

Vacuum Pads

Basic Pad ZP Series / Compact Type ZP3 Series
Oval Pad ZP/ZP2 Series / High Rigidity Pad ZP3E Series
Pads for Special Applications



Basic Pad ZP Series

p. 26

Pad diameter	ø2, ø4, ø6, ø8, ø10, ø13, ø16, ø20, ø25, ø32, ø40, ø50
Pad form	Flat type, Flat type with ribs, Bellows type, Thin flat type, Thin flat type with ribs, Deep type
Mounting	Male thread, Female thread
Vacuum inlet direction	Vertical, Lateral
Vacuum inlet	Male thread, Female thread, One-touch fitting, Barb fitting
Buffer	Without, With [Buffer stroke [mm]: 6, 10, 15, 20, 25, 30, 40, 50]
Ball joint	Without, With (Flat type only)

12 sizes, 6 types of pad forms
The mounting bracket can be selected according to the application.



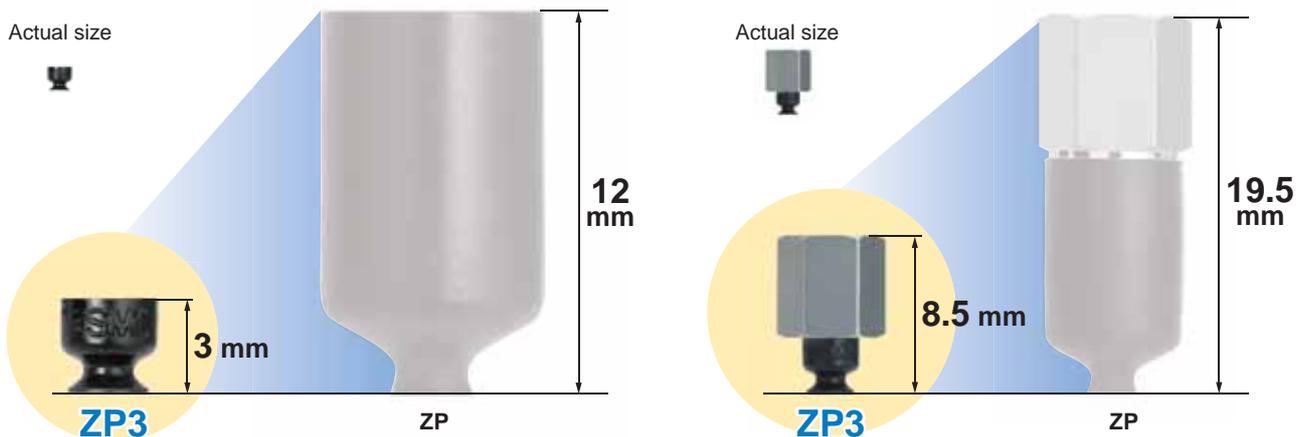
Compact Type ZP3 Series

p. 132

Pad diameter	ø1.5, ø2, ø3.5, ø4, ø6, ø8, ø10, ø13, ø16
Pad form	Flat type, Flat type with groove, Bellows type, Bellows type with ribs
Mounting	Male thread, Female thread
Vacuum inlet direction	Vertical, Lateral
Vacuum inlet	Male thread, Female thread, One-touch fitting, Barb fitting
Buffer	Without, With [Buffer stroke [mm]: 3, 6, 10, 15, 20]



Overall length shortened For the flat type (Pad diameter: ø2)



Oval Pad ZP/ZP2 Series

p. 166

Pad size	2 x 4, 3.5 x 7, 4 x 10, 4 x 20, 4 x 30, 5 x 10, 5 x 20, 5 x 30, 6 x 10, 6 x 20, 6 x 30, 8 x 20, 8 x 30
Pad form	Oval flat type
Mounting	Male thread, Female thread
Vacuum inlet direction	Vertical, Lateral
Vacuum inlet	Male thread, Female thread, One-touch fitting, Barb fitting
Buffer	Without, With [Buffer stroke [mm] ZP: 6, 10, 15, 20 ZP2: 10, 20, 30, 40, 50]

For rectangular, vertically long, and horizontally long workpieces



High Rigidity Pad ZP3E Series

p. 200

Pad diameter	ø32, ø40, ø50, ø63, ø80, ø100, ø125
Pad form	Flat type with groove, Bellows type with ribs and groove
Mounting	Male thread, Female thread
Vacuum inlet direction	Vertical, Lateral
Vacuum inlet	Male thread, Female thread
Buffer	Without, With [Buffer stroke [mm]: 10, 30, 50]
Ball joint	Without, With



Stable suction position, Improved ease of removal

Stable suction position

Groove and rib formed to adsorb with entire surface



Improved ease of removal

With groove

The dents and bumps on the adsorption surface prevent workpieces from sticking to the pad. This facilitates easy removal.

Shot-blasted

Micro-dents and bumps are formed on the adsorption surface. Workpieces can be removed easily.



Pads for Special Applications ZP2/ZP3P Series

Mark-free Pad

For use where adsorption marks must not be left on workpieces



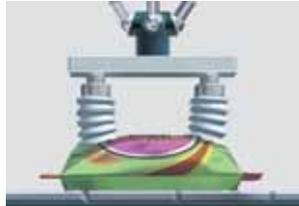
For Film Adsorption

Good for film packaging applications



Multistage

For use where there is no space for a buffer (spring type)
For workpieces with inclined adsorption surfaces



Flat Pad

For the adsorption of flexible sheets or film
Reduced deformation of flat surfaces during adsorption



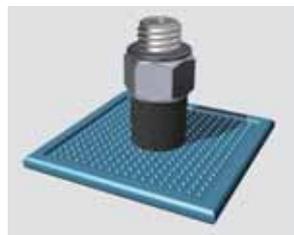
Nozzle Pad

For the adsorption of small components such as IC chips



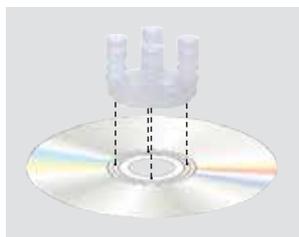
Sponge Pad

For the adsorption of workpieces with bumps



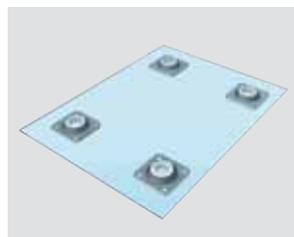
Vacuum Pad for Disk Adsorption

For the adsorption of circular components like CDs and DVDs



Vacuum Pad for Panel Holding

For the adsorption and holding of the stage of panels, glass circuit boards, etc.



Pad with Ball Spline Buffer

The ball spline guide is used for buffers.



Compact Pad

Pad diameter: $\varnothing 3, \varnothing 4, \varnothing 5, \varnothing 6, \varnothing 7, \varnothing 8$
 Pad form: Flat type, Flat type with ribs, Thin flat type, Bellows type

Compact, Space saving

Blast-type pad

Workpieces can be removed easily.



Short-type Pad

Pad diameter: $\varnothing 2, \varnothing 3, \varnothing 3.5, \varnothing 4, \varnothing 5, \varnothing 6, \varnothing 8, \varnothing 10, \varnothing 15$
 Pad form: Flat type

Space saving in the height direction

Blast-type pad

Workpieces can be removed easily.



Thin Flat Pad

Pad diameter: $\varnothing 5, \varnothing 6, \varnothing 11, \varnothing 14, \varnothing 18, \varnothing 20$

For the adsorption of soft workpieces such as thin sheets or vinyl
 Wrinkling or deformation during adsorption is reduced.



Bellows Pad

Pad diameter: $\varnothing 2, \varnothing 4, \varnothing 5, \varnothing 6, \varnothing 8, \varnothing 10, \varnothing 15, \varnothing 20$

For use where there is no space for a buffer (spring type)
 For the adsorption of workpieces with inclined surfaces



High Rigidity Pad

Pad diameter: $\varnothing 32, \varnothing 40, \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100, \varnothing 125, \varnothing 150, \varnothing 250, \varnothing 300, \varnothing 340, 30 \times 50$

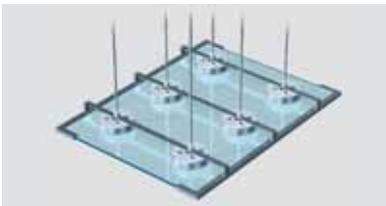
Pad form: Flat type with ribs, Thin flat type with ribs, Bellows type, Oval type



Ball joint

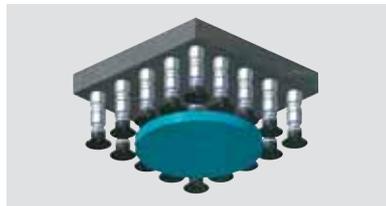
Non-contact Gripper

Assists in non-contact workpiece transfer



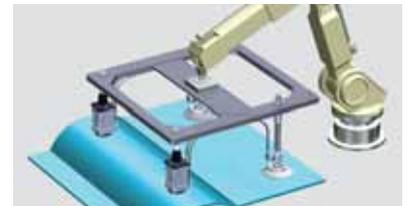
Vacuum Saving Valve

Can restrict the reduction of vacuum pressure even when there is no workpiece



Magnet Gripper

Steel plates can be transferred without vacuum.



Pad Form/Pad Diameter Variations List

Vacuum Pad ZP Series Variations ▶ p. 27

Pad form	Symbol	Pad diameter [mm]												Page						
		Ø1.5	Ø2	Ø3.5	Ø4	Ø6	Ø8	Ø10	Ø13	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Dimensions/Models	Construction	Mounting bracket assembly		
Flat		—	U		●		●	●	●	●	●	●	●	●	●	●	●	From p. 32	From p. 115	From p. 121
		With ribs	C						●	●	●	●	●	●	●	●	●	From p. 51	From p. 117	From p. 121
		Ball joint	F						●	●	●	●	●	●	●	●	●	From p. 62	From p. 119	From p. 127
Bellows		—	B				●	●	●	●	●	●	●	●	●	●	From p. 68	From p. 115	From p. 121	
Thin flat		—	UT						●	●	●						From p. 87	From p. 115	From p. 121	
		With ribs	CT						●	●	●						From p. 96	From p. 115	From p. 121	
Deep		—	D						●	●				●			From p. 105	From p. 117	From p. 121	

Vacuum Pad/Compact Type ZP3 Series Variations ▶ p. 134

Pad form	Symbol	Pad diameter [mm]												Page					
		Ø1.5	Ø2	Ø3.5	Ø4	Ø6	Ø8	Ø10	Ø13	Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Dimensions/Models	Construction	Mounting bracket assembly	
Flat		—	U	●	●	●											From p. 137	From p. 160	From p. 162
		With groove	UM				●	●	●	●	●	●					From p. 143	From p. 160	From p. 162
Bellows		—	B			●	●	●									From p. 149	From p. 160	From p. 162
		With ribs	B						●	●	●						From p. 155	From p. 160	From p. 162

Oval Pad ZP/ZP2 Series Variations ▶ p. 167

Pad form	Series	Symbol	Pad size (Breadth x Length) [mm]								Page								
			2 x 4	3.5 x 7	4 x 10	4 x 20	4 x 30	5 x 10	5 x 20	5 x 30	6 x 10	6 x 20	6 x 30	8 x 20	8 x 30	Dimensions/Models	Construction	Mounting bracket assembly	
Oval	ZP	U	●	●	●												From p. 171	From p. 185	From p. 189
	ZP2	W		●	●	●	●	●	●	●	●	●	●	●	●	●	From p. 180	From p. 187	From p. 195

High Rigidity Pad ZP3E Series Variations ▶ p. 203

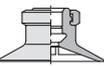
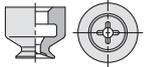
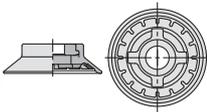
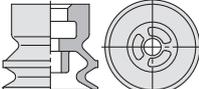
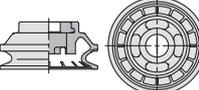
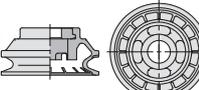
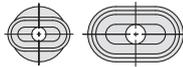
Pad form	Symbol	Pad diameter [mm]							Page						
		Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125	Dimensions/Models	Construction	Mounting bracket assembly				
Flat		With groove	UM	●	●	●	●	●	●	●	●	●	From p. 209	From p. 233	From p. 237
		Ball joint, With groove	F, UM	●	●	●	●	●	●	●	●	●	From p. 215	From p. 235	From p. 241
Bellows		With ribs and groove	BM	●	●	●	●	●	●	●	●	●	From p. 221	From p. 233	From p. 237
		Ball joint, With ribs and groove	F, BM	●	●	●	●	●	●	●	●	●	From p. 227	From p. 235	From p. 241

Pads for Special Applications Variations ▶ p. 249

Page

Pad form		Series	Symbol	Pad diameter [mm]											How to order
Mark-free pad	Flat		—	ZP2	U, CL	ø4	ø6	ø8	ø10	ø16	ø25	ø32	ø40	ø50	p. 253
			With ribs	ZP2	H, CL/NT/FT	ø40	ø50	ø63	ø80	ø100	ø125	p. 254			
			With groove	ZP3E	UM, CL	ø32	ø40	ø50	ø63	ø80	ø100	ø125	p. 208		
			With groove, Ball joint type	ZP3E	F, UM, CL	ø32	ø40	ø50	ø63	ø80	ø100	ø125	p. 214		
	Bellows		With ribs and groove	ZP3E	BM, CL	ø32	ø40	ø50	ø63	ø80	ø100	ø125	p. 220		
			With groove, Ball joint type	ZP3E	F, BM, CL	ø32	ø40	ø50	ø63	ø80	ø100	ø125	p. 226		
	Resin attachment		—	ZP2	K	ø6	ø8	ø10	ø13	ø16	ø20	ø25	ø32	p. 264	
For film adsorption		With groove	ZP3P	PT	ø20	ø25	ø35	ø50	p. 267						
Multistage		4.5-stage	ZP2	ZJ	ø15	ø20	ø30	ø40	ø46	p. 276					
		2.5-stage 3.5-stage	ZP2	J	ø6	ø9	ø10	ø14	ø15	ø16	ø25	ø30	p. 282		
Flat pad		With groove	ZP2	MT	ø10	ø15	ø20	ø25	ø30	p. 286					
Nozzle type		—	ZP2	AN	ø0.8	ø1.1	p. 289								
Sponge		—	ZP2	S	ø4	ø6	ø8	ø10	ø15	p. 290					
For disk adsorption		—	ZP2	Z1	p. 294										
For panel holding		—	ZP2	Z	p. 295										
With ball spline buffer		Flat type	ZP2	U, S	ø2	ø4	ø6	ø8	p. 297						
Vacuum saving valve			ZP2V	p. 346											
Non-contact gripper			XT661	p. 362											
Magnet gripper			MHM	p. 373											

Select from pad forms

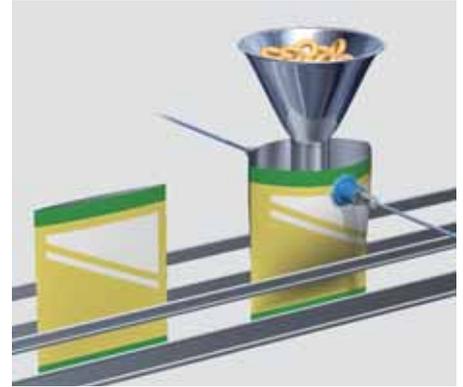
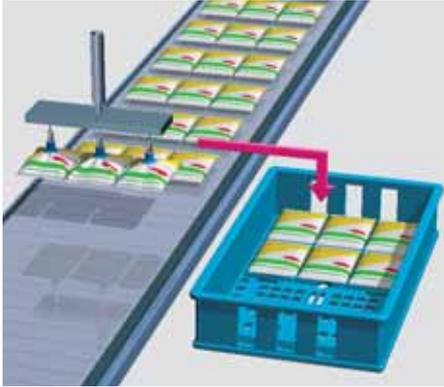
			Basic	Compact	High rigidity	Oval		
			ZP	ZP3	ZP3E	ZP	ZP2	
Flat	Flat type		<ul style="list-style-type: none">For the adsorption of general workpiecesFor the adsorption of workpieces with flat and non-deformed surfaces		p. 31	p. 136		
	Flat type with ribs		<ul style="list-style-type: none">For workpieces which are likely to become deformedFor the reliable release of workpieces		p. 50			
	Flat type with groove		<ul style="list-style-type: none">For workpieces which are likely to become deformedFor the reliable release of workpieces			p. 142	p. 208	
	Ball joint, Flat type		<ul style="list-style-type: none">For the adsorption of workpieces with inclined or curved surfaces		p. 61			
	Ball joint, Flat type with groove		<ul style="list-style-type: none">For the adsorption of workpieces with inclined or curved surfacesFor workpieces which are likely to become deformedFor the reliable release of workpieces				p. 214	
Bellows	Bellows type		<ul style="list-style-type: none">For the adsorption of workpieces with inclined surfacesFor workpieces of varying heights		p. 67	p. 148		
	Bellows type with ribs		<ul style="list-style-type: none">For the adsorption of workpieces with inclined surfacesFor workpieces of varying heightsFor the reliable release of workpieces			p. 154		
	Bellows type with ribs and groove		<ul style="list-style-type: none">To be used when the adsorption surface of the workpieces is slantedFor the reliable release of workpieces				p. 220	
	Ball joint, Bellows type with ribs and groove		<ul style="list-style-type: none">For the adsorption of workpieces with inclined or curved surfacesFor the reliable release of workpieces				p. 226	
Thin flat	Thin flat type		<ul style="list-style-type: none">For workpieces which are likely to become deformed		p. 86			
	Thin flat type with ribs		<ul style="list-style-type: none">For workpieces which are likely to become deformedFor the reliable release of workpieces		p. 95			
Deep	Deep type		<ul style="list-style-type: none">For workpieces with curved surfaces		p. 104			
Oval	Oval flat type		<ul style="list-style-type: none">For workpieces with adsorption surface limitationsFor use when a large adsorption area is required for long and narrow workpieces				p. 170	p. 179

Select according to the workpiece, application, or industry

Film packaging

Packaging facility

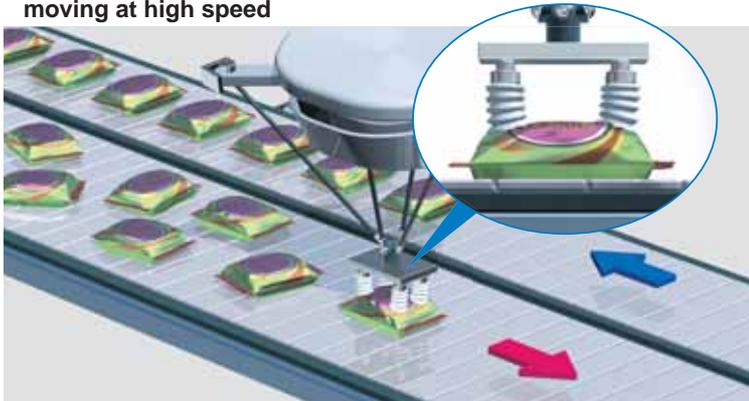
Food



· Good for film packaging applications



· For the adsorption of workpieces randomly moving at high speed



Applicable Pads

FDA regulation compliant

For Film Adsorption ZP3P
p. 266

4.5-Stage Bellows Pad ZP2
p. 276

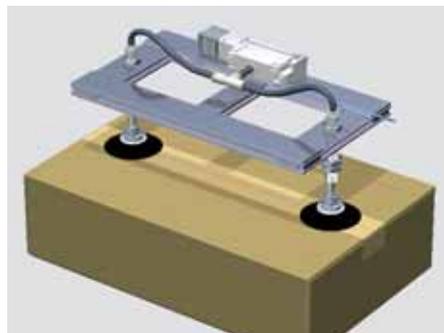


Corrugated boards

Carton former

Palletizer

Food



Applicable Pads

High Rigidity Pad ZP3E
p. 200



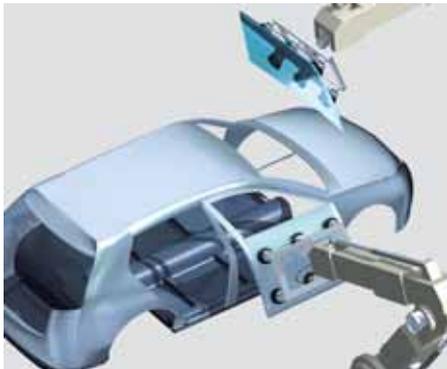
Select according to the workpiece, application, or industry

■ Glass

Automobile

Electronics

· For use where adsorption marks must not be left on workpieces



Applicable Pads

Mark-free Pad ZP3E

p. 200



Mark-free Pad ZP2

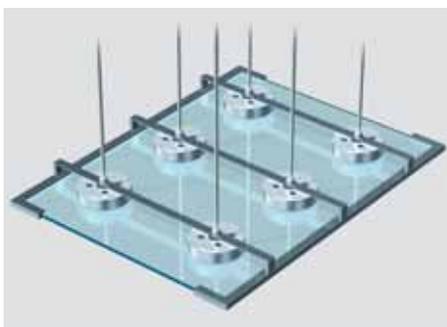
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■ FPD, Glass circuit boards

Automobile

Electronics



Applicable Pads

Mark-free Pad ZP3E

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Mark-free Pad ZP2

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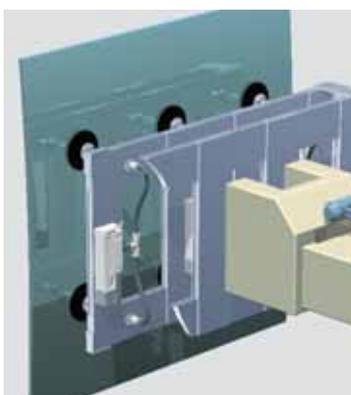
Non-contact Gripper XT661

p. 353



■ Iron plates, Metal

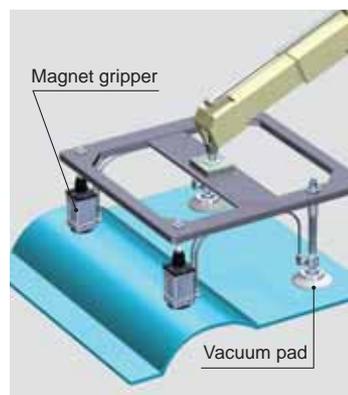
Automobile



Applicable Pads

High Rigidity Pad ZP3E

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Applicable Pads

Magnet Gripper MHM

p. 372



Select according to the workpiece, application, or industry

IC chips

Electronics



Applicable Pads

Nozzle Pad ZP2

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Compact Type ZP3

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Applicable Pads

Oval Pad ZP

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Oval Pad ZP2

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Applicable Pads

Pad with Ball Spline Buffer ZP2

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Applicable Pads

Sponge Pad ZP2

p. 290

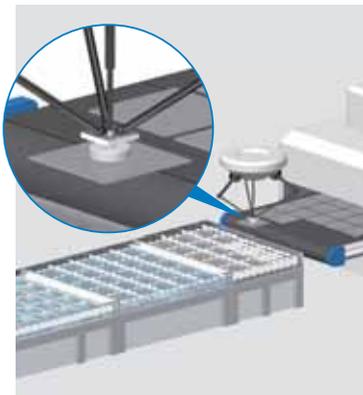


Solar battery cells

Electronics

Circuit boards with holes

Electronics



Applicable Pads

Non-contact Gripper XT661

p. 353



Applicable Pads

Non-contact Gripper XT661

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Mounting Bracket Assembly Model Index

Assembly part no.		Basic		Compact		Oval		High Rigidity		Special applications													
		ZP		ZP3		ZP		ZP2		Mark-free				Multistage		Flat	Nozzle	Sponge	For film adsorption				
		Standard	Ball joint	Standard	Standard	Standard	Standard	Standard	Ball joint	Standard	Ball joint	Standard	Ball joint	Standard	Ball joint	J	ZJ	MT	AN	S	Standard		
ZP	ZPB1	From p. 124			From p. 192				From p. 124														
	ZPB(1/2/3)(J/K)-	From p. 124	From p. 124		From p. 192	From p. 196			From p. 124												p. 275		
	ZPR(S/L)-	From p. 122			From p. 190	From p. 195			From p. 122								p. 284						
	ZPRF(1/2/3)-		From p. 128																				
	ZPT(1/2/3/4)-	From p. 121			From p. 189				From p. 121									From p. 283					
	ZPTF(1/2/3)-		From p. 127																				
	ZPY(1/2/3/4)-	From p. 123			From p. 191				From p. 123									p. 285					
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	ZPB-								From p. 257														
	ZP2A-					From p. 195				p. 261						p. 281	p. 288	p. 289	p. 293				
	ZP2B-									From p. 262													
ZP3	ZP3A-																						
	ZP3B-																						
ZP3E	ZP3EA-							From p. 237	From p. 241			From p. 237	From p. 241										
	ZP3EA-F								p. 241				p. 241										
	ZP3EB-							p. 240				p. 240											
	ZP3EU-(T/Y)F								p. 244				p. 244										
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	ZPNA-M8	From p. 121	p. 127		From p. 192				From p. 121								From p. 283						
	ZPNA-M8A					p. 164																	
	ZPNA-M10	From p. 124	From p. 127		p. 163		From p. 196		From p. 124													p. 124	
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	ZPNA-M12C																					p. 281	
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	ZPNA-M14A																						p. 281
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	ZPNA-M22								p. 240	p. 244					p. 240	p. 244							

Vacuum Pads

Basic Pad
ZP Series



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Compact Type
ZP3 Series



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Oval Pad
ZP/ZP2 Series



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High Rigidity Pad
ZP3E Series



p. 200

Pads for Special Applications
ZP2/ZP3P Series



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Made to Order
ZP/ZP2 Series



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Vacuum Saving Valve
ZP2V Series



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Non-contact Gripper
XT661 Series



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Magnet Gripper
MHM-X6400



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Model Selection p. 4

Basic Pad ZP Series p. 26

ø2, ø4, ø6, ø8, ø10, ø13, ø16, ø20, ø25, ø32, ø40, ø50



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 - How to Order p. 31
 - Dimensions/Models p. 32
- **Flat Type with Ribs**
 - How to Order p. 50
 - Dimensions/Models p. 51
- **Flat, Ball Joint Type**
 - How to Order p. 61
 - Dimensions/Models p. 62
- **Bellows Type**
 - How to Order p. 67
 - Dimensions/Models p. 68
- **Thin Flat Type**
 - How to Order p. 86
 - Dimensions/Models p. 87
- **Thin Flat Type with Ribs**
 - How to Order p. 95
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- **Deep Type**
 - How to Order p. 104
 - Dimensions/Models p. 105

Construction

- Flat type/Flat type with ribs/Bellows type/Thin flat type/
Thin flat type with ribs/Deep type p. 115
- Flat, Ball joint type p. 119

Mounting Bracket Assembly

- Flat type/Flat type with ribs/Bellows type/Thin flat type/
Thin flat type with ribs/Deep type p. 121
- Flat, Ball joint type p. 127

Specific Product Precautions p. 165

Compact Type ZP3 Series p. 132

ø1.5, ø2, ø3.5, ø4, ø6, ø8, ø10, ø13, ø16



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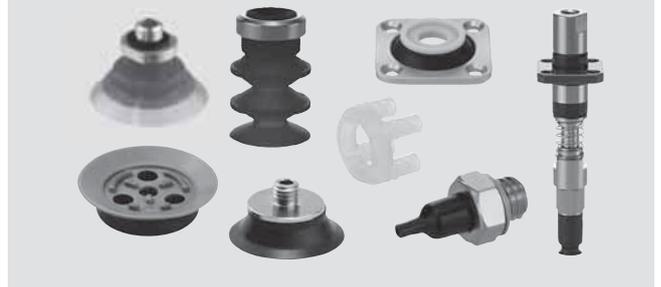
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1 Features and Precautions for Vacuum Adsorption

Systems which use vacuum adsorption as a method to hold workpieces have the following features.

- Compared with mechanical grippers and other similar products, they have a simpler construction and fewer moving parts.
- Workpieces of any shape can be adsorbed if they have an adsorption surface.
- No need for accurate positioning
- Compatible with soft and easily-deformed workpieces

However, special care is required regarding the following.

- Be careful not to drop workpieces during transfer. (Make sure there is no excessive acceleration, vibration, or impact.)
- The piping may become clogged by liquid or particles suctioned near the workpieces.
- It is necessary to appropriately position the pads in order to transfer heavy objects.
- The vacuum pads (rubber) will deteriorate at a rate depending on the operating environment and conditions.
- As the product life (replacement period) depends on the customer's operating conditions, it cannot be estimated beforehand.

A suction test with the actual equipment is recommended before selecting the product model.

Consider the features and precautions shown above, perform periodic maintenance, and take corrective actions regarding the operating conditions.

2 Vacuum Pad Selection

■ Vacuum Pad Selection Procedures

- 1) Fully taking into account the balance of a workpiece, identify the suction position, number of pads, and applicable pad diameter (or pad area).
 - * When selecting a model based on workpiece mass, there is a possibility that the workpieces won't be able to be adsorbed or that they will be dropped depending on the operating conditions (workpiece balance, transfer acceleration, pressure or friction force applied to the workpieces during transfer, etc.).
- 2) Find the theoretical lifting force from the identified adsorption area (pad area x number of pads) and the vacuum pressure, and then find the lifting force considering the safety factor of the actual lifting method and transfer conditions.
 - * Use the calculated values as a guideline (reference value) and check the actual values by performing a suction test as necessary.
- 3) Determine the necessary pad diameter (pad area) and suction position (workpiece balance) so that the lift force is larger than the weight of the workpieces.
- 4) Determine the pad form and materials, the necessity of a buffer based on the operating environment, and the workpiece shape and materials.
- 5) This product is not designed to hold vacuum.
- 6) Perform a suction test with the actual equipment to determine whether or not the product can be used.

The above shows the selection procedure for general vacuum pads; thus, it is not applicable to all pads. Customers are required to conduct a test on their own and to select applicable suction conditions and pads based on their test results.

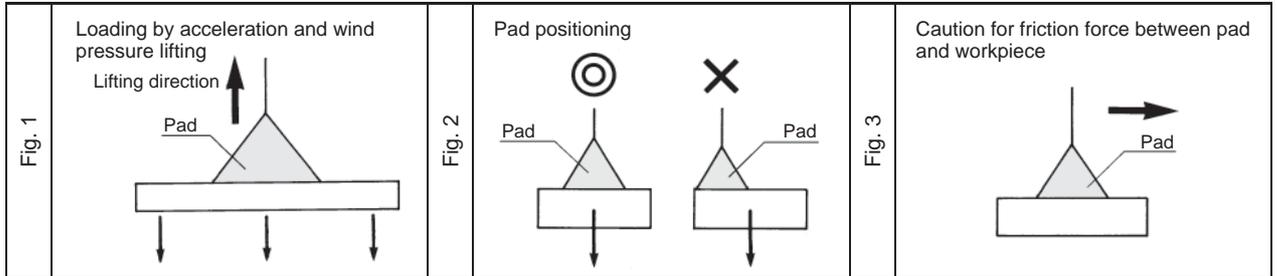
■ Points for Selecting Vacuum Pads

A. Shear Force and Moment Applied to Vacuum Pads

- a) Vacuum pads are susceptible to shear force (parallel force with adsorption surface) and moment.
- b) Minimize the moment applied to the vacuum pads with the position of the workpiece center of gravity in mind.
- c) The acceleration rate of the movement must be as small as possible, so be sure to take into consideration the wind pressure and impact. If measures to slow down the acceleration rate are introduced, workpieces will be less likely to be dropped.
- d) Avoid lifting workpieces by adsorbing the vertical side with vacuum pads (vertical lifting).
When it is unavoidable, a sufficient safety factor must be secured.

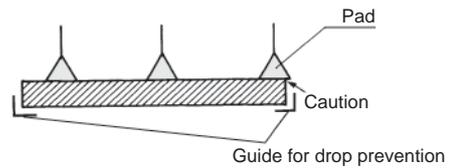
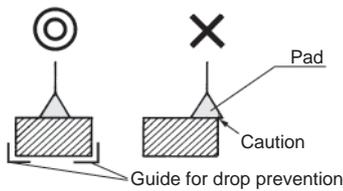
Lifting Force, Moment, Horizontal Force

- (Refer to Fig. 1) To lift workpieces vertically, be sure to take into consideration the acceleration rate, wind pressure, impact, etc., in addition to the mass of the workpieces.
- (Refer to Fig. 2) Because the pads are susceptible to moments, mount the pads so as not to allow the workpieces to create a moment.
- (Refer to Fig. 3) When workpieces that are suspended horizontally are moved laterally, they could shift depending on the extent of the acceleration rate or the size of the friction coefficient between the pad and the workpiece. Therefore, the acceleration rate of the lateral movement must be minimized.



Balance of Pad and Workpiece

- 1) Make sure that the pad's adsorption area is not larger than the surface of the workpiece to prevent vacuum leakage and unstable suction.
- 2) If multiple pads are used for transferring a flat object with a large surface area, properly allocate the pads to maintain balance. Also, make sure that the pads are aligned properly to prevent them from becoming disengaged along the edges.



Provide an auxiliary device (example: a guide for preventing workpieces from dropping) as necessary.

* Mount the guide for drop prevention so that no load is applied to the workpieces (it does not push the workpieces up). If a load is applied, it is applied to the pad when the guide for drop prevention is removed. This may cause workpieces to be dropped.

- 3) Consider that the load may increase at a certain place due to the suction balance.

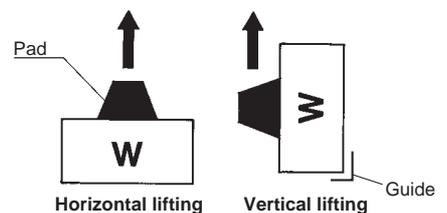
Formula examples with beams (Reference)

Load/Shape conditions			
Formula (Reactive force: R, Total load: W)	$RA = RB = P/2$ $W = P$	$RA = Pb/L$ $RB = Pa/L$ $W = P$	$RA = RC = 5Pb/16$ $RB = 11P/8$

Mounting Position

The basic mounting method is a horizontal lift. Do not perform suction when tilted, vertical suction, or holding suction (as the pads receive the load of the workpieces). If the unit must be installed in such a manner, be sure to provide a guide and take appropriate safety measures.

The vacuum pad is designed for workpiece transfer while suctioned from below. If workpieces are to be suctioned from below or held with the pad after being positioned by other components, perform a suction test to determine whether or not the transfer method is applicable.



B. Theoretical Lifting Force

- The theoretical lifting force is determined by the vacuum pressure and the contact area of the vacuum pad.
- Since the theoretical lifting force is the value measured at the static state, the safety factor responding to the actual operating conditions must be estimated.
- It is not necessarily true that higher vacuum pressure is better. Extremely high vacuum pressure may cause problems.
 - If the vacuum pressure is higher than necessary, an increase in the friction of the pads, the generation of cracks, the sticking of the pads to workpieces, and the sticking of the pads (bellows pad) are more likely to occur, possibly shortening the life of the pads.
 - Doubling the vacuum pressure makes the theoretical lifting force double, while doubling the pad diameter makes the theoretical lifting force quadruple.
 - When the vacuum pressure (set pressure) is high, it makes not only the response time longer but also the necessary energy to generate vacuum larger.

Example) Theoretical lifting force = Pressure x Area → 2 times

Pad diameter	Area [cm ²]	Vacuum pressure [-40 kPa]	Vacuum pressure [-80 kPa]
∅20	3.14	Theoretical lifting force 12 N	Theoretical lifting force 25 N
∅40	12.56	Theoretical lifting force 50 N	Theoretical lifting force 100 N

↓ 4 times

Lifting Force and Vacuum Pad Diameter

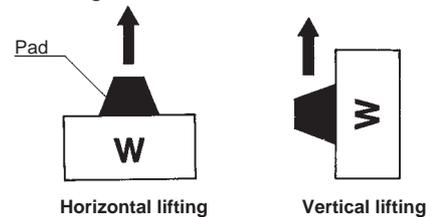
- The vacuum pressure should be set below the pressure that has been stabilized after adsorption. However, when workpieces are permeable or have a rough surface, note that the vacuum pressure drops since the workpieces take in air. In such cases, it is necessary to perform a suction test to check the vacuum pressure reached during suction.
- The vacuum pressure when using an ejector is approximately -40 to -60 kPa as a guide.

The theoretical lifting force of a pad can be found by calculation or from the theoretical lifting force table.

Calculation

$$W = P \times S \times 0.1 \times \frac{1}{t}$$

- W:** Lifting force [N]
P: Vacuum pressure [kPa]
S: Pad area [cm²]
t: Safety factor Horizontal lifting: 4 or more
 Vertical lifting: 8 or more



(This type of application should generally be avoided.)

Theoretical Lifting Force

The theoretical lifting force (not including the safety factor) can be determined by the pad diameter and vacuum pressure. The required lifting force can then be determined by dividing the theoretical lifting force by the safety factor t.

