

Precise suction plate

PVP

■ Vacuum component

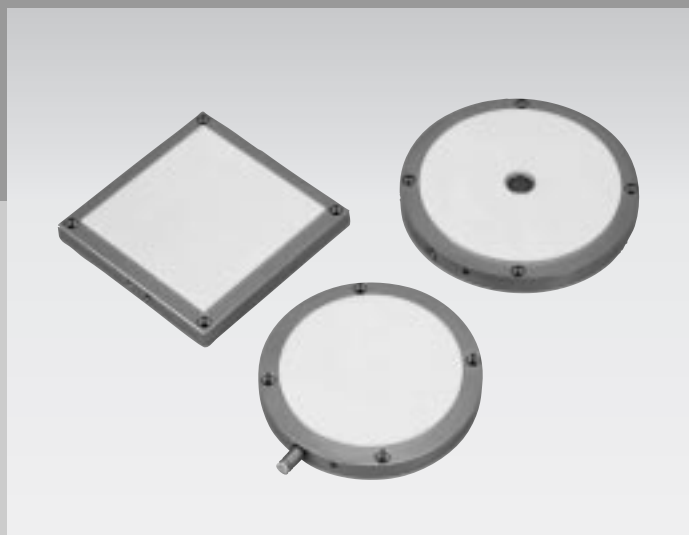
Overview

This precision suction plate uses CKD's original sintered multiporous fluorine resin with 40% porosity for the suction surface.

Even extremely thin or soft workpieces are handled without suction damage, distortion, or deformation. A wide variety of workpiece types is processed highly accurately.

Feature

- Highly accurate workpiece processing
- Large suction
- Workpieces are not damaged.
- Three types of plate shapes available.



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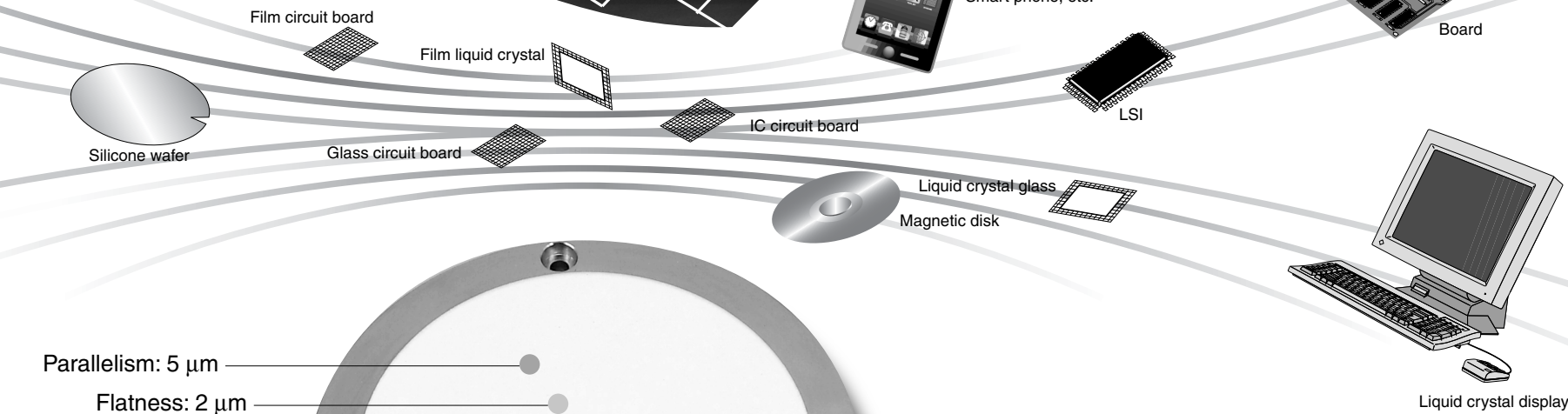
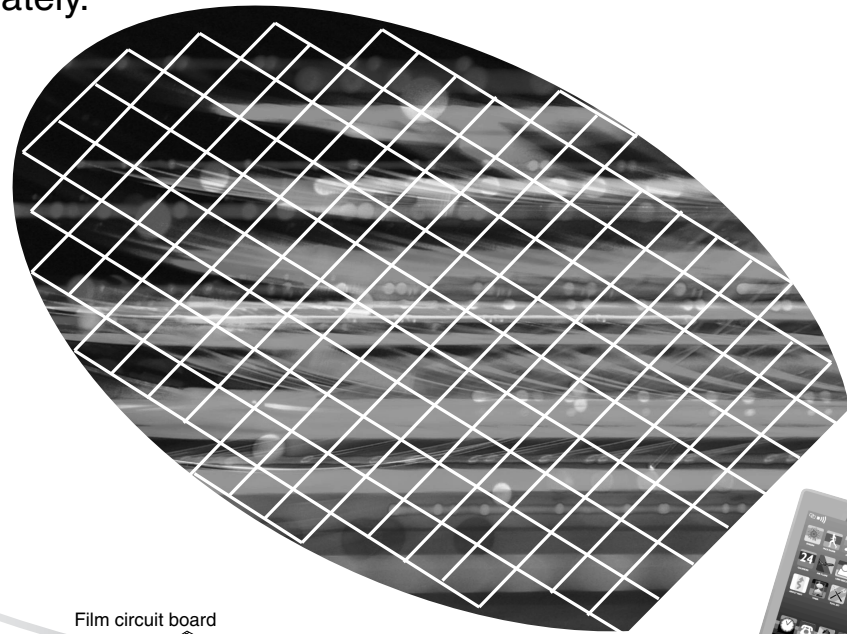
Refrigerating type dryer
Desiccant type dryer
High polymer membrane type dryer
Air filter
Auto. drain / others
F.R.L. (Module unit)
F.R.L. (Separate)
Compact F.R.
Precise regulator
F.R.L. (Related products)
Clean F.R.
Electro pneumatic regulator
Air booster
Speed control valve
Silencer
Check valve / others
Joint / tube
Vacuum filter
Vacuum regulator
Suction plate
Magnetic spring buffer
Mechanical pressure SW
Electronic pressure SW
Contact / close contact cont. SW
Air sensor
Pressure SW for coolant
Small flow sensor
Small flow controller
Flow sensor for air
Flow sensor for water
Total air system
Total air system (Gamma)

