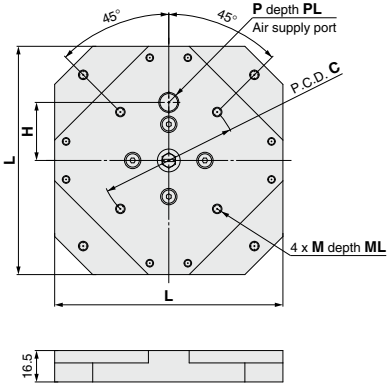
XT661-8C-X321



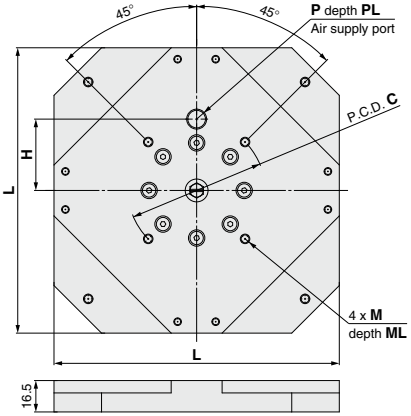
XT661-10C-X321



XT661-120E-X322



XT661-150E-X322



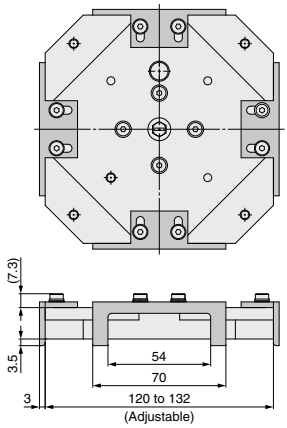
(mm)

Part no.	P	PL	M	ML	C	H	D	L
XT661-4C-X321	M5 x 0.8	5	M4 x 0.7	8	32	6	39	—
XT661-6C-X321	M5 x 0.8	6	M4 x 0.7	6	47	11	59	—
XT661-8C-X321	M5 x 0.8	6	M4 x 0.7	6	47	17	79	—
XT661-10C-X321	Rc 1/8	—	M4 x 0.7	6	47	23	99	—
XT661-120E-X322	Rc 1/8	—	M5 x 0.8	7	72	30.5	—	120
XT661-150E-X322	Rc 1/8	—	M5 x 0.8	7	72	37.5	—	150

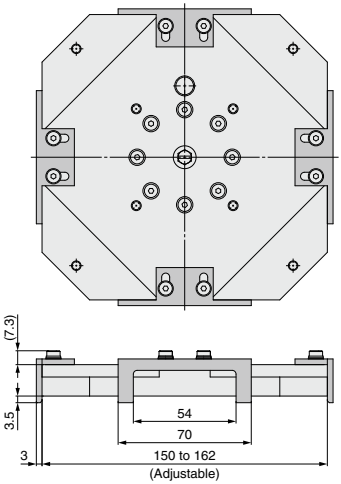
Dimensions [Bernoulli Type]

With guide assembly

Size: □120

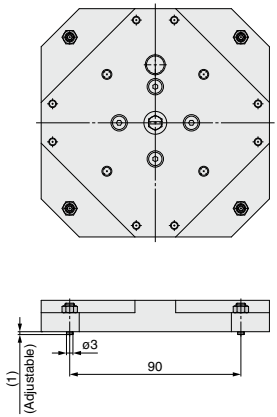


Size: □150

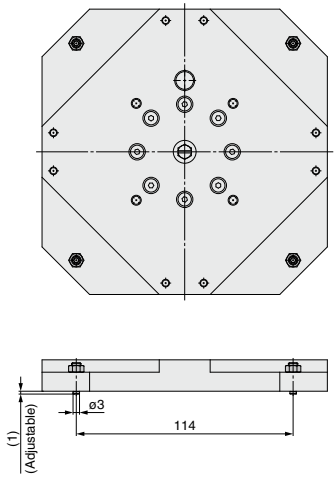


With adjustment bolt assembly

Size: □120



Size: □150



Model Index (Alphanumerical Order)

A

Products listed in the New Products Guide 1 and 2 are displayed in alphabetical order.
Part numbers can be searched for over the two volumes.

Alphabet Index

C

Model Index (Alphanumerical Order)

Products listed in the New Products Guide 1 and 2 are displayed in alphabetical order.
Part numbers can be searched for over the two volumes.

Alphabet Index

D

E

H

I

Model Index (Alphanumerical Order)

J

K

L

M

Products listed in the New Products Guide 1 and 2 are displayed in alphabetical order.
Part numbers can be searched for over the two volumes.

Alphabet Index

Model Index (Alphanumerical Order)

W

X

Z

Numbers

Other Products

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

⚠Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

⚠Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.