Lifting force = Theoretical lifting force ÷ t

Theoretical Lifting Force (Theoretical lifting force = P x S x 0.1)

Pad Size (∅1.5 to ∅50)

Pad size [mm]	∅1.5	∅2	∅3.5	∅4	∅6	∅8	∅10	∅13	∅16	∅20	∅25	∅32	∅40	∅50
S: Pad area [cm ²]	0.02	0.03	0.10	0.13	0.28	0.50	0.79	1.33	2.01	3.14	4.91	8.04	12.6	19.6
Vacuum pressure [kPa]	-85	0.15	0.27	0.82	1.07	2.40	4.2	6.6	11	17	26	41	68	106
	-80	0.14	0.25	0.77	1.00	2.26	4.0	6.2	10	16	25	39	64	100
	-75	0.13	0.24	0.72	0.94	2.12	3.7	5.8	10	15	23	36	60	94
	-70	0.12	0.22	0.67	0.88	1.98	3.5	5.5	9.3	14	22	34	56	87
	-65	0.11	0.20	0.63	0.82	1.84	3.2	5.1	8.6	13	20	31	52	81
	-60	0.11	0.19	0.58	0.75	1.70	3.0	4.7	8.0	12	18	29	48	75
	-55	0.10	0.17	0.53	0.69	1.55	2.7	4.3	7.3	11	17	27	44	69
	-50	0.09	0.16	0.48	0.63	1.41	2.5	3.9	6.7	10	15	24	40	62
	-45	0.08	0.14	0.43	0.57	1.27	2.2	3.5	6.0	9.0	14	22	36	56
-40	0.07	0.13	0.38	0.50	1.13	2.0	3.1	5.3	8.0	12	19	32	50	

Pad Size (ø63 to ø340)

[N]

Pad size [mm]	ø63	ø80	ø100	ø125	ø150	ø200	ø250	ø300	ø340
S: Pad area [cm ²]	31.2	50.2	78.5	122.7	176.6	314.0	490.6	706.5	907.5
Vacuum pressure [kPa]	-85	265	427	667	1043	1501	2669	4170	6005
	-80	250	402	628	982	1413	2512	3925	5652
	-75	234	377	589	920	1325	2355	3680	5299
	-70	218	351	550	859	1236	2198	3434	4946
	-65	203	326	510	798	1148	2041	3189	4592
	-60	187	301	471	736	1060	1884	2944	4239
	-55	172	276	432	675	971	1727	2698	3886
	-50	156	251	393	614	883	1570	2453	3533
	-45	140	226	353	552	795	1413	2208	3179
-40	125	201	314	491	706	1256	1962	2826	

Oval Pad (2 x 4 to 8 x 30, 30 x 50)

[N]

Pad size [mm]	2 x 4	3.5 x 7	4 x 10	5 x 10	6 x 10	4 x 20	5 x 20	6 x 20	8 x 20	4 x 30	5 x 30	6 x 30	8 x 30	30 x 50
S: Pad area [cm ²]	0.07	0.21	0.36	0.44	0.52	0.76	0.94	1.12	1.46	1.16	1.44	1.72	2.26	13.07
Vacuum pressure [kPa]	-85	0.60	1.79	3.0	3.7	4.4	6.4	7.9	9.5	12.4	9.8	12.2	14.6	19.2
	-80	0.56	1.68	2.8	3.5	4.1	6.0	7.5	8.9	11.6	9.2	11.5	13.7	18.0
	-75	0.53	1.58	2.7	3.3	3.9	5.7	7.0	8.4	10.9	8.7	10.8	12.9	16.9
	-70	0.49	1.47	2.5	3.0	3.6	5.3	6.5	7.8	10.2	8.1	10.0	12.0	15.8
	-65	0.46	1.37	2.3	2.8	3.3	4.9	6.1	7.2	9.4	7.5	9.3	11.1	14.6
	-60	0.42	1.26	2.1	2.6	3.1	4.5	5.6	6.7	8.7	6.9	8.6	10.3	13.5
	-55	0.39	1.16	1.9	2.4	2.8	4.1	5.1	6.1	8.0	6.3	7.9	9.4	12.4
	-50	0.35	1.05	1.8	2.2	2.6	3.8	4.7	5.6	7.3	5.8	7.2	8.6	11.3
	-45	0.32	0.95	1.6	1.9	2.3	3.4	4.2	5.0	6.5	5.2	6.4	7.7	10.1
-40	0.28	0.84	1.4	1.7	2.0	3.0	3.7	4.4	5.8	4.6	5.7	6.8	9.0	

■ Vacuum Pad Type

- Various types of vacuum pads are available such as flat, deep, bellows, thin flat, with ribs, oval, etc. Select the optimal form in accordance with the workpiece type and the operating environment. Please contact SMC for shapes not included in this catalog.

Pad Type

Pad form	Application
Flat type Flat type with groove 	To be used when the adsorption surface of workpieces is flat and not deformed
Flat type with ribs 	To be used when workpieces are likely to become deformed or for the reliable release of workpieces
Deep type 	To be used when workpieces are curved in shape
Bellows type Bellows type with groove 	To be used when there is not enough space to install a buffer or when the adsorption surface of workpieces is slanted
Oval type 	To be used when workpieces have a limited adsorption surface or are long in length and when the accurate positioning of workpieces is required

Pad form	Application
Ball joint pad 	To be used when the adsorption surface of workpieces is not horizontal
Conductive pad 	As a countermeasure against static electricity, rubber material with reduced resistance is used.
For film adsorption 	For film packaging applications
Nozzle type 	For small workpieces such as IC chips
Sponge 	For workpieces with bumps

Vacuum Pad Material

- It is necessary to determine vacuum pad materials carefully taking into account the shape of the workpieces, adaptability in the operating environment, effect after being adsorbed, electrical conductivity, etc.
- Based on the workpiece transfer example for each material, select after confirming the characteristics (adaptability) of the rubber.

Vacuum Pad/Workpiece Transfer Examples for Each Material

Material	Application
NBR	General workpieces, Corrugated boards, Veneer plates, Iron plates, etc.
Silicone rubber	Semiconductors, Removal from die-casting, Thin workpieces, Food processors
Urethane rubber	Corrugated boards, Iron plates, Veneer plates
FKM	Chemical workpieces
Conductive NBR	General semiconductor workpieces (Countermeasure against static electricity)
Conductive silicone rubber	Semiconductors (Countermeasure against static electricity)

- As the following materials are not suitable for use in specific environments, please select from the recommended materials.

Material	Specific environment	Example of problem	Recommended material
NBR, Conductive NBR	<ul style="list-style-type: none"> Ozone environments <Examples> In clean rooms Around static removal equipment Around motor devices 	Cracks are generated earlier on the portions to which stress is applied.	Silicone rubber Urethane rubber FKM Conductive silicone rubber
Urethane rubber	<ul style="list-style-type: none"> High-temperature, high-humidity environments 	Deformation, discoloration, or cracking occurs Adhesiveness increases	NBR Silicone rubber FKM Conductive silicone rubber

Rubber Material and Properties

- ◎ = Excellent --- Not affected at all, or almost no effect △ = Better not to use if possible
 ○ = Good --- Affected a little, but adequate resistance depending on conditions × = Unsuitable for usage. Severely affected.

General name		NBR (Nitrile rubber)	Silicone rubber	Urethane rubber	FKM (Fluoro rubber)	CR (Chloroprene rubber)	EPR (Ethylene propylene rubber)	Conductive NBR (Nitrile rubber)	Conductive silicone rubber	Conductive silicone sponge	Conductive CR sponge (Chloroprene sponge)
Main features		Good oil resistance, abrasion resistance, and aging resistance	Excellent heat resistance and cold resistance	Excellent mechanical strength	Best heat resistance and chemical resistance	Well balanced weather resistance, ozone resistance, and chemical resistance	Good aging resistance, ozone resistance, and electrical properties	Good oil resistance, abrasion resistance, and aging resistance Conductive	Excellent heat resistance and cold resistance Conductive	Excellent heat insulation and impact resilience	Excellent impact resilience and sound insulation Flame retardance
Pure rubber property (specific gravity)		1.00-1.20	0.95-0.98	1.00-1.30	1.80-1.82	1.15-1.25	0.86-0.87	1.00-1.20	0.95-0.98	0.4 g/cm ³	0.161 g/cm ³
Physical properties of compounded rubber	Impact resilience	○	◎	◎	△	◎	○	○	◎	× to △	× to △
	Abrasion resistance	◎	× to △	◎	◎	◎	○	◎	× to △	×	×
	Tear resistance	○	× to △	◎	○	○	△	○	× to △	×	×
	Flex crack resistance	○	× to ○	◎	○	○	○	○	× to ○	×	×
	Max. operating temperature [°C]	120	200	60	250	150	150	100	200	180	120
	Min. operating temperature [°C]	0	-30	0	0	-40	-20	0	-10	-30	-20
	Volume resistivity [Ωcm]	—	—	—	—	—	—	10 ⁴ or less	10 ⁴ or less	10 ⁵ or less	10 ⁵ or less
	Heat aging	○	◎	△	◎	○	○	○	◎	△	△
	Weather resistance	×	◎	◎	◎	◎	○	×	◎	△	△
	Ozone resistance	×	◎	◎	◎	○	◎	×	◎	△	△
Gas permeability resistance	○	× to △	× to △	× to △	○	× to △	○	× to △	×	×	
Solvent resistance	Gasoline/Gas oil	◎	× to △	◎	◎	○	×	◎	× to △	×	×
	Benzene/Toluene	× to △	×	× to △	◎	× to △	×	× to △	×	×	×
	Alcohol	◎	◎	△	△ to ◎	◎	◎	◎	◎	△	△
	Ether	× to △	× to △	×	× to △	× to △	○	× to △	× to △	×	×
	Ketone (MEK)	×	○	×	×	△ to ○	◎	×	○	×	×
Oil resistance	Ethyl acetate	× to △	△	× to △	×	× to △	◎	× to △	△	×	×
	Water	◎	○	×	◎	◎	◎	◎	○	○	○
	Organic acid	× to △	○	×	△ to ○	× to △	×	× to △	○	×	×
	Organic acid of high concentration	△ to ○	△	×	◎	○	○	△ to ○	△	×	×
	Organic acid of low concentration	○	○	△	◎	◎	◎	○	○	×	×
Alkaline resistance	Strong alkali	○	◎	×	○	◎	◎	○	◎	△	△
	Weak alkali	○	◎	×	○	◎	◎	○	◎	△	△

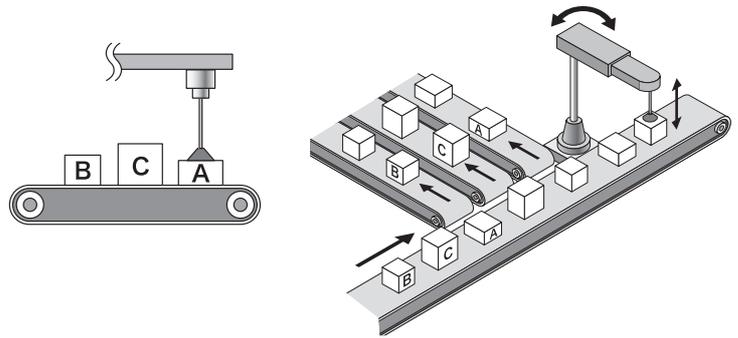
- * The indicated physical properties, chemical resistance, and other numerical values are only approximate values to be used for reference. They are not guaranteed values.
- The above general characteristics may change according to the working conditions and the working environment.
- When determining the material, carry out adequate confirmation and verification in advance.
- SMC will not bear responsibility concerning the accuracy of data or any damage arising from this data.

Buffer Attachment

- Choose the buffer type when the workpieces are of varying heights, the workpieces are fragile, or you need to reduce the impact to the pads. If rotation needs to be limited, use a non-rotating buffer.
- The buffer is manufactured for the purpose of protecting the pads from impact when the pads are applied to workpieces. An eccentric load applied to the buffer caused by piping (tubing) or the position of the attachment, or an improper tightening torque used when the buffer is attached may lead to poor sliding or a shortened product life. Also, minimize the load in the lateral direction.
- Prevent eccentric loads caused by piping (tubing) from being applied to the buffer. Route the tube piping with some degree of freedom, and ensure that it extends in the direction of the fitting. Also, make adjustments as required to prevent long piping, piping bundles, piping material, etc., from becoming a load.
- Use the buffer within the stroke.

Unsteady Distance between Pads and Workpieces

When the workpieces are of varying heights, use the buffer type pad with a built-in spring. The spring creates a cushion effect between the pads and the workpieces. If rotation needs to be limited further, use the non-rotating buffer type.

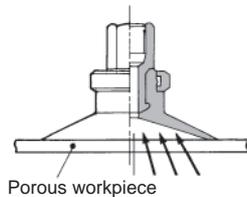


Pad Selection by Workpiece Type

- Carefully select the pads for the following workpieces.

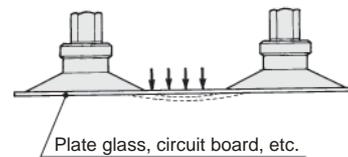
1. Porous Workpieces

To adsorb permeable workpieces such as paper, select pads with a small diameter that are sufficient to lift the workpieces. Because a large amount of air leakage could reduce the pads' suction force, it may be necessary to increase the capacity of the ejector or vacuum pump or to enlarge the conductance area of the piping passage.



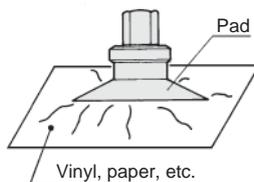
2. Flat Plate Workpieces

When workpieces with a large surface area such as sheet glass or PCB are suspended, the workpieces could move in a wavelike motion if a large force is applied by wind pressure or impact. Therefore, it is necessary to ensure the proper allocation and size of pads.



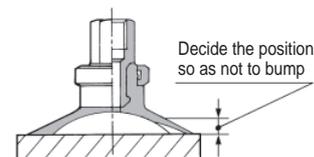
3. Soft Workpieces

When soft workpieces such as vinyl, paper, or thin sheets are adsorbed, the vacuum pressure could cause the workpieces to become deformed or wrinkle. In such cases, it will be necessary to use small pads or ribbed pads and reduce the vacuum pressure.



4. Impact to Pads

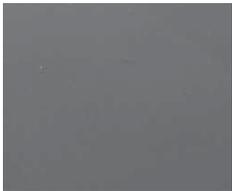
When pushing a pad to a workpiece, make sure not to apply an impact or a large force which would lead to premature deformation, cracking, or wearing of the pad. Pads should only be pushed against workpieces to the extent that their skirt portion deforms or their ribbed portion comes into slight contact with the workpieces. Especially, when using smaller diameter pads, make sure to position them correctly.



■ Pad Selection by Workpiece Type

5. Adsorption Marks

The main causes of adsorption marks are as follows:

	Before suction	After suction	Countermeasure
Marks due to deformed (lined) workpieces			1) Reduce the vacuum pressure. If the lifting force is inadequate, increase the number of pads. 2) Select a pad with a smaller center area.
	Suction conditions: Workpiece: Vinyl Vacuum pad: ZP20CS Vacuum pressure: -40 kPa		
Marks due to components contained in the rubber pads (material) moving to the workpieces			Use the following products. 1) Mark-free NBR pad 2) ZP2 series <ul style="list-style-type: none"> • Fluororesin-coated pad • Resin attachment
	Suction conditions: Workpiece: Glass Vacuum pad: ZP20CS Vacuum pressure: -40 kPa		
Marks which remain on the rough surface of the workpieces due to wearing of the rubber (pad material)			Use the following products. 1) ZP2 series <ul style="list-style-type: none"> • Fluororesin-coated pad • Resin attachment
	Suction conditions: Workpiece: Resin plate (Surface roughness 2.5 μ) Vacuum pad: ZP20CS Vacuum pressure: -80 kPa		

■ Vacuum Pad Durability

- The vacuum pads (rubber) need to be checked periodically for deterioration.
- When vacuum pads are used continuously, the following problems may occur.
 - 1) Wearing of the adsorption surface
 Shrinkage of the pad dimensions, sticking of the part where the rubber materials come into contact with each other (bellows pad)
 - 2) Weakening of the rubber parts (skirt of the adsorption surface, bending parts, etc.)

* This may occur at an early stage depending on the operating conditions (high vacuum pressure, suction time [vacuum holding], etc.).
- Decide when to replace the pads, referring to the signs of deterioration, such as changes in the appearance due to wear, reduction in the vacuum pressure, or delay in the transport cycle time.

3 Vacuum Ejector and Vacuum Switching Valve Selection

Formula for Calculating Vacuum Ejector and Switching Valve Size

Average suction flow rate for achieving adsorption response time

$$Q = \frac{V \times 60}{T_1} + Q_L$$

$$T_2 = 3 \times T_1$$

Q: Average suction flow rate [L/min (ANR)]

V: Piping capacity [L]

T₁: Arrival time to stable **P_v** 63% after adsorption [sec]

T₂: Arrival time to stable **P_v** 95% after adsorption [sec]

Q_L: Leakage volume during workpiece adsorption [L/min (ANR)] *1

Max. suction flow rate

$$Q_{max} = (2 \text{ to } 3) \times Q \text{ [L/min (ANR)]}$$

<Selection Procedure>

• **Ejector**

Select an ejector with a maximum suction flow rate greater than the **Q_{max}** indicated above.

• **Direct operation valve**

$$\text{Conductance } C = \frac{Q_{max}}{55.5} \text{ [dm}^3\text{/(s-bar)]}$$

* Select a valve (solenoid valve) with a conductance that is greater than that of the conductance **C** formula given above from the related equipment (**Web Catalog**).

*1 **Q_L: 0** when no leakage occurs during workpiece adsorption

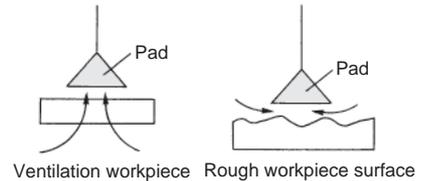
If there is leakage during workpiece adsorption, find the leakage volume based on "4. Leakage Volume during Workpiece Adsorption."

* The tube piping capacity can be found in "3 Data: Piping Capacity by Tube I.D. (Selection Graph (2))."

4 Leakage Volume during Workpiece Adsorption

Air could be drawn in depending on the type of workpiece. As a result, the vacuum pressure in the pads declines and the amount of vacuum that is necessary for adsorption cannot be attained.

When this type of workpiece must be handled, it is necessary to select an ejector and vacuum switching valve of the proper size by taking into consideration the amount of air that could leak through the workpieces.



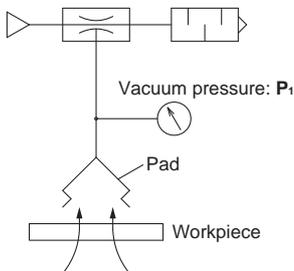
Leakage Volume from Conductance of Workpieces

Leakage volume **Q_L = 55.5 x C_L**

Q_L: Leakage volume [L/min (ANR)]

C_L: Conductance between workpieces and pads, and workpiece opening area [dm³/(s-bar)]

Leakage Volume from Suction Test



As described in the illustration to the left, adsorb the workpiece with the ejector, using the ejector, pad, and vacuum gauge. At this time, read the vacuum pressure **P₁**, obtain the suction flow rate from the flow rate characteristics graph for the ejector that is being used, and render this amount as the leakage of the workpiece.

Exercise: Using a supply pressure of 0.45 MPa, when the ejector (ZH07□S) adsorbed a workpiece that leaks air, the vacuum gauge indicated a pressure of -53 kPa. Calculate the leakage volume from the workpiece.

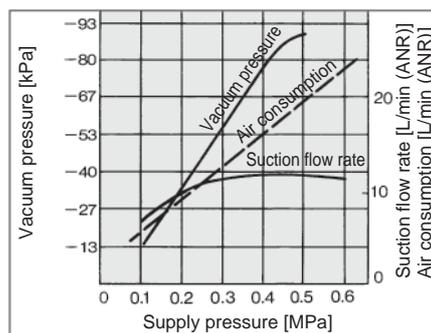
<Selection Procedure>

When obtaining the suction flow rate at a vacuum pressure of -53 kPa from the ZH07DS flow rate characteristics graph, the suction flow rate is 5 L/min (ANR). (A→B→C)

Leakage volume ≈ Suction flow rate 5 L/min (ANR)

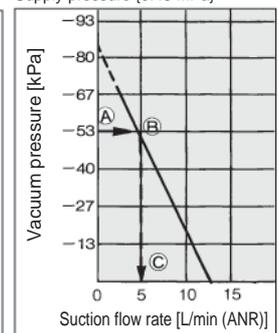
ZH07BS, ZH07DS

Exhaust Characteristics



Flow Rate Characteristics

Supply pressure (0.45 MPa)



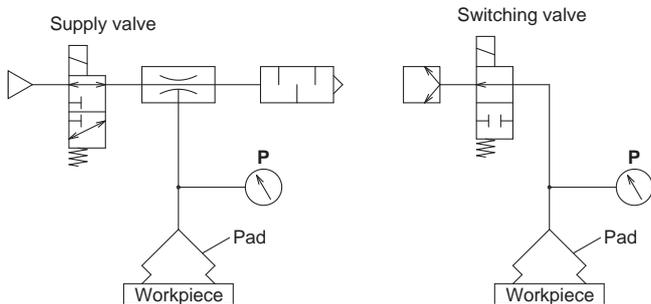
5 Adsorption Response Time

When vacuum pads are used for the adsorption transfer of workpieces, the approximate adsorption response time can be obtained (the length of time it takes for the pads' internal vacuum pressure to reach the pressure that is required for adsorption after the supply valve {vacuum switching valve} has been operated). An approximate adsorption response time can be obtained through formulas and selection graphs.

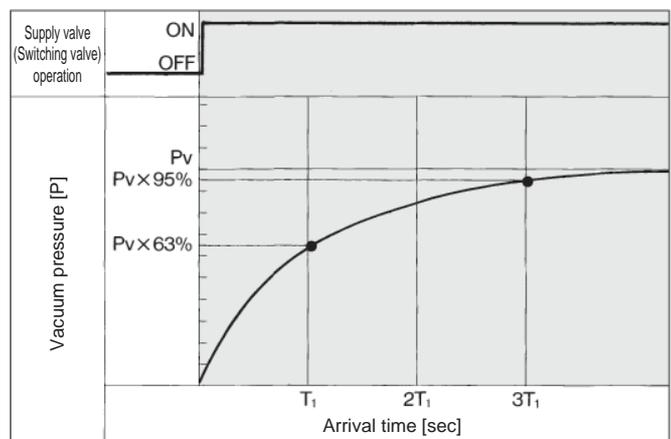
Relationship between Vacuum Pressure and Response Time after Supply Valve (Switching Valve) is Operated

The relationship between the vacuum pressure and the response time after the supply valve (switching valve) is operated is shown below.

Vacuum System Circuit



Vacuum Pressure and Response Time after Supply Valve (Switching Valve) is Operated



Pv: Final vacuum pressure
T1: Arrival time to 63% of final vacuum pressure **Pv**
T2: Arrival time to 95% of final vacuum pressure **Pv**

Formula for Calculating Adsorption Response Time

Adsorption response times **T1** and **T2** can be obtained through the formulas given below.

<p>Adsorption response time $T_1 = \frac{V \times 60}{Q}$</p> <p>Adsorption response time $T_2 = 3 \times T_1$</p> <p>Piping capacity</p> <p>$V = \frac{3.14}{4} D^2 \times L \times \frac{1}{1000}$ [L]</p>	<p>T1: Arrival time to 63% of final vacuum pressure Pv [sec]</p> <p>T2: Arrival time to 95% of final vacuum pressure Pv [sec]</p> <p>Q1: Average suction flow rate [L/min (ANR)]</p> <p>Calculation of average suction flow rate</p> <ul style="list-style-type: none"> • Ejector $Q_1 = (1/2 \text{ to } 1/3) \times \text{Ejector max. suction flow rate}$ [L/min (ANR)] • Vacuum pump $Q_1 = (1/2 \text{ to } 1/3) \times 55.5 \times \text{Conductance of switching valve}$ [dm³/(s·bar)] <p>D: Piping diameter [mm]</p> <p>L: Length from ejector and switching valve to pad [m]</p> <p>V: Piping capacity from ejector and switching valve to pad [L]</p> <p>Q2: Max. flow from ejector and switching valve to pad by piping system $Q_2 = C \times 55.5$ L/min (ANR)</p> <p>Q: Smaller one between the Q1 and Q2 [L/min (ANR)]</p> <p>C: Conductance of piping [dm³/(s·bar)]</p>
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For the conductance, the equivalent conductance can be found in “**8 Data: Conductance by Tube I.D. (Selection Graph (3))**”.

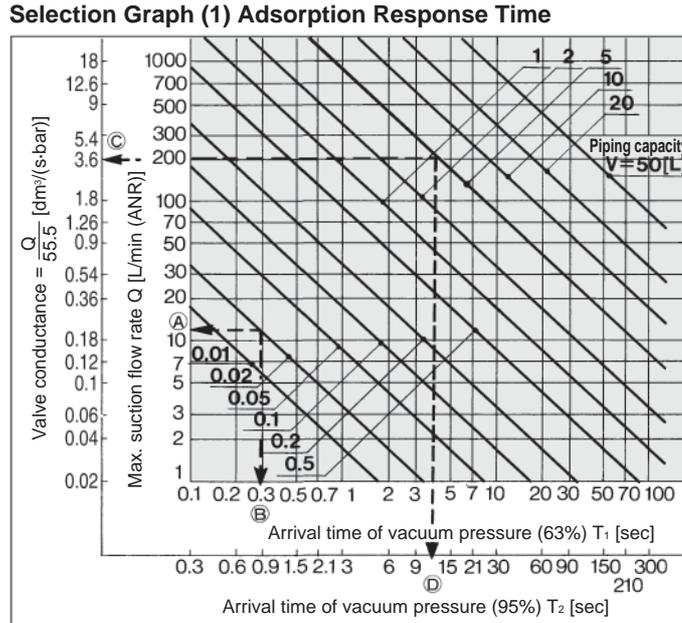
■ Adsorption Response Time from the Selection Graph

1. Tube Piping Capacity

The piping capacity from the ejector and the switching valve of the vacuum pump system to the pad can be found in “**8** Data: Piping Capacity by Tube I.D. (Selection Graph (2)).”

2. Obtain the adsorption response times.

By operating the supply valve (switching valve) that controls the ejector (vacuum pump), the adsorption response times **T₁** and **T₂** that elapsed before the prescribed vacuum pressure is reached can be obtained from Selection Graph (1).



* Conversely, the size of the ejector or the size of the switching valve of the vacuum pump system can be obtained from the adsorption response time.

How to read the graph

Example 1: For obtaining the adsorption response time until the pressure in the piping system with a piping capacity of 0.02 L is discharged to 63% (**T₁**) of the final vacuum pressure through the use of a ZH07□S vacuum ejector with a maximum suction flow rate of 12 L/min (ANR)

<Selection Procedure>

From the point at which the vacuum ejector’s maximum vacuum suction flow rate of 12 L/min (ANR) and the piping capacity of 0.02 L intersect, the adsorption response time **T₁** that elapses until 63% of the maximum vacuum pressure is reached can be obtained. (Sequence in Selection Graph (1), (A)→(B)) **T₁ ≈ 0.3 seconds**

Example 2: For obtaining the discharge response time until the internal pressure in the 5 L tank is discharged to 95% (**T₂**) of the final vacuum pressure through the use of a valve with a conductance of 3.6 dm³/(s·bar)

<Selection Procedure>

From the point at which the valve’s conductance of 3.6 dm³/(s·bar) and the piping capacity of 5 L intersect, the discharge response time (**T₂**) that elapses until 95% of the final vacuum pressure is reached can be obtained. (Sequence in Selection Graph (1), (C)→(D)) **T₂ ≈ 12 seconds**

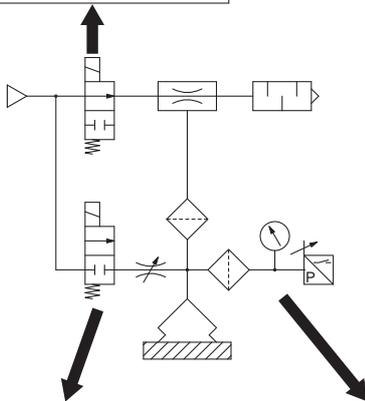
6 Precautions for Vacuum Equipment Selection and SMC's Proposals

Safety Measures

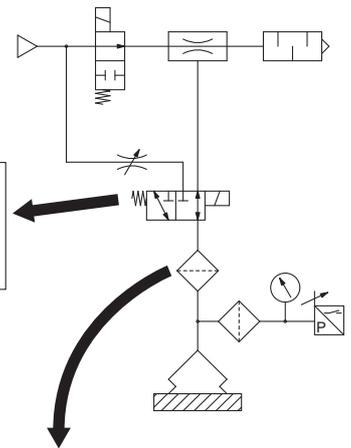
- Make sure to provide a safe design that takes into account vacuum pressure drops caused by power supply disruptions or a lack of supply air. Drop prevention measures must be taken in particular when the dropping of workpieces presents some degree of danger.

Precautions for Vacuum Equipment Selection

As a countermeasure for power outages, select a supply valve that is normally open or one that is equipped with a self-holding function.

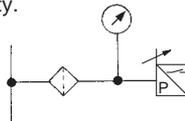


Be aware that the composite conductance consisting of the areas from the pad to the ejector of a vacuum switching valve does not decrease.



For the release valve, select a 2/3-port valve with a low-vacuum specification. Also, use a needle valve to regulate the release flow rate.

- During the adsorption and transfer of workpieces, checking of the vacuum switch values is recommended.
- In addition, visually check the vacuum gauge values when handling a heavy or a hazardous item.
- Install a filter (ZFA, ZFB, ZFC series) before the pressure switch if the ambient air is of low quality.



Use a suction filter (ZFA, ZFB, ZFC series) to protect the switching valve and to prevent the ejector from becoming clogged. Also, a suction filter must be used in dusty environments. If only the unit's filter is used, it will become clogged quickly.

Vacuum Ejector or Pump and Number of Vacuum Pads

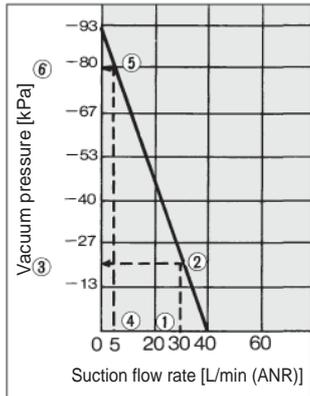
Ejector and number of pads		Vacuum pump and number of pads	
Ideally, one pad should be used for each ejector.	When more than one pad is attached to a single ejector, if one of the workpieces becomes detached, the vacuum pressure will drop, causing the other workpieces to become detached. Therefore, the countermeasures listed below must be taken. <ul style="list-style-type: none"> • Adjust the needle valve to minimize the pressure fluctuation between adsorption and non-adsorption operations. • Provide a vacuum switching valve to each individual pad to minimize the influence on other pads if an adsorption error occurs. 	Ideally, one pad should be used for each line.	When more than one pad is attached to a single vacuum line, take the countermeasures listed below. <ul style="list-style-type: none"> • Adjust the needle valve to minimize the pressure fluctuation between adsorption and non-adsorption operation. • Include a tank and a vacuum pressure reduction valve (vacuum pressure regulator valve) to stabilize the source pressure. • Provide a vacuum switching valve to each individual pad to minimize the influence on other pads if an adsorption error occurs.

Vacuum Ejector Selection and Handling Precautions

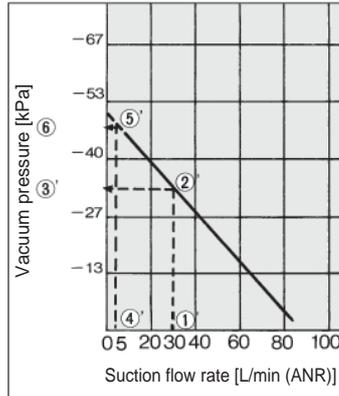
Ejector Selection

There are 2 types of ejector flow rate characteristics: the high-vacuum type (S type) and the high-flow type (L type). During selection, pay particular attention to the vacuum pressure when adsorbing workpieces that leak.

High Vacuum Type Flow Rate Characteristics/ ZH13□S



High Flow Type Flow Rate Characteristics/ ZH13□L

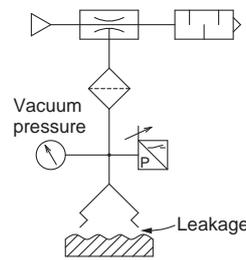


The vacuum pressure varies in accordance with the leakage volumes indicated in the above diagrams.

If the leakage volume is 30 L/min (ANR), the vacuum pressure of the S type is -20 kPa ① → ② → ③, and for the L type it is -33 kPa ①' → ②' → ③'. If the leakage volume is 5 L/min (ANR), the vacuum pressure of the S type is -80 kPa ④ → ⑤ → ⑥, and for the L type it is -47 kPa ④' → ⑤' → ⑥'. Thus, if the leakage volume is 30 L/min (ANR), the L type can attain a higher vacuum pressure, and if the leakage volume is 5 L/min (ANR), the S type can attain a higher vacuum pressure.

Thus, during the selection process, make sure to take the flow rate characteristics of the high-vacuum type (S type) and the high-flow type (L type) into consideration in order to select the type that is optimal for your application.

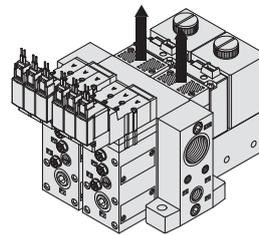
Ejector Nozzle Diameter Selection



If a considerable amount of leakage occurs between the workpieces and the pads, resulting in incomplete adsorption, or to shorten the adsorption and transfer time, select an ejector nozzle with a larger diameter from the ZH, ZR, or ZL series.

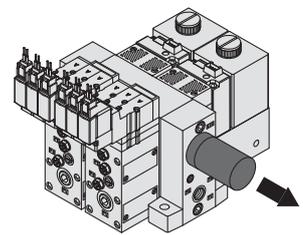
Manifold Use

Individual exhaust



If there are a large number of ejectors that are linked on a manifold and operated simultaneously, use the built-in silencer type or the port exhaust type.

Centralized exhaust



If there are a large number of ejectors that are linked on a manifold, which exhaust collectively, install a silencer at both ends. If the exhaust must be discharged outdoors through piping, make the diameter of the piping larger to control its back pressure to 5 kPa or less so that the back pressure will not affect the operation of the ejectors.

- If the vacuum ejector makes an intermittent noise (abnormal noise) from the exhaust at a certain supply pressure, the vacuum pressure may not be stable. No problems should arise from using the vacuum ejector in this state. However, if the noise is disturbing or affects the operation of the vacuum pressure switch, lower or raise the supply pressure a little at a time, and use within an air pressure range that does not produce the intermittent noise.

Supply Pressure of Vacuum Ejector

- It is recommended to use the vacuum ejector at the standard supply pressure. The maximum vacuum pressure and suction flow rate can be obtained when the vacuum ejector is used at the standard supply pressure, and as a result, the adsorption response time also improves. From the viewpoint of energy saving, it is most effective to use the ejector at the standard supply pressure. Since using it at an excessive supply pressure may cause the ejector performance to decline, it is recommended that it be used at the standard supply pressure.

■ Timing for Vacuum Generation and Suction Verification

A. Timing for Vacuum Generation

The time for opening/closing the valve will be counted if vacuum is generated after the adsorption pad descends to adsorb a workpiece. Also, there may be a delay in the generation of vacuum since the operational pattern of the verification switch, which is used for detecting the descending vacuum pad, is varied.

To solve this issue, we recommend that vacuum be generated in advance, before the vacuum pads begin to descend to the workpieces. Adopt this method after confirming that there will be no misalignment resulting from the workpieces' light weight.

B. Suction Verification

When lifting a vacuum pad after adsorbing a workpiece, confirm that there is a suction verification signal from the vacuum pressure switch before the vacuum pad is lifted. If the vacuum pad is lifted based on the timing of a timer, etc., the workpiece may be left behind.

In general adsorption transfer, the time for adsorbing a workpiece is slightly different since the position of the vacuum pad and the workpiece are different after every operation. Therefore, program a sequence in which the suction completion is verified by a vacuum pressure switch, etc., before moving to the next operation.

C. Set Pressure for the Vacuum Pressure Switch

Set the optimum value after calculating the required vacuum pressure for lifting workpieces.

If a higher pressure than required is set, there is a possibility of being unable to confirm the suction even though a workpiece is being adsorbed. This will result in a suction error.

When setting vacuum pressure switch set values, you should set using a lower pressure, with which workpieces can be adsorbed, only after considering the acceleration or vibration when the workpieces are transferred. The set value of the vacuum pressure switch shortens the time required to lift the workpieces. Since a switch detects whether a workpiece is being lifted or not, the pressure must be set high enough to detect it.

Vacuum Pressure Switch (ZSE series) Flow Sensor (PFMV series) Vacuum Pressure Gauge (GZ series)

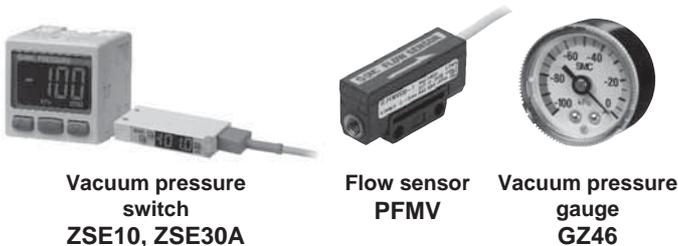
When adsorbing and transferring workpieces, check the vacuum pressure switch values as much as possible. (In addition, visually check the vacuum gauge values, especially when handling a heavy or hazardous item.)

Approx. $\phi 1$ adsorption nozzle

The difference in pressure between ON and OFF is reduced depending on the capacity of the ejector and the vacuum pump.

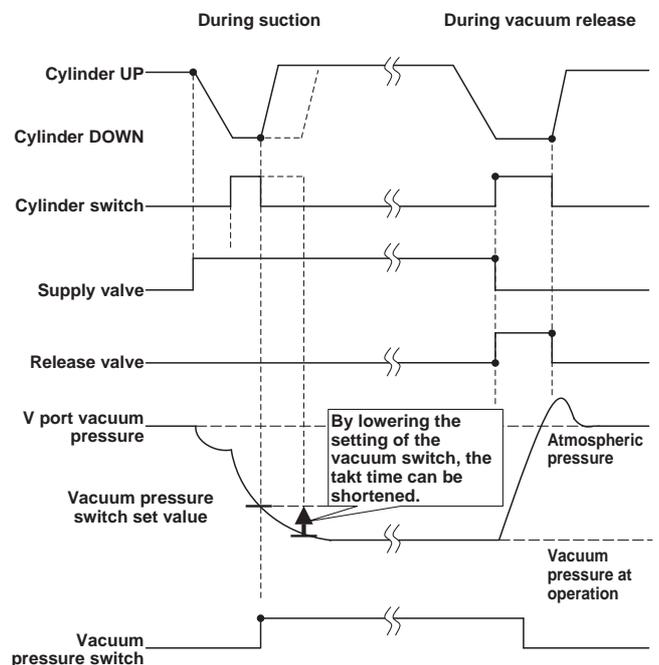
In such cases, it is necessary to use a **ZSE 10 or ZSE 30 A digital pressure switch with a fine smallest settable increment or a flow switch for flow rate detection.**

- * • A vacuum generator with a large suction capacity will not be detected properly, so an ejector with an appropriate capacity must be selected.
- Since the hysteresis is small, vacuum pressure must be stabilized.



Refer to the [Web Catalog](#) for details.