Ending

Precise suction plate
Vacuum component

High cleanness and highly accurate suction easy on workpieces

Performance is highly accurate for difficult processes within fine processes. Even extremely thin or soft workpieces are handled without suction damage, distortion, or deformation. A wide variety of workpiece types is processed highly accurately.



- Parallelism: 5 μm
- Flatness: 2 μm
- Specific gravity: 2.7 or less
- Porosity: 40%
- Hardness: Shore D60

Applications

● This series can be used to transfer and laminate optical and magnetic disks, to laminate and transfer LCD glass and film substrates, and to spin, polish, and transfer wafers. In addition to suction applications, suspension systems are available as custom orders.

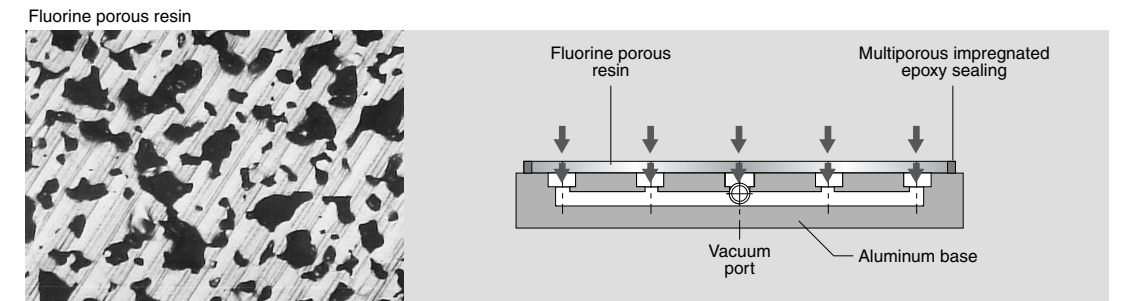
CKD's original sintered multipurpose fluorine resin with 40% porosity. Performance is highly accurate for difficult processes within fine processes.

Highly accurate workpiece processing

Suction surface flatness: 2 μm, parallelism: 5 μm.
(Specified value for R-36-18, C-50, S50-50)
Workpiece fixing is highly accurate, enabling highly accurate processing.

Large suction

40% porosity lets the entire surface be picked up with strong suction. Extra thin workpieces are not deformed even under large suction.



Easy on workpieces

Suction surface hardness is Shore D60. Soft handling leaves workpieces damage-free.

Light

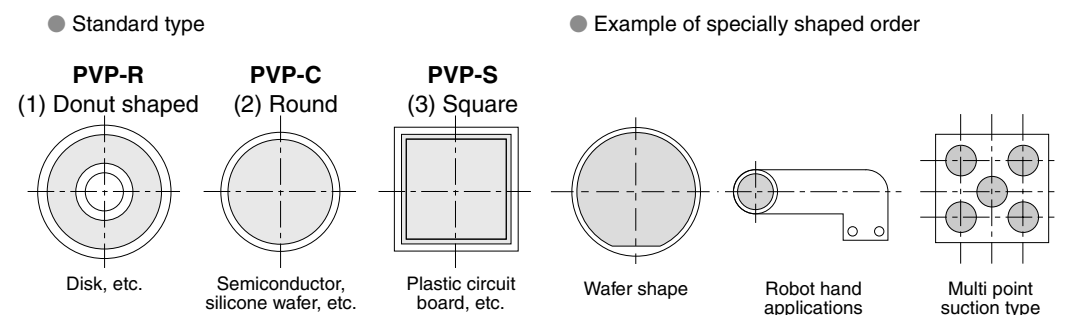
The plate is made of multiporous fluorine resin (visible weight 1.3) and an aluminum base (weight 2.7). This light weight requires only a small drive.

Antistatic (Optional)

Multiporous fluorine resin is coated with antistatic agent. Electrostatic discharge is suppressed, protecting workpieces.

Free plate design

The plate comes in three standard shapes. Original shapes are available as custom orders.



• Consult with CKD for custom order of special shape.

Precise suction plate
PVP Series

- Refrigerating type dryer
- Desiccant type dryer
- High polymer membrane type dryer
- Air filter
- Auto. drain / others
- F.R.L. (Module unit)
- F.R.L. (Separate)
- Compact F.R.
- Precise regulator
- F.R.L. (Related products)
- Clean F.R.
- Electro pneumatic regulator
- Air booster
- Speed control valve
- Silencer
- Check valve / others
- Joint / tube
- Vacuum filter
- Vacuum regulator
- Suction plate**
- Magnetic spring buffer
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Vacuum component



Safety precautions

Always read this section before starting use.

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Design & Selection

WARNING

■ If problems could arise when using a system with a precise suction plate and the selected workpiece is dropped, provide mechanical position locking for safety.

■ Do not use in areas containing corrosive or flammable gases.
Do not let the precision suction plate get stuck in corrosive or flammable gases.