Timing Chart Example



Dust and Vacuum Equipment

- When vacuum equipment is used, not only the workpieces but also the dust in the surrounding environment is taken into the equipment. Preventing the intrusion of dust is more important for vacuum equipment than it is for any other kind of pneumatic equipment. Some of SMC's vacuum equipment comes with a filter, but when there is a large amount of dust, an additional filter must be installed.
- When vaporized materials such as oil or adhesive are sucked into the equipment, they accumulate inside, which may cause problems.
- It is important to prevent dust from entering the vacuum equipment as much as possible.
 - (1) Make sure to keep the working environment and the surrounding area of the workpieces clean so that dust will not be sucked into the equipment.
 - (2) Check the amount and types of dust before using the equipment and install a filter, etc., in the piping when necessary.
 - (3) Conduct a test and make sure that operating conditions are cleared before using the equipment.
 - (4) Perform filter maintenance according to how dirty the filter becomes.
 - (5) Filter clogging generates a pressure difference between the adsorption and ejector parts. This requires attention since clogging can prevent proper adsorption from being achieved.

Air Suction Filter (ZFA, ZFB, ZFC series)

- To protect the switching valve and the ejector from becoming clogged, a suction filter in the vacuum circuit is recommended.
- When using an ejector in dusty environments, the unit's filter will become clogged quickly, so it is recommended that a ZFA, ZFB, or ZFC series filter be used concurrently.

Vacuum Line Equipment Selection

Determine the volume of the suction filter and the conductance of the switching valve in accordance with the maximum suction flow rate of the ejector and the vacuum pump. Make sure that the conductance is greater than the value that has been obtained through the formula given below. (If the devices are connected in series in the vacuum line, their conductance values must be combined.)

$$C = \frac{Q_{\max}}{55.5}$$

C: Conductance [dm³/(s·bar)]
Q_{max}: Max. suction flow rate [L/min (ANR)]

7 Vacuum Equipment Selection Example

Transfer of Semiconductor Chips

Selection conditions

- (1) Workpiece: Semiconductor chips, Dimensions: 8 mm x 8 mm x 1 mm, Weight: 1 g
- (2) Vacuum piping length: 1 m
- (3) Adsorption response time: 300 ms or less

1. Vacuum Pad Selection

- (1) Based on the workpiece size, the pad diameter is 4 mm (1 pc.).
- (2) Using the formula on page 7, check the lifting force.

$$W = P \times S \times 0.1 \times 1/t$$

$$0.0098 = P \times 0.13 \times 0.1 \times 1/4$$

$$P = 3.0 \text{ kPa}$$

$$W = 1 \text{ g} = 0.0098 \text{ N}$$

$$S = \pi/4 \times (0.4)^2 = 0.13 \text{ cm}^2$$

$$t = 4 \text{ (Horizontal lifting)}$$

According to the calculation, -3.0 kPa or more of vacuum pressure can adsorb the workpieces.

- (3) Based on the workpiece shape and type, select:

Pad form: Flat type with groove

Pad material: Silicone rubber

- (4) According to the results above, select the vacuum pad part number ZP3-04UMS.

2. Vacuum Ejector Selection

- (1) Find the vacuum piping capacity.

Assuming that the tube I.D. is 2 mm, the piping capacity is as follows:

$$V = \pi/4 \times D^2 \times L \times 1/1000 = \pi/4 \times 2^2 \times 1 \times 1/1000 \\ = 0.0031 \text{ L}$$

- (2) Assuming that leakage (Q_L) during adsorption is 0, find the average suction flow rate to meet the adsorption response time using the formula on page 12.

$$Q = (V \times 60) / T_1 + Q_L = (0.0031 \times 60) / 0.3 + 0 = 0.62 \text{ L}$$

From the formula on page 12, the maximum suction flow rate Q_{max} is

$$Q_{max} = (2 \text{ to } 3) \times Q = (2 \text{ to } 3) \times 0.62 \\ = 1.24 \text{ to } 1.86 \text{ L/min (ANR)}$$

According to the maximum suction flow rate of the vacuum ejector, a nozzle with a 0.5 diameter can be used.

If a ZX series vacuum ejector is used, the ZX105□ representative model can be selected.

(Based on the operating conditions, specify the complete part number for the vacuum ejector to be used.)

3. Adsorption Response Time Confirmation

Confirm the adsorption response time based on the characteristics of the vacuum ejector selected.

- (1) The maximum suction flow rate of the ZX105□ vacuum ejector is 5 L/min (ANR).

From the formula on page 13, the average suction flow rate Q_1 is as follows:

$$Q_1 = (1/2 \text{ to } 1/3) \times \text{Ejector max. suction flow rate} \\ = (1/2 \text{ to } 1/3) \times 5 = 2.5 \text{ to } 1.7 \text{ L/min (ANR)}$$

- (2) Next, find the maximum flow rate Q_2 of the piping. The conductance C is 0.22 from Selection Graph (3).

From the formula on page 13, the maximum flow rate is as follows:

$$Q_2 = C \times 55.5 = 0.22 \times 55.5 = 12.2 \text{ L/min (ANR)}$$

- (3) Since Q_2 is smaller than Q_1 , $Q = Q_1$.

Thus, from the formula on page 13, the adsorption response time is as follows:

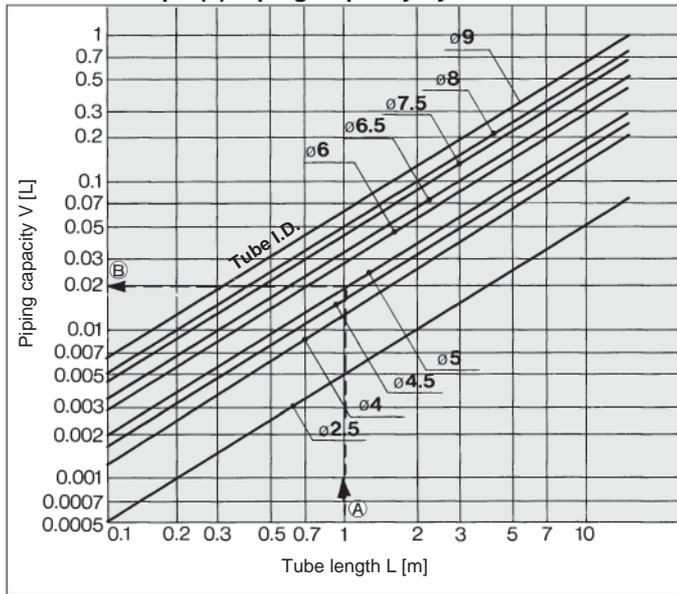
$$T = (V \times 60) / Q = (0.0031 \times 60) / 1.7 = 0.109 \text{ s} \\ = 109 \text{ ms}$$

It is possible to confirm that the calculation result satisfies the required specification of 300 ms.

8 Data

Selection Graph

Selection Graph (2) Piping Capacity by Tube I.D.



How to read the graph

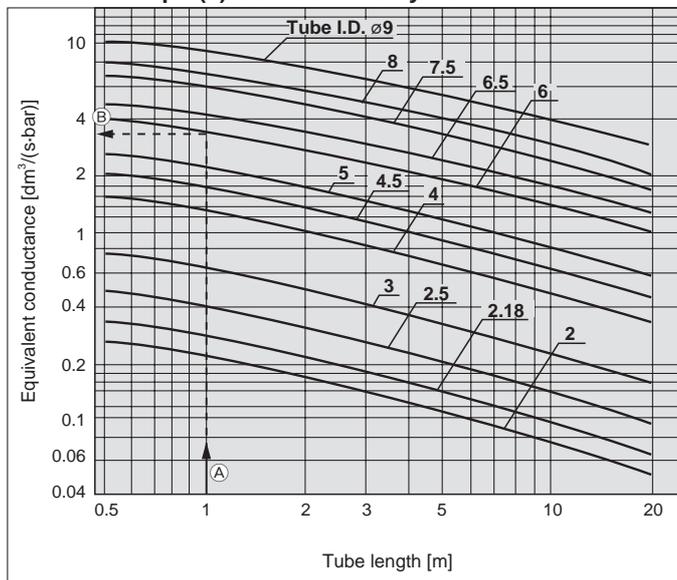
Example: For obtaining the capacity of a tube with an I.D. of ø5 and a length of 1 meter

<Selection Procedure>

By extending leftward from the point at which the 1 meter tube length on the horizontal axis intersects the line for a tube with an I.D. of ø5, a piping capacity approximately equivalent to 0.02 L can be obtained on the vertical axis.

Piping capacity ≈ 0.02 L

Selection Graph (3) Conductance by Tube I.D.



How to read the graph

Example: A ø8/ø6 sized tube with a length of 1 meter

<Selection Procedure>

By extending leftward from the point at which the 1 meter tube length on the horizontal axis intersects the line for a tube with an I.D. of ø6, an equivalent conductance of approximately 3.6 dm³/(s·bar) can be obtained on the vertical axis.

Equivalent conductance ≈ 3.6 dm³/(s·bar)

Glossary of Terms

Terms	Description
(Max.) suction flow rate	Volume of air taken in by the ejector The maximum value is the volume of air taken in without having anything connected to the vacuum port.
Maximum vacuum pressure	The maximum value of the vacuum pressure generated by the ejector
Air consumption	The compressed volume of air consumed by the ejector
Standard supply pressure	The optimal supply pressure for operating the ejector
Exhaust characteristics	The relationship between the vacuum pressure and the suction flow rate when the supply pressure to the ejector has been changed
Flow rate characteristics	The relationship between the vacuum pressure and the suction flow rate with the standard supply pressure supplied to the ejector
Vacuum pressure switch	Pressure switch for verifying the adsorption of a workpiece
(Air) supply valve	Valve for supplying compressed air to the ejector
(Vacuum) release valve	Valve for supplying positive pressure or air for breaking the vacuum state of the adsorption pad
Flow adjustment valve	Valve for adjusting the volume of air for breaking the vacuum
Pilot pressure	Pressure for operating the ejector valve
External release	The action of breaking the vacuum using externally supplied air instead of using the ejector unit
Vacuum port	Port for generating vacuum
Exhaust port	Port for exhausting air consumed by the ejector, and air taken in from the vacuum port
Supply port	Port for supplying air to the ejector
Back pressure	Pressure inside the exhaust port
Leakage	The entry of air into the vacuum passage, such as from an area between a workpiece and a pad, or between a fitting and a tube The vacuum pressure decreases when leakage occurs.
Response time	The time from the application of the rated voltage to the supply valve or release valve until the V port pressure reaches the specified pressure
Average suction flow rate	The suction flow rate by the ejector or pump for calculating the response speed It is 1/2 to 1/3 of the maximum suction flow rate.
Conductive pad	A low-electrical resistance pad for electrostatic prevention
Vacuum pressure	Any pressure below the atmospheric pressure When the atmospheric pressure is used as a reference, the pressure is represented by -kPa (G), and when the absolute pressure is used as a reference, the pressure is represented by kPa (abs). When referencing a piece of vacuum equipment such as an ejector, the pressure is generally represented by -kPa.
Ejector	A unit for generating vacuum by discharging the compressed air from a nozzle at a high speed, which is based on the phenomenon in which the pressure is reduced when the air around the nozzle is sucked in
Air suction filter	Vacuum filter provided in the vacuum passage for preventing the intrusion of dust into the ejector, vacuum pump, or peripheral equipment

Countermeasures for Vacuum Adsorption Problems (Troubleshooting)

Condition & Description of improvement	Contributing factor	Countermeasure
Initial adsorption problem (During trial operation)	The adsorption area is too small. (The lifting force is lower than the workpiece mass.)	Recheck the relationship between the workpiece mass and the lifting force. <ul style="list-style-type: none"> • Use vacuum pads with a larger adsorption area. • Increase the quantity of vacuum pads.
	The vacuum pressure is too low. (Leakage from adsorption surface) (Air permeable workpiece)	Eliminate (reduce) the leakage from the adsorption surface. <ul style="list-style-type: none"> • Reconsider the form of the vacuum pads. Check the relationship between the suction flow rate and the arrival pressure of the vacuum ejector. <ul style="list-style-type: none"> • Use a vacuum ejector with a high suction flow rate. • Increase the adsorption area.
	The vacuum pressure is too low. (Leakage from vacuum piping)	Repair the leakage point.
	The internal volume of the vacuum circuit is too large.	Check the relationship between the internal volume of the vacuum circuit and the suction flow rate of the vacuum ejector. <ul style="list-style-type: none"> • Reduce the internal volume of the vacuum circuit. • Use a vacuum ejector with a high suction flow rate.
	The pressure drop in the vacuum piping is too large.	Reconsider the vacuum piping. <ul style="list-style-type: none"> • Use a shorter or larger tube (of an appropriate diameter).
	Inadequate supply pressure of vacuum ejector	Measure the supply pressure in a vacuum generation state. <ul style="list-style-type: none"> • Use the standard supply pressure. • Reconsider the compressed air circuit (line).
	Clogging of nozzle or diffuser (Infiltration of foreign matter during piping)	Remove foreign matter.
	The supply valve (switching valve) is not being activated.	Measure the supply voltage at the solenoid valve with a tester. <ul style="list-style-type: none"> • Reconsider the electric circuits, wiring, and connectors. • Use within the rated voltage range.
	The workpieces become deformed during adsorption.	Since the workpieces are thin, they become deformed easily and leakage occurs. <ul style="list-style-type: none"> • Use pads for the adsorption of thin objects.
Slow vacuum achieving time (Shortening of response time)	The internal volume of the vacuum circuit is too large.	Check the relationship between the internal volume of the vacuum circuit and the suction flow rate of the vacuum ejector. <ul style="list-style-type: none"> • Reduce the internal volume of the vacuum circuit. • Use a vacuum ejector with a high suction flow rate.
	The pressure drop in the vacuum piping is too large.	Reconsider the vacuum piping. <ul style="list-style-type: none"> • Use a shorter or larger tube (of an appropriate diameter).
	The vacuum pressure required is too high.	Set the vacuum pressure to the minimum necessary value by optimizing the pad diameter, etc. <p>As the vacuum power of an ejector (venturi) rises, the vacuum flow actually lowers. When an ejector is used at its highest possible vacuum value, the vacuum flow will lower. Due to this, the amount of time needed to achieve adsorption increases. One should consider an increase in the diameter of the ejector nozzle or an increase in the size of the vacuum pads utilized in order to lower the required vacuum pressure, maximize the vacuum flow, and speed up the adsorption process.</p>
	The setting of the vacuum pressure switch is too high.	Set to a suitable setting pressure.
Fluctuation in vacuum pressure	Fluctuation in supply pressure	Reconsider the compressed air circuit (line). (Addition of a tank, etc.)
	The vacuum pressure fluctuates under certain conditions due to the ejector characteristics.	Lower or raise the supply pressure a little at a time, and use within a supply pressure range where the vacuum pressure does not fluctuate.
Occurrence of abnormal noise (intermittent noise) from exhaust of vacuum ejector	An intermittent noise occurs under certain conditions due to the ejector characteristics.	Lower or raise the supply pressure a little at a time, and use within a supply pressure range where the intermittent noise does not occur.
Air leakage from vacuum port of manifold type vacuum ejector	Exhaust air from the ejector enters the vacuum port of another ejector that is stopped.	Use a vacuum ejector with a check valve. (Please contact SMC for the part number of an ejector with a check valve.)

■ **Countermeasures for Vacuum Adsorption Problems (Troubleshooting)**

Condition & Description of improvement	Contributing factor	Countermeasure
Adsorption problem over time (Adsorption is normal during trial operation.)	Clogging of suction filter	Replace the filters. Improve the installation environment.
	Clogging of sound absorbing material	Replace the sound absorbing materials. Add a filter to the supply (compressed) air circuit. Install an additional suction filter.
	Clogging of nozzle or diffuser	Remove foreign matter. Add a filter to the supply (compressed) air circuit. Install an additional suction filter.
	Vacuum pad (rubber) deterioration, cracking, etc.	Replace the vacuum pads. Check the compatibility between the vacuum pad material and the workpieces.
Workpieces are not released.	Inadequate release flow rate	Open the release flow adjustment needle.
	The vacuum pressure is too high. Excessive force (adhesiveness of the rubber + vacuum pressure) is applied to the pads (rubber part).	Reduce the vacuum pressure. If inadequate lifting force causes a problem in transferring the workpieces, increase the number of pads.
	Effects due to static electricity	Use conductive pads.
	The adhesiveness of the rubber increases due to the operating environment or wearing of the pad. • The adhesiveness of the rubber material is too high. • The adhesiveness increases due to the wearing of the vacuum pads (rubber).	Replace the pads. Reconsider the pad material and check the compatibility between the pad material and the workpieces. Reconsider the pad form. (Change to rib, groove, blast options) Reconsider the pad diameter and quantity of pads.

Examples of Non-conformance

Phenomenon	Possible causes	Countermeasure
No problem occurs during the test, but adsorption becomes unstable after starting operation.	<ul style="list-style-type: none"> The setting of the vacuum switch is not appropriate. The supply pressure is unstable. The vacuum pressure does not reach the set pressure. There is leakage between the workpieces and the vacuum pads. 	<ol style="list-style-type: none"> Set the pressure for the vacuum equipment (supply pressure, if using an ejector) to the necessary vacuum pressure during the adsorption of the workpieces. And set the set pressure for the vacuum switch to the necessary vacuum pressure for adsorption. It is presumed that there was leakage during the test, but it was not serious enough to prevent adsorption. Reconsider the vacuum ejector and the form, diameter, and material of the vacuum pads. Reconsider the vacuum pads.
Adsorption becomes unstable after replacing the pads.	<ul style="list-style-type: none"> The initial setting conditions (vacuum pressure, vacuum switch setting, height of the pads) have changed. The settings have changed because the pads were worn out due to the operating environment. When the pads were replaced, leakage was generated from the screw connection part or the engagement between the pad and the adapter. 	<ol style="list-style-type: none"> Reconsider the operating conditions including vacuum pressure, the set pressure of the vacuum switch, and the height of the pads. Reconsider the engagement.
Identical pads are used to adsorb identical workpieces, but some of the pads cannot adsorb the workpieces.	<ul style="list-style-type: none"> There is leakage between the workpieces and the vacuum pads. The supply circuit for the cylinder, the solenoid valve, and the ejector are in the same pneumatic circuit system. The supply pressure decreases when they are used simultaneously. (Vacuum pressure does not increase.) There is leakage from the screw connection part or the engagement between the pad and the adapter. 	<ol style="list-style-type: none"> Reconsider the pad diameter, form, material, vacuum ejector (suction flow rate), etc. Reconsider the pneumatic circuit. Reconsider the engagement.
The bellows of the bellows pad sticks and/or there are recovery delays. (This may occur at an early stage.)	<p>When the vacuum pad (bellows type) reaches the end of its life, the weakening of bent parts or the wear or sticking of rubber parts may occur.</p>	<p>The operating conditions will determine the product life. Inspect it sufficiently and determine the replacement period.</p> <ul style="list-style-type: none"> Replace the pads. Reconsider the diameter, form, and material of the vacuum pads. Reconsider the quantity of the vacuum pads.
	<p>The vacuum pressure is higher than necessary, so excessive force (adhesiveness of the rubber + vacuum pressure) is applied to the pads (rubber part).</p>	<p>Reduce the vacuum pressure. If an inadequate lifting force causes a problem in transferring the workpieces due to the reduction of vacuum pressure, increase the number of pads.</p>
	<p>A load is applied to the bellows due to the following operations, leading to the sticking of rubber parts or a reduction of the pad recovery performance.</p> <ul style="list-style-type: none"> Pushing exceeding pad displacement (operating range), external load Workpiece holding/waiting Waiting 10 seconds or more while a workpiece is being held <p>* Even when under 10 seconds, the sticking of pads or recovery delay issues may occur earlier depending on the operating environment and operating method. Longer workpiece holding times lead to longer recovery times and a shorter life.</p>	<p>Reduce the load applied to the pads.</p> <ul style="list-style-type: none"> Review the equipment so that an external load exceeding the pad displacement (operating range) is not applied. Avoid workpiece holding and waiting. <p>The operating conditions will determine the product life. Inspect it and determine the replacement period.</p>
The product life has been shortened after the replacement of the product (pad, buffer, etc.).	<ul style="list-style-type: none"> The settings of the product changed. A tube is being pulled. Unbalanced load in the clockwise direction. The transfer speed increased. The workpiece to be transferred was changed. (Shape, center of gravity, weight, etc.) The mounting orientation was at an angle. The operating environment changed. The buffer (mounting nut) was not tightened with the appropriate torque. 	<p>If the problem (inability to adsorb) does not occur when starting the operation, the product may reach the end of its life due to the customer's specification conditions. Reconsider the piping and operation (specifications). The selected model may not be appropriate for the current workpieces to be transferred or for the specifications. Select a different product model by reconsidering the pad form, diameter, quantity, and suction balance.</p>

Examples of Non-conformance

Phenomenon	Possible causes	Countermeasure
<p>The pads come out from the adapter during operation. Cracks are generated on the pads.</p>	<p>A load is applied to the pads (rubber part) due to the following factors.</p> <ul style="list-style-type: none"> • Inadequate lifting force • Incorrect suction balance • Loads due to transfer acceleration were not considered when selecting the product model. 	<p>The selected model may not be appropriate for the current workpieces to be transferred or for the specifications. Select a different product model by reconsidering the pad form, diameter, quantity, and suction balance.</p>
<p>Cracks are generated on the rubber (NBR, conductive NBR).</p> 	<ul style="list-style-type: none"> • The product is operated in an ozone environment. • An ionizer is used. * This phenomenon occurs earlier if pushing or high vacuum pressure is used. 	<p>Reconsider the operating environment. Reconsider the materials to be used.</p>
<p>Even when a mark-free pad is used, the pad end wears out quickly. (Suction marks are generated.)</p>	<p>If the pad adsorbs an extremely clean workpiece, slippage is minimized, and a load (impact) is applied to the pad end.</p>	<p>Use the following products.</p> <ul style="list-style-type: none"> • Fluororesin-coated pad • Clean attachment
<p>Even when a mark-free pad is used, suction marks are generated.</p>	<ul style="list-style-type: none"> • Incorrect application (The mark was generated due to a deformation.) • Contamination (insufficient cleaning) was left on the pad when installing the equipment, dust was present in the operating environment, etc. 	<p>Check the marks generated on the workpieces.</p> <ol style="list-style-type: none"> 1) Marks due to deformed (lined) workpieces Reconsider the pad diameter, form, material, vacuum ejector (suction flow rate), etc. 2) Marks due to worn rubber Reconsider the pad diameter, form, material, vacuum ejector (suction flow rate), etc. 3) Marks generated by moving components If the suction marks disappear or become smaller after wiping with a cloth or waste cloth (without using solutions), clean the pads as they may have been contaminated. Refer to "Cleaning method (Mark-free NBR pad)" in this catalog.
<p>Sometimes the buffer operation is not smooth, or the buffer does not slide.</p>	<p>The tightening torque of the nut for mounting the buffer is outside of the specified range.</p>	<p>Tighten the nut to the recommended tightening torque. Refer to the Specific Product Precautions on pages 165, 198, 246, and 343.</p>
	<p>Particles are stuck to the sliding surface, or it is scratched.</p>	<p>Reconsider the ambient environment.</p>
	<p>A lateral load was applied to the piston rod, causing eccentric wearing.</p>	<p>Review whether a radial load was applied due to piping, etc.</p>

Vacuum Pad Replacement Period

- Vacuum pads are disposable. Replace them on a regular basis.

Continued use of vacuum pads will cause wear and tear on the adsorption surface, and the exterior dimensions will gradually get smaller and smaller. As the pads' diameter gets smaller, their lifting force will decrease, though adsorption will still remain possible.

It is extremely difficult to provide advice on the frequency of vacuum pad replacement. This is because there are numerous factors at work, including surface roughness, operating environment (temperature, humidity, ozone, solvents, etc.), and operating conditions (vacuum pressure, workpiece weight, pressing force of the vacuum pads on the workpieces, presence or absence of a buffer, etc.).

(The weakening of bent parts or the wear or sticking of rubber parts may occur with the bellows type pad.)

Thus, the customer should decide when vacuum pads should be replaced, based on their condition at the time of initial use.

The bolts may become loose depending on the operating conditions and environment. Be sure to perform regular maintenance.

Basic Pad *ZP* Series

RoHS

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

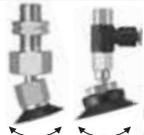
Precautions

∅2, ∅4, ∅6, ∅8, ∅10, ∅13, ∅16, ∅20, ∅25, ∅32, ∅40, ∅50

Flat Type, Flat Type with Ribs, Bellows Type, Thin Flat Type, Thin Flat Type with Ribs, Deep Type

12 sizes, 6 types of pad forms, and a wide range of adapter variations

Pad form	Application
Flat type 	For workpieces with flat and undeformed surfaces
Flat type with ribs 	For workpieces which are easily deformed Workpieces can be removed easily thanks to the ribs.
Bellows type 	For use where there is no space for a buffer or for workpieces with inclined surfaces
Thin flat type 	For soft workpieces such as thin sheets or vinyl Wrinkling or deformation during adsorption can be reduced.
Thin flat type with ribs 	For soft workpieces such as thin sheets or vinyl Workpieces can be removed easily thanks to the ribs.
Deep type 	For workpieces with curved surfaces or for spherical workpieces

Mounting bracket	Application
Ball joint 	For workpieces with inclined or curved surfaces
With adapter 	The adapter can be selected according to the installation conditions.
With buffer 	For workpieces of varying heights The buffer can reduce the impact to the workpiece during adsorption.



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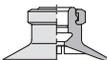
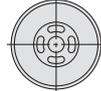
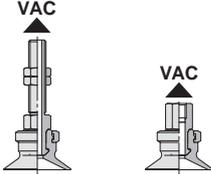
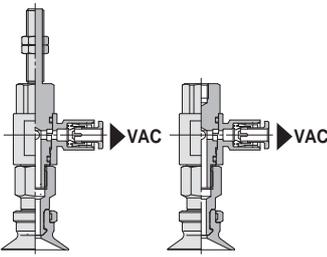
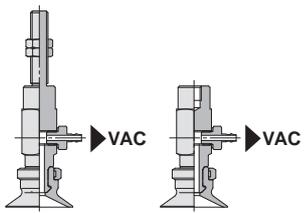
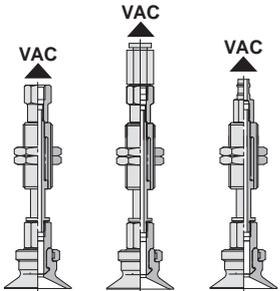
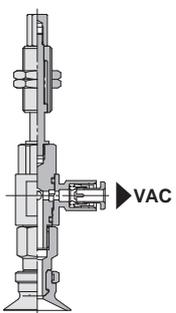
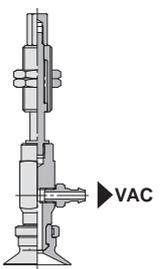
Thin Flat Type with Ribs

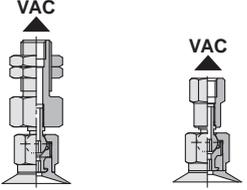
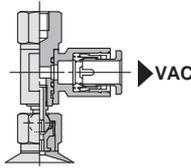
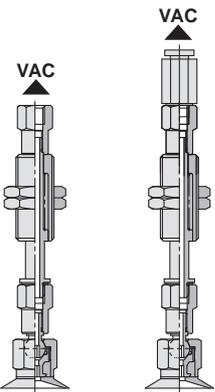
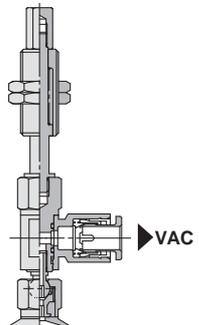
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Deep Type

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		Vacuum inlet direction						
								
		Flat type	Flat type with ribs	Bellows type	Thin flat type	Thin flat type with ribs	Deep type	
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	Single unit							
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Ball Joint Type		Vacuum inlet direction	Flat type
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Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Basic Pad *ZP* Series Specifications

Pad Material

Material	NBR (Nitrile rubber)	Silicone rubber*1	Urethane rubber	FKM (Fluoro rubber)	Conductive NBR (Nitrile rubber)	Conductive silicone rubber
Color of rubber	Black	White	Brown	Black		
Rubber hardness HS ($\pm 5^\circ$)	A50/S	A40/S	A60/S		A50/S	
Identification (Dot)	—	—	—	· 1 green dot	· 1 silver dot	· 2 silver dots

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Adapter Specifications

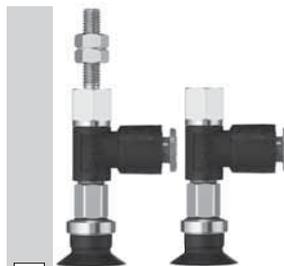
Vacuum Inlet Direction **Vertical** T Type/ZPT



Connection		Male thread		Female thread			
Pad diameter		$\phi 2$ to $\phi 16$	$\phi 20$ to $\phi 50$	$\phi 2$ to $\phi 8^{*1}$	$\phi 10$ to $\phi 16$	$\phi 20$ to $\phi 32$	$\phi 40, \phi 50$
Connection thread		M5 x 0.8 M6 x 1	M6 x 1 M8 x 1	M4 x 0.7 M5 x 0.8	M5 x 0.8 M6 x 1 1/8 (Rc, NPT, NPTF)	M5 x 0.8 M6 x 1 M8 x 1.25 1/8 (Rc, NPT, NPTF)	M6 x 1 M8 x 1.25 1/8 (Rc, NPT, NPTF)
Vacuum inlet		Use the connection thread.					

*1 Refer to $\phi 2$ to $\phi 8$ for the thin flat type and thin flat type with ribs.

Vacuum Inlet Direction **Lateral** R Type/ZPR



Connection		Male thread			Female thread			
Pad diameter		$\phi 2$ to $\phi 16$	$\phi 20$ to $\phi 32$	$\phi 40, \phi 50$	$\phi 2$ to $\phi 8^{*1}$	$\phi 10$ to $\phi 16$	$\phi 20$ to $\phi 32$	$\phi 40, \phi 50$
Connection thread		M5 x 0.8 M6 x 1	M6 x 1 M8 x 1		M4 x 0.7 M5 x 0.8	M5 x 0.8 M6 x 1	M5 x 0.8 M6 x 1 M8 x 1.25	M6 x 1 M8 x 1.25
Vacuum inlet	One-touch fitting	$\phi 4, \phi 6$	$\phi 4, \phi 6, \phi 8$	$\phi 6, \phi 8$	$\phi 4, \phi 6$	$\phi 4, \phi 6, \phi 8$	$\phi 6, \phi 8$	

*1 Refer to $\phi 2$ to $\phi 8$ for the thin flat type and thin flat type with ribs.

Vacuum Inlet Direction **Lateral** Y Type/ZPY



Connection		Male thread			Female thread			
Pad diameter		$\phi 2$ to $\phi 16$	$\phi 20$ to $\phi 32$	$\phi 40, \phi 50$	$\phi 2$ to $\phi 8^{*1}$	$\phi 10$ to $\phi 16$	$\phi 20$ to $\phi 32$	$\phi 40, \phi 50$
Connection thread		M5 x 0.8 M6 x 1	M6 x 1 M8 x 1		M4 x 0.7 M5 x 0.8	M5 x 0.8 M6 x 1	M5 x 0.8 M6 x 1 M8 x 1.25	M6 x 1 M8 x 1.25
Vacuum inlet	Barb fitting*2	$\phi 4, \phi 6$		$\phi 6$	$\phi 4, \phi 6$		$\phi 6$	

*1 Refer to $\phi 2$ to $\phi 8$ for the thin flat type and thin flat type with ribs.

*2 Applicable tubing: Nylon tubing, Soft tubing

Buffer Specifications



Pad diameter		$\phi 2$ to $\phi 8^{*1}$	$\phi 10$ to $\phi 32$	$\phi 40, \phi 50$
Non-rotating specification		J: Rotating, K: Non-rotating		
Stroke [mm]		6, 10, 15, 25	10, 20, 30, 40, 50	10, 20, 30, 50
Connection thread		M8 x 1	M10 x 1	M14 x 1
Spring reactive force [N]	At 0 stroke	0.8	1.0	2.0
	At full stroke	1.2	3.0	5.0

*1 Refer to $\phi 2$ to $\phi 8$ for the thin flat type and thin flat type with ribs.

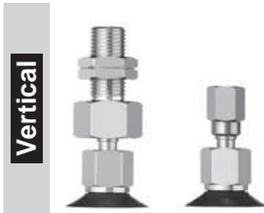
Basic Pad *ZP Series* Specifications

Ball Joint Type

Adapter Specifications (Ball Joint Type)

Ball joint rotating angle	30°
---------------------------	-----

Vacuum Inlet Direction **Vertical** T Type/ZPT□F



Connection	Male thread			Female thread		
Pad diameter	ø10 to ø16	ø20 to ø32	ø40, ø50	ø10 to ø16	ø20 to ø32	ø40, ø50
Connection thread	M8 x 1	M10 x 1	M14 x 1	M5 x 0.8	M5 x 0.8 M8 x 1.25 1/8 (Rc, NPT, NPTF)	M8 x 1.25 1/8 (Rc, NPT, NPTF)
Vacuum inlet	M5 x 0.8			Use the connection thread.		

Vacuum Inlet Direction **Lateral** R Type/ZPR□F



Connection	Female thread		
Pad diameter	ø10 to ø16	ø20 to ø32	ø40, ø50
Connection thread	M5 x 0.8	M5 x 0.8 M8 x 1.25	M5 x 0.8 M8 x 1.25
Vacuum inlet	One-touch fitting	ø4, ø6	ø6, ø8

Buffer Specifications (Ball Joint Type)



Pad diameter	ø10 to ø16		ø20 to ø50	
Non-rotating specification	J: Rotating, K: Non-rotating			
Stroke [mm]	10, 20, 30, 40, 50		10, 20, 30, 50	
Connection thread	M10 x 1		M14 x 1	
Spring reactive force [N]	At 0 stroke	1.0	2.0	
	At full stroke	3.0	5.0	

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions



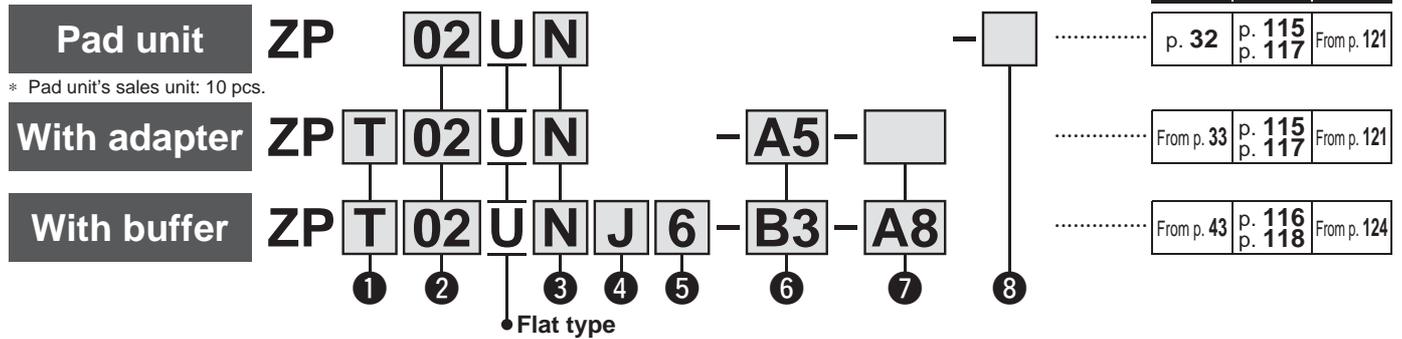
Basic Pad

Flat Type

ZP Series



How to Order



① Vacuum inlet direction

Symbol	Pad unit
Nil	Pad unit
T	Vertical
R	Lateral (With One-touch fitting)
Y	Lateral (With barb fitting)

③ Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

② Pad diameter

02	ø2	16	ø16
04	ø4	20	ø20
06	ø6	25	ø25
08	ø8	32	ø32
10	ø10	40	ø40
13	ø13	50	ø50

④ Buffer specification

J	Rotating
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Pad diameter [mm]											
	ø2	ø4	ø6	ø8	ø10	ø13	ø16	ø20	ø25	ø32	ø40	ø50
6	●	●	●	●	—	—	—	—	—	—	—	—
10	●	●	●	●	●	●	●	●	●	●	●	●
15	●	●	●	●	—	—	—	—	—	—	—	—
20	—	—	—	—	●	●	●	●	●	●	●	●
25	●	●	●	●	—	—	—	—	—	—	—	—
30	—	—	—	—	●	●	●	●	●	●	●	●
40	—	—	—	—	●	●	●	●	●	—	—	—
50	—	—	—	—	●	●	●	●	●	●	●	●

With adapter

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø2 to ø8	ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A5	M5 x 0.8	○	○	—	—
	A6	M6 x 1	○	○	○	○
	A8	M8 x 1	—	—	○	○
Female thread	B4	M4 x 0.7	○	—	—	—
	B5	M5 x 0.8	○	○	○	—
	B6	M6 x 1	—	○	○	○
	B8	M8 x 1.25	—	—	○	○
	B01	Rc1/8	—	○	○	○
One-touch fitting	N01	NPT1/8	—	○	○	○
	T01	NPTF1/8	—	○	○	○
Barb fitting	04	ø4	●	●	●	—
	06	ø6	●	●	●	●
	08	ø8	—	—	●	●
Barb fitting	N4	For ø4 nylon tubing	△	△	△	—
	N6	For ø6 nylon tubing	△	△	△	△
	U4	For ø4 soft tubing	△	△	△	—
	U6	For ø6 soft tubing	△	△	△	△

⑦ Connection thread ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø2 to ø8	ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A5	M5 x 0.8	●△	●△	—	—
	A6	M6 x 1	●△	●△	●△	●△
	A8	M8 x 1	—	—	●△	●△
Female thread	B4	M4 x 0.7	●△	—	—	—
	B5	M5 x 0.8	●△	●△	●△	—
	B6	M6 x 1	—	●△	●△	●△
	B8	M8 x 1.25	—	—	●△	●△

It is not necessary to select a connection thread for ○: ZPT/Vertical. Use the vacuum inlet.

* The pad, lock ring, mounting nut, fitting, and buffer plate are shipped together but do not come assembled.

With buffer

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø2 to ø8	ø10 to ø16	ø20 to ø32	ø40, ø50
Female thread	B3	M3 x 0.5	○	—	—	—
	B5	M5 x 0.8	○	○	○	○
	B01	Rc1/8	—	—	—	○
	N01	NPT1/8	—	—	—	○
One-touch fitting	T01	NPTF1/8	—	—	—	○
	04	ø4	○●	○●	○●	—
Barb fitting	06	ø6	○●	○●	○●	○●
	08	ø8	—	—	●	○●
	N4	For ø4 nylon tubing*1	○△	△	△	—
	N6	For ø6 nylon tubing*1	△	○△	○△	○△
	U4	For ø4 soft tubing*2	○△	△	△	—
	U6	For ø6 soft tubing*2	△	○△	○△	○△

*1 Nylon tube piping *2 Soft nylon/Polyurethane tube piping

⑦ Connection thread

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø2 to ø8	ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A8	M8 x 1	○●△	—	—	—
	A10	M10 x 1	—	○●△	○●△	—
	A14	M14 x 1	—	—	—	○●△

⑧ Lock ring

Symbol	Pad diameter [mm]	
	ø2 to ø8	ø10 to ø50
Nil	None*1	With lock ring
X19		Without lock ring

*1 The lock ring cannot be used for pad diameters ø2 to ø8.

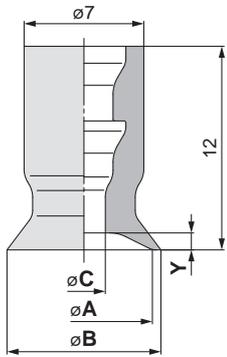
Lock ring unit

Part no.	Pad diameter [mm]
ZPL1	ø10 to ø16
ZPL2	ø20 to ø32
ZPL3	ø40, ø50

Dimensions/Models

Single unit $\phi 2$ to $\phi 8$

ZP 02 U N
① ②



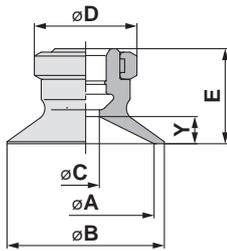
Model				A	B	C	Y
① Pad dia.	Form	② Material ^{*1}	ZP				
02	U	N	2	2.6	1.2	0.5	
04		S	4	4.8	1.6	0.8	
06		F	6	7	2.5		
08		GN GS	8	9		1	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction	p. 115
Mounting Bracket Assembly	From p. 121

Single unit $\phi 10$ to $\phi 50$

ZP 10 U N
① ②



Model				A	B	C	D	E	Y
① Pad dia.	Form	② Material ^{*1}	ZP						
10	U	N S F GN GS	4	10	12	4	13	12	3
13				13	15			12.5	3.5
16				16	18				
20			20	23	15		14	4	
25			25	28					
32			32	35					
40			40	43	7	18	18.5	6.5	
50			50	53					19.5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction	p. 117
Mounting Bracket Assembly	From p. 121

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

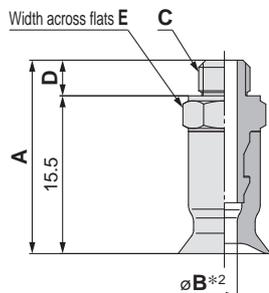
With adapter $\varnothing 2$ to $\varnothing 8$

ZPT **02** U **N** - **A5**

① ②

③ Vacuum inlet (Male thread)

A5	M5 x 0.8
A6	M6 x 1



Construction	p. 115
Adapter Assembly	p. 121

Model					A	B*2	C	D	E
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet					
ZP	T	U	N S U F GN GS	A5	19	1.2	M5 x 0.8	3.5	7
						1.6			
						2.5			
				A6	20	1.2	M6 x 1	4.5	8
						1.6			
						2.5			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

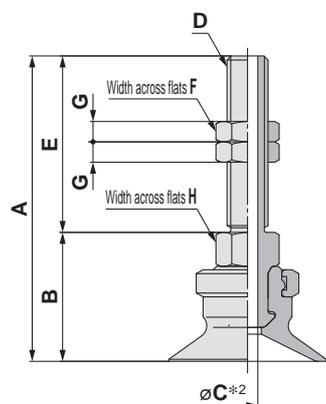
With adapter $\varnothing 10$ to $\varnothing 50$

ZPT **10** U **N** - **A5**

① ②

③ Vacuum inlet (Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1



Construction	p. 117
Adapter Assembly	p. 121

Model					A	B	C*2	D	E	F	G	H						
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet														
ZP	T	U	N S U F GN GS	A5	38	17	2.5	M5 x 0.8	21	8	4	8						
					38.5	17.5												
					43	17												
					43.5	17.5												
					45	19							3	M6 x 1	26	8	3	8
					45.5	19.5												
				50.5	24.5													
				51.5	25.5													
				40	24	3.5	M8 x 1	16	12	3	12							
				40.5	24.5													
				41.5	25.5							4.5						

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

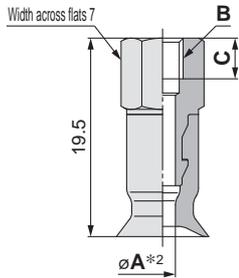
*2 Indicates the minimum hole size of the adapter or vacuum pad

Recommended Gasket Part Nos.

Part no.	D vacuum inlet (Male thread)
WCS5X0.8	M5 x 0.8
WCS6X1	M6 x 1
WCS8X1	M8 x 1

Dimensions/Models

With adapter $\varnothing 2$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 121

ZPT **02** U **N** - **B4**

① ② ③

③ Vacuum inlet (Female thread)

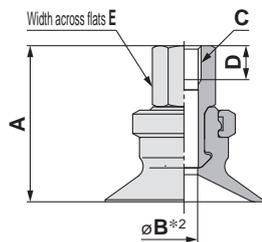
B4	M4 x 0.7
B5	M5 x 0.8

Model					A*2	B	C
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet			
ZP	T	U	N S U F GN GS	B4	1.2	M4 x 0.7	4
					1.6		
					2.5		
				B5	1.2	M5 x 0.8	5
					1.6		
					2.5		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

With adapter $\varnothing 10$ to $\varnothing 50$



Construction	p. 117
Adapter Assembly	p. 121

ZPT **10** U **N** - **B5**

① ② ③

③ Vacuum inlet (Female thread)

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25
B01	Rc1/8
N01	NPT1/8
T01	NPTF1/8

Model					A	B*2	C	D	E				
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet									
ZP	T	U	N S U F GN GS	B5	21	2.5	M5 x 0.8	5	8				
					21.5								
					23	4							
					23.5								
					B6	21				2.5	M6 x 1	6	8
						21.5							
				23		4							
				23.5									
				32		4.9							
				33									
				B8	29	3.5	M8 x 1.25	8	12				
					29.5								
					32	6.6							
					33								
					B01 N01 T01	27				2.5	Rc1/8 NPT1/8 NPTF1/8	—	12
						27.5							
				29		3.5							
				29.5									
				32		7							
				33									

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

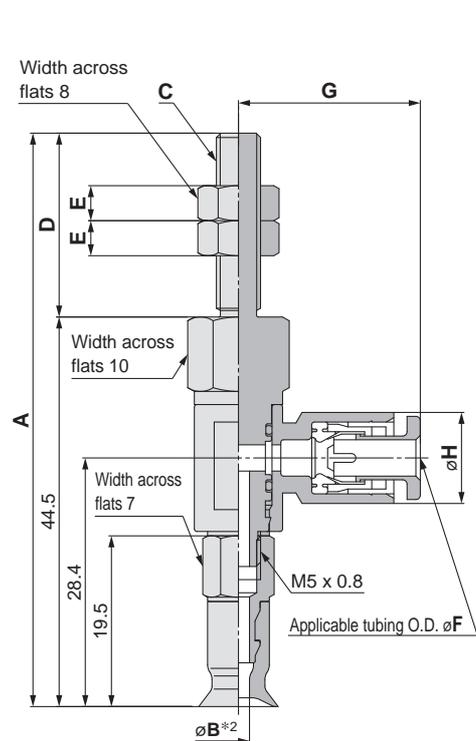
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/One-touch fitting $\varnothing 2$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 122

ZPR **02** U **N** - **04** - **A5**

1	2	3	4
		Vacuum inlet (One-touch fitting)	Connection thread (Male thread)
04	06	$\varnothing 4$	$\varnothing 6$

A5	M5 x 0.8
A6	M6 x 1

Model						A	B*2	C	D	E	
Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Vacuum inlet	4 Connection thread						
ZP	R	U	N S U F GN GS	04 06	A5	65.5	1.2	M5 x 0.8	21	4	
					A6		1.6				
							2.5				
					A5	70.5	1.2	M6 x 1	26	3	
							A6				1.6
											2.5

Dimensions Per Vacuum Inlet

Model						F	G	H	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Vacuum inlet	4 Connection thread				
ZP	R	U	N S U F GN GS	04	A5	4	20.6	10.4	$\varnothing 3$
				06	A6				
				06		6	21.6	12.8	$\varnothing 4$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 50$

ZPR **10** **U** **N** - **04** - **A5**

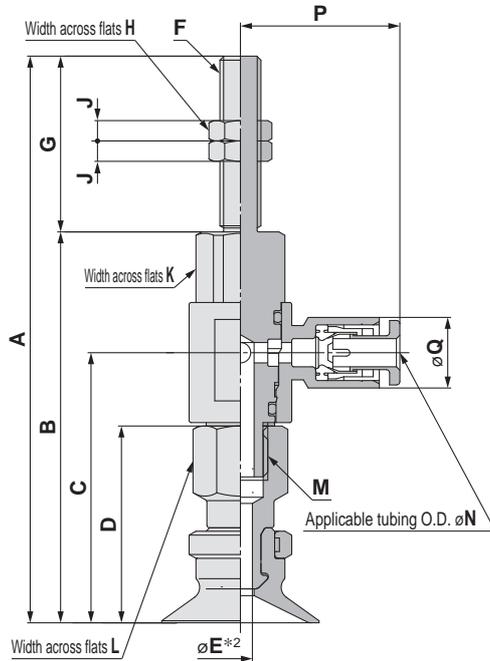
① ②

Vacuum inlet
(One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

④ Connection thread
(Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1



Construction	p. 117
Adapter Assembly	p. 122

		Model				A	B	C	D	E ^{*2}	F	G	H	J	K	L	M
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread												
ZP	R	U	N S U F GN GS	04 06 08	A5	67	46	29.9	21	2.5	M5 x 0.8	21	8	4	10	8	M5 x 0.8
						67.5	46.5	30.4	21.5								
						72	46	29.9	21								
						72.5	46.5	30.4	21.5								
					A6	83.5	57.6	39.8	29	3.5	M6 x 1	25.9	8	3	12	12	M8 x 1.25
						84	58.1	40.3	29.5								
						86.5	60.6	42.8	32								
						87.5	61.6	43.8	33								
	A8	73.5	57.6	39.8	29	3.5	M8 x 1	15.9	12	3	12	12	M8 x 1.25				
		74	58.1	40.3	29.5												
		76.5	60.6	42.8	32												
		77.5	61.6	43.8	33												

Dimensions Per Vacuum Inlet

		Model				N	P	Q	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	R	U	N S U F GN GS	04	A5	4	20.6	10.4	$\varnothing 3$	
						6	21.6	12.8	$\varnothing 4$	
					06	A6	4	23.3	10.4	$\varnothing 3$
							6	24.3	12.8	$\varnothing 4.5$
				08	A8	8	26.2	15.2	$\varnothing 6$	
						6	24.3	12.8	$\varnothing 4.5$	
						8	26.2	15.2	$\varnothing 6$	
						6	24.3	12.8	$\varnothing 4.5$	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

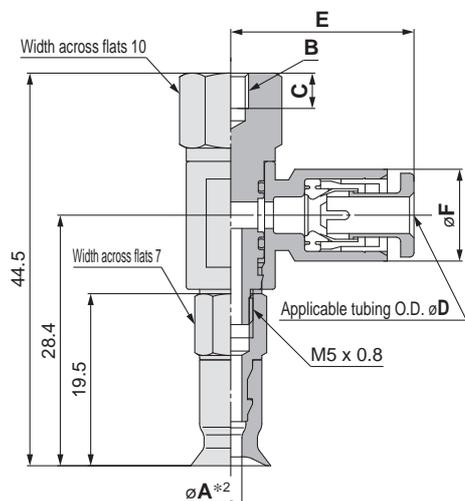
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/One-touch fitting $\varnothing 2$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 122

ZPR **02** U **N** - **04** - **B4**

1	2	3	4
Vacuum inlet (One-touch fitting)	Material	Vacuum inlet	Connection thread (Female thread)
04	$\varnothing 4$	04	B4
06	$\varnothing 6$	06	B5

B4	M4 x 0.7
B5	M5 x 0.8

Model						A*2	B	C
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Vacuum inlet	4 Connection thread			
ZP	R	U	N S U F GN GS	04 06	B4	1.2	M4 x 0.7	4
						1.6		
						2.5		
					B5	1.2	M5 x 0.8	5
						1.6		
						2.5		

Dimensions Per Vacuum Inlet

Model						D	E	F	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Vacuum inlet	4 Connection thread				
ZP	R	U	N S U F GN GS	04	B4 B5	4	20.6	10.4	$\varnothing 3$
				06		6	21.6	12.8	$\varnothing 4$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 50$

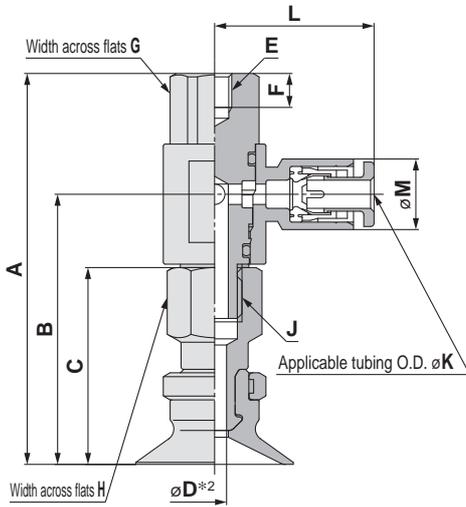
ZPR **10** **U** **N** - **04** - **B5**

1 Pad dia.
2 Form
3 Vacuum inlet (One-touch fitting)

4 Connection thread (Female thread)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25



Construction	p. 117
Adapter Assembly	p. 122

		Model				A	B	C	D*2	E	F	G	H	J	
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Vacuum inlet	4 Connection thread										
ZP	R	U	N S U F GN GS	04 06 08	B5	10	46	29.9	21	2.5	M5 x 0.8	5	10	8	M5 x 0.8
						13	46.5	30.4	21.5						
						16	46.5	30.4	21.5						
						20	57.6	39.8	29						
						25	57.6	39.8	29						
						32	58.1	40.3	29.5						
					B6	10	46	29.9	21	2.5	M6 x 1	6	10	8	M5 x 0.8
						13	46.5	30.4	21.5						
						16	46.5	30.4	21.5						
						20	57.6	39.8	29						
						25	57.6	39.8	29						
						32	58.1	40.3	29.5						
						40	60.6	42.8	32						
						50	61.6	43.8	33						
						4									
B8	20	57.6	39.8	29	3.5	M8 x 1.25	8	12	12	M8 x 1.25					
	25	57.6	39.8	29											
	32	58.1	40.3	29.5											
	40	60.6	42.8	32											
	50	61.6	43.8	33											
	4														

Dimensions Per Vacuum Inlet

		Model				K	L	M	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Vacuum inlet	4 Connection thread				
ZP	R	U	N S U F GN GS	04	B5	4	20.6	10.4	$\varnothing 3$
					B6	6	21.6	12.8	$\varnothing 4$
				06	B5	4	23.3	10.4	$\varnothing 3$
					B6	6	24.3	12.8	$\varnothing 4.5$
				08	B5	8	26.2	15.2	$\varnothing 6$
					B6	6	24.3	12.8	$\varnothing 4.5$
				50	B5	8	26.2	15.2	$\varnothing 6$
					B6	8	26.2	15.2	$\varnothing 6$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber
*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

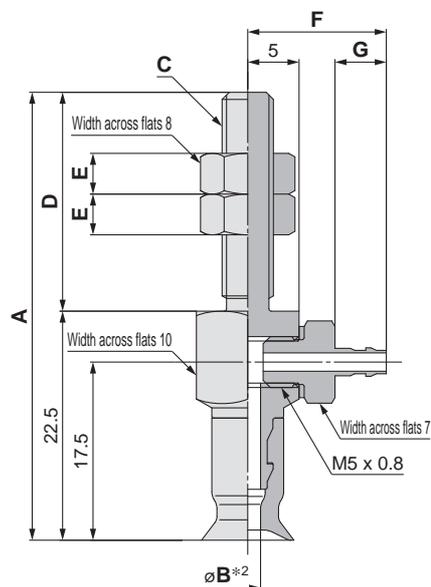
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/barb fitting $\varnothing 2$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 123

ZPY **02** U **N** - **N4** - **A5**

①

②

④

Vacuum inlet ③
(Barb fitting)

④ Connection thread
(Male thread)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

A5	M5 x 0.8
A6	M6 x 1

		Model				A	B*2	C	D	E	
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet	④ Connection thread						
ZP	Y	02	U	N S U F GN GS	N4 N6 U4 U6	44	1.2	M5 x 0.8	21.5	4	
		04					1.6				
		06 08					2.5				
		02				49.5	A6	1.2	M6 x 1	27	3
		04						1.6			
		06 08						2.5			

Dimensions Per Vacuum Inlet

		Model				F	G	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet	④ Connection thread			
ZP	Y	02 04 06 08	U	N S U F GN GS	N4 U4	13.5	5	$\varnothing 1.8$
		N6 U6			A5 A6			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY **10** U **N** - **N4** - **A5**

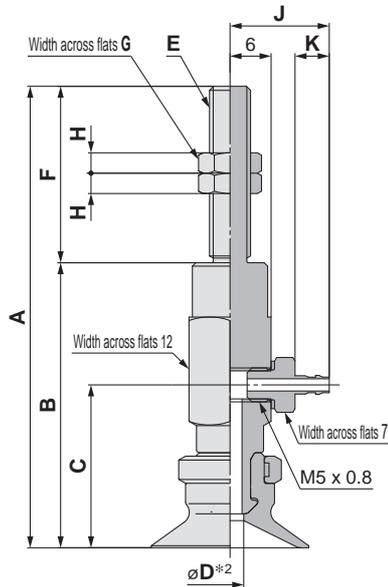
① ②

Vacuum inlet ③
(Barb fitting)

④ Connection thread
(Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6



Construction	p. 117
Adapter Assembly	p. 123

		Model				A	B	C	D*2	E	F	G	H						
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet	④ Connection thread														
ZP	Y	U	N S U F GN GS	N4 N6 U4 U6	A5	10	59	38	22	2.5	M5 x 0.8	21	8	4					
						13	59.5	38.5	22.5										
						16	64	38	22										
						13	64.5	38.5	22.5										
					A6	20	68	42	24	3.5	M6 x 1	26	8	3					
						25	68.5	42.5	24.5										
						32	72.5	46.5	28.5										
						40	73.5	47.5	29.5										
						A8	20	58	42	24					3.5	M8 x 1	16	12	3
							25	58.5	42.5	24.5									
							32	62.5	46.5	28.5									
							40	63.5	47.5	29.5									
					6		32				6								
							50												

Dimensions Per Vacuum Inlet

		Model				J	K	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet	④ Connection thread				
ZP	Y	U	N S U F GN GS	N4 U4	A5 A6	10	14.5	5	$\varnothing 1.8$
						13			
				N6 U6	A6 A8	16	16.5	7	$\varnothing 2.5$
						20			
				32	A6 A8	25	16.5	7	$\varnothing 2.5$
						32			
50									

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

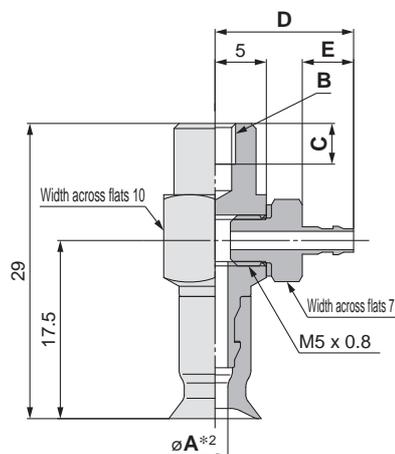
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/barb fitting $\varnothing 2$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 123

ZPY **02** **U** **N** - **N4** - **B4**

①

②

④

Vacuum inlet ③
(Barb fitting)

④ Connection thread
(Female thread)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

B4	M4 x 0.7
B5	M5 x 0.8

	Vacuum inlet direction	Model				A*2	B	C
		① Pad dia.	Form	②*1 Material	③ Vacuum inlet			
ZP	Y	02	U	N S U F GN GS	N4 N6 U4 U6	B4	M4 x 0.7	4
		04						
		06						
		08				B5		
		02						
		04						
06	B5	M5 x 0.8	5					
08								

Dimensions Per Vacuum Inlet

	Vacuum inlet direction	Model				D	E	Fitting part min. hole size	
		① Pad dia.	Form	②*1 Material	③ Vacuum inlet				④ Connection thread
ZP	Y	02	U	N S U F GN GS	N4	B4	13.5	5	$\varnothing 1.8$
		04			U4				
		06			N6	B5	15.5	7	$\varnothing 2.5$
		08			U6				

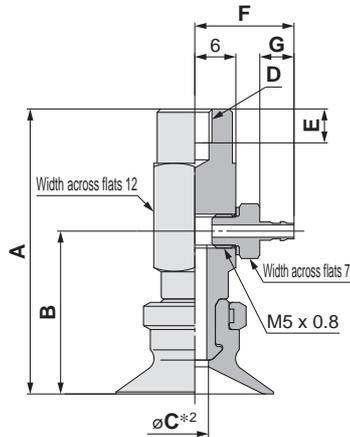
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY 10 U N - N4 - B5



Construction	p. 117
Adapter Assembly	p. 123

①
②
③ Vacuum inlet (Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

④ Connection thread (Female thread)

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25

		Model				A	B	C*2	D	E	
Vacuum inlet direction	① Pad dia.	Form	② Material	③ Vacuum inlet	④ Connection thread						
ZP	Y	U	N S U F GN GS	N4 N6 U4 U6	B5	10	38	22	2.5	M5 x 0.8	5
						13	38.5	22.5			
						16	42	24	3.5		
						20	42.5	24.5			
						25	38	22	2.5		
						32	38.5	22.5			
					B6	10	42	24	3.5	M6 x 1	6
						13	42.5	24.5			
						16	46.5	28.5	6		
						20	47.5	29.5			
						25	42	24	3.5		
						32	42.5	24.5			
					B8	40	46.5	28.5	6	M8 x 1.25	8
						40	47.5	29.5			
						50					

Dimensions Per Vacuum Inlet

		Model				F	G	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② Material	③ Vacuum inlet	④ Connection thread			
ZP	Y	U	N S U F GN GS	N4	B4	14.5	5	$\varnothing 1.8$
				U4	B5	16.5	7	$\varnothing 2.5$
				N6	B5	14.5	5	$\varnothing 1.8$
				U6	B6	16.5	7	$\varnothing 2.5$
				N6	B8	16.5	7	$\varnothing 2.5$
				U6	B8	16.5	7	$\varnothing 2.5$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer $\varnothing 2$ to $\varnothing 8$

ZPT **02** **U** **N** **J** **6** - **B3** - **A8**

① ② ③ ④

Buffer specification ③

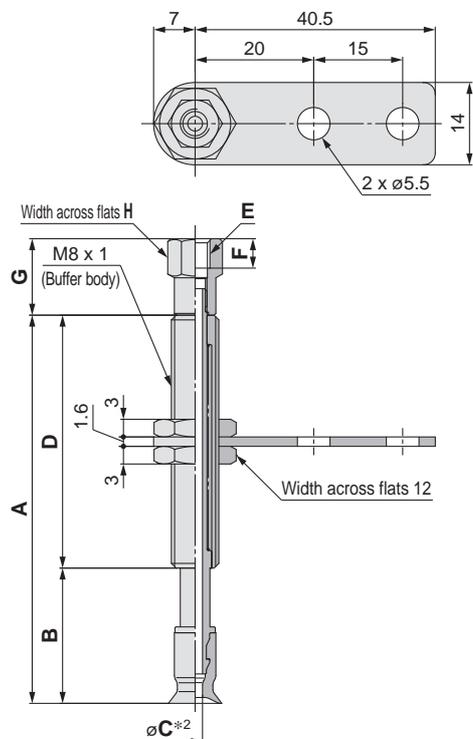
J	Rotating
K	Non-rotating

⑥ Connection thread
(Male thread)

A8	M8 x 1
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⑤ Vacuum inlet

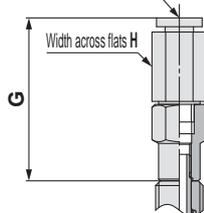
B3	M3 x 0.5	Female thread	
B5	M5 x 0.8	Female thread	
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N
06	$\varnothing 6$		KQ2H06-M5N
N4	For $\varnothing 4$ nylon tubing	Barb fitting	
U4	For $\varnothing 4$ soft tubing		



		Model						A	B	C*2	D
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread				
ZP	T	02	U	N S U F G N G S	J K	B3 B5 04 06 N4 U4	A8		1.2	15	6
											10
											15
		25									
		6									
		10									
	15										
	25										
	6										
	10										
	15										
	25										
04	15	18	15	43	15	43	1.6	15	43	J: 2.5 K: 2	33
											66
											71
	81										
	33										
	66										
71											
81											
33											
66											
71											
81											
06 08	15	18	15	43	15	43	1.6	15	43	J: 2.5 K: 2	33
											66
											71
	81										
	33										
	66										
71											
81											
33											
66											
71											
81											

Vacuum inlet: One-touch fitting

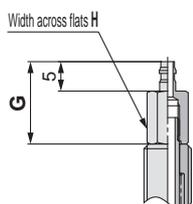
Applicable tubing O.D. $\varnothing J$



Dimensions Per Vacuum Inlet: Female Thread

		Model						E	F	G	H																
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread																				
ZP	T	02 04 06 08	U	N S U F G N G S	J K	6 10 15 25	B3 B5	A8	M3 x 0.5	3	11	6															
													06 08	15	25	06	A8	M5 x 0.8	5	13	8						
																						06 08	15	25	06	A8	M5 x 0.8
		06 08			15		25																				
													06 08	15	25	06	A8	M5 x 0.8	5	13	8						
																						06 08	15	25	06	A8	M5 x 0.8
06 08	15	25	06	A8	M5 x 0.8	5	13	8																			

Vacuum inlet: Barb fitting



Dimensions Per Vacuum Inlet: One-touch Fitting

		Model						G	H	J	Fitting part min. hole size											
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread															
ZP	T	02 04 06 08	U	N S U F G N G S	J K	6 10 15 25	04	A8	27.7	8	4	$\varnothing 2.5$										
													06 08	15	25	06	A8	10	6			
																				06 08	15	25
		06 08			15		25				06											
													06 08	15	25	06	A8	10	6			
																				06 08	15	25

Construction	p. 116
Buffer Assembly	p. 124

Dimensions Per Vacuum Inlet: Barb Fitting

		Model						G	H	Fitting part min. hole size														
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread																	
ZP	T	02 04 06 08	U	N S U F G N G S	J K	6 10 15 25	N4 U4	A8	14	6	$\varnothing 1.8$													
												06 08	15	25	U4	A8	14	6	$\varnothing 1.8$					
																				06 08	15	25	U4	A8
		06 08			15		25																	
												06 08	15	25	U4	A8	14	6	$\varnothing 1.8$					
																				06 08	15	25	U4	A8

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

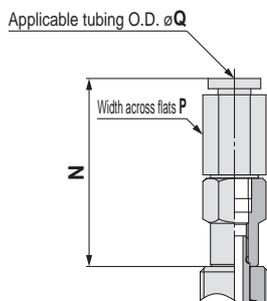
*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 50$

ZPT **10** **U** **N** **J** **10** - **04** - **A10**

Vacuum inlet: One-touch fitting



Buffer specification **3**

J	Rotating
K	Non-rotating

6 Connection thread (Male thread)

A10	M10 x 1
A14	M14 x 1

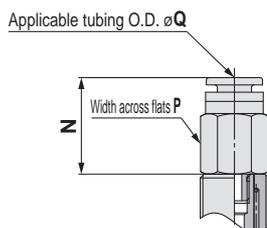
5 Vacuum inlet

			Pad diameter	
			$\varnothing 10$ to $\varnothing 32$	$\varnothing 40, \varnothing 50$ (10 st only)
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N	KQ2H06-01NS
06	$\varnothing 6$		KQ2H06-M5N	
08	$\varnothing 8$		KQ2H08-01NS	
N6	For $\varnothing 6$ nylon tubing	Barb fitting		
U6	For $\varnothing 6$ soft tubing			

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model						N	P	Q	Fitting part min. hole size				
	Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet					6 Connection thread			
ZP	T	10	U	N S U F GN GS	J K	10	04	A10	27.7	8	4	$\varnothing 2.5$			
		13				20									
		16				30									
		20				40									
		25				50									
		32													
		40				10	06	A14		31.8	10		6	$\varnothing 4.5$	
		50				20	08			35.9	14		8	$\varnothing 6$	
							30			19.9	12		6	$\varnothing 3$	
							50			24.9	14		8		

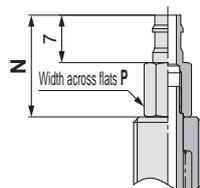
Vacuum inlet: Built-in One-touch fitting Pad diameter: $\varnothing 40, \varnothing 50$ (Buffer stroke: 20 to 50 st)



Dimensions Per Vacuum Inlet: Barb Fitting

		Model						N	P	Fitting part min. hole size				
	Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet				6 Connection thread			
ZP	T	10	U	N S U F GN GS	J K	10	N6	A10	15	6	$\varnothing 2.5$			
		13				20								
		16				30								
		20				40								
		25				50								
		32												
		40				10	N6 U6	A14		19		10		
		50				20	N6 U6			12				

Vacuum inlet: Barb fitting



*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction	p. 118
Buffer Assembly	p. 124

Dimensions/Models

With buffer/One-touch fitting $\varnothing 2$ to $\varnothing 8$

ZPR **02** **U** **N** **J** **6** - **04** - **A8**

① ② ③ ④

Buffer specification ③

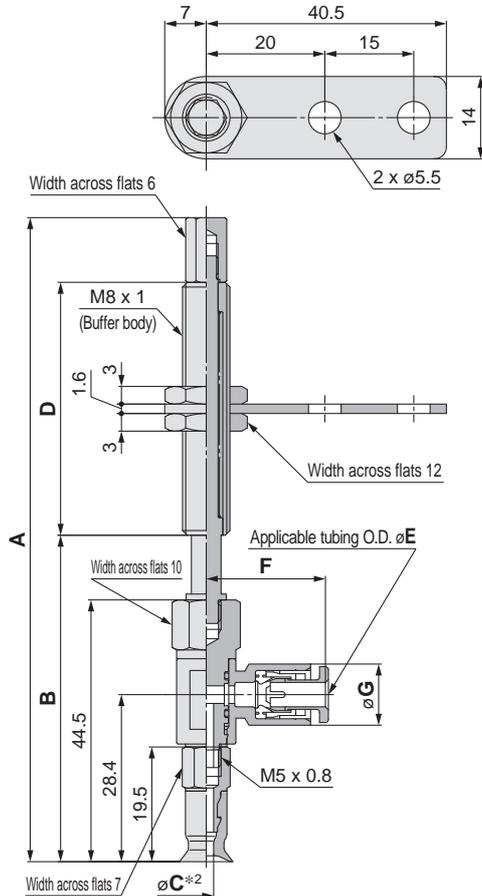
J	Rotating
K	Non-rotating

⑥ Connection thread
(Male thread)

A8	M8 x 1
-----------	--------

⑤ Vacuum inlet
(One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$



Construction	p. 116
Buffer Assembly	p. 125

		Model						A	B	C*2	D	
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	R	02	U	N	J	6	04	A8	78.5	52.5	1.2	15
						10			109.5	55.5		43
						15			114.5	60.5		
						25			124.5	70.5		
						6			78.5	52.5		15
						10			109.5	55.5		
	15	114.5			60.5	43						
	25	124.5			70.5							
	6	78.5			52.5	15						
	10	109.5			55.5							
	15	114.5			60.5	43						
	25	124.5			70.5							
R	04	U	S	K	6	06	A8	78.5	52.5	1.6	15	
					10			109.5	55.5		43	
					15			114.5	60.5			
					25			124.5	70.5			
					6			78.5	52.5		15	
					10			109.5	55.5			
15	114.5	60.5		43								
25	124.5	70.5										
R	06	U		F	K	6	06	A8	78.5	52.5	2.5	15
						10			109.5	55.5		43
						15			114.5	60.5		
						25			124.5	70.5		
			6			78.5			52.5	15		
			10			109.5			55.5			
15	114.5	60.5	43									
25	124.5	70.5										

Dimensions Per Vacuum Inlet

		Model						E	F	G	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	R	02	U	N	J	6	04	A8	4	20.6	10.4	$\varnothing 3$
						10			6	21.6	12.8	$\varnothing 4$
						15						
						25						
						6						
						10						

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

BelloWS Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer/One-touch fitting $\varnothing 10$ to $\varnothing 50$

ZPR **10** **U** **N** **J** **10** - **04** - **A10**

① ② ③ ④

⑥ **Connection thread (Male thread)**

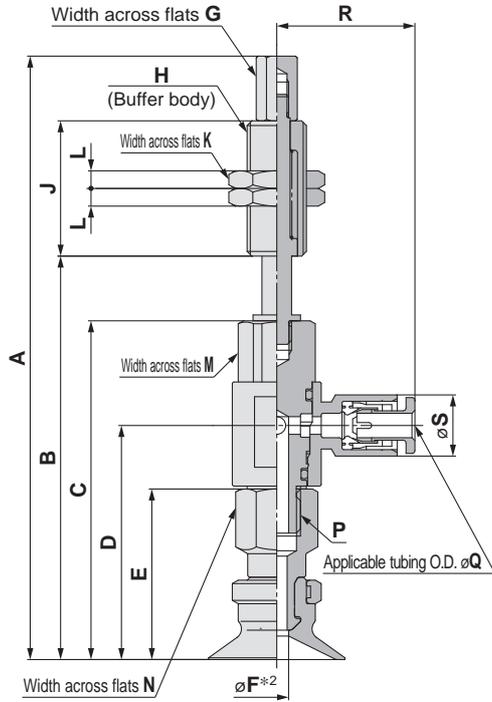
Buffer specification ③

J	Rotating
K	Non-rotating

A10	M10 x 1
A14	M14 x 1

⑤ **Vacuum inlet (One-touch fitting)**

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$



Construction	p. 118
Buffer Assembly	p. 125

		Model											A	B	C	D	E	*2	G	H	J	K	L	M	N	P				
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread																							
ZP	R	U	N S U F G N S	J K	10	04	06	91	57	46	29.9	21	2.5	6	M10 x1	23	14	3	23	10	8	M5 x 0.8								
					20			129	67							51														
					30			139	77							77														
					40			175	87							77														
					50			185	97							77														
					10			91.5	57.5							23														
					20			129.5	67.5							51														
					30			139.5	77.5							51														
					40			175.5	87.5							77														
					50			185.5	97.5							77														
					10			102.6	68.6							23														
					20			140.6	78.6							51														
	30	150.6	88.6	51																										
	40	186.6	98.6	77																										
	50	196.6	108.6	77																										
	10	103.1	69.1	23																										
	20	141.1	79.1	51																										
	30	151.1	89.1	51																										
	40	187.1	99.1	77																										
	50	197.1	109.6	77																										
	10	140.6	72.6	50																										
	20	137.6	82.6	50																										
	30	147.6	92.6	50																										
	40	192.6	112.6	75																										
50	192.6	112.6	75																											
10	141.6	73.6	75																											
20	138.6	83.6	50																											
30	148.6	93.6	50																											
40	193.6	113.6	75																											
50	193.6	113.6	75																											

Dimensions Per Vacuum Inlet

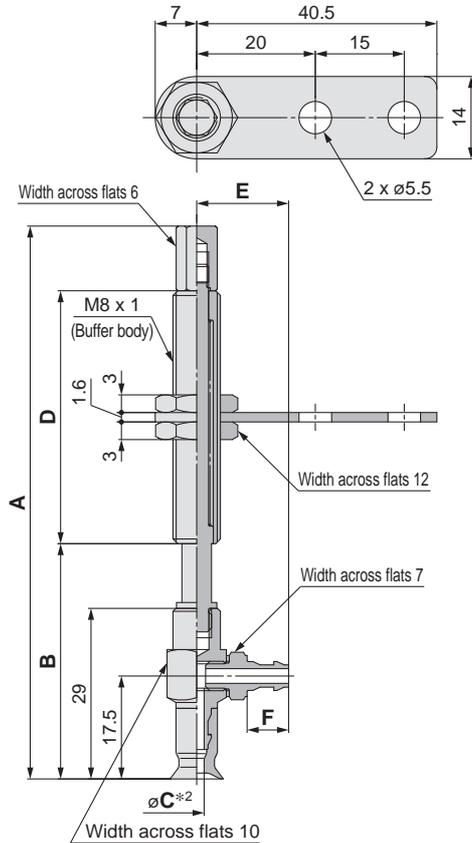
		Model							Q	R	S	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	R	U	N S U F G N S	J K	10	04	A10	4	20.6	10.4	$\varnothing 3$	
					20							
					30							
					40							
					50							
					10							06
	20											
	30											
	40											
	50											
	10	08	A14	8	26.2	15.2	$\varnothing 6$					
	20											
30												
40												
50												
10	06							A14	6	24.3	12.8	$\varnothing 4.5$
20												
30												
40												
50												
10		08	A14	8	26.2	15.2	$\varnothing 6$					
20												
30												
40												
50												

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer/barb fitting $\varnothing 2$ to $\varnothing 8$