■ Consider the behavior during emergency stop.
Design the system so that operators, workpieces, devices or system will not be damaged if the safety device activates during emergency stop or a system error and causes the power source or machine, etc., to stop.

■ Be sure to use the product within the specified range — 5 to 40°C, 0.2 MPa or less.
The multi-porous layer could peel off and generate corrosive gases when used at pressure or temperature exceeding the specified range.

■ Consider the behavior when restarting after emergency stop or abnormal stop.
Design the system so that the operators, workpieces, devices or system will not be damaged when restarting.

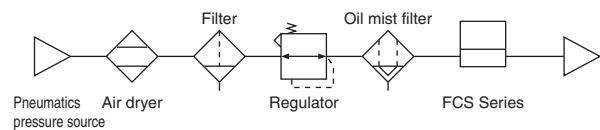
CAUTION

■ Check that the product withstands the working environment before use.
Avoid use in environments involving functional damage — high levels of dust, processes where dust is generated, chemicals, environments containing chemicals, vibration, humidity, moisture, gas, or ozone-generating environments.

■ Use within the specified humidity range (65% RH or less). Use exceeding the specified range could adversely affect suction surface accuracy.

■ Suction conditions vary with the product, piping, work, and working environment.
When selecting a vacuum generator, consider the maximum vacuum, suction flow rate, and response time.

■ Use dry, clean compressed air “Class 1.6.2” (solid particles 0.1µm, pressure dew point 10°C, oil concentration 0.1mg/m³) when purging with air.
(Class follows JIS B 8392-1:2000 compressed air quality class.)
<Use of the CKD Super Dryer D Series or CKD Inline Clean Filter FCS Series is recommended.>
<Recommended circuit>



■ Do not use a spiral hose.
Using a spiral hose could increase piping resistance and lead to faults such as delays in gaining vacuum levels and required suction.

■ Note the following when connecting more than one precision suction plate to one vacuum generator.
● If one precise suction plate leaks, vacuum will drop and cause suction faults.
● Piping between the vacuum generator and branch must be bigger than piping between the branch and vacuum pad.

■ Take appropriate anti-freezing measures when using in cold climates.
Foreign debris or oil in the compressed air could clog the porous plate and cause faults or malfunction.

■ Insulate if there is a heat source in the area.
Radiant heat could cause the product's temperature to rise and exceed the working temperature range. Insulate the product with a cover, etc.

■ Do not use where product could be subject to vibration or impact.
There is a risk of fault or malfunction.

Installation & Adjustment

CAUTION

■ If the workpiece is not picked up using the entire multi-porous surface, suction drops. Consult with CKD in this case.

■ Use an M4 hexagon socket bolt when installing the product's device. Fix in place with a tightening torque of 0.62 to 0.75 N·m.

■ Store the product so that foreign debris will not enter from the screws on the end, the holes on the side, or the gaps under the body. To prevent contamination, do not remove the product from the package until just before mounting or piping it to the device.
Contamination could result in faults or malfunctions.

■ Do not remove the protective port seal until just before piping.

■ Wipe the device's mounting surface with ethanol and remove foreign matter by flushing with air.

Installation & Adjustment

⚠ CAUTION

- When not using for a long time, place the product in a polyethylene bag, etc., and store in a dry clean environment. When reusing, do not remove the product from the package until just before mounting or piping it to the device.
Contamination could result in faults or malfunctions.
- Before starting operation, check for loosening or problems at load or joint connections.

- Read the instruction manual before use.
Familiarize yourself with details before using the product.
- Start operation after confirming that devices operate correctly.
After installing, repairing, or modifying the product, conduct a function inspection and confirm that the product is correctly installed.

During Use & Maintenance

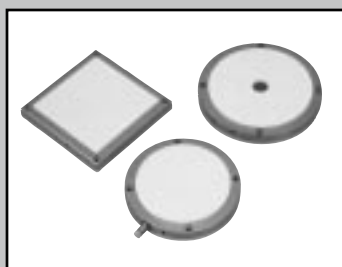
⚠ CAUTION

- Avoid using outdoors in areas with high levels of dust. Materials deteriorate if exposed to direct sunlight. Dust may clog the multi-porous layer and reduce suction.
- Do not use in applications applying a pressure of 1.0 MPa or more to the multi-porous surface.
- Do not use in applications applying partial loads or impact to the multi-porous surface.
- Check that the surface the product is installed on is not warped and that the required flatness is attained.
The product could warp or be deflected if not fixed on a surface with the required flatness.
- Do not machine the product additionally.
Accuracy could drop due to machining strain.
- Note the following when installing the product to prevent reducing product accuracy and causing permanent deformation.
 - Do not support the product with a point or lean the product against a wall. (Install the product on a flat surface, such as a table, to avoid strain and deflection caused by product weight.)
 - Do not pull on the product excessively or expose it to sudden or strong impact.
(The product scratches easily, so be sure to lift it when moving it.)
 - Do not apply sudden or excessive impact.
(Damage from impact damages flatness accuracy. Protect the multi-porous surface and sides when mounting and transporting the product.)
 - Do not install immediately upon arrival.
(Installing the product before temperature is adjusted to the surroundings damages shape accuracy due to thermal expansion or contraction. Leave the product to the working environment for 24 hours before installing.)