Construction	p. 116
Buffer Assembly	p. 126

ZPY **02** U **N** **J** **6** - **N4** - **A8**

1 Pad dia.
2 Form
3 Buffer spec.
4 Buffer stroke
5 Vacuum inlet (Barb fitting)
6 Connection thread (Male thread)

J	Rotating
K	Non-rotating

A8	M8 x 1
-----------	--------

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

		Model						A	B	C*2	D	
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread					
ZP	Y	02	U	N S U F GN GS	J K	6	N4 N6 U4 U6	A8	63	37	1.2	15
						10			94	40		43
						15			99	45		43
		25				109			55	43		
		6				63			37	15		
		10				94			40	43		
	15	99		45	43							
	25	109		55	43							
	6	63		37	15							
	10	94		40	43							
	15	99		45	43							
	25	109		55	43							

Dimensions Per Vacuum Inlet

		Model						E	F	Fitting part min. hole size	
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	Y	02	U	N S U F GN GS	J K	6	N4 U4 N6 U6	A8	13.5	5	$\varnothing 1.8$
		10				15.5			7	$\varnothing 2.5$	
		15				15.5			7	$\varnothing 2.5$	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

BelloWS Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY **10** U **N** **J** **10** - **N4** - **A10**

① ② ④

⑥ Connection thread
(Male thread)

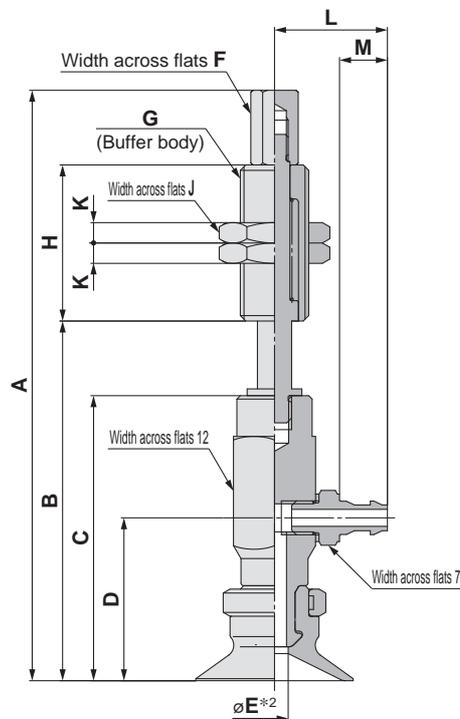
Buffer specification ③

J	Rotating
K	Non-rotating

A10	M10 x 1
A14	M14 x 1

⑤ Vacuum inlet
(Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6



Construction	p. 118
Buffer Assembly	p. 126

		Model						A	B	C	D	*2 E	F	G	H	J	K
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread										
ZP	Y	U	N S U F GN GS	J K	10	N4 N6 U4 U6	A10	83	49	38	22	2.5	6	M10 x 1	14	3	23
					20			121	59								51
					30			131	69								77
					40			167	79								77
					50			177	89	77							
					10			83.5	49.5	23							
					20			121.5	59.5	51							
					30			131.5	69.5	77							
					40			167.5	79.5	77							
					50			177.5	89.5	77							
					10			87	53	23							
					20			125	63	23							
	30	135	73	51													
	40	171	83	77													
	50	181	93	77													
	10	87.5	53.5	23													
	20	125.5	63.5	23													
	30	135.5	73.5	51													
	40	171.5	83.5	77													
	50	181.5	93.5	77													
	10	126.5	58.5	50													
	20	123.5	68.5	50													
	30	133.5	78.5	75													
	50	178.5	98.5	75													
10	127.5	59.5	19														
20	124.5	69.5	50														
30	134.5	79.5	50														
50	179.5	99.5	75														

Dimensions Per Vacuum Inlet

		Model						L	M	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread			
ZP	Y	U	N S U F GN GS	J K	10 20 30 40 50	N4 U4	A10	14.5	5	$\varnothing 1.8$
								N6 U6	A10	16.5
						N6 U6	A14			16.5
								N6 U6	A14	16.5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad



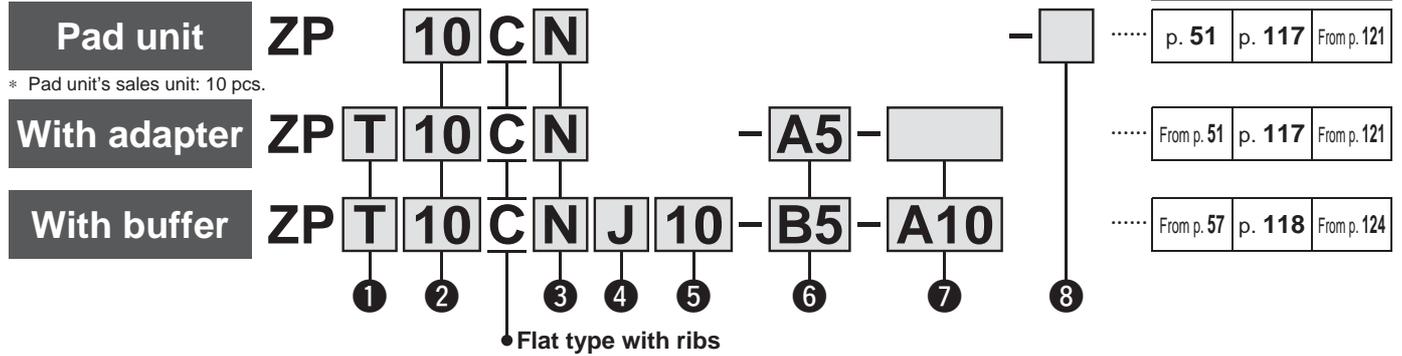
Basic Pad

Flat Type with Ribs

ZP Series



How to Order



① Vacuum inlet direction

Nil	Pad unit
T	Vertical
R	Lateral (With One-touch fitting)
Y	Lateral (With barb fitting)

③ Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

② Pad diameter

10	ø10
13	ø13
16	ø16
20	ø20
25	ø25
32	ø32
40	ø40
50	ø50

④ Buffer specification

J	Rotating
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Pad diameter [mm]							
	ø10	ø13	ø16	ø20	ø25	ø32	ø40	ø50
10	●	●	●	●	●	●	●	●
20	●	●	●	●	●	●	●	●
30	●	●	●	●	●	●	●	●
40	●	●	●	●	●	●	—	—
50	●	●	●	●	●	●	●	●

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

With adapter

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]		
			ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A5	M5 x 0.8	○	—	—
	A6	M6 x 1	○	○	○
	A8	M8 x 1	—	○	○
Female thread	B5	M5 x 0.8	○	○	—
	B6	M6 x 1	○	○	○
	B8	M8 x 1.25	—	○	○
	B01	Rc1/8	○	○	○
	N01	NPT1/8	○	○	○
One-touch fitting	T01	NPTF1/8	○	○	○
	04	ø4	●	●	—
	06	ø6	●	●	●
Barb fitting	08	ø8	—	●	●
	N4	For ø4 nylon tubing	△	△	—
	N6	For ø6 nylon tubing	△	△	△
	U4	For ø4 soft tubing	△	△	—
	U6	For ø6 soft tubing	△	△	△

⑦ Connection thread

●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]		
			ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A5	M5 x 0.8	●△	—	—
	A6	M6 x 1	●△	●△	●△
	A8	M8 x 1	—	●△	●△
Female thread	B5	M5 x 0.8	●△	●△	—
	B6	M6 x 1	●△	●△	●△
	B8	M8 x 1.25	—	●△	●△

It is not necessary to select a connection thread for ○: ZPT/Vertical. Use the vacuum inlet.

* The pad, mounting nut, fitting, and buffer plate are shipped together but do not come assembled.

With buffer

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]		
			ø10 to ø16	ø20 to ø32	ø40, ø50
Female thread	B5	M5 x 0.8	○	○	○
	B01	Rc1/8	—	—	○
	N01	NPT1/8	—	—	○
	T01	NPTF1/8	—	—	○
One-touch fitting	04	ø4	○●	○●	—
	06	ø6	○●	○●	○●
	08	ø8	—	●	○●
Barb fitting	N4	For ø4 nylon tubing*1	△	△	—
	N6	For ø6 nylon tubing*1	○△	○△	○△
	U4	For ø4 soft tubing*2	△	△	—
	U6	For ø6 soft tubing*2	○△	○△	○△

*1 Nylon tube piping

*2 Soft nylon/Polyurethane tube piping

⑦ Connection thread

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]		
			ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A10	M10 x 1	○●△	○●△	—
	A14	M14 x 1	—	—	○●△

⑧ Lock ring

Symbol	Pad diameter	
	All sizes	
Nil	With lock ring	
X19	Without lock ring	

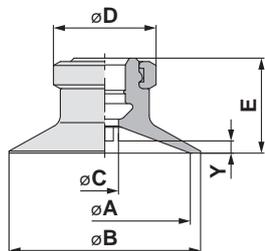
Lock ring unit

Part no.	Pad diameter [mm]
ZPL1	ø10 to ø16
ZPL2	ø20 to ø32
ZPL3	ø40, ø50

Dimensions/Models

Single unit $\varnothing 10$ to $\varnothing 50$

ZP **10** C **N**
① ②



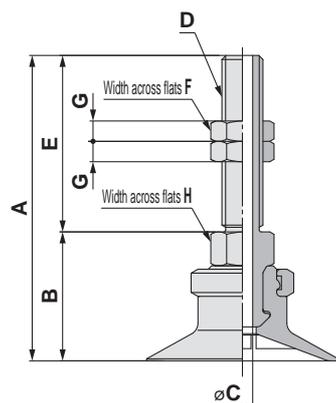
Construction	p. 117
Mounting Bracket Assembly	From p. 121

Model	① Pad dia.	② Form	② ^{*1} Material	A	B	C	D	E	Y
	13		13	15		1.8			
	16		16	18		1.2			
	20		20	23	15	14	1.7		
	25		25	28		1.8			
	32		32	35		14.5	2.3		
	40		40	43	7	18	18.5	3.3	
	50		50	53			19.5	3.8	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

With adapter $\varnothing 10$ to $\varnothing 50$

ZPT **10** C **N** - **A5**
① ② ③



Construction	p. 117
Adapter Assembly	p. 121

③ Vacuum inlet
(Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1

Model	Vacuum inlet direction	① Pad dia.	② Form	② ^{*1} Material	③ Vacuum inlet	A	B	C	D	E	F	G	H	
														ZP
		13			38.5	17.5								
		16			43	17	2.5	M6 x 1	26	8	3	8		
		10			43.5	17.5								
		13			45	19							3	M8 x 1
		16			45.5	19.5								
		20			50.5	24.5	3.5	M8 x 1	16	12	3	12		
		25			50.5	24.5								
		32			51.5	25.5							4.5	M8 x 1
		40			40	24								
		50			40.5	24.5	4.5	M8 x 1	16	12	3	12		
		20			41.5	25.5								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

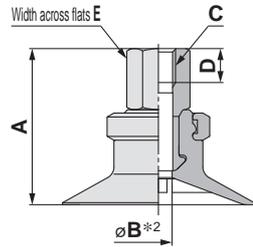
Recommended Gasket Part Nos.

Part no.	D vacuum inlet (Male thread)
WCS5X0.8	M5 x 0.8
WCS6X1	M6 x 1
WCS8X1	M8 x 1

Dimensions/Models

With adapter $\varnothing 10$ to $\varnothing 50$

ZPT **10** C **N** - **B5**



③ Vacuum inlet
(Female thread)

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25
B01	Rc1/8
N01	NPT1/8
T01	NPTF1/8

Construction	p. 117
Adapter Assembly	p. 121

		Model					A	B*2	C	D	E				
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet											
ZP	T	C	N S U F GN GS	B5	10	21	2.5	M5 x 0.8	5	8					
					13	21.5									
					16	23									
					20	23.5									
					25										
				T	C	N S U F GN GS	N S U F GN GS	B6	10	21	2.5	M6 x 1	6	8	
									13	21.5					
									16	23					
									20	23.5					
									25						
	T	C	N S U F GN GS					N S U F GN GS	B8	20	29	3.5	M8 x 1.25	8	12
										25	29.5				
										32	32				
										40	33				
										50					
				T	C	N S U F GN GS	N S U F GN GS		B01 N01 T01	10	27	2.5	Rc1/8 NPT1/8 NPTF1/8	—	12
										13	27.5				
										16	29				
										20	29.5				
										25					
T	C	N S U F GN GS	N S U F GN GS					B01 N01 T01	32	32	3.5	Rc1/8 NPT1/8 NPTF1/8	—	12	
									40	32					
									50	33					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 50$

ZPR **10** C **N** - **04** - **A5**

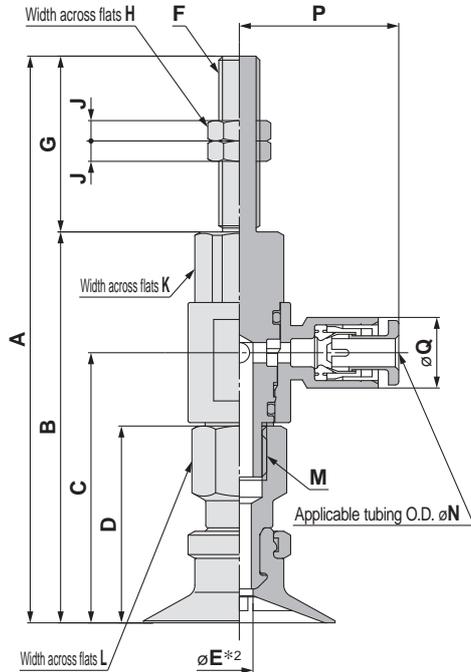
① ②

Vacuum inlet ③
(One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

④ Connection thread
(Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1



Construction	p. 117
Adapter Assembly	p. 122

		Model				A	B	C	D	E ^{*2}	F	G	H	J	K	L	M	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread													
ZP	R	C	N S U F GN GS	04 06 08	A5	10	67	46	29.9	21	2.5	M5 x 0.8	21	8	4	10	8	M5 x 0.8
						13	67.5	46.5	30.4	21.5								
						16	72	46	29.9	21								
						10	72.5	46.5	30.4	21.5	2.5	M6 x 1	25.9	8	3	12	12	M8 x 1.25
						13	83.5	57.6	39.8	29								
						16	84	58.1	40.3	29.5								
						20	86.5	60.6	42.8	32	4	M8 x 1	15.9	12	3	12	12	M8 x 1.25
						25	87.5	61.6	43.8	33								
						32	73.5	57.6	39.8	29								
						40	74	58.1	40.3	29.5	4	M8 x 1	15.9	12	3	12	12	M8 x 1.25
						50	76.5	60.6	42.8	32								
						20	77.5	61.6	43.8	33								

Dimensions Per Vacuum Inlet

		Model				N	P	Q	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	R	C	N S U F GN GS	04 06 08	A5 A6 A8	10	4	20.6	10.4	$\varnothing 3$
						13	6	21.6	12.8	$\varnothing 4$
						16	4	23.3	10.4	$\varnothing 3$
						20	6	24.3	12.8	$\varnothing 4.5$
						25	8	26.2	15.2	$\varnothing 6$
						32	6	24.3	12.8	$\varnothing 4.5$
						40	6	24.3	12.8	$\varnothing 4.5$
						50	8	26.2	15.2	$\varnothing 6$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 50$

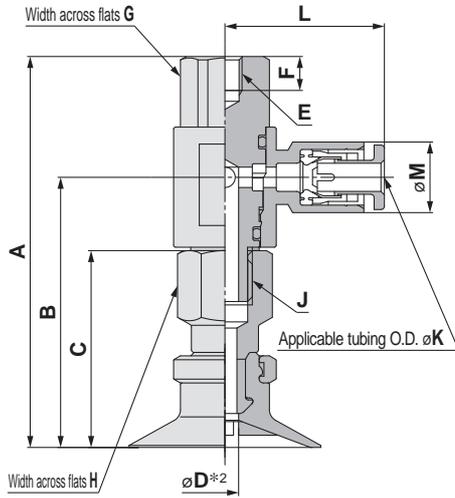
ZPR **10** C **N** - **04** - **B5**

1 Pad dia.
2 Form
3 Vacuum inlet (One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

4 Connection thread (Female thread)

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25



Construction	p. 117
Adapter Assembly	p. 122

		Model				A	B	C	D*2	E	F	G	H	J						
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Vacuum inlet	4 Connection thread															
ZP	R	C	N S U F GN GS	04 06 08	B5	10	46	29.9	21	2.5	M5 x 0.8	5	10	8	M5 x 0.8					
						13	46.5	30.4	21.5				3.5	12	12	M8 x 1.25				
						16	57.6	39.8	29	2.5		10		8	M5 x 0.8					
						20	58.1	40.3	29.5							3.5	6	12	12	M8 x 1.25
						25	46	29.9	21	2.5		M6 x 1		10	8					
						32	46.5	30.4	21.5				4							
					40	57.6	39.8	29	3.5	M8 x 1.25	8	12		M8 x 1.25						
					50	58.1	40.3	29.5							4	M8 x 1.25	8	12	12	M8 x 1.25
					20	60.6	42.8	32	3.5	M8 x 1.25	8	12		12						
					25	61.6	43.8	33					4							
					32	57.6	39.8	29	3.5	M8 x 1.25	8	12		12						
					40	58.1	40.3	29.5							4	M8 x 1.25	8	12	12	M8 x 1.25
					50	60.6	42.8	32	3.5	M8 x 1.25	8	12		12						
					50	61.6	43.8	33					4							

Dimensions Per Vacuum Inlet

		Model				K	L	M	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Vacuum inlet	4 Connection thread				
ZP	R	C	N S U F GN GS	04	B5	4	20.6	10.4	$\varnothing 3$
				06	B6	6	21.6	12.8	$\varnothing 4$
				04	B5	4	23.3	10.4	$\varnothing 3$
				06	B6	6	24.3	12.8	$\varnothing 4.5$
				08	B8	8	26.2	15.2	$\varnothing 6$
				06	B6	6	24.3	12.8	$\varnothing 4.5$
				08	B8	8	26.2	15.2	$\varnothing 6$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY 10 C N - N4 - A5

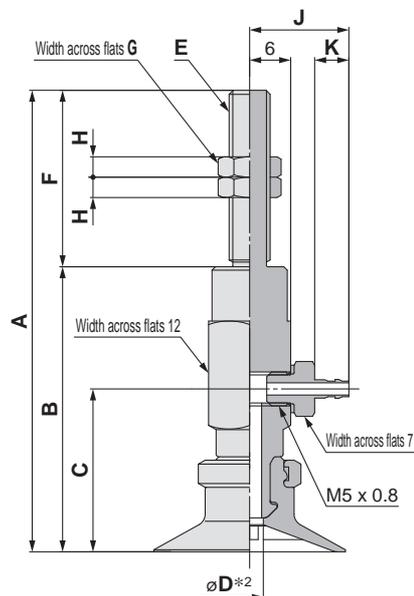
① ②

Vacuum inlet ③
(Barb fitting)

④ Connection thread
(Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6



Construction	p. 117
Adapter Assembly	p. 123

		Model				A	B	C	D*2	E	F	G	H		
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet	④ Connection thread										
ZP	Y	C	N S U F GN GS	N4 N6 U4 U6	A5	10	59	38	22	2.5	M5 x 0.8	21	8	4	
						13	59.5	38.5	22.5						
						16	64	38	22						
					Y	A6	10	64.5	38.5	22.5	2.5	M6 x 1	26	8	3
							13	68	42	24					
							16	68.5	42.5	24.5					
	Y			A8		20	72.5	46.5	28.5	3.5	M8 x 1	16	12	3	
						25	73.5	47.5	29.5						
						32	58	42	24						
	Y			A8	40	58.5	42.5	24.5	3.5	M8 x 1	16	12	3		
					50	62.5	46.5	28.5							
					50	63.5	47.5	29.5							

Dimensions Per Vacuum Inlet

		Model				J	K	Fitting part min. hole size		
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet	④ Connection thread					
ZP	Y	C	N S U F GN GS	N4 U4	A5	10	14.5	5	$\varnothing 1.8$	
						13	14.5	5	$\varnothing 1.8$	
				Y	A6	N6 U6	20	16.5	7	$\varnothing 2.5$
						25	16.5	7	$\varnothing 2.5$	
Y	A8	N6 U6	40	16.5	7	$\varnothing 2.5$				
		50	16.5	7	$\varnothing 2.5$					

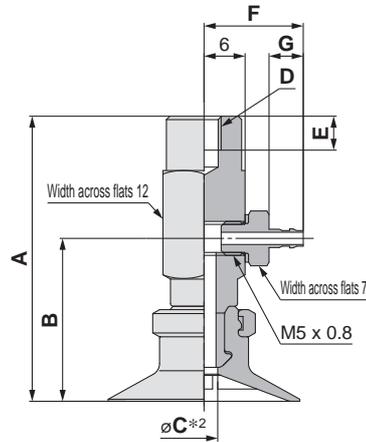
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY 10 C N - N4 - B5



Construction	p. 117
Adapter Assembly	p. 123

①
②
③ Vacuum inlet
(Barb fitting)

④ Connection thread
(Female thread)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25

		Model				A	B	C*2	D	E			
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet	④ Connection thread								
ZP	Y	C	N S U F GN GS	N4 N6 U4 U6	B5	10	38	22	2.5	M5 x 0.8	5		
						13	38.5	22.5					
						16	42	24	3.5				
						20	42.5	24.5					
						25	38	22	2.5			M6 x 1	6
						32	38.5	22.5					
					10	42	24	3.5					
					13	42.5	24.5						
					16	46.5	28.5						
					20	47.5	29.5	6					
					25	42	24		3.5	M8 x 1.25	8		
					32	42.5	24.5						
					40	46.5	28.5						
					50	47.5	29.5						

Dimensions Per Vacuum Inlet

		Model				F	G	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet	④ Connection thread			
ZP	Y	C	N S U F GN GS	N4	B4	14.5	5	$\varnothing 1.8$
				U4	B5			
				N6	B5	16.5	7	$\varnothing 2.5$
				U6	B8			
				N4	B5	14.5	5	$\varnothing 1.8$
				U4	B8			
N6	B6	16.5	7	$\varnothing 2.5$				
U6	B8							
N6	B6	16.5	7	$\varnothing 2.5$				
U6	B8							

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

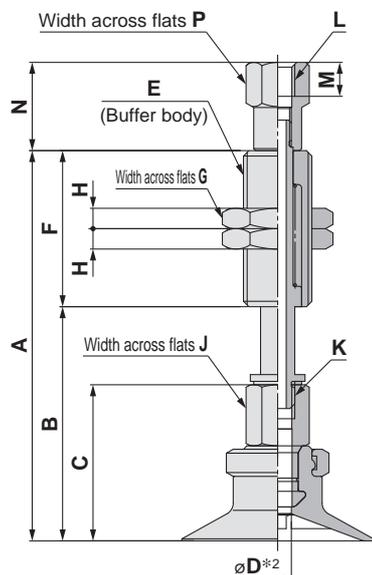
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 50$



Construction	p. 118
Buffer Assembly	p. 124

ZPT **10** C **N** **J** **10** - **B5** - **A10**

① ② ③ ④ ⑤ ⑥

Buffer specification ③

J	Rotating
K	Non-rotating

⑥ Connection thread (Male thread)

A10	M10 x 1
A14	M14 x 1

⑤ Vacuum inlet (Female thread)

B5	M5 x 0.8
B01	Rc1/8
N01	NPT1/8
T01	NPTF1/8

		Model						A	B	C	D*2	E	F	G	H	J	K
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke	⑥ Vacuum inlet	⑦ Connection thread										
ZP	T	C	N S U F GN GS	J K	10	B5 04 06 N6 U6	A10	55.5	32.5	21	J: 2.5 K: 2	M10 x 1	14	3	8	M5 x 0.8	23
					20			93.5	42.5								51
					30			103.5	52.5								77
					40			139.5	62.5								77
					50			149.5	72.5								77
					10			56	33								23
					20			94	43								51
					30			104	53								51
					40			140	63								77
					50			150	73								77
					10			57.5	34.5								23
					20			95.5	44.5								51
	30	105.5	54.5	51													
	40	141.5	64.5	77													
	50	151.5	74.5	77													
	10	58	35	23													
	20	96	45	51													
	30	106	55	51													
	40	142	65	77													
	50	152	75	77													
	10	94.5	44.5	4	M14 x 1	19	5	12	M8 x 1.25								
	20	104.5	54.5							50							
	30	114.5	64.5							75							
	40	159.5	84.5							75							
50	159.5	84.5	75														
10	95.5	45.5	50														
20	105.5	55.5	50														
30	115.5	65.5	75														
40	142	65	75														
50	160.5	85.5	75														

Dimensions Per Vacuum Inlet: Female Thread

		Model						L	M	N	P
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke	⑥ Vacuum inlet	⑦ Connection thread				
ZP	T	C	N S U F GN GS	J K	10	B5	A10	M5 x 0.8	5	13	8
					20						
					30						
					40						
					50						
					10						
	20										
	30										
	40										
	50										
	10	B01 N01 T01	A14	Rc1/8 NPT1/8 NPTF1/8	—	16.5	13				
	20										
30											
40											
50											

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 50$

ZPT **10** C **N** **J** **10** - **04** - **A10**

① ② ③ ④

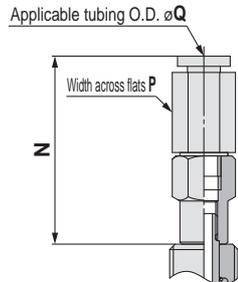
⑥ Connection thread (Male thread)

A10	M10 x 1
A14	M14 x 1

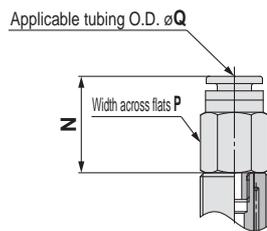
⑤ Vacuum inlet

	Vacuum inlet	One-touch fitting	Pad diameter	
			$\varnothing 10$ to $\varnothing 32$	$\varnothing 40, \varnothing 50$ (10 st only)
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N	KQ2H06-01NS KQ2H08-01NS
06	$\varnothing 6$		KQ2H06-M5N	
08	$\varnothing 8$			
N6	For $\varnothing 6$ nylon tubing	Barb fitting		
U6	For $\varnothing 6$ soft tubing			

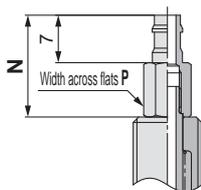
Vacuum inlet: One-touch fitting



Vacuum inlet: Built-in One-touch fitting Pad diameter: $\varnothing 40, \varnothing 50$ (Buffer stroke: 20 to 50 st)



Vacuum inlet: Barb fitting



Dimensions Per Vacuum Inlet: One-touch Fitting

		Model						N	P	Q	Fitting part min. hole size					
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread									
ZP	T	C	N S U F GN GS	J K	10	04	A10	27.7	8	4	$\varnothing 2.5$					
					13											
					16											
					20											
					25											
					32											
	40 50	06	A14	31.8	10	6	$\varnothing 4.5$									
								35.9	14	8	$\varnothing 6$					
								19.9				12	6	$\varnothing 3$		
								24.9							14	8

Dimensions Per Vacuum Inlet: Barb Fitting

		Model						N	P	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread			
ZP	T	C	N S U F GN GS	J K	10	N6	A10	15	6	$\varnothing 2.5$
					20					
					30					
					40					
					50					
					U6					
	40 50	10	A14	19	10	12				
							U6			
							20	10	12	
							30			
							50			
							U6			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction	p. 118
Buffer Assembly	p. 124

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

BelloWS Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer/One-touch fitting $\varnothing 10$ to $\varnothing 50$

ZPR **10** C **N** **J** **10** - **04** - **A10**

① ② ④

Buffer specification ③

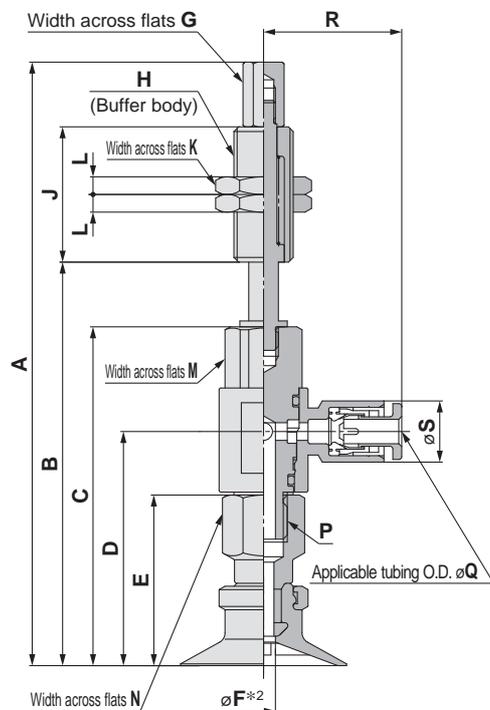
J	Rotating
K	Non-rotating

⑥ Connection thread (Male thread)

A10	M10 x 1
A14	M14 x 1

⑤ Vacuum inlet (One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$



Construction	p. 118
Buffer Assembly	p. 125

		Model										A	B	C	D	E	*2	G	H	J	K	L	M	N	P								
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread																										
ZP	R	C	N S U F G N S	J K	10	04	A10	91	57											23													
					20	129		67															51										
					30	139		77	46	29.9	21													77									
					40	175		87																23									
					50	185		97																									
					10	91.5		57.5																	23								
					20	129.5		67.5																	51								
					30	139.5		77.5	46.5	30.4	21.5														77								
					40	175.5		87.5																									
					50	185.5		97.5																									
					10	102.6		68.6																	23								
					20	140.6		78.6																	51								
	30	150.6	88.6	57.6	39.8	29														77													
	40	186.6	98.6																														
	50	196.6	108.6																														
	10	103.1	69.1																	23													
	20	141.1	79.1																		51												
	30	151.1	89.1	58.1	40.3	29.5																											
	40	187.1	99.1																														
	50	197.1	109.6																														
	10	140.6	72.6																														
	20	137.6	82.6																		50												
	30	147.6	92.6	60.6	42.8	32																											
	50	192.6	112.6																														
10	141.6	73.6																		75													
20	138.6	83.6																															
30	148.6	93.6	61.6	43.8	33																												
50	193.6	113.6																															

Dimensions Per Vacuum Inlet

		Model							Q	R	S	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	R	C	N S U F G N S	J K	10	04	A10	4	20.6	10.4	$\varnothing 3$	
					20	6		21.6	12.8	$\varnothing 4$		
					30	4		23.3	10.4	$\varnothing 3$		
					40	6		24.3	12.8	$\varnothing 4.5$		
					50	8		26.2	15.2	$\varnothing 6$		
					50	8		26.2	15.2	$\varnothing 6$		
	R	C	N S U F G N S	J K	10	06	A14	6	24.3	12.8	$\varnothing 4.5$	
					20	8		26.2	15.2	$\varnothing 6$		
					30	6		24.3	12.8	$\varnothing 4.5$		
					40	8		26.2	15.2	$\varnothing 6$		
					50	8		26.2	15.2	$\varnothing 6$		
					50	8		26.2	15.2	$\varnothing 6$		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY **10** C **N** **J** **10** - **N4** - **A10**

① ② ④

⑥ Connection thread (Male thread)

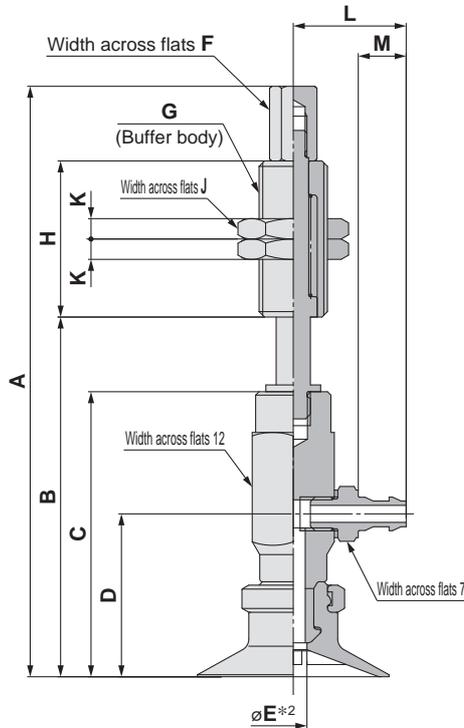
Buffer specification ③

J	Rotating
K	Non-rotating

A10	M10 x 1
A14	M14 x 1

⑤ Vacuum inlet (Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6



Construction	p. 118
Buffer Assembly	p. 126

		Model										A	B	C	D	*2 E	F	G	H	J	K
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread														
ZP	Y	C	N S U F GN GS	J K	10 20 30 40 50 10 20 30 40 50 10 20 30 40 50	N4 U4 U6	A10	83	49	38	22	2.5	6	M10 x 1	14	3	23				
								121	59								51				
								131	69								77				
								167	79								23				
								177	89								51				
								83.5	49.5								77				
								121.5	59.5	23											
								131.5	69.5	51											
								167.5	79.5	77											
								177.5	89.5	23											
								87	53	51											
								125	63	77											
	135	73	23																		
	171	83	51																		
	181	93	77																		
	87.5	53.5	23																		
	125.5	63.5	51																		
	135.5	73.5	77																		
	171.5	83.5	23																		
	181.5	93.5	51																		
	126.5	58.5	77																		
	123.5	68.5	23																		
	133.5	78.5	51																		
	178.5	98.5	77																		
127.5	59.5	23																			
124.5	69.5	51																			
134.5	79.5	77																			
179.5	99.5	23																			

Dimensions Per Vacuum Inlet

		Model							L	M	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	Y	C	N S U F GN GS	J K	10 20 30 40 50	N4 U4	A10	14.5	5	$\varnothing 1.8$		
								N6 U6	A14	16.5	7	$\varnothing 2.5$
						N6 U6	A14			16.5	7	$\varnothing 2.5$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions



Basic Pad

Flat Type Ball Joint Type

ZP Series



How to Order

	Dimensions/Models	Construction	Mounting Bracket Assembly
Pad unit ZP 10 F N	p. 62	p. 119	From p. 127
With adapter ZP T 10 F N - B5 - A8	From p. 62	p. 119	From p. 127
With buffer ZP T 10 F N J 10 - B5 - A10	From p. 65	p. 120	From p. 129

1 2 3 4 5 6 7
 • Ball joint type

1 Vacuum inlet direction

T	Vertical
R	Lateral (With One-touch fitting)

2 Pad diameter

10	ø10
13	ø13
16	ø16
20	ø20
25	ø25
32	ø32
40	ø40
50	ø50

5 Buffer stroke

Stroke [mm]	Pad diameter [mm]	
	ø10 to ø16	ø20 to ø50
10	●	●
20	●	●
30	●	●
40	●	—
50	●	●

3 Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

4 Buffer specification

J	Rotating
K	Non-rotating

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

With adapter

6 Vacuum inlet/7 Connection thread

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting)

6 Vacuum inlet			7 Connection thread			Pad diameter [mm]		
Type	Symbol	Size	Type	Symbol	Size	ø10 to ø16	ø20 to ø32	ø40, ø50
Female thread	B5	M5 x 0.8	Male thread	A8	M8 x 1	○	—	—
				A10	M10 x 1	—	○	—
				A14	M14 x 1	—	—	○
—	Nil	—*1	Female thread	B5	M5 x 0.8	○	○	—
				B8	M8 x 1.25	—	○	○
				B01	Rc1/8	—	○	○
				N01	NPT1/8	—	○	○
				T01	NPTF1/8	—	○	○
				B5	M5 x 0.8	●	—	—
				B8	M8 x 1.25	—	●	●
One-touch fitting	04	ø4	Female thread	B5	M5 x 0.8	—	—	—
				B8	M8 x 1.25	—	●	●
				B5	M5 x 0.8	—	●	●
	06	ø6		B8	M8 x 1.25	—	●	●
	08	ø8		B5	M5 x 0.8	—	●	●
				B8	M8 x 1.25	—	●	●

*1 Use the connection thread.

With buffer

6 Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting)

Type	Symbol	Size	Pad diameter [mm]		
			ø10 to ø16	ø20 to ø32	ø40, ø50
Female thread	B5	M5 x 0.8	○	—	—
	B01	Rc1/8	—	○	○
	N01	NPT1/8	—	○	○
	T01	NPTF1/8	—	○	○
One-touch fitting	04	ø4	○●	—	—
	06	ø6	○●	○●	○●
	08	ø8	—	○●	○●

7 Connection thread

○: ZPT/Vertical ●: ZPR/Lateral

Type	Symbol	Size	Pad diameter [mm]		
			ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A10	M10 x 1	○●	—	—
	A14	M14 x 1	—	○●	○●

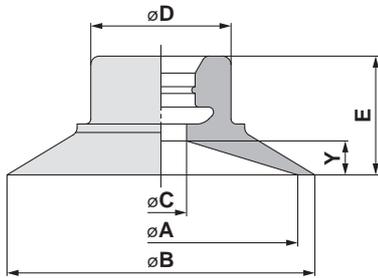
Lock ring unit

Part no.	Pad diameter [mm]
ZPLF	ø40, ø50

* The mounting nut and fitting are shipped together but do not come assembled.