- Check that the multi-porous surface is not exposed to coolant or dust.
(The multi-porous surface is extremely hard to clean. Dirt cannot be removed.)
- Always release the residual pressure before mounting or removing the product.
- When starting the system after it has been idle for a long time, check that it operates normally before starting full-scale operations.
- Perform the following periodic inspection once or twice a year to ensure that the product is used with the optimum functions.
 - (1) Check for leaks to the outside
 - (2) Check for a drop in pickup performance
 - (3) Check for exterior faults (scratches, chips on the porous plate, surface contamination)
- Start the vacuum generator after the workpiece contacts the multi-porous surface.
(This reduces environmental dust that the multi-porous surface absorbs and helps prevent contamination.)
- The antistatic effect is reduced if the product is washed and depends on the working environment such as workpiece suction frequency. The product should be recoated if its effectiveness drops.
- Conduct daily inspections and regular inspections to ensure that maintenance control is done correctly.
Insufficient maintenance could lower product functions, shorten product life, or result in damage or incorrect operations.
- Stop use if leakage increases or if the device does not function correctly.
After installing, repairing, or modifying the product, conduct a function inspection and confirm that the product is correctly installed.

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Desiccant type dryer
High polymer membrane type dryer
Air filter
Auto. drain / others
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F.R.L. (Separate)
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Precise regulator
F.R.L. (Related products)
Clean F.R.
Electro pneumatic regulator
Air booster
Speed control valve
Silencer
Check valve / others
Joint / tube
Vacuum filter
Vacuum regulator
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Pressure SW for coolant
Small flow sensor
Small flow controller
Flow sensor for air
Flow sensor for water
Total air system
Total air system (Gamma)
Ending

Precise suction plate
Vacuum component



Precise suction plate

PVP Series



Specifications

Descriptions	PVP-R-36-18		PVP-R-85-27 PVP-R-118-18		PVP-C-187	
	PVP-C-50		PVP-C-75 PVP-C-100 PVP-C-113 PVP-C-138		PVP-S-150-150 PVP-S-200-250	
		PVP-S-50-50		PVP-S-100-100		
Product	Suction surface	Flatness	2	3	4	
		μm (Note 1)	Parallelism	5	10	15
	Datum level flatness		μm	10	10	10
	Air leakage volume		$\ell/\text{min. (ANR)}$	0.4	0.6	1
	Vacuum differential pressure		kPa (Note 2)	40 and over		
	Use pressure		MPa	0.2 or less (clean air)		
	Ambient temperature range		$^{\circ}\text{C}$	5 to 40		
	Working humidity range		$\%RH$ (Note 3)	65 or less		
Porous material	Material		Trifluoroethylene resin			
	Porosity		$\%$	40 \pm 5		
	Shore D hardness		Degree	60 \pm 15		
Base	Material		Corrosion proof aluminum alloy			
	Surface treatment		(Note 4)	None		

Note 1: This accuracy is that measured after leaving the product for 24 hours at constant 23°C room temperature.

Accuracy may deviate from that specified at a temperature other than 23°C.

The value is measured by placing the product without load on a table and measuring straightness in two or more and using the maximum value.

This is not usual flatness measurement, but has been used because multiporous material has indentations.

Note 2: Indicates the vacuum source pressure drop when a workpiece is vacuumed onto the entire multiporous surface.

Note 3: In humidity exceeding 65% RH, suction surface accuracy may deviate from the specified value.

Note 4: This product is made of corrosion-resistant aluminum alloy.

Surface treatment — alumite, electroless nickel plating, etc. — is a custom order.

Suction area / weight table

Model no.	Suction area (cm ²)	Weight (g)
PVP-R-36-18	8	80
PVP-R-85-27	51	290
PVP-R-118-18	107	520
PVP-C-50	20	140
PVP-C-75	44	250
PVP-C-100	79	390
PVP-C-113	100	490
PVP-C-138	149	680
PVP-C-187	275	1,170
PVP-S-50-50	25	160
PVP-S-100-100	100	490
PVP-S-150-150	225	980
PVP-S-200-250	500	2,030

How to order

● How to order round suction plate

PVP - C - 50 - CP - A

Round A B C

A Porous plate O.D. dimension	B Vacuum port position		C Option	
50	Blank	Side port	Blank	None
75	CP	Rear port	A	Antistatic treatment
100				
113				
138				
187				

● How to order square suction plate

PVP - S - 50-50 - CP - A

Square A B C

A Porous material short side dimension- Porous material long side dimension	B Vacuum port position		C Option	
50-50	Blank	Side port	Blank	None
100-100	CP	Rear port	A	Antistatic treatment
150-150				
200-250				

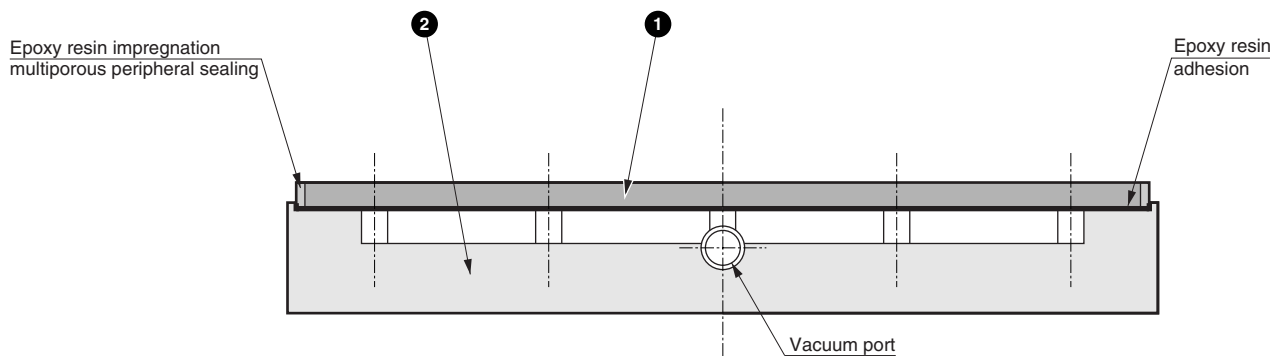
● How to order donut shaped suction plate