Dimensions/Models

Single unit $\varnothing 10$ to $\varnothing 50$



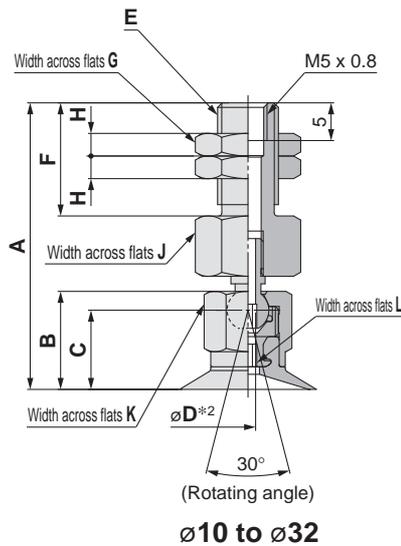
Construction	p. 119
Mounting Bracket Assembly	From p. 127

ZP 10 F N
 ① ②

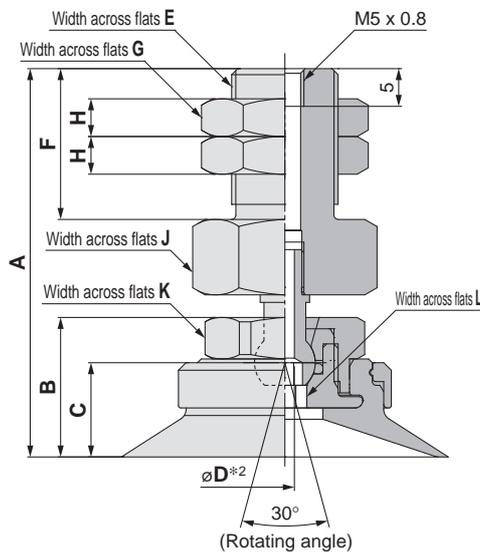
Model	① Pad dia.	② Form	② Material ^{*1}	A	B	C	D	E	Y
	13		S	13	15			7	2
	16		U	16	18			8.5	3
	20		F	20	22	4	10.2	9	
	25		S	25	28			13	5
	32		U	32	35			14	6
	40		F	40	43	10	26		
	50		GN	50	53	8			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

With adapter $\varnothing 10$ to $\varnothing 50$



$\varnothing 10$ to $\varnothing 32$



$\varnothing 40, \varnothing 50$

ZPT 10 F N - B5 - A8
 ① ② ③ ④

Vacuum inlet (Female thread)

B5	M5 x 0.8
----	----------

④ Connection thread (Male thread)

A8	M8 x 1
A10	M10 x 1
A14	M14 x 1

Model	Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Vacuum inlet	④ Connection thread	A	B	C	D ^{*2}	E	F	G	H	J	K	L	
																		ZP
		13		S		A8	38	13	10.5									
		16		U		A8												
		20		F		A10	48.5	15.5	12.5	2	M10 x 1	20	14	3	16	12	3	
		25		S		A10	49	16	13									
		32		U		A10	51.5	18.5	12.5									
		40		F		A14	52.5	19.5	13.5	2.5	M14 x 1	20	19	5	21	19	5	
		50		GN		A14												

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 119
Adapter Assembly	p. 127

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

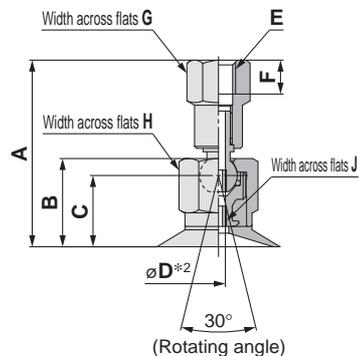
With adapter $\varnothing 10$ to $\varnothing 50$

ZPT **10** F **N** - **B5**

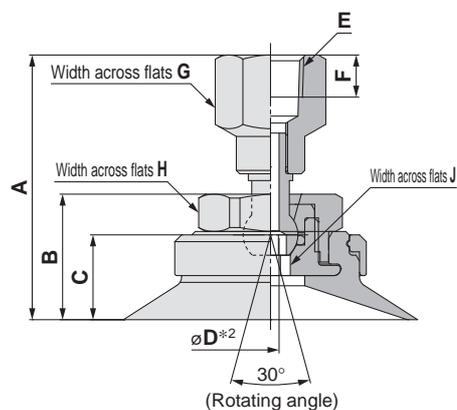
① ②

③ Vacuum inlet (Female thread)

B5	M5 x 0.8
B8	M8 x 1.25
B01	Rc1/8
N01	NPT1/8
T01	NPTF1/8



$\varnothing 10$ to $\varnothing 32$



$\varnothing 40, \varnothing 50$

		Model					A	B	C	D*2	E	F	G	H	J
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet											
ZP	T	F	N S U F GN GS	B5	10	27	12.5	10	2	M5 x 0.8	5	8	10	2	
					13	27.5	13	10.5							
					20	32	15.5	12.5							
					25	32.5	16	13							
					32	36	15.5	12.5	2		M8 x 1.25	8	12	12	3
					20	36.5	16	13							
					25	39	18.5	12.5							
					32	40	19.5	13.5	2.5					19	5
					40	36	15.5	12.5	2			Rc1/8 NPT1/8 NPTF1/8	14	12	12
				20	36.5	16	13								
				25	39	18.5	12.5								
				32	40	19.5	13.5	2.5					19	5	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 119
Adapter Assembly	p. 127

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 50$

ZPR **10** F **N** - **04** - **B5**

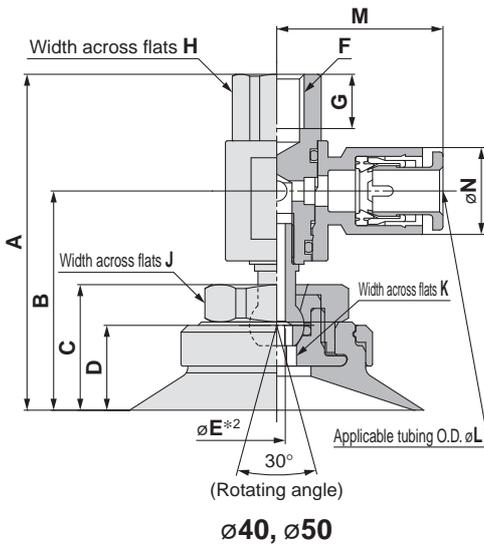
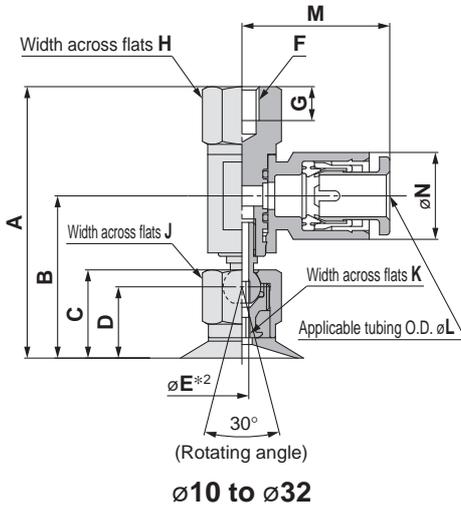
① ②

Vacuum inlet
(One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

④ Connection thread
(Female thread)

B5	M5 x 0.8
B8	M8 x 1.25



		Model				A	B	C	D	*2 E	F	G	H	J	K
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet	④ Connection thread										
ZP	R	F	N S U F GN GS	04 06 08	B5	10	39.5	23.4	12.5	10	M5 x 0.8	5	10	10	2
						13	40	23.9	13	10.5					
						16	40	23.9	13	10.5					
						20	46.5	29.3	15.5	12.5					
						25	46.5	29.3	15.5	12.5					
						32	47	29.8	16	13					
	R	F	N S U F GN GS	04 06 08	B8	40	49.5	32.3	18.5	12.5	M8 x 1.25	8	12	12	3
						50	50.5	33.3	19.5	13.5					
						20	46.5	29.3	15.5	12.5					
						25	46.5	29.3	15.5	12.5					
						32	47	29.8	16	13					
						40	49.5	32.3	18.5	12.5					
R	F	N S U F GN GS	04 06 08	B8	50	50.5	33.3	19.5	13.5	M8 x 1.25	8	12	12	3	
					20	46.5	29.3	15.5	12.5						
					25	46.5	29.3	15.5	12.5						
					32	47	29.8	16	13						
					40	49.5	32.3	18.5	12.5						
					50	50.5	33.3	19.5	13.5						

Dimensions Per Vacuum Inlet

		Model				L	M	N	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet	④ Connection thread				
ZP	R	F	N S U F GN GS	04	B5	4	20.6	10.4	$\varnothing 3$
				06		6	21.6	12.8	$\varnothing 4$
				06	B5 B8	6	24.3	12.8	$\varnothing 4.5$
				08		8	26.2	15.2	$\varnothing 6$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 119
Adapter Assembly	p. 128

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

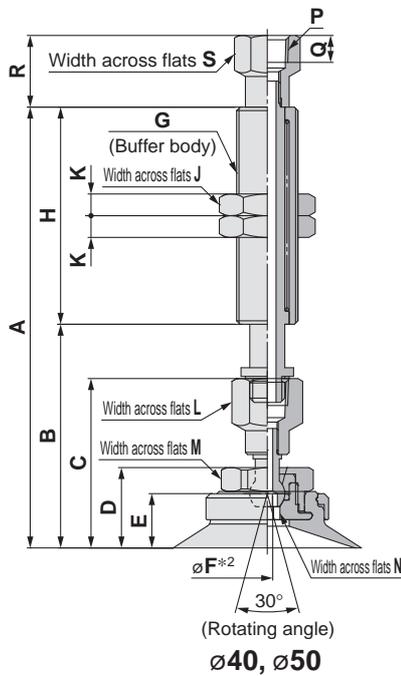
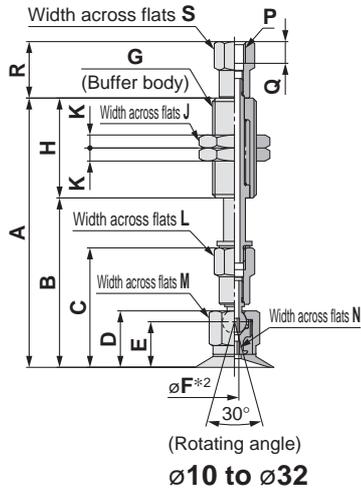
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 50$



ZPT 10 F N J 10 - B5 - A10

Buffer specification

J	Rotating
K	Non-rotating

Connection thread (Male thread)

A10	M10 x 1
A14	M14 x 1

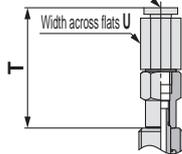
Vacuum inlet

		Pad diameter	
		$\varnothing 10$ to $\varnothing 16$	$\varnothing 20$ to $\varnothing 50$ (10 st only)
B5	M5 x 0.8	Female thread	
B01	Rc1/8		
T01	NPT1/8		
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N
06	$\varnothing 6$		KQ2H06-M5N
08	$\varnothing 8$		KQ2H08-01NS

		Model																							
Vacuum inlet direction	1 Pad dia.	2 Form	3 Material	4 Buffer spec.	5 Buffer stroke	6 Vacuum inlet	7 Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	
ZP	T	F	N S U F G S	J K	10	B5	A10	61.5	38.5	27	12.5	10	2	M10 x1	23	14	3	8	10	2	M5 x 0.8	5	13	8	
					20			99.5	48.5						51										77
					30			109.5	58.5						77										77
					40			145.5	68.5						77										77
					50			155.5	78.5						77										77
					10			62	39						23										23
					20			100	49						51										51
					30			110	59						51										51
					40			146	69						51										51
					50			156	79						51										51
					10			98.5	48.5						50										50
					20			108.5	58.5						50										50
	30	118.5	68.5	50	50																				
	40	138.5	88.5	50	50																				
	50	148.5	98.5	50	50																				
	10	99	49	12	3																				
	20	109	59	12	3																				
	30	119	69	12	3																				
	40	164	89	12	3																				
	50	174	99	12	3																				
	10	101.5	51.5	19	5																				
	20	111.5	61.5	19	5																				
	30	121.5	71.5	19	5																				
	40	166.5	91.5	19	5																				
50	176.5	101.5	19	5																					
10	102.5	52.5	19	5																					
20	112.5	62.5	19	5																					
30	122.5	72.5	19	5																					
40	167.5	92.5	19	5																					
50	177.5	102.5	19	5																					

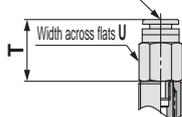
Vacuum inlet: One-touch fitting

Applicable tubing O.D. $\varnothing V$



Vacuum inlet: Built-in One-touch fitting
Pad diameter: $\varnothing 20$ to $\varnothing 50$ (Buffer stroke: 20 to 50 st)

Applicable tubing O.D. $\varnothing V$



Dimensions Per Vacuum Inlet: One-touch Fitting

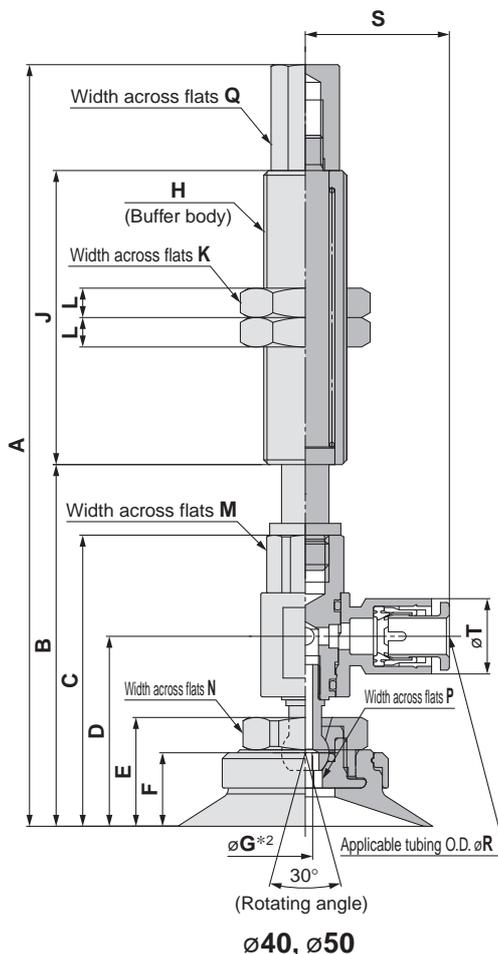
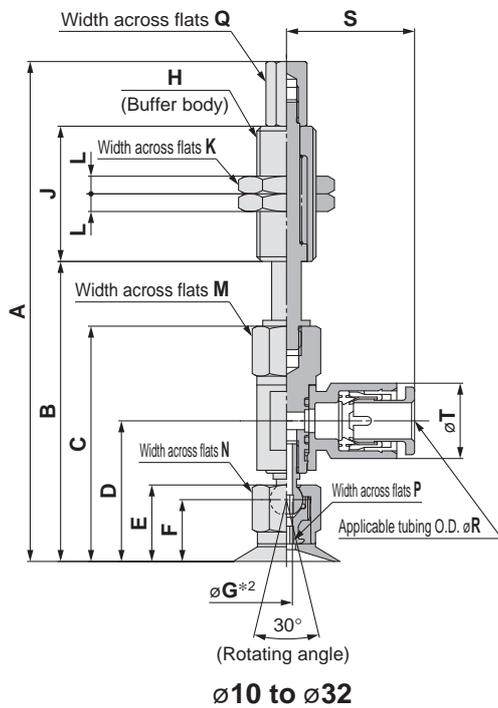
		Model										T	U	V	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	2 Form	3 Material	4 Buffer spec.	5 Buffer stroke	6 Vacuum inlet	7 Connection thread	8	9	10	11	12	13	14	15
ZP	T	F	N S U F G S	J K	10	04	A10	27.7	8	4	$\varnothing 2.5$				
					20										
					30										
					40										
					50										
					10										
	20	08	19.9	12	6	$\varnothing 6$									
	30	06													
	40	08													
	50	08													
	10	08					24.9	14	8	$\varnothing 3$					
	20														
30															
40															
50															

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber
*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 120
Buffer Assembly	p. 129

Dimensions/Models

With buffer/One-touch fitting $\phi 10$ to $\phi 50$



ZPR **10** F **N** **J** **10** - **04** - **A10**

1 2 3 4 5 6

Buffer specification 3

J	Rotating
K	Non-rotating

6 Connection thread (Male thread)

A10	M10 x 1
A14	M14 x 1

5 Vacuum inlet (One-touch fitting)

04	$\phi 4$
06	$\phi 6$
08	$\phi 8$

		Model																														
Vacuum inlet direction	1 Pad dia.	Form	2 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread	A	B	C	D	E	F	G ^{*2}	H	J	K	L	M	N	P	Q										
ZP	R	F	N S U F GN GS	J K	10	04 06	A10	84.5	50.5						M10 x1	23																
					20			122.5	60.5					51																		
					30			132.5	70.5	39.5	23.4	12.5	10																			
					40			168.5	80.5																							
					50			178.5	90.5																							
					10			85	51																							
					20			123	61																							
					30			133	71	40	23.9	13	10.5																			
					40			169	81																							
					50			179	91																							
					10			126.5	58.5																							
					20			123.5	68.5																							
	30	133.5	78.5	46.5	29.3	15.5	12.5																									
	50	178.5	98.5																													
	10	127	59																				12	3								
	20	124	69																													
	30	134	79	47	29.8	16	13																									
	50	179	99																													
	10	129.5	61.5																													
	20	126.5	71.5																													
	30	136.5	81.5	49.5	32.3	18.5	12.5																									
	50	181.5	101.5																													
	10	130.5	62.5																					19	5							
	20	127.5	72.5																													
30	137.5	82.5																														
50	182.5	102.5																														

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model						R	S	T	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	R	F	N S U F GN GS	J K	10	04	A10	4	20.6	10.4	$\phi 3$
					20						
					30						
					40						
					50						
					6			21.6	12.8	$\phi 4$	
	R	F	N S U F GN GS	J K	10	06 08	A14	6	24.3	12.8	$\phi 4.5$
					8			26.2	15.2	$\phi 6$	
					6			24.3	12.8	$\phi 4.5$	
					8			26.2	15.2	$\phi 6$	
					6			24.3	12.8	$\phi 4.5$	
					8			26.2	15.2	$\phi 6$	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

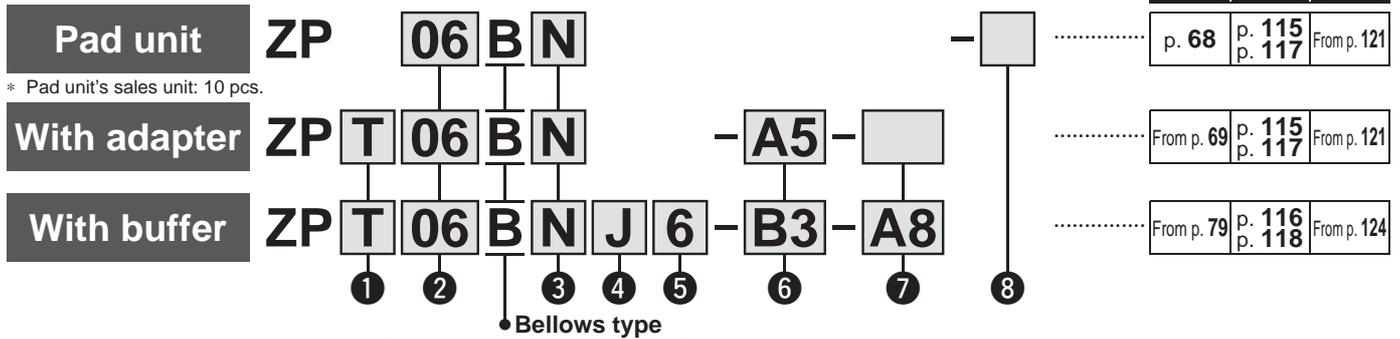
Construction	p. 120
Buffer Assembly	p. 130



Basic Pad Bellows Type ZP Series



How to Order



① Vacuum inlet direction

Symbol	Pad unit
Nil	Pad unit
T	Vertical
R	Lateral (With One-touch fitting)
Y	Lateral (With barb fitting)

③ Material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

② Pad diameter

Symbol	ø6	ø8	ø10	ø13	ø16	ø20	ø25	ø32	ø40	ø50
06	●	—	—	—	—	—	—	—	—	—
08	—	●	—	—	—	—	—	—	—	—
10	—	—	●	—	—	—	—	—	—	—
13	—	—	—	●	—	—	—	—	—	—
16	—	—	—	—	●	—	—	—	—	—

④ Buffer specification

Symbol	Specification
J	Rotating
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Pad diameter [mm]									
	ø6	ø8	ø10	ø13	ø16	ø20	ø25	ø32	ø40	ø50
6	●	●	—	—	—	—	—	—	—	—
10	●	●	●	●	●	●	●	●	●	●
15	●	●	—	—	—	—	—	—	—	—
20	—	—	●	●	●	●	●	●	●	●
25	●	●	—	—	—	—	—	—	—	—
30	—	—	●	●	●	●	●	●	●	●
40	—	—	●	●	●	●	●	●	—	—
50	—	—	●	●	●	●	●	●	●	●

With adapter

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø6, ø8	ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A5	M5 x 0.8	○	○	—	—
	A6	M6 x 1	○	○	○	○
	A8	M8 x 1	—	—	○	○
Female thread	B4	M4 x 0.7	○	—	—	—
	B5	M5 x 0.8	○	○	○	—
	B6	M6 x 1	—	○	○	○
	B8	M8 x 1.25	—	—	○	○
	B01	Rc1/8	—	○	○	○
	N01	NPT1/8	—	○	○	○
One-touch fitting	T01	NPTF1/8	—	○	○	○
	04	ø4	●	●	●	—
Barb fitting	06	ø6	●	●	●	●
	08	ø8	—	—	●	●
	N4	For ø4 nylon tubing	△	△	△	—
Barb fitting	N6	For ø6 nylon tubing	△	△	△	△
	U4	For ø4 soft tubing	△	△	△	—
	U6	For ø6 soft tubing	△	△	△	△

⑦ Connection thread ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø6, ø8	ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A5	M5 x 0.8	●△	●△	—	—
	A6	M6 x 1	●△	●△	●△	●△
	A8	M8 x 1	—	—	●△	●△
Female thread	B4	M4 x 0.7	●△	—	—	—
	B5	M5 x 0.8	●△	●△	●△	—
	B6	M6 x 1	—	●△	●△	●△
Barb fitting	B8	M8 x 1.25	—	—	●△	●△

It is not necessary to select a connection thread for ○: ZPT/Vertical. Use the vacuum inlet.

* The pad, lock ring, mounting nut, fitting, and buffer plate are shipped together but do not come assembled.

With buffer

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø6, ø8	ø10 to ø16	ø20 to ø32	ø40, ø50
Female thread	B3	M3 x 0.5	○	—	—	—
	B5	M5 x 0.8	○	—	○	○
	B01	Rc1/8	—	—	—	○
	N01	NPT1/8	—	—	—	○
One-touch fitting	T01	NPTF1/8	—	—	—	○
	04	ø4	○●	○●	○●	—
Barb fitting	06	ø6	○●	○●	○●	○●
	08	ø8	—	—	●	○●
	N4	For ø4 nylon tubing*1	○△	△	△	—
	N6	For ø6 nylon tubing*1	△	○△	○△	○△
Barb fitting	U4	For ø4 soft tubing*2	○△	△	△	—
	U6	For ø6 soft tubing*2	△	○△	○△	○△

*1 Nylon tube piping *2 Soft nylon/Polyurethane tube piping

⑦ Connection thread

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø6, ø8	ø10 to ø16	ø20 to ø32	ø40, ø50
Male thread	A8	M8 x 1	○●△	—	—	—
	A10	M10 x 1	—	○●△	○●△	—
	A14	M14 x 1	—	—	—	○●△

⑧ Lock ring

Symbol	Pad diameter [mm]	
	ø6, ø8	ø10 to ø50
Nil	None*1	With lock ring
X19	None*1	Without lock ring

*1 The lock ring cannot be used for pad diameters ø6 and ø8.

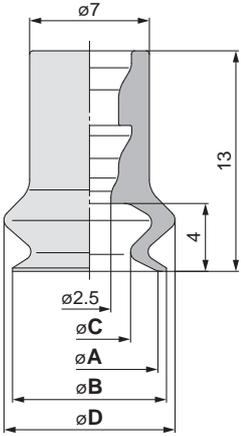
Lock ring unit

Part no.	Pad diameter [mm]
ZPL1	ø10 to ø16
ZPL2	ø20 to ø32
ZPL3	ø40, ø50

Dimensions/Models

Single unit $\varnothing 6$ to $\varnothing 8$

ZP **06** B **N**
① ②



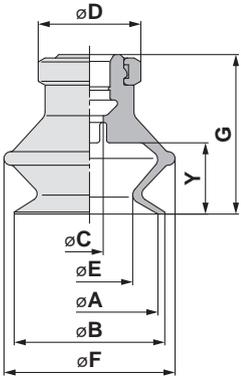
Model			A	B	C	D
① Pad dia.	Form	② ^{*1} Material				
ZP	06	B N S U F GN GS	6	7	3.4	9
	08		8	9	4.8	10

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

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Mounting Bracket Assembly From p. 121

Single unit $\varnothing 10$ to $\varnothing 50$

ZP **10** B **N**
① ②



Model			A	B	C	D	E	F	G	Y		
① Pad dia.	Form	② ^{*1} Material										
ZP	B N S U F GN GS		10	12	4	13	5.5	13.5	16	5.5		
			13	15			8.7	19	18.5	7.5		
			16	18			10	21	20	8.5		
			20	22			12.6	25	23.5	10.5		
			25	27			16	28	24			
			32	34			18.9	37	29	14		
			40	43	24.4	47	34	16				
			50	53	33.4	57	38	19				
							7	18				

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

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Mounting Bracket Assembly From p. 121

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

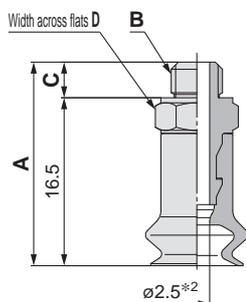
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter $\varnothing 6$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 121

ZPT **06** B **N** - **A5**

① ②

③ Vacuum inlet (Male thread)

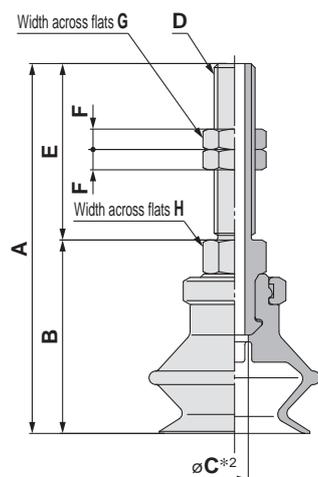
A5	M5 x 0.8
A6	M6 x 1

Model					A	B	C	D		
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet						
ZP	T	06 08	B	N	A5	20	M5 x 0.8	3.5	7	
				S	A6	21	M6 x 1	4.5	8	
		U								
		F GN GS								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

With adapter $\varnothing 10$ to $\varnothing 50$



Construction	p. 117
Adapter Assembly	p. 121

ZPT **10** B **N** - **A5**

① ②

③ Vacuum inlet (Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1

Model					A	B	C ^{*2}	D	E	F	G	H
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet								
ZP	T	10	B	N S U F GN GS	A5	42	21	M5 x 0.8	21	4	8	8
		13				44.5	23.5					
		16				46	25					
		10				47	21					
		13			49.5	23.5	M6 x 1	26	3	8	8	
		16			51	25						
		20			54.5	28.5						
		25			55	29						
		32			60	34	M8 x 1	16	3	12	12	
		40			66	40						
		50			70	44						
		20			49.5	33.5						
		25			50	34	M8 x 1	16	3	12	12	
		32			55	39						
		40			56	40						
		50			60	44						

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

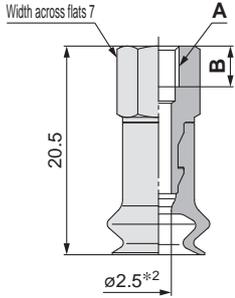
*2 Indicates the minimum hole size of the adapter or vacuum pad

Recommended Gasket Part Nos.

Part no.	D vacuum inlet (Male thread)
WCS5X0.8	M5 x 0.8
WCS6X1	M6 x 1
WCS8X1	M8 x 1

Dimensions/Models

With adapter ø6 to ø8



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Adapter Assembly	p. 121

ZPT **06** B **N** - **B4**

① ② ③

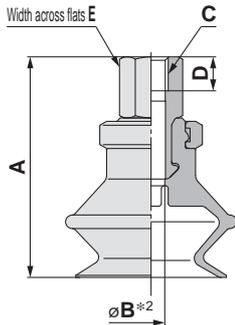
③ Vacuum inlet (Female thread)

B4	M4 x 0.7
B5	M5 x 0.8

Model						A	B
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet			
ZP	T	06 08	B	N S U F GN GS	B4	M4 x 0.7	4
					B5	M5 x 0.8	5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber
*2 Indicates the minimum hole size of the adapter or vacuum pad

With adapter ø10 to ø50



Construction	p. 117
Adapter Assembly	p. 121

ZPT **10** B **N** - **B5**

① ② ③

③ Vacuum inlet (Female thread)

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25
B01	Rc1/8
N01	NPT1/8
T01	NPTF1/8

Model						A	B*2	C	D	E
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet						
ZP	T	B	N S U F GN GS	B5	10	25	M5 x 0.8	5	8	
					13	27.5				
					16	29				
					20	32.5				
					25	33				
					32	38				
					B6	10	25	M6 x 1		6
						13	27.5			
						16	29			
						20	32.5			
						25	33			
						32	38			
				B8	10	25	M8 x 1.25	8		
					13	27.5				
					16	29				
					20	32.5				
					25	33				
					32	38				
				B01 N01 T01	10	31	Rc1/8 NPT1/8 NPTF1/8	—		
					13	33.5				
					16	35				
					20	38.5				
					25	39				
					32	44				
					40	47.5				
					50	51.5				
					10	31			7	
					13	33.5				
16	35									
20	38.5									

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber
*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

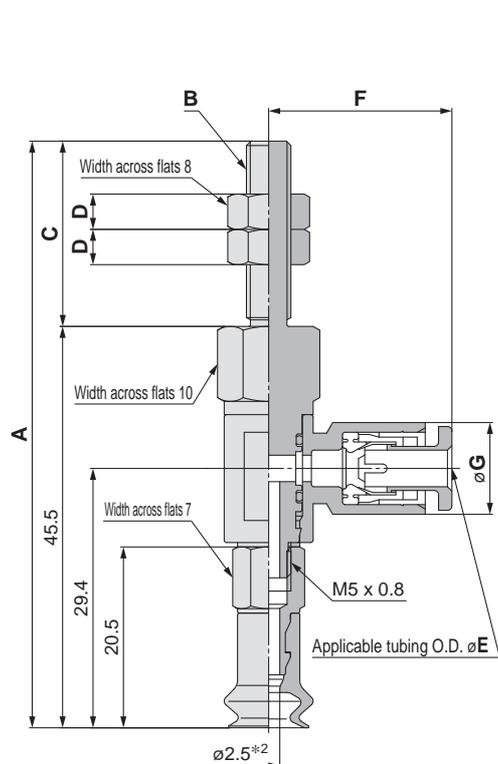
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/One-touch fitting $\varnothing 6$ to $\varnothing 8$



ZPR **06** **B** **N** - **04** - **A5**

1	2	3
04	06	
		$\varnothing 4$
		$\varnothing 6$

4 Connection thread
(Male thread)

A5	M5 x 0.8
A6	M6 x 1

Construction	p. 115
Adapter Assembly	p. 122

Model						A	B	C	D	Fitting part min. hole size	
Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Vacuum inlet	4 Connection thread						
ZP	R	06 08	B	N S U F GN GS	04	A5	66.5	M5 x 0.8	21	4	$\varnothing 3$
					06	A6	71.5	M6 x 1	26	3	$\varnothing 4$

Dimensions Per Vacuum Inlet

Model						E	F	G
Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Vacuum inlet	4 Connection thread			
ZP	R	06 08	B	N S U F GN GS	04	4	20.6	10.4
					06	6	21.6	12.8

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 50$

ZPR **10** **B** **N** - **04** - **A5**

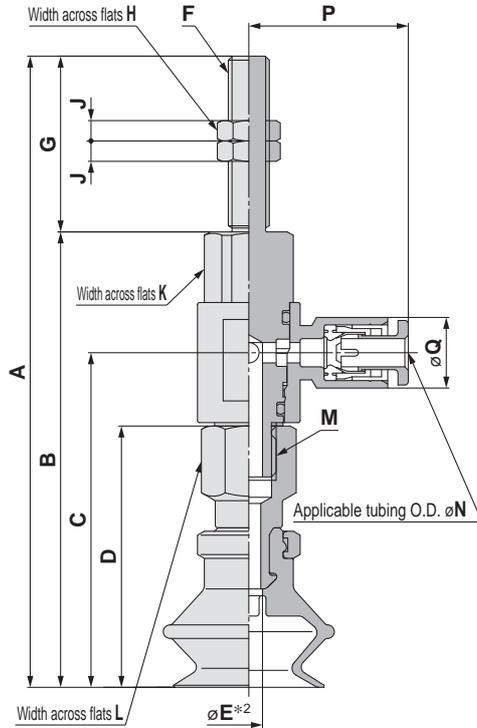
① ②

Vacuum inlet
(One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

④ Connection thread
(Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1



Construction	p. 117
Adapter Assembly	p. 122

Model						A	B	C	D	^{*2} E	F	G	H	J	K	L	M
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread												
ZP	R	B	N S U F GN GS	04 06 08	A5	10	71	50	33.9	25	M5 x 0.8	21	8	4	10	8	M5 x 0.8
						13	73.5	52.5	36.4	27.5							
						16	75	54	37.9	29							
						10	76	50	33.9	25							
						13	78.5	52.5	36.4	27.5							
						16	80	54	37.9	29							
						20	93	67.1	49.3	38.5							
						25	93.5	67.6	49.8	39							
						32	98.5	72.6	54.8	44							
						40	102	76.1	58.3	47.5							
					50	106	80.1	62.3	51.5								
					20	83	67.1	49.3	38.5								
					25	83.5	67.6	49.8	39								
					32	88.5	72.6	54.8	44								
					40	92	76.1	58.3	47.5								
					50	96	80.1	62.3	51.5								

Dimensions Per Vacuum Inlet

Model						N	P	Q	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread				
ZP	R	B	N S U F GN GS	04	A5	4	20.6	10.4	$\varnothing 3$
				06	A6	6	21.6	12.8	$\varnothing 4$
				04	A6	4	23.3	10.4	$\varnothing 3$
				06	A8	6	24.3	12.8	$\varnothing 4.5$
				08	A8	8	26.2	15.2	$\varnothing 6$
				06	A6	6	24.3	12.8	$\varnothing 4.5$
				08	A8	8	26.2	15.2	$\varnothing 6$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

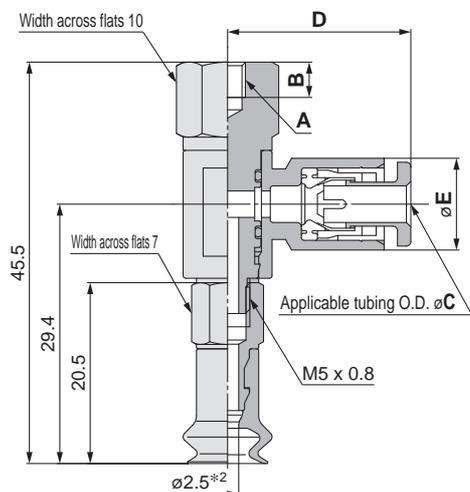
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/One-touch fitting $\varnothing 6$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 122

ZPR **06** **B** **N** - **04** - **B4**

1	2	3	4 Connection thread (Female thread)
Vacuum inlet (One-touch fitting)			
04	$\varnothing 4$		B4 M4 x 0.7
06	$\varnothing 6$		B5 M5 x 0.8

Model						A	B	
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Vacuum inlet	4 Connection thread			
ZP	R	06 08	B	N S U F GN GS	04	B4	M4 x 0.7	4
					06	B5	M5 x 0.8	5

Dimensions Per Vacuum Inlet

Model						C	D	E	Fitting part min. hole size	
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Vacuum inlet	4 Connection thread					
ZP	R	06 08	B	N S U F GN GS	04	B4	4	20.6	10.4	$\varnothing 3$
					06	B5	6	21.6	12.8	$\varnothing 4$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

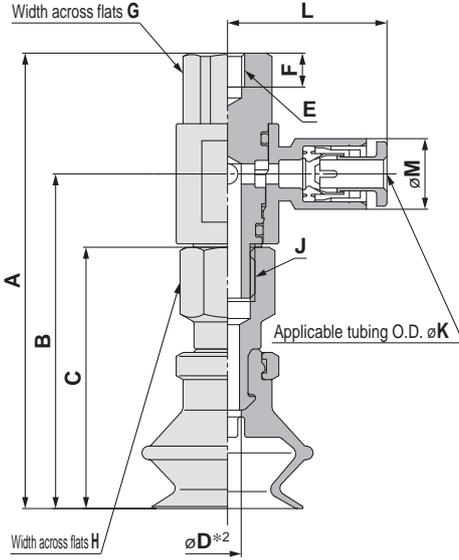
With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 50$

ZPR **10** **B** **N** - **04** - **B5**

1 Pad dia.
2 Form
3 Vacuum inlet (One-touch fitting)
4 Connection thread (Female thread)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25



Construction	p. 117
Adapter Assembly	p. 122

		Model				A	B	C	D*2	E	F	G	H	J	
Vacuum inlet direction	1 Pad dia.	2 Form	3*1 Material	4 Vacuum inlet	5 Connection thread										
ZP	R	B	N S U F GN GS	04 06 08	B5	10	50	33.9	25	2.5	M5 x 0.8	5	10	8	M5 x 0.8
						13	52.5	36.4	27.5						
						16	54	37.9	29						
						20	67.1	49.3	38.5						
						25	67.6	49.8	39						
						32	72.6	54.8	44						
						10	50	33.9	25	2.5	M6 x 1	6	10	8	M5 x 0.8
						13	52.5	36.4	27.5						
						16	54	37.9	29						
						20	67.1	49.3	38.5						
	25	67.6	49.8	39											
	32	72.6	54.8	44											
	40	76.1	58.3	47.5	4	M8 x 1.25	8	12	12	M8 x 1.25					
	50	80.1	62.3	51.5											
	20	67.1	49.3	38.5							3.5	M8 x 1.25	8	12	12
	25	67.6	49.8	39											
	32	72.6	54.8	44											
	40	76.1	58.3	47.5	4						M8 x 1.25				
	50	80.1	62.3	51.5											
	20	67.1	49.3	38.5											
25	67.6	49.8	39												
32	72.6	54.8	44												
40	76.1	58.3	47.5												
50	80.1	62.3	51.5												

Dimensions Per Vacuum Inlet

		Model				K	L	M	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	2 Form	3*1 Material	4 Vacuum inlet	5 Connection thread				
ZP	R	B	N S U F GN GS	04	B5	4	20.6	10.4	$\varnothing 3$
				06	B6	6	21.6	12.8	$\varnothing 4$
				04	B5	4	23.3	10.4	$\varnothing 3$
				06	B6	6	24.3	12.8	$\varnothing 4.5$
				08	B8	8	26.2	15.2	$\varnothing 6$
				06	B6	6	24.3	12.8	$\varnothing 4.5$
				08	B8	8	26.2	15.2	$\varnothing 6$
				08	B8	8	26.2	15.2	$\varnothing 6$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