PVP - R - 36-18 - CP - A

Donut shaped A B C

A Porous plate O.D. dimension- Porous plate I.D. dimension	B Vacuum port position		C Option	
36-18	Blank	Side port	Blank	None
85-27	CP	Rear port	A	Antistatic treatment
118-18				

Internal structure and parts list



● Parts list

No.	Parts name	Material
1	Porous material	Trifluoroethylene resin
2	Base	Corrosion proof aluminum alloy

Refrigerating type dryer
Desiccant type dryer
High polymer membrane type dryer
Air filter
Auto. drain / others
F.R.L. (Module unit)
F.R.L. (Separate)
Compact F.R.
Precise regulator
F.R.L. (Related products)
Clean F.R.
Electro pneumatic regulator
Air booster
Speed control valve
Silencer
Check valve / others
Joint / tube
Vacuum filter
Vacuum regulator
Suction plate
Magnetic spring buffer
Mechanical pressure SW
Electronic pressure SW
Contact / close contact cont. SW
Air sensor
Pressure SW for coolant
Small flow sensor
Small flow controller
Flow sensor for air
Flow sensor for water
Total air system
Total air system (Gamma)

Ending

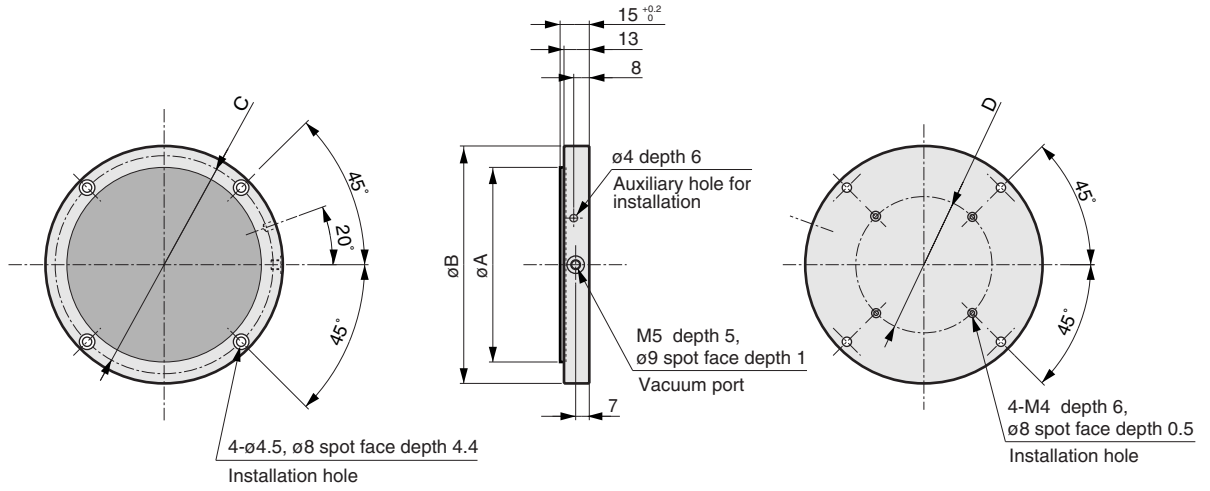
Precise suction plate
Vacuum component

Dimensions



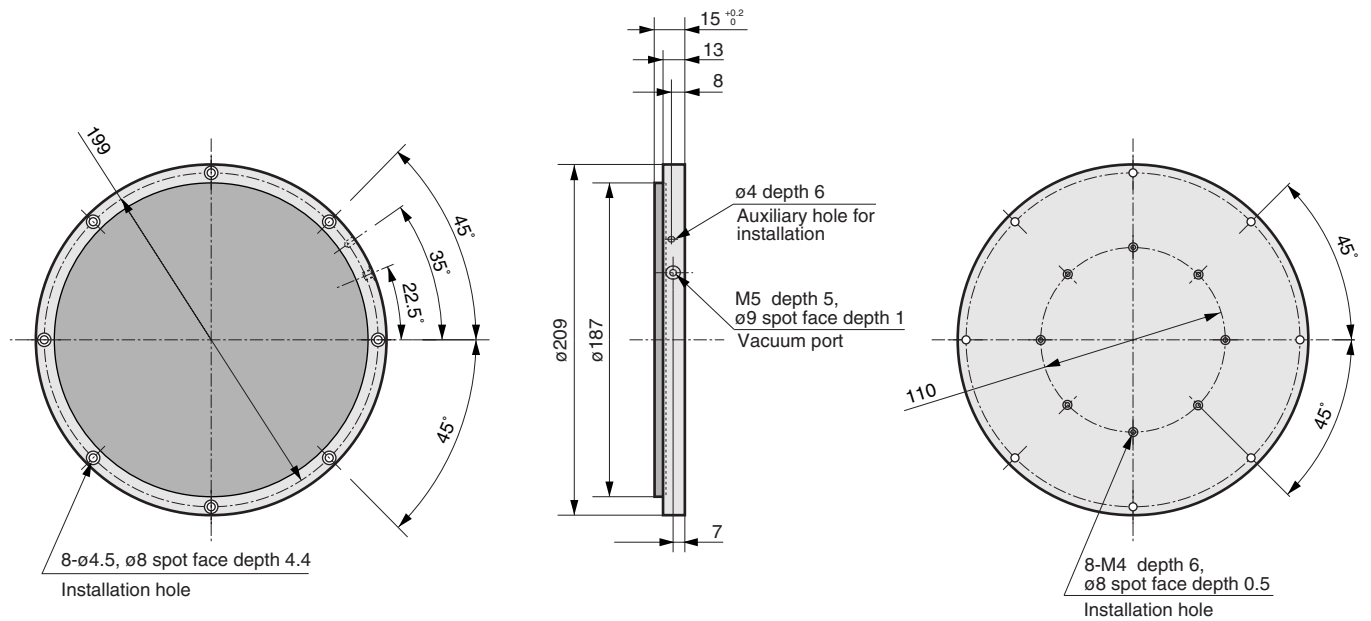
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- Desiccant type dryer
- High polymer membrane type dryer
- Air filter
- Auto. drain / others
- F.R.L. (Module unit)
- F.R.L. (Separate)
- Compact F.R.
- Precise regulator
- F.R.L. (Related products)
- Clean F.R.
- Electro pneumatic regulator
- Air booster
- Speed control valve
- Silencer
- Check valve / others
- Joint / tube
- Vacuum filter
- Vacuum regulator
- Suction plate**
- Magnetic spring buffer
- Mechanical pressure SW
- Electronic pressure SW
- Contact / close contact cont. SW
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● PVP-C-*