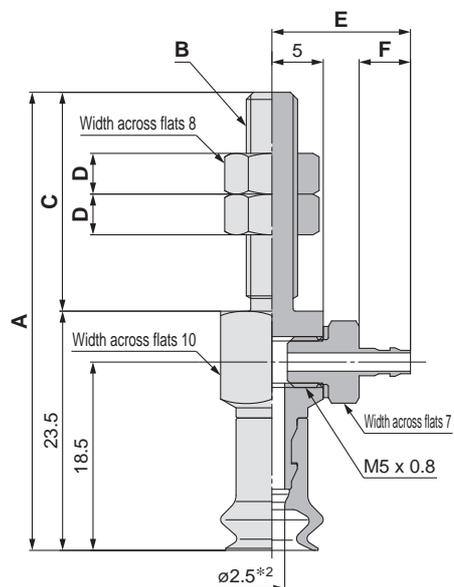
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/barb fitting $\varnothing 6$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 123

ZPY **06** **B** **N** - **N4** - **A5**

①

②

④

Connection thread
(Male thread)

Vacuum inlet ③
(Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

A5	M5 x 0.8
A6	M6 x 1

		Model				A	B	C	D	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet						
ZP	Y	06 08	B	N S U F GN GS	N4 N6 U4 U6	A5	45	M5 x 0.8	21.5	4
						A6	50.5	M6 x 1	27	3

Dimensions Per Vacuum Inlet

		Model				E	F	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet					
ZP	Y	06 08	B	N S U F GN GS	N4 U4	A5 A6	13.5	5	$\varnothing 1.8$
					N6 U6		15.5	7	$\varnothing 2.5$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY **10** **B** **N** - **N4** - **A5**

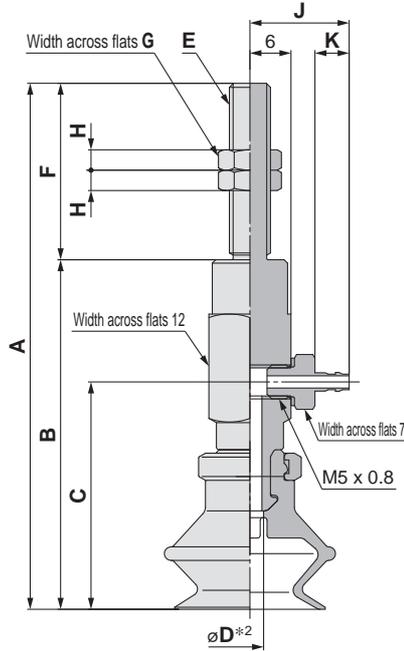
① ②

Vacuum inlet ③
(Barb fitting)

④ Connection thread
(Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6



Construction	p. 117
Adapter Assembly	p. 123

		Model				A	B	C	D*2	E	F	G	H	
	Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet									
ZP	Y	10	B	N S U F GN GS	N4 N6 U4 U6	A5	63	42	26	2.5	M5 x 0.8	21	8	4
		13					65.5	44.5	28.5					
		16					67	46	30					
		10					68	42	26					
		13				70.5	44.5	28.5						
		16				72	46	30						
		20				77.5	51.5	33.5						
		25				78	52	34						
		32				83	57	39						
		40				88	62	44						
		50			92	66	48							
		20			A6	67.5	51.5	33.5	2.5	M6 x 1	26	8	3	
		25				68	52	34						
		32				73	57	39						
		40				78	62	44						
		50				82	66	48						
		20				A8	67.5	51.5						33.5
		25			68		52	34						
		32			73		57	39						
		40			78		62	44						
50	82	66	48											

Dimensions Per Vacuum Inlet

		Model				J	K	Fitting part min. hole size	
	Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet				
ZP	Y	10	B	N S U F GN GS	N4 U4	A5 A6	14.5	5	$\varnothing 1.8$
		13							
		16							
		20			N6 U6	A6 A8	16.5	7	$\varnothing 2.5$
		25							
		32							
40	N6 U6	A6 A8	16.5	7	$\varnothing 2.5$				
50									

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

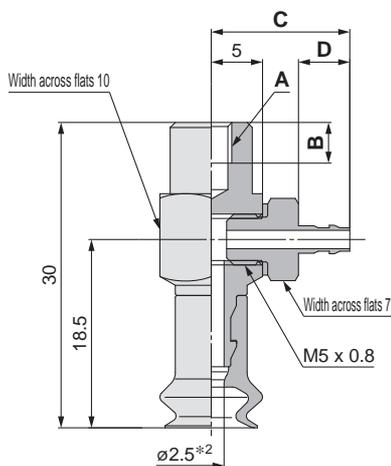
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/barb fitting $\varnothing 6$ to $\varnothing 8$



Construction	p. 115
Adapter Assembly	p. 123

ZPY **06** **B** **N** - **N4** - **B4**

① ②

Vacuum inlet ③
(Barb fitting)

④ Connection thread
(Female thread)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

B4	M4 x 0.7
B5	M5 x 0.8

		Model				A	B	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet	Connection thread			
ZP	Y	06 08	B	N S U F GN GS	N4 N6 U4 U6	B4	M4 x 0.7	4
						B5	M5 x 0.8	5

Dimensions Per Vacuum Inlet

		Model				C	D	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet	Connection thread				
ZP	Y	06 08	B	N S U F GN GS	N4 U4	B4 B5	13.5	5	$\varnothing 1.8$
					N6 U6		15.5	7	$\varnothing 2.5$

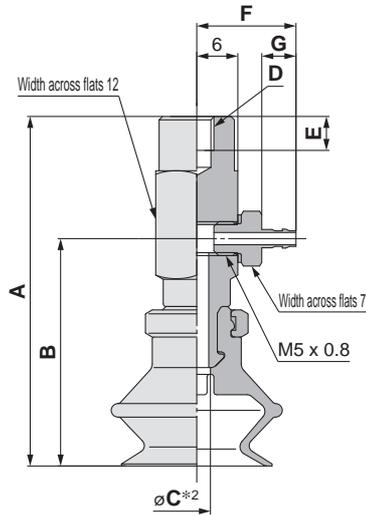
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY 10 B N - N4 - B5



Construction	p. 117
Adapter Assembly	p. 123

①
②
③ Vacuum inlet (Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

④ Connection thread (Female thread)

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25

		Model				A	B	C*2	D	E
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet						
ZP	Y	B	N S U F GN GS	N4 N6 U4 U6	B5	42	26	2.5	M5 x 0.8	5
						44.5	28.5			
						46	30			
						51.5	33.5			
						52	34			
						57	39			
					B6	42	26	2.5	M6 x 1	6
						44.5	28.5			
						46	30			
						51.5	33.5			
						52	34			
						57	39			
	B8	51.5	33.5	3.5	M8 x 1.25	8				
		52	34							
		57	39							
		62	44							
		66	48							
		62	44							

Dimensions Per Vacuum Inlet

		Model				F	G	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet				
ZP	Y	B	N S U F GN GS	N4 U4	B4	14.5	5	$\varnothing 1.8$
				N6 U6	B5	16.5	7	$\varnothing 2.5$
				N4 U4	B5	14.5	5	$\varnothing 1.8$
				N6 U6	B6 B8	16.5	7	$\varnothing 2.5$
				N6 U6	B6 B8	16.5	7	$\varnothing 2.5$
				N6 U6	B6 B8	16.5	7	$\varnothing 2.5$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

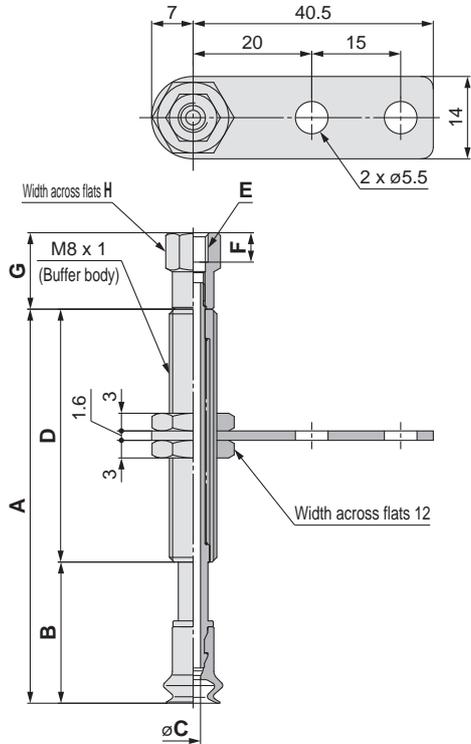
Construction

Mounting Bracket Assembly

Precautions

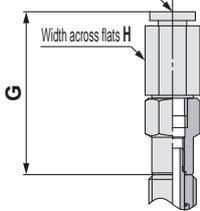
Dimensions/Models

With buffer $\varnothing 6$ to $\varnothing 8$

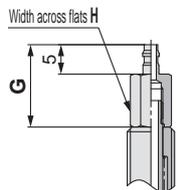


Vacuum inlet: One-touch fitting

Applicable tubing O.D. $\varnothing J$



Vacuum inlet: Barb fitting



Construction	p. 116
Buffer Assembly	p. 124

ZPT 06 B N J 6 - B3 - A8

1 2 4 3

Buffer specification 3

J	Rotating
K	Non-rotating

6 **Connection thread (Male thread)**

A8	M8 x 1
----	--------

5 **Vacuum inlet**

B3	M3 x 0.5	Female thread	
B5	M5 x 0.8		
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N
06	$\varnothing 6$		KQ2H06-M5N
N4	For $\varnothing 4$ nylon tubing	Barb fitting	
U4	For $\varnothing 4$ soft tubing		

Model										A	B	C*2	D
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread						
ZP	T	06 08	B	N S U F GN GS	J K	6	B3	A8	34	19	J: 2.5 K: 2	15	
						10	B5		67	24			
						15	04		72	29			
						25	06 N4 U4		82	39		43	

Dimensions Per Vacuum Inlet: Female Thread

Model										E	F	G	H
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread						
ZP	T	06 08	B	N S U F GN GS	J K	6	B3	A8	M3 x 0.5	3	11	6	
						10 15 25	B5		M5 x 0.8	5	13	8	

Dimensions Per Vacuum Inlet: One-touch Fitting

Model										G	H	J	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread						
ZP	T	06 08	B	N S U F GN GS	J K	6	04	A8	27.7	8	4	$\varnothing 2.5$	
						10 15 25	06			10	6		

Dimensions Per Vacuum Inlet: Barb Fitting

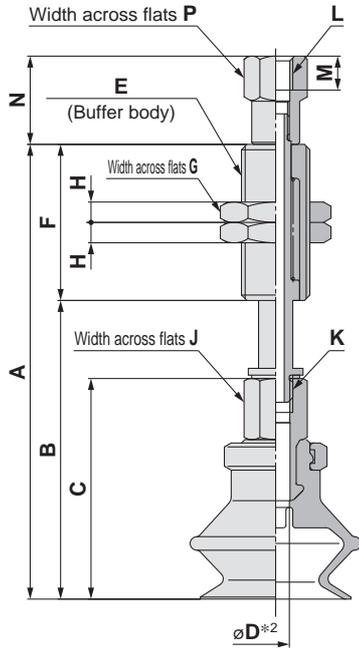
Model										G	H	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread					
ZP	T	06 08	B	N S U F GN GS	J K	6	N4	A8	14	6	$\varnothing 1.8$	
						10 15 25	U4					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 50$



Construction	p. 118
Buffer Assembly	p. 124

ZPT 10 B N J 10 - B5 - A10

1	2	3	4	5	6
Buffer specification	Buffer spec.	Buffer stroke	Vacuum inlet	Connection thread	Connection thread (Male thread)
J Rotating K Non-rotating			B5 M5 x 0.8 B01 Rc1/8 N01 NPT1/8 T01 NPTF1/8	A10 M10 x 1 A14 M14 x 1	

Model		1	2	3	4	5	6	A	B	C	D*2	E	F	G	H	J	K
Vacuum inlet direction	Pad dia.	Form	Material	Buffer spec.	Buffer stroke	Vacuum inlet	Connection thread										
ZP	T	B	N S U F G N S	J K	10	B5 04 06 N6 U6	A10	59.5	36.5	25	J:2.5 K:2	M10 x 1	14	3	8	M5 x 0.8	23
					20			97.5	46.5								51
					30			107.5	56.5								77
					40			143.5	66.5								23
					50			153.5	76.5								51
					10			62	39								23
					20			100	49								51
					30			110	59								77
					40			146	69								23
					50			156	79								51
					10			63.5	40.5								23
					20			101.5	50.5								51
					30			111.5	60.5								77
					40			147.5	70.5								23
					50			157.5	80.5								51
					10			67	44								23
					20			105	54								51
					30			115	64								77
					40			151	74								23
					50			161	84								51
					10			67.5	44.5								23
					20			105.5	54.5								51
					30			115.5	64.5								77
					40			151.5	74.5								23
					50			161.5	84.5								51
					10			72.5	49.5								23
					20			110.5	59.5								51
					30			120.5	69.5								77
					40			156.5	79.5								23
					50			166.5	89.5								51
					10			110	60								23
					20			120	70								51
					30			130	80								77
					40			175	100								23
					50			175	100								51
					10			114	64								23
					20			124	74								51
					30			134	84								77
					40			179	104								23
					50			179	104								51
					10			110	60								23
					20			120	70								51
					30			130	80								77
					40			175	100								23
					50			175	100								51
					10			114	64								23
					20			124	74								51
					30			134	84								77
40	179	104	23														
50	179	104	51														

Dimensions Per Vacuum Inlet: Female Thread

Model		1	2	3	4	5	6	L	M	N	P												
Vacuum inlet direction	Pad dia.	Form	Material	Buffer spec.	Buffer stroke	Vacuum inlet	Connection thread																
ZP	T	B	N S U F G N S	J K	10	B5	A10	M5 x 0.8	5	13	8												
					20																		
					30																		
					40																		
					50																		
					10							B5	A14	M5 x 0.8	5	9	10						
					20																		
					30																		
					40																		
					50																		
					10													B01 N01 T01	A14	Rc1/8 NPT1/8 NPTF1/8	—	16.5	13
					20																		
30																							
40																							
50																							

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

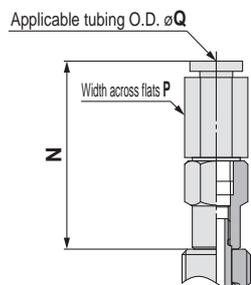
Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 50$

ZPT **10** **B** **N** **J** **10** - **04** - **A10**

① ② ③ ④ ⑤ ⑥

Vacuum inlet: One-touch fitting



Buffer specification ③

J	Rotating
K	Non-rotating

⑥ Connection thread (Male thread)

A10	M10 x 1
A14	M14 x 1

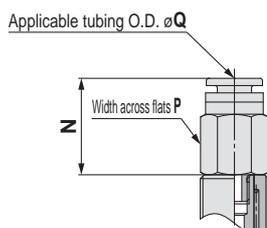
⑤ Vacuum inlet		Pad diameter	
		$\varnothing 10$ to $\varnothing 32$	$\varnothing 40, \varnothing 50$ (10 st only)
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N
			KQ2H06-M5N
06	$\varnothing 6$	One-touch fitting	KQ2H06-01NS
08	$\varnothing 8$		KQ2H08-01NS
N6	For $\varnothing 6$ nylon tubing	Barb fitting	
U6	For $\varnothing 6$ soft tubing		

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model						N	P	Q	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread				
ZP	T	10	B	N S U F GN GS	J K	10	A10	27.7	8	4	$\varnothing 2.5$
		13				20					
		16				30					
		20				40					
		25				50					
		32									
	40	10	B	N S U F GN GS	J K	06	A14	31.8	10	6	$\varnothing 4.5$
	50	08				35.9		14	8	$\varnothing 6$	
		20				19.9		12	6	$\varnothing 3$	
		30				24.9		14	8		
		50									

Vacuum inlet: Built-in One-touch fitting

Pad diameter: $\varnothing 40, \varnothing 50$ (Buffer stroke: 20 to 50 st)

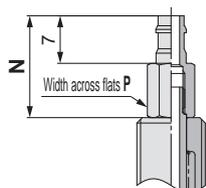


Dimensions Per Vacuum Inlet: Barb Fitting

		Model						N	P	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread			
ZP	T	10	B	N S U F GN GS	J K	10	A10	15	6	$\varnothing 2.5$
		13				20				
		16				30				
		20				40				
		25				50				
		32								
40	10	B	N S U F GN GS	J K	06	A14	19	10		
50	U6				12					
	N6									
	U6									
	N6									
	U6									

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Vacuum inlet: Barb fitting



Construction	p. 118
Buffer Assembly	p. 124

Dimensions/Models

With buffer/One-touch fitting $\varnothing 10$ to $\varnothing 50$

ZPR **10** **B** **N** **J** **10** - **04** - **A10**

1 2 3 4 5 6

Buffer specification 3

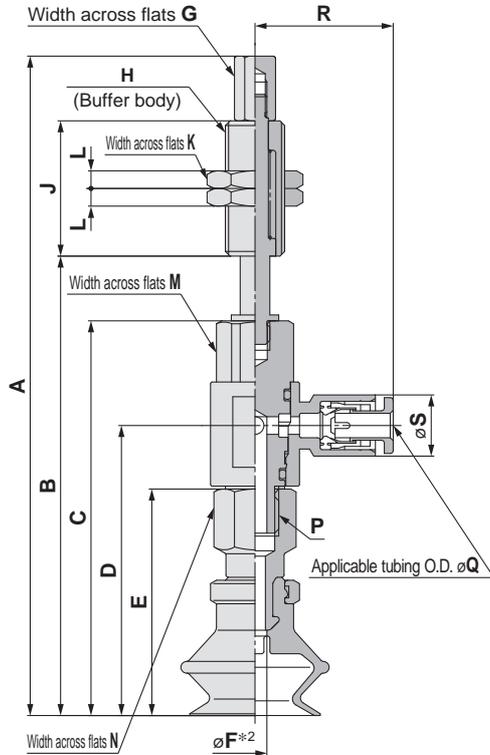
J	Rotating
K	Non-rotating

Vacuum inlet (One-touch fitting) 5

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

Connection thread (Male thread) 6

A10	M10 x 1
A14	M14 x 1



Construction	p. 118
Buffer Assembly	p. 125

		Model																			
Vacuum inlet direction	1 Pad dia.	Form	2 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread	A	B	C	D	E	*2 F	G	H	J	K	L	M	N	P
ZP	R	B	N S U F G N S	J K	10	04	A10	95	61	50	33.9	25	2.5	6	M10 x1	23	14	3	10	8	M5 x 0.8
					20			133	71							51					
					30			143	81							77					
					40			179	91							23					
					50			189	101							51					
					10			97.5	63.5							77					
					20			135.5	73.5							23					
					30			145.5	83.5							51					
					40			181.5	93.5							77					
					50			191.5	103.5							23					
					10			99	65							51					
					20			137	75							77					
					30			147	85							23					
					40			183	95							51					
					50			193	105							77					
					10			112.1	78.1							23					
					20			150.1	88.1							51					
					30			160.1	98.1							77					
					40			196.1	108.1							23					
					50			206.1	118.1							51					
					10			112.6	78.6							77					
					20			150.6	88.6							23					
					30			160.6	98.6							51					
					40			196.6	108.6							77					
					50			206.6	118.6							23					
					10			117.6	83.6							51					
					20			155.6	93.6							77					
					30			165.6	103.6							23					
					40			201.6	113.6							51					
					50			211.6	123.6							77					
					10			156.1	88.1							23					
					20			153.1	98.1							51					
					30			163.1	108.1							77					
					40			208.1	128.1							23					
					50			160.1	92.1							51					
					10			157.1	102.1							77					
					20			167.1	112.1							23					
					30			212.1	132.1							51					
					40			156.1	88.1							77					
					50			153.1	98.1							23					
					10			163.1	108.1							51					
					20			208.1	128.1							77					
					30			160.1	92.1							23					
					40			157.1	102.1							51					
					50			167.1	112.1							77					
					10			156.1	88.1							23					
					20			153.1	98.1							51					
					30			163.1	108.1							77					
40	208.1	128.1	23																		
50	160.1	92.1	51																		
10	157.1	102.1	77																		
20	167.1	112.1	23																		
30	212.1	132.1	51																		
40	156.1	88.1	77																		
50	153.1	98.1	23																		
10	163.1	108.1	51																		
20	208.1	128.1	77																		
30	160.1	92.1	23																		
40	157.1	102.1	51																		
50	167.1	112.1	77																		

Dimensions Per Vacuum Inlet

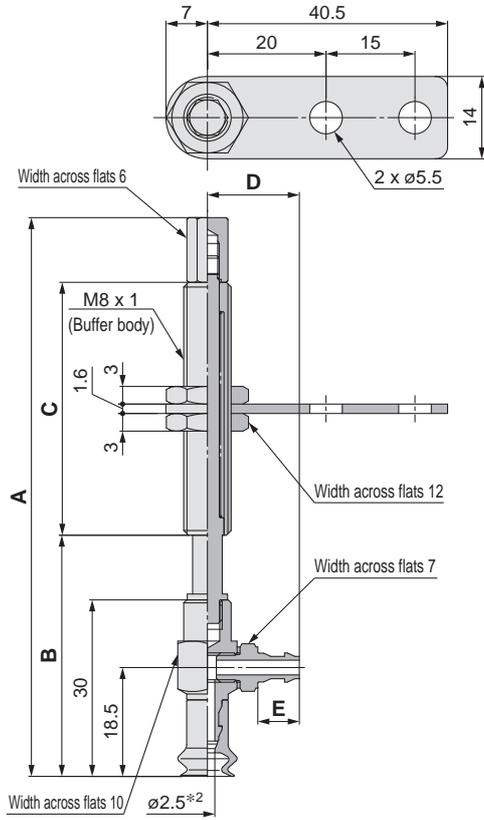
		Model						Q	R	S	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	R	B	N S U F G N S	J K	10	04	A10	4	20.6	10.4	$\varnothing 3$
					20			6	21.6	12.8	$\varnothing 4$
					30			6	23.3	10.4	$\varnothing 3$
					40			6	24.3	12.8	$\varnothing 4.5$
					50			8	26.2	15.2	$\varnothing 6$
					10			6	24.3	12.8	$\varnothing 4.5$
					20			8	26.2	15.2	$\varnothing 6$
					30			6	24.3	12.8	$\varnothing 4.5$
					40			8	26.2	15.2	$\varnothing 6$
					50			6	24.3	12.8	$\varnothing 4.5$
					10			8	26.2	15.2	$\varnothing 6$
					20			6	24.3	12.8	$\varnothing 4.5$
30	8	26.2	15.2	$\varnothing 6$							
40	6	24.3	12.8	$\varnothing 4.5$							
50	8	26.2	15.2	$\varnothing 6$							

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer/barb fitting $\varnothing 6$ to $\varnothing 8$



Construction	p. 116
Buffer Assembly	p. 126

ZPY **06** **B** **N** **J** **6** - **N4** - **A8**

① ② ④

Buffer specification ③

J	Rotating
K	Non-rotating

⑥ Connection thread
(Male thread)

A8	M8 x 1
----	--------

⑤ Vacuum inlet
(Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

		Model						A	B	C	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread				
ZP	Y	06 08	B	N S U F GN GS	J K	6	N4 N6 U4 U6	A8	64	38	15
						10			95	41	43
						15			100	46	
						25			110	56	

Dimensions Per Vacuum Inlet

		Model						D	E	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread				
ZP	Y	06 08	B	N S U F GN GS	J K	6	N4 U4	A8	13.5	5	$\varnothing 1.8$
						10 15 25			N6 U6	15.5	7

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer/barb fitting $\varnothing 10$ to $\varnothing 50$

ZPY 10 B N J 10 - N4 - A10

① ② ④

⑥ **Connection thread (Male thread)**

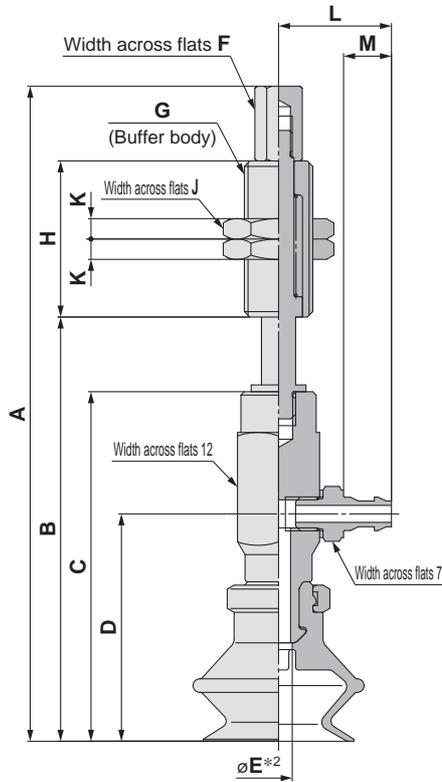
Buffer specification ③

J	Rotating
K	Non-rotating

A10	M10 x 1
A14	M14 x 1

⑤ **Vacuum inlet (Barb fitting)**

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6



Construction	p. 118
Buffer Assembly	p. 126

		Model										A	B	C	D	*2 E	F	G	H	J	K
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread														
ZP	Y	B	N S U F GN GS	J K	10	N4 N6 U4 U6	A10	87	53	42	26	2.5	6	M10 x 1	23	14	3	23	51	77	
					20			125	63												
					30			135	73												
					40			171	83												
					50			181	93												
					10			89.5	55.5												
					20			127.5	65.5												
					30			137.5	75.5												
					40			173.5	85.5												
					50			183.5	95.5												
					10			91	57												
					20			129	67												
	30	139	77																		
	40	175	87																		
	50	185	97																		
	10	96.5	62.5																		
	20	134.5	72.5																		
	30	144.5	82.5																		
	40	180.5	92.5																		
	50	190.5	102.5																		
	10	97	63																		
	20	135	73																		
	30	145	83																		
	40	181	93																		
50	191	103																			
10	102	68																			
20	140	78																			
30	150	88																			
40	186	98																			
50	196	108																			
10	142	74																			
20	139	84																			
30	149	94																			
40	194	114																			
50	194	114																			
10	146	78																			
20	143	88																			
30	153	98																			
50	198	118																			
10	142	74																			
20	139	84																			
30	149	94																			
40	194	114																			
50	194	114																			
10	146	78																			
20	143	88																			
30	153	98																			
50	198	118																			
10	142	74																			
20	139	84																			
30	149	94																			
40	194	114																			
50	194	114																			
10	146	78																			
20	143	88																			
30	153	98																			
50	198	118																			

Dimensions Per Vacuum Inlet

		Model							L	M	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	Y	B	N S U F GN GS	J K	10 20 30 40 50	N4 U4	A10	14.5	5	$\varnothing 1.8$		
								N6 U6	A10	16.5	7	$\varnothing 2.5$
										N6 U6	A14	16.5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad



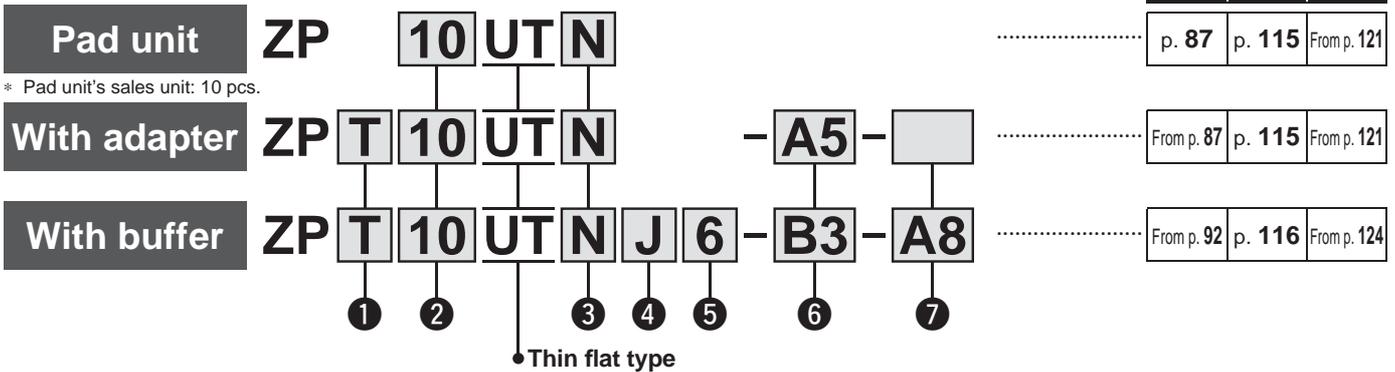
Basic Pad

Thin Flat Type

ZP Series



How to Order



① Vacuum inlet direction

Nil	Pad unit
T	Vertical
R	Lateral (With One-touch fitting)
Y	Lateral (With barb fitting)

② Pad diameter

10	Pad diameter
10	ø10
13	ø13
16	ø16

③ Material

N	Material
N	NBR
S	Silicone rubber *1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

④ Buffer specification

J	Specification
J	Rotating
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Pad diameter
	All sizes
6	●
10	●
15	●
25	●

With adapter

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter
			All sizes
Male thread	A5	M5 x 0.8	○
	A6	M6 x 1	○
Female thread	B4	M4 x 0.7	○
	B5	M5 x 0.8	○
One-touch fitting	04	ø4	●
	06	ø6	●
Barb fitting	N4	For ø4 nylon tubing	△
	N6	For ø6 nylon tubing	△
	U4	For ø4 soft tubing	△
	U6	For ø6 soft tubing	△

⑦ Connection thread ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter
			All sizes
Male thread	A5	M5 x 0.8	●△
	A6	M6 x 1	●△
Female thread	B4	M4 x 0.7	●△
	B5	M5 x 0.8	●△

It is not necessary to select a connection thread for ○:ZPT/Vertical. Use the vacuum inlet.

* The pad, mounting nut, fitting, and buffer plate are shipped together but do not come assembled.

With buffer

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter
			All sizes
Female thread	B3	M3 x 0.5	○
	B5	M5 x 0.8	○
One-touch fitting	04	ø4	○●
	06	ø6	○●
Barb fitting	N4	For ø4 nylon tubing*1	○△
	N6	For ø6 nylon tubing*1	△
	U4	For ø4 soft tubing*2	○△
	U6	For ø6 soft tubing*2	△

*1 Nylon tube piping

*2 Soft nylon/Polyurethane tube piping

⑦ Connection thread

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter
			All sizes
Male thread	A8	M8 x 1	○●△

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

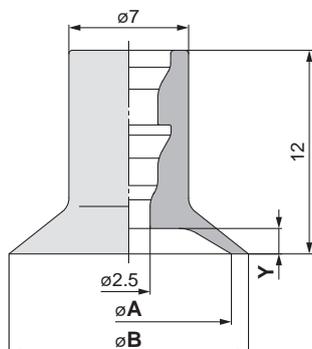
Precautions

Dimensions/Models

Single unit $\varnothing 10$ to $\varnothing 16$

ZP **10** UT **N**

① ②



Model				A	B	Y
① Pad dia.	Form	② Material ^{*1}				
ZP	10	UT	N S U F GN GS	10	11	1
	13			13	14	1.5
	16			16	17	

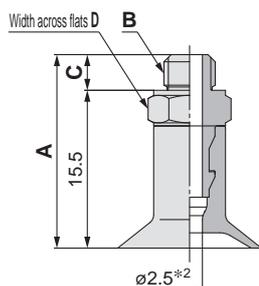
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction	p. 115
Mounting Bracket Assembly	From p. 121

With adapter $\varnothing 10$ to $\varnothing 16$

ZPT **10** UT **N** - **A5**

① ② ③ Vacuum inlet (Male thread)



A5	M5 x 0.8
A6	M6 x 1

Construction	p. 115
Adapter Assembly	p. 121

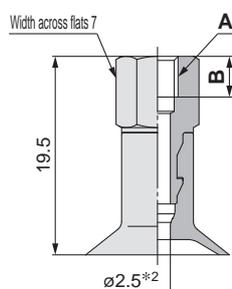
Model						A	B	C	D
Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Vacuum inlet					
ZP	T	10 13 16	UT	N S U F GN GS	A5	19	M5 x 0.8	3.5	7
					A6	20	M6 x 1	4.5	8

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

ZPT **10** UT **N** - **B4**

① ② ③ Vacuum inlet (Female thread)



B4	M4 x 0.7
B5	M5 x 0.8

Construction	p. 115
Adapter Assembly	p. 121

Model						A	B
Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Vacuum inlet			
ZP	T	10 13 16	UT	N S U F GN GS	B4	M4 x 0.7	4
					B5	M5 x 0.8	5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 16$

ZPR **10** UT **N** - **04** - **A5**

①

②

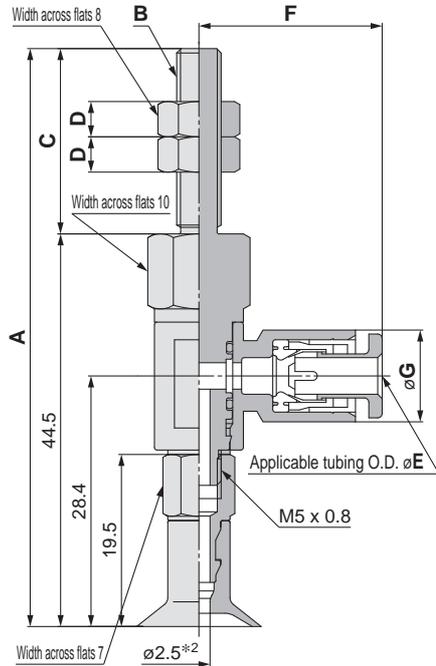
④

④ Connection thread
(Male thread)

Vacuum inlet
(One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$

A5	M5 x 0.8
A6	M6 x 1



Construction	p. 115
Adapter Assembly	p. 122

Model						A	B	C	D	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	R	10 13 16	UT	N S U F GN GS	04	A5	65.5	M5 x 0.8	21	4
					06	A6	70.5	M6 x 1	26	3

Dimensions Per Vacuum Inlet

Model						E	F	G	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	R	10 13 16	UT	N S U F GN GS	04	A5	4	20.6	10.4	$\varnothing 3$
					06	A6	6	21.6	12.8	$\varnothing 4$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

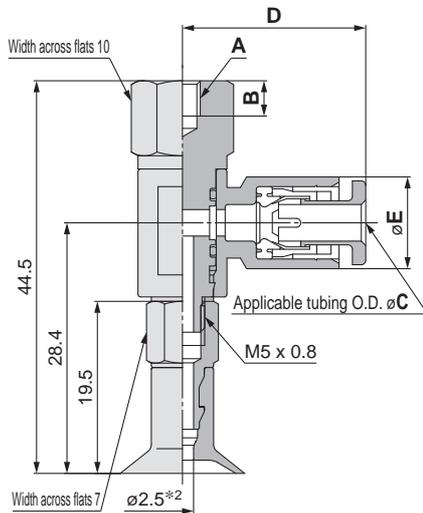
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 16$



Construction	p. 115
Adapter Assembly	p. 122

ZPR **10** UT **N** - **04** - **B4**

①

②

④

Vacuum inlet
(One-touch fitting)

④ Connection thread
(Female thread)

04	$\varnothing 4$
06	$\varnothing 6$

B4	M4 x 0.7
B5	M5 x 0.8

		Model				A	B	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread			
ZP	R	10	UT	N S U F GN GS	04	B4	M4 x 0.7	4
		13			06		M5 x 0.8	5
		16				B5		

Dimensions Per Vacuum Inlet

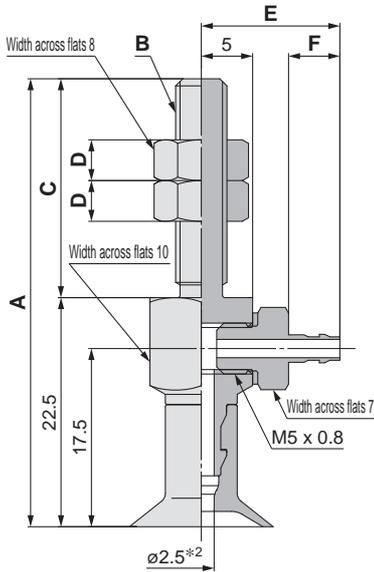
		Model				C	D	E	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	R	10	UT	N S U F GN GS	04	B4	4	20.6	10.4	$\varnothing 3$
		13			06		B5	6	21.6	12.8
		16								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 16$



Construction	p. 115
Adapter Assembly	p. 123

ZPY **10** UT **N** - **N4** - **A5**

①

②

③

④

Vacuum inlet
(Barb fitting)

Connection thread
(Male thread)

A5	M5 x 0.8
A6	M6 x 1

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

Model						A	B	C	D	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	Y	10 13 16	UT	N S U F GN GS	N4 N6 U4 U6	A5	44	M5 x 0.8	21.5	4
						A6	49.5	M6 x 1	27	3

Dimensions Per Vacuum Inlet

Model						E	F	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread				
ZP	Y	10 13 16	UT	N S U F GN GS	N4 U4	A5 A6	13.5	5	$\varnothing 1.8$
					N6 U6		15.5	7	$\varnothing 2.5$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

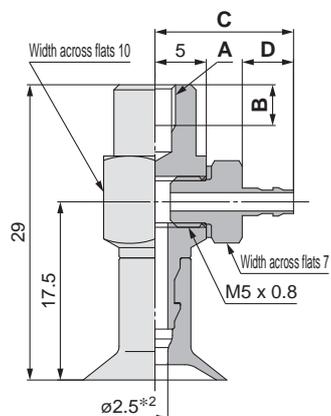
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 16$



Construction	p. 115
Adapter Assembly	p. 123

ZPY **10** UT **N** - **N4** - **B4**

①

②

④

Connection thread
(Female thread)

Vacuum inlet
(Barb fitting)

B4	M4 x 0.7
B5	M5 x 0.8

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

		Model				A	B	
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet			④ Connection thread
ZP	Y	10 13 16	UT	N S U F GN GS	N4 N6 U4 U6	B4	M4 x 0.7	4
						B5	M5 x 0.8	5