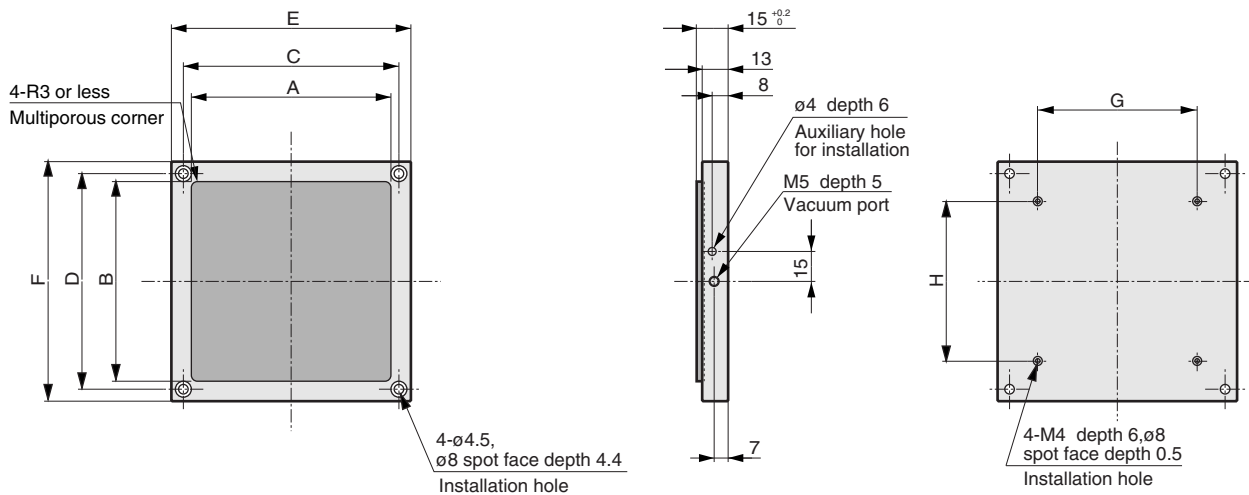
Model no.	A	B	C	D
PVP-C-50	50	72	62	30
PVP-C-75	75	97	87	50
PVP-C-100	100	122	112	70
PVP-C-113	113	135	125	70
PVP-C-138	138	160	150	90

● PVP-C-187



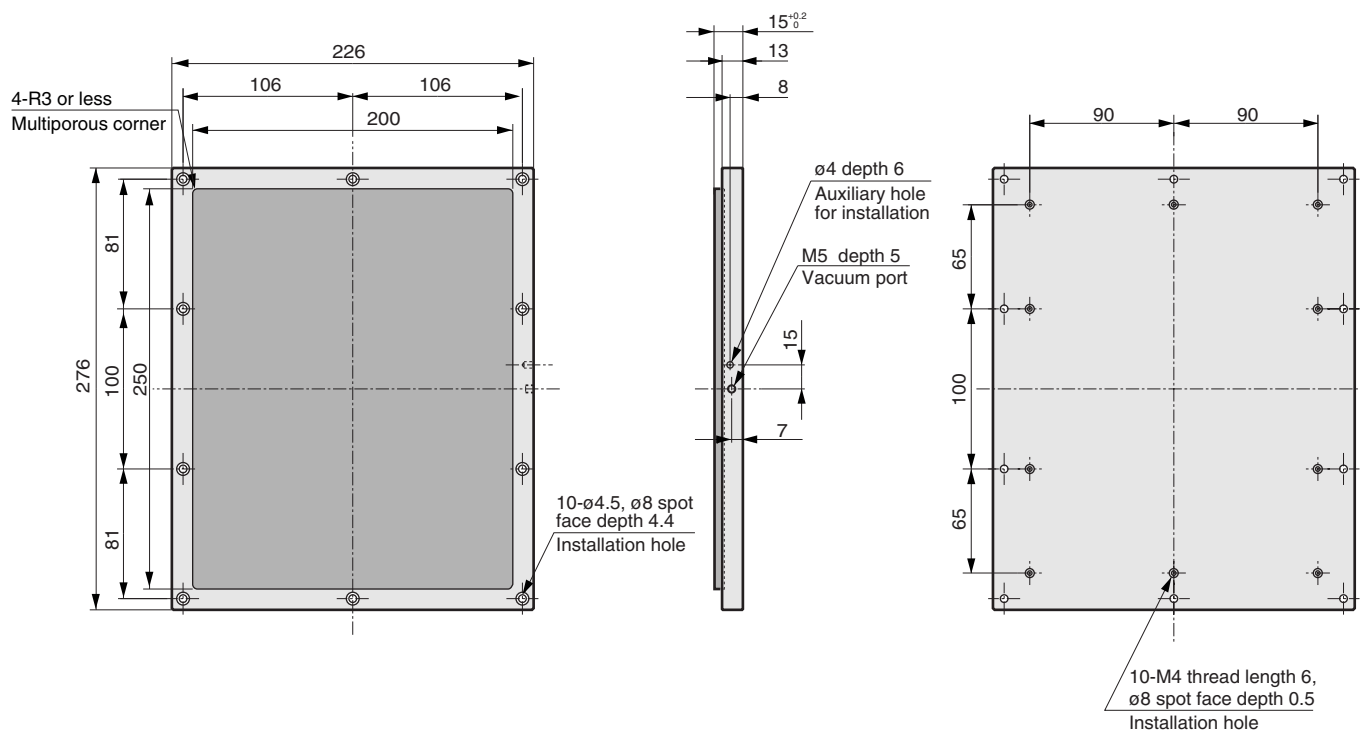
Dimensions

● PVP-S-*



Model no.	A	B	C	D	E	F	G	H
PVP-S-50-50	50	50	58	58	70	70	40	40
PVP-S-100-100	100	100	108	108	120	120	80	80
PVP-S-150-150	150	150	158	158	170	170	120	120

● PVP-S-200-250



- Refrigerating type dryer
- Desiccant type dryer
- High polymer membrane type dryer
- Air filter
- Auto. drain / others
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- F.R.L. (Separate)
- Compact F.R.
- Precise regulator
- F.R.L. (Related products)
- Clean F.R.
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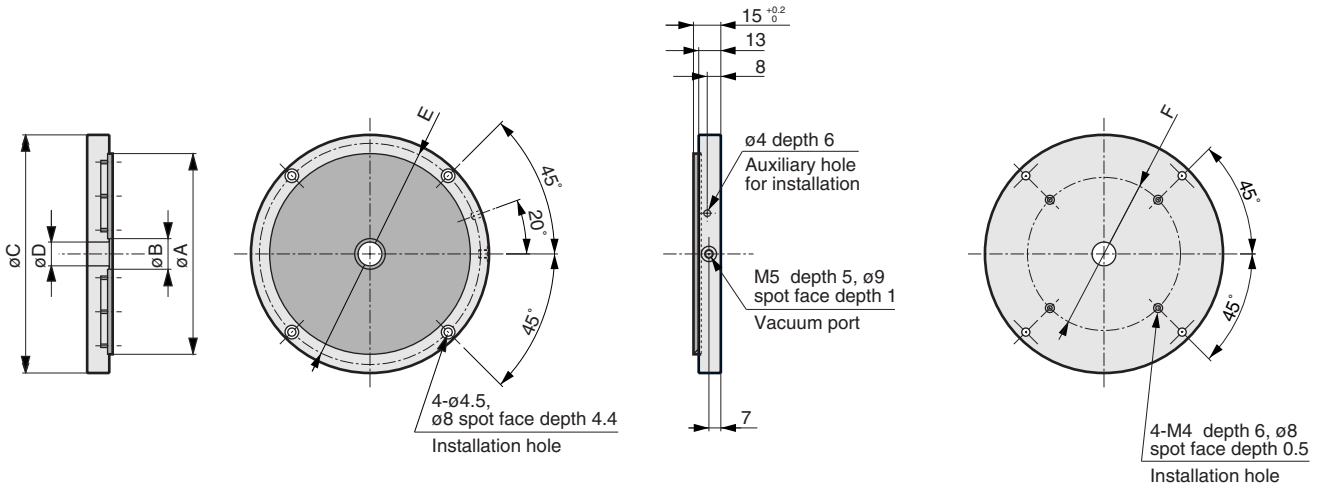
Ending

Precise suction plate
Vacuum component



Dimensions

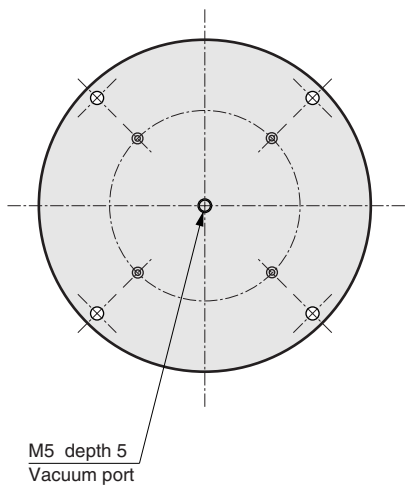
● PVP-R-*



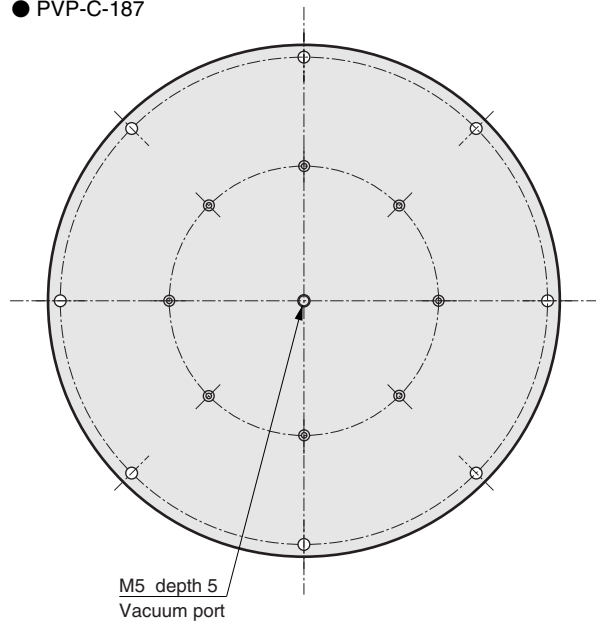
Model no.	A	B	C	D	E	F
PVP-R-36-18	36	18	58	16	48	30
PVP-R-85-27	85	27	107	25	97	60
PVP-R-118-18	118	18	140	16	130	90

Vacuum port position rear port (CP)

● PVP-C-*



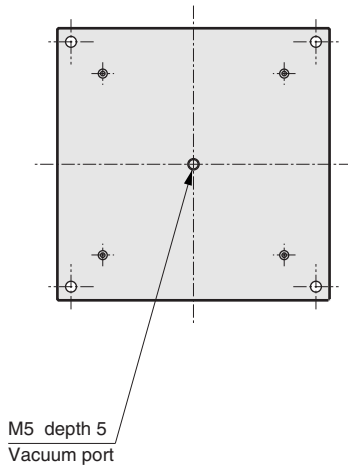
● PVP-C-187



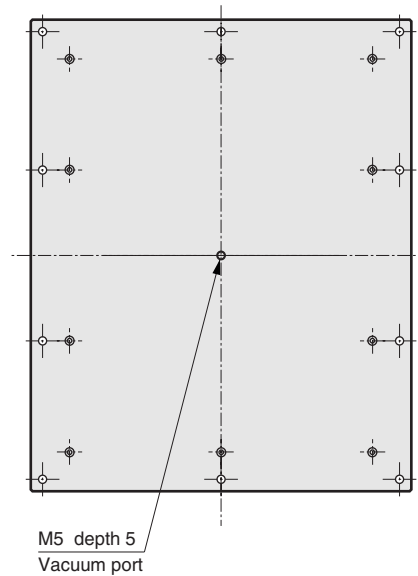
Dimensions

Vacuum port position rear port (CP)

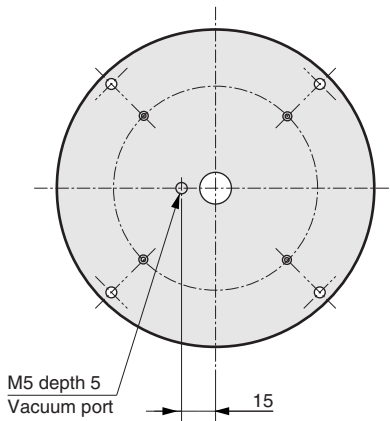
● PVP-S-*



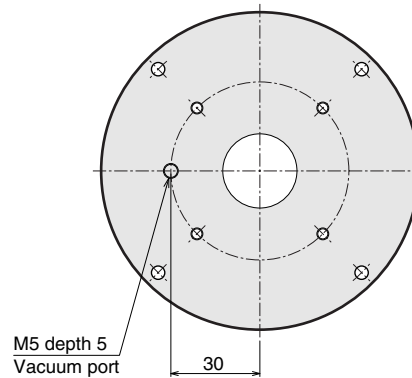
● PVP-S-200-250



● PVP-R-*-18

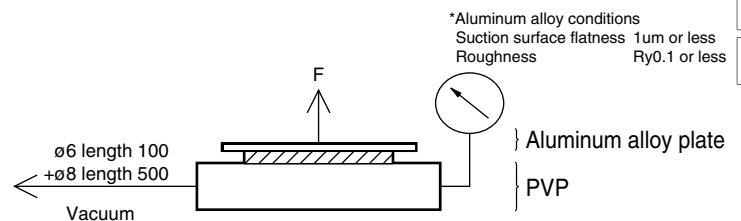
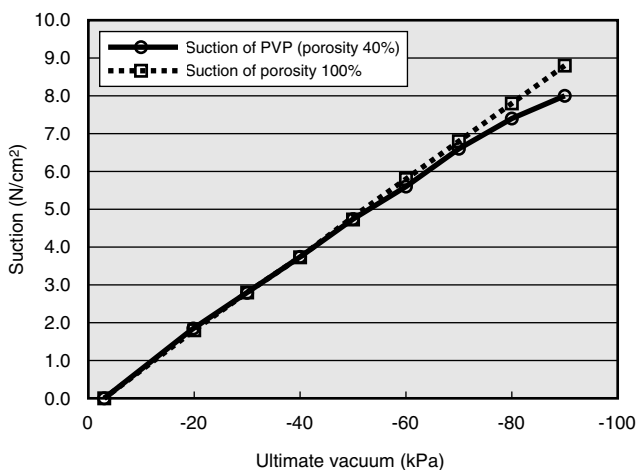


● PVP-R-85-27



Technical data

● Vertical suction (references data)



This reference data is measured at PVP-S-50-50 or above.
 The ultimate vacuum's minimum is not zero because of piping resistance due to multiporous material and piping.
 Under conditions other than the above, suction could vary due to piping resistance, the shape of the part to be vacuumed, or surface roughness.

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