Dimensions Per Vacuum Inlet

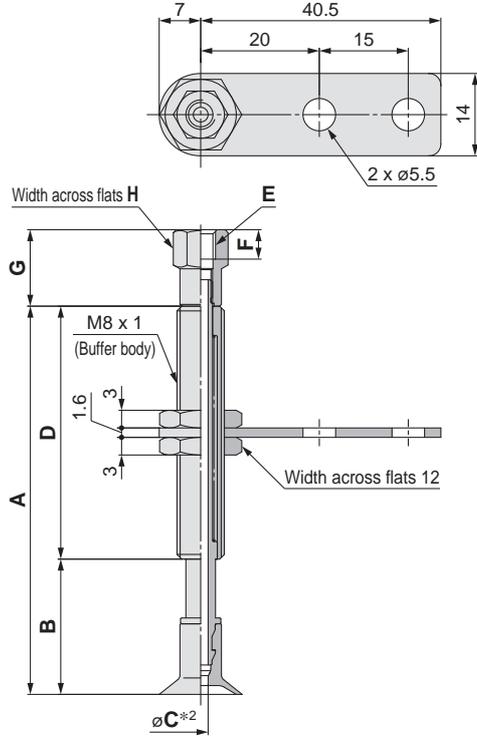
		Model				C	D	Fitting part min. hole size	
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet				④ Connection thread
ZP	Y	10 13 16	UT	N S U F GN GS	N4 U4	B4 B5	13.5	5	$\varnothing 1.8$
					N6 U6		15.5	7	$\varnothing 2.5$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 16$



ZPT **10** UT **N** **J** **6** - **B3** - **A8**

Buffer specification **3**

J	Rotating
K	Non-rotating

6 Connection thread (Male thread)

A8	M8 x 1
-----------	--------

5 Vacuum inlet

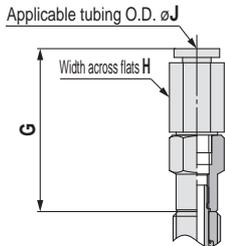
B3	M3 x 0.5	Female thread	
B5	M5 x 0.8		
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N
06	$\varnothing 6$		KQ2H06-M5N
N4	For $\varnothing 4$ nylon tubing	Barb fitting	
U4	For $\varnothing 4$ soft tubing		

		Model						A	B	C*2	D	
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread					
ZP	T	10 13 16	UT	N S U F GN GS	J K	6	B3	A8	33	18	J: 2.5 K: 2	15
						10	B5		66	23		43
						15	04		71	28		
						25	06 N4 U4		81	38		

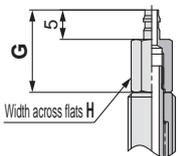
Dimensions Per Vacuum Inlet: Female Thread

		Model						E	F	G	H
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	T	10 13 16	UT	N S U F GN GS	J K	6	B3	M3 x 0.5	3	11	6
						10 15 25	B5				

Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Construction	p. 116
Buffer Assembly	p. 124

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model						G	H	J	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	T	10 13 16	UT	N S U F GN GS	J K	6	04	27.7	8	4	$\varnothing 2.5$
						10 15 25	06				

Dimensions Per Vacuum Inlet: Barb Fitting

		Model						G	H	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread			
ZP	T	10 13 16	UT	N S U F GN GS	J K	6	N4	14	6	$\varnothing 1.8$
						10 15 25	U4			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

BelloWS Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer/One-touch fitting $\varnothing 10$ to $\varnothing 16$

ZPR **10** UT **N** **J** **6** - **04** - **A8**

① ② ③ ④

Buffer specification ③

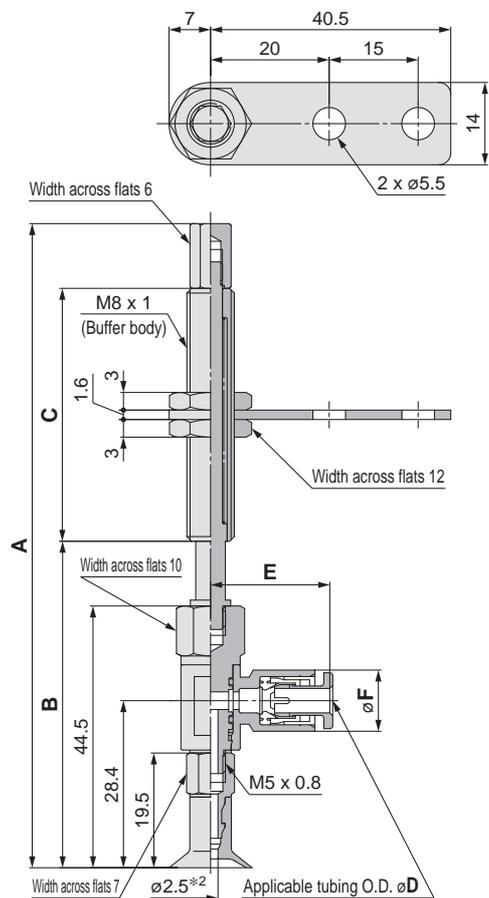
J	Rotating
K	Non-rotating

⑥ Connection thread
(Male thread)

A8	M8 x 1
-----------	--------

⑤ Vacuum inlet
(One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$



		Model						A	B	C	
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread				
ZP	R	10 13 16	UT	N S U F GN GS	J K	6	04 06	A8	78.5	52.5	15
						10			109.5	55.5	43
						15			114.5	60.5	
						25			124.5	70.5	

Dimensions Per Vacuum Inlet

		Model						D	E	F	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	R	10 13 16	UT	N S U F GN GS	J K	6	04 06	A8	4	20.6	10.4	$\varnothing 3$
						10 15 25			6	21.6	12.8	$\varnothing 4$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 116
Buffer Assembly	p. 125

Dimensions/Models

With buffer/barb fitting $\varnothing 10$ to $\varnothing 16$

ZPY **10** UT **N** **J** **6** - **N4** - **A8**

Buffer specification **3**

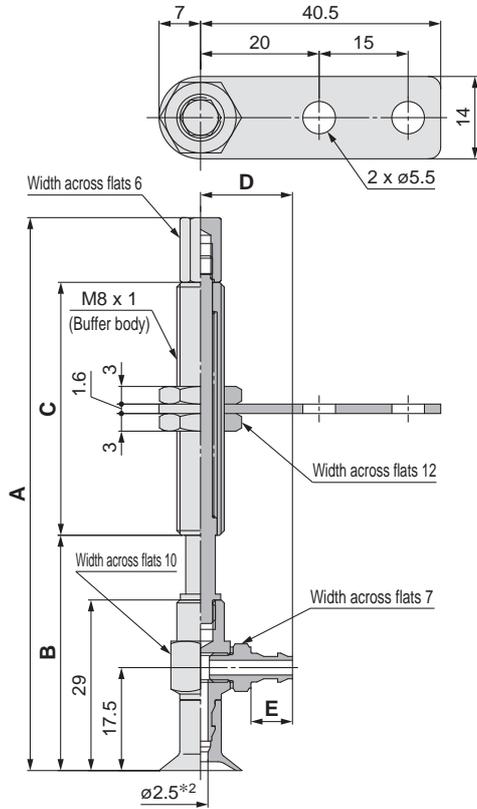
J	Rotating
K	Non-rotating

6 Connection thread (Male thread)

A8	M8 x 1
-----------	--------

5 Vacuum inlet (Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6



Construction	p. 116
Buffer Assembly	p. 126

		Model						A	B	C	
	Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet				6 Connection thread
ZP	Y	10	UT	N S U F GN GS	J K	6	N4 N6 U4 U6	A8	63	37	15
		13				10			94	40	43
		16				15			99	45	
						25			109	55	

Dimensions Per Vacuum Inlet

		Model						D	E	Fitting part min. hole size	
	Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet				6 Connection thread
ZP	Y	10	UT	N S U F GN GS	J K	6	N4 U4 N6 U6	A8	13.5	5	$\varnothing 1.8$
		13				10			15.5	7	$\varnothing 2.5$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions



Basic Pad

Thin Flat Type with Ribs

ZP Series



How to Order

	Dimensions/Models	Construction	Mounting Bracket Assembly
Pad unit ZP 10 CT N	p. 96	p. 115	From p. 121
With adapter ZP T 10 CT N - A5 -	From p. 96	p. 115	From p. 121
With buffer ZP T 10 CT N J 6 - B3 - A8	From p. 101	p. 116	From p. 124

① ② ③ ④ ⑤ ⑥ ⑦
Thin flat type with ribs

① Vacuum inlet direction

Nil	Pad unit
T	Vertical
R	Lateral (With One-touch fitting)
Y	Lateral (With barb fitting)

② Pad diameter

10	ø10
13	ø13
16	ø16

③ Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

④ Buffer specification

J	Rotating
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Pad diameter
	All sizes
6	●
10	●
15	●
25	●

With adapter

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter
			All sizes
Male thread	A5	M5 x 0.8	○
	A6	M6 x 1	○
Female thread	B4	M4 x 0.7	○
	B5	M5 x 0.8	○
One-touch fitting	04	ø4	●
	06	ø6	●
Barb fitting	N4	For ø4 nylon tubing	△
	N6	For ø6 nylon tubing	△
	U4	For ø4 soft tubing	△
	U6	For ø6 soft tubing	△

⑦ Connection thread ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter
			All sizes
Male thread	A5	M5 x 0.8	●△
	A6	M6 x 1	●△
Female thread	B4	M4 x 0.7	●△
	B5	M5 x 0.8	●△

It is not necessary to select a connection thread for ○: ZPT/Vertical. Use the vacuum inlet.

* The pad, mounting nut, and buffer plate are shipped together but do not come assembled.

With buffer

⑥ Vacuum inlet

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter
			All sizes
Female thread	B3	M3 x 0.5	○
	B5	M5 x 0.8	○
One-touch fitting	04	ø4	○●
	06	ø6	○●
Barb fitting	N4	For ø4 nylon tubing*1	○△
	N6	For ø6 nylon tubing*1	△
	U4	For ø4 soft tubing*2	○△
	U6	For ø6 soft tubing*2	△

*1 Nylon tube piping

*2 Soft nylon/Polyurethane tube piping

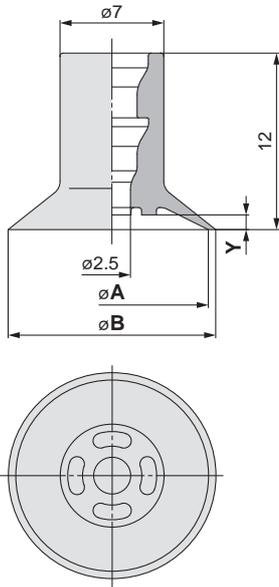
⑦ Connection thread ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter
			All sizes
Male thread	A8	M8 x 1	○●△

Dimensions/Models

Single unit $\varnothing 10$ to $\varnothing 16$



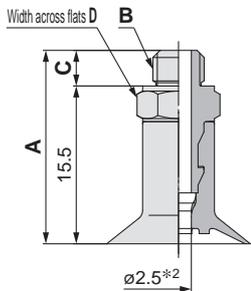
ZP 10 CT N
① ②

Model				A	B	Y
① Pad dia.	Form	② Material ^{*1}				
ZP	10	CT	N S U F GN GS	10	11	0.8
	13			14	1	
	16			17		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction p. 115
Mounting Bracket Assembly From p. 121

With adapter $\varnothing 10$ to $\varnothing 16$



ZPT 10 CT N - A5
① ②

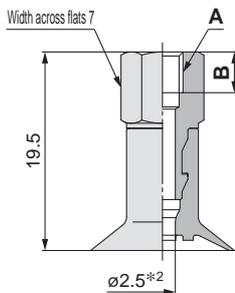
③ Vacuum inlet (Male thread)

A5	M5 x 0.8
A6	M6 x 1

Model						A	B	C	D
Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Vacuum inlet					
ZP	T	10 13 16	CT	N S U F GN GS	A5	19	M5 x 0.8	3.5	7
					A6	20	M6 x 1	4.5	8

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber
*2 Indicates the minimum hole size of the adapter or vacuum pad

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Adapter Assembly p. 121



ZPT 10 CT N - B4
① ②

③ Vacuum inlet (Female thread)

B4	M4 x 0.7
B5	M5 x 0.8

Model						A	B
Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Vacuum inlet			
ZP	T	10 13 16	CT	N S U F GN GS	B4	M4 x 0.7	4
					B5	M5 x 0.8	5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber
*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction p. 115
Adapter Assembly p. 121

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

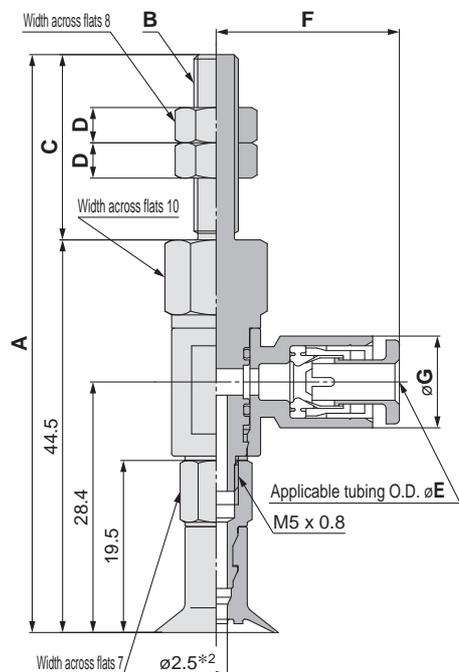
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 16$



Construction	p. 115
Adapter Assembly	p. 122

ZPR **10** CT **N** - **04** - **A5**

①

②

④

Connection thread
(Male thread)

Vacuum inlet (One-touch fitting)	
04	$\varnothing 4$
06	$\varnothing 6$

A5	M5 x 0.8
A6	M6 x 1

Model						A	B	C	D
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread				
ZP	R	10	CT	N S U F GN GS	04	A5	M5 x 0.8	21	4
		13			06				
		16			A6	M6 x 1	26	3	

Dimensions Per Vacuum Inlet

Model						E	F	G	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	R	10 13 16	CT	N S U F GN GS	04	A5 A6	4	20.6	10.4	$\varnothing 3$
					06					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 16$

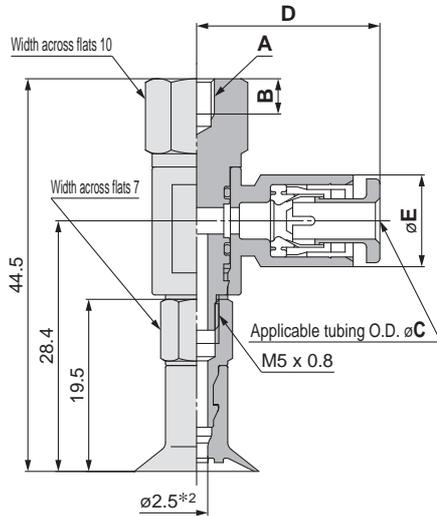
ZPR **10** CT **N** - **04** - **B4**

1 Pad dia.
2 Material
3 Vacuum inlet (One-touch fitting)

4 Connection thread (Female thread)

04	$\varnothing 4$
06	$\varnothing 6$

B4	M4 x 0.7
B5	M5 x 0.8



Construction	p. 115
Adapter Assembly	p. 122

Model							A	B
Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Vacuum inlet	4 Connection thread			
ZP	R	CT	N S U F GN GS	04 06	B4	M4 x 0.7	4	
					B5	M5 x 0.8	5	

Dimensions Per Vacuum Inlet

Model						C	D	E	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Vacuum inlet	4 Connection thread				
ZP	R	CT	N S U F GN GS	04	B4 B5	4	20.6	10.4	$\varnothing 3$
				06		6	21.6	12.8	$\varnothing 4$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

BelloWS Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

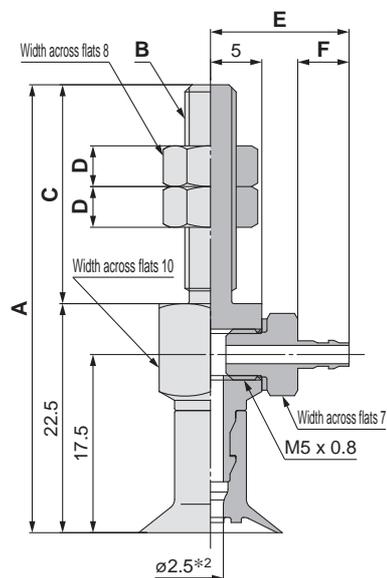
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 16$



Construction	p. 115
Adapter Assembly	p. 123

ZPY **10** CT **N** - **N4** - **A5**

①

②

④

Vacuum inlet
(Barb fitting)

Connection thread
(Male thread)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

A5	M5 x 0.8
A6	M6 x 1

		Model				A	B	C	D	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	Y	10 13 16	CT	N	N4	A5	44	M5 x 0.8	21.5	4
				S	N6					
				F	U4	A6	49.5	M6 x 1	27	3
				GN	U6					
				GS						

Dimensions Per Vacuum Inlet

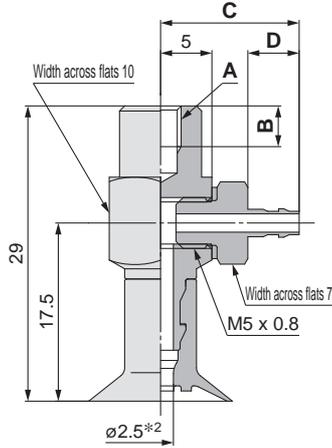
		Model				E	F	Fitting part min. hole size	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread				
ZP	Y	10 13 16	CT	N	N4	A5	13.5	5	$\varnothing 1.8$
				S	U4				
				F	U6	A6	15.5	7	$\varnothing 2.5$
				GN					
				GS					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/barb fitting $\varnothing 10$ to $\varnothing 16$



Construction	p. 115
Adapter Assembly	p. 123

ZPY **10** CT **N** - **N4** - **B4**

①
②
③ Vacuum inlet (Barb fitting)

④ Connection thread (Female thread)

B4	M4 x 0.7
B5	M5 x 0.8

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

		Model						A	B
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread			
ZP	Y	10 13 16	CT	N S U F GN GS	N4	B4	M4 x 0.7	4	
					N6 U4 U6		B5	M5 x 0.8	5

Dimensions Per Vacuum Inlet

		Model						C	D	Fitting part min. hole size
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread				
ZP	Y	10 13 16	CT	N S U F GN GS	N4 U4	B4 B5	13.5	5	$\varnothing 1.8$	
					N6 U6		15.5	7	$\varnothing 2.5$	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

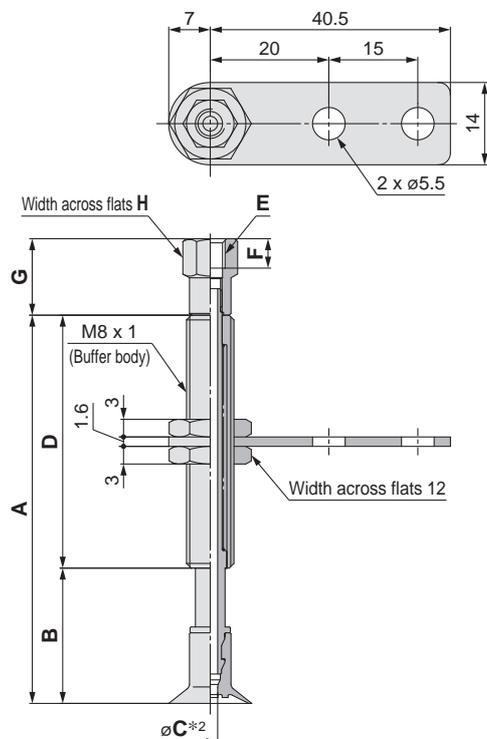
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 16$



ZPT **10** CT **N** **J** **6** - **B3** - **A8**

Buffer specification **3**

J	Rotating
K	Non-rotating

6 Connection thread (Male thread)

A8	M8 x 1
-----------	--------

5 Vacuum inlet

B3	M3 x 0.5	Female thread	
B5	M5 x 0.8		
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N
06	$\varnothing 6$		KQ2H06-M5N
N4	For $\varnothing 4$ nylon tubing	Barb fitting	
U4	For $\varnothing 4$ soft tubing		

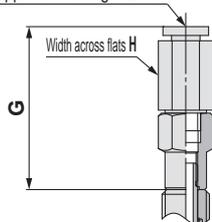
		Model						A	B	C*2	D
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	T	CT	N S U F GN GS	J K	6	B3	A8	33	18	J: 2.5 K: 2	15
					10	B5		66	23		43
					15	04		71	28		
					25	06 N4 U4		81	38		

Dimensions Per Vacuum Inlet: Female Thread

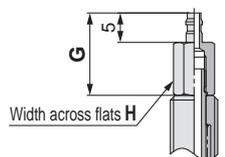
		Model						E	F	G	H
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	T	CT	N S U F GN GS	J K	6 10 15 25	B3	M3 x 0.5	3	11	6	
						B5	M5 x 0.8	5	13	8	

Vacuum inlet: One-touch fitting

Applicable tubing O.D. $\varnothing J$



Vacuum inlet: Barb fitting



Construction	p. 116
Buffer Assembly	p. 124

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model						G	H	J	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	T	CT	N S U F GN GS	J K	6 10 15 25	04	A8	27.7	8	4	$\varnothing 2.5$
						06			10	6	

Dimensions Per Vacuum Inlet: Barb Fitting

		Model						G	H	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2*1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread			
ZP	T	CT	N S U F GN GS	J K	6 10 15 25	N4	A8	14	6	$\varnothing 1.8$
						U4				

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer/One-touch fitting $\varnothing 10$ to $\varnothing 16$

ZPR **10** CT **N** **J** **6** - **04** - **A8**

Buffer specification **3**

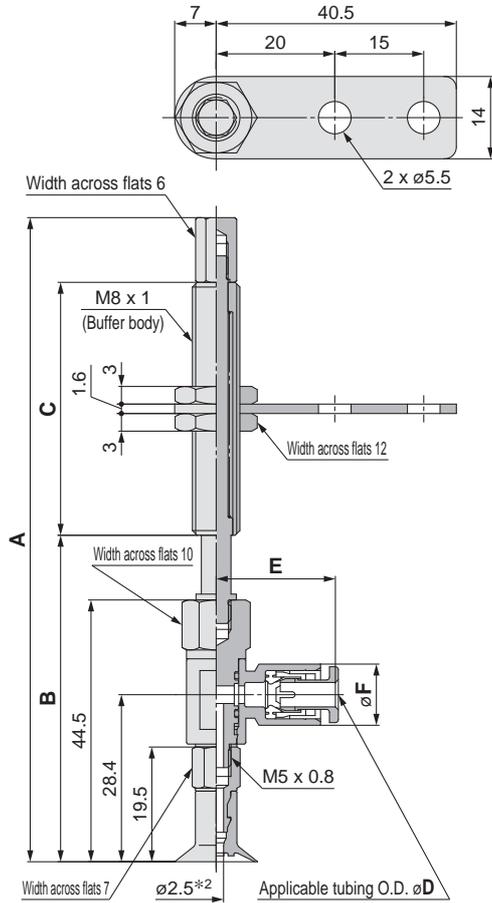
J	Rotating
K	Non-rotating

6 Connection thread (Male thread)

A8	M8 x 1
-----------	--------

5 Vacuum inlet (One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$



		Model						A	B	C
Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread			
ZP	R	CT	N S U F GN GS	J K	6	04 06	A8	78.5	52.5	15
					10			109.5	55.5	43
					15			114.5	60.5	
					25			124.5	70.5	

Dimensions Per Vacuum Inlet

		Model						D	E	F	Fitting part min. hole size
Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	R	CT	N S U F GN GS	J K	6	04 06	A8	4	20.6	10.4	$\varnothing 3$
					10 15 25			6	21.6	12.8	$\varnothing 4$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 116
Buffer Assembly	p. 125

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

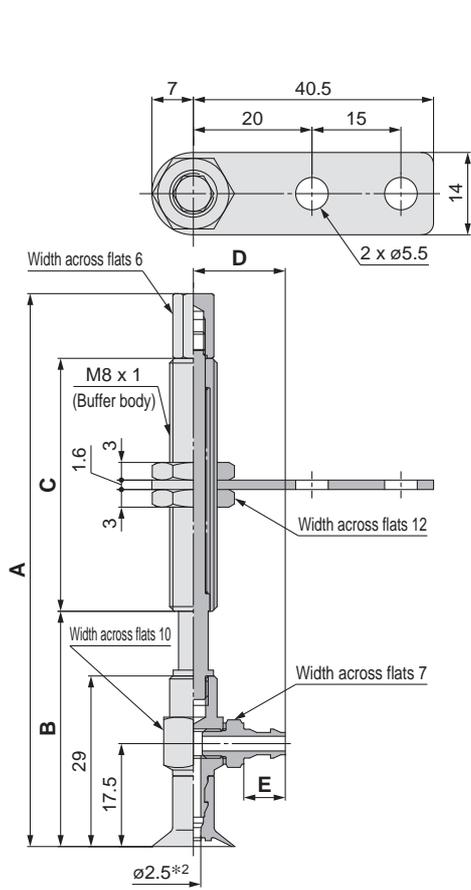
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer/barb fitting $\varnothing 10$ to $\varnothing 16$



Construction	p. 116
Buffer Assembly	p. 126

ZPY **10** CT **N** **J** **6** - **N4** - **A8**

Buffer specification

J	Rotating
K	Non-rotating

6 Connection thread (Male thread)

A8	M8 x 1
-----------	--------

5 Vacuum inlet (Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6

Model								A	B	C	
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	Y	10 13 16	CT	N S U F GN GS	J K	6	N4 N6 U4 U6	A8	63	37	15
						10			94	40	43
						15			99	45	
						25			109	55	

Dimensions Per Vacuum Inlet

Model								D	E	Fitting part min. hole size	
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	Y	10 13 16	CT	N S U F GN GS	J K	6	N4 U4	A8	13.5	5	$\varnothing 1.8$
						10 15 25			N6 U6	15.5	7

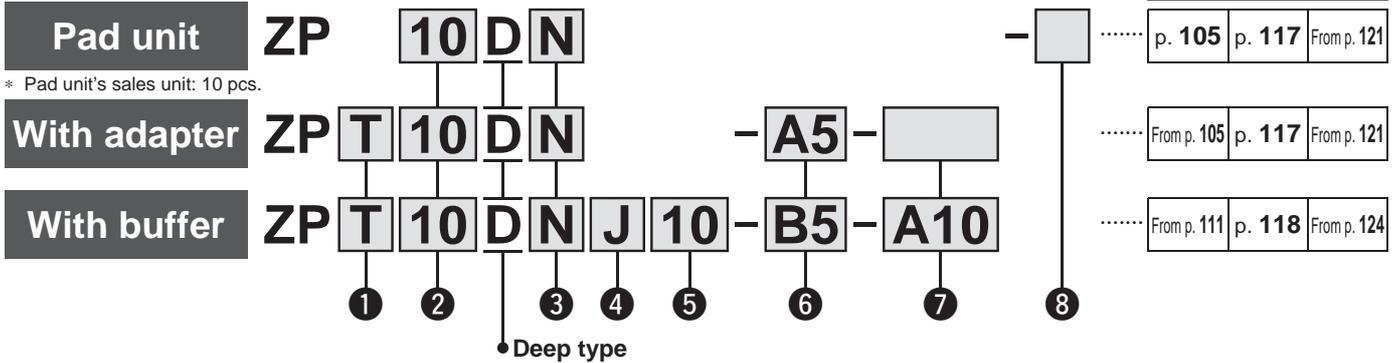
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber
*2 Indicates the minimum hole size of the adapter or vacuum pad



Basic Pad Deep Type ZP Series



How to Order



1 Vacuum inlet direction

Symbol	Pad unit
Nil	Pad unit
T	Vertical
R	Lateral (With One-touch fitting)
Y	Lateral (With barb fitting)

2 Pad diameter

Symbol	Pad diameter [mm]
10	ø10
16	ø16
25	ø25
40	ø40

5 Buffer stroke

Stroke [mm]	Pad diameter [mm]			
	ø10	ø16	ø25	ø40
10	●	●	●	●
20	●	●	●	●
30	●	●	●	●
40	●	●	●	—
50	●	●	●	●

3 Material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

4 Buffer specification

Symbol	Specification
J	Rotating
K	Non-rotating

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

With adapter

6 Vacuum inlet
○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]			
			ø10, ø16	ø25	ø40	
Male thread	A5	M5 x 0.8	○	—	—	
	A6	M6 x 1	○	○	○	
	A8	M8 x 1	—	○	○	
Female thread	B5	M5 x 0.8	○	○	—	
	B6	M6 x 1	○	○	○	
	B8	M8 x 1.25	—	○	○	
	B01	Rc1/8	○	○	○	
	N01	NPT1/8	○	○	○	
One-touch fitting	T01	NPTF1/8	○	○	○	
	04	ø4	●	●	—	
	06	ø6	●	●	●	
Barb fitting	08	ø8	—	●	●	
	N4	For ø4 nylon tubing	△	△	—	
	N6	For ø6 nylon tubing	△	△	△	
Barb fitting	U4	For ø4 soft tubing	△	△	—	
	U6	For ø6 soft tubing	△	△	△	

7 Connection thread ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]		
			ø10, ø16	ø25	ø40
Male thread	A5	M5 x 0.8	●△	—	—
	A6	M6 x 1	●△	●△	●△
	A8	M8 x 1	—	●△	●△
Female thread	B5	M5 x 0.8	●△	●△	—
	B6	M6 x 1	●△	●△	●△
	B8	M8 x 1.25	—	●△	●△

It is not necessary to select a connection thread for ○:ZPT/Vertical. Use the vacuum inlet.

* The pad, lock ring, mounting nut, fitting, and buffer plate are shipped together but do not come assembled.

With buffer

6 Vacuum inlet
○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]		
			ø10, ø16	ø25	ø40
Female thread	B5	M5 x 0.8	○	○	○
	B01	Rc1/8	—	—	○
	N01	NPT1/8	—	—	○
	T01	NPTF1/8	—	—	○
One-touch fitting	04	ø4	○●	○●	—
	06	ø6	○●	○●	○●
	08	ø8	—	●	○●
Barb fitting	N4	For ø4 nylon tubing*1	△	△	—
	N6	For ø6 nylon tubing*1	○△	○△	○△
	U4	For ø4 soft tubing*2	△	△	—
Barb fitting	U6	For ø6 soft tubing*2	○△	○△	○△

*1 Nylon tube piping

*2 Soft nylon/Polyurethane tube piping

7 Connection thread
○: ZPT/Vertical ●: ZPR/Lateral (With One-touch fitting) △: ZPY/Lateral (With barb fitting)

Type	Symbol	Size	Pad diameter [mm]		
			ø10, ø16	ø25	ø40
Male thread	A10	M10 x 1	○●△	○●△	—
	A14	M14 x 1	—	—	○●△

8 Lock ring

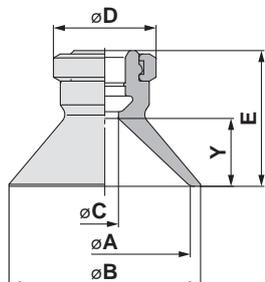
Symbol	Pad diameter	Lock ring unit	
		Part no.	Pad diameter [mm]
Nil	All sizes	ZPL1	ø10, ø16
X19	With lock ring	ZPL2	ø25
	Without lock ring	ZPL3	ø40

Model Selection
ZP Basic
Flat Type
Flat Type with Ribs
Flat, Ball Joint Type
Bellows Type
Thin Flat Type
Thin Flat Type with Ribs
Deep Type
Construction
Mounting Bracket Assembly
Precautions

Dimensions/Models

Single unit $\varnothing 10$ to $\varnothing 40$

ZP **10** D **N**
① ②



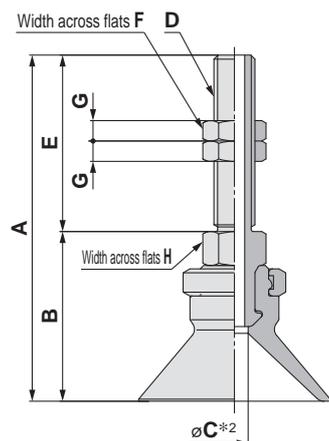
Model	① Pad dia.		② Form	② ^{*1} Material	A	B	C	D	E	Y
	10	16								
ZP	10	D	D	N S U F GN GS	10	12	4	13	15	6
	16				18	16			7	
	25				28	15	20	10		
	40				43	7	18	29	17	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction	p. 117
Mounting Bracket Assembly	From p. 121

With adapter $\varnothing 10$ to $\varnothing 40$

ZPT **10** D **N** - **A5**
① ② ③



③ Vacuum inlet
(Male thread)

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1

Model	Vacuum inlet direction	① Pad dia.		② Form	② ^{*1} Material	③ Vacuum inlet	A	B	C*2	D	E	F	G	H										
		10	16																					
ZP	T	D	D	N S U F GN GS	A5	M5 x 0.8	41	20	2.5	M5 x 0.8	21	8	4	8										
							42	21																
							46	20	2.5						M6 x 1	26	8	3	8					
							47	21																
							51	25	3											M8 x 1	16	12	3	12
							61	35.5																
	46	30	3.5	M8 x 1	16	12	3	12																
	51	35.5							4.5															

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 117
Adapter Assembly	p. 121

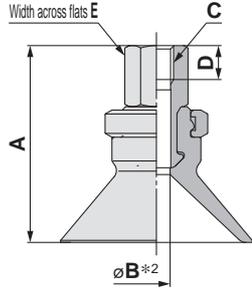
Recommended Gasket Part Nos.

Part no.	D vacuum inlet (Male thread)
WCS5X0.8	M5 x 0.8
WCS6X1	M6 x 1
WCS8X1	M8 x 1

Dimensions/Models

With adapter $\varnothing 10$ to $\varnothing 40$

ZPT **10** D **N** - **B5**



Construction	p. 117
Adapter Assembly	p. 121

③ Vacuum inlet
(Female thread)

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25
B01	Rc1/8
N01	NPT1/8
T01	NPTF1/8

		Model				A	B*2	C	D	E
Vacuum inlet direction	① Pad dia.	Form	② Material*1	③ Vacuum inlet						
ZP	T	D	N S U F GN GS	B5	24	2.5	M5 x 0.8	5	8	
					25					
					29					
				B6	24	2.5	M6 x 1	6	8	
					25					
					29					
				B8	40	4.9	M8 x 1.25	8	12	
					25					
					40					
				B01 N01 T01	10	2.5	Rc1/8 NPT1/8 NPTF1/8	—	12	
					16					
					25					
					40					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

BelloWS Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 40$

ZPR **10** D **N** - **04** - **A5**

①

②

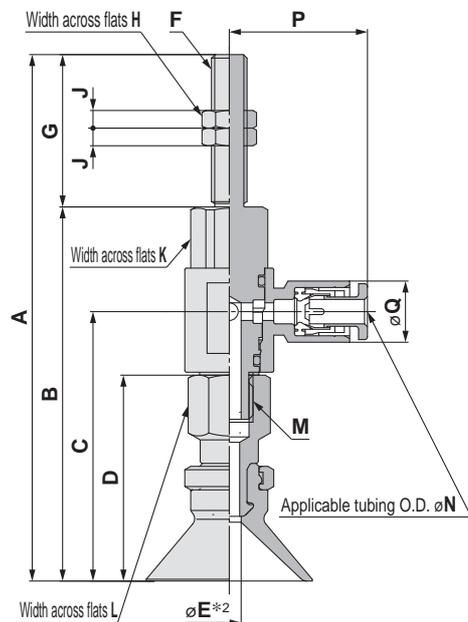
④

Connection thread
(Male thread)

Vacuum inlet
(One-touch fitting)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1



Construction	p. 117
Adapter Assembly	p. 122

		Model				A	B	C	D	*2 E	F	G	H	J	K	L	M							
	Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet	④ Connection thread																		
ZP	R	10	D	N S U F GN GS	04	A5	70	49	32.9	24	2.5	M5 x 0.8	21	8	4	10	8	M5 x 0.8						
		16					71	50	33.9	25														
		10				75	49	32.9	24	2.5														
		16				76	50	33.9	25															
		25				89.5	63.6	45.8	35	3.5	M6 x 1								26	8	3	10	8	M5 x 0.8
		40				97	71.1	53.3	42.5	4														
		25			79.5	63.6	45.8	35	3.5	M8 x 1	16	12	3	12	12	M8 x 1.25								
		40			87	71.1	53.3	42.5	4															

Dimensions Per Vacuum Inlet

		Model				N	P	Q	Fitting part min. hole size		
	Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Vacuum inlet	④ Connection thread					
ZP	R	10	D	N S U F GN GS	04	A5	4	20.6	10.4	$\varnothing 3$	
		16			06		A6	6	21.6	12.8	$\varnothing 4$
		25			04	A6	4	23.3	10.4	$\varnothing 3$	
					06		6	24.3	12.8	$\varnothing 4.5$	
					08		8	26.2	15.2	$\varnothing 6$	
					08		06	6	24.3	12.8	$\varnothing 4.5$
							08	8	26.2	15.2	$\varnothing 6$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/One-touch fitting $\varnothing 10$ to $\varnothing 40$

ZPR **10** D **N** - **04** - **B5**

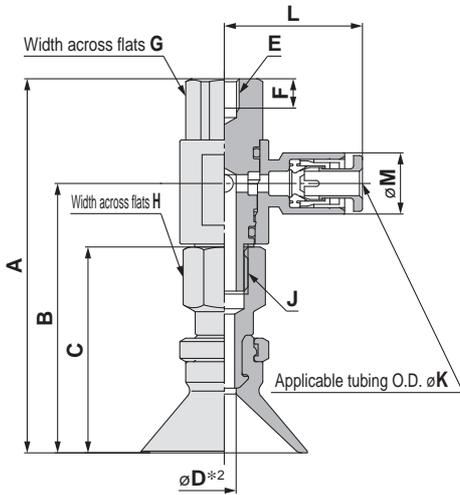
① ②

Vacuum inlet ③
(One-touch fitting)

④ Connection thread
(Female thread)

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25



Construction	p. 117
Adapter Assembly	p. 122

		Model				A	B	C	*2 D	E	F	G	H	J					
	Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet	④ Connection thread													
ZP	R	10	D	N S U F GN GS	04 06 08	B5	49	32.9	24	2.5	M5 x 0.8	5	10	8	M5 x 0.8				
		16					50	33.9	25				12	12		M8 x 1.25			
		25					63.6	45.8	35				3.5						
		10				D	N S U F GN GS	04 06 08	B6	49	32.9	24	2.5	M6 x 1	6	10	8	M5 x 0.8	
		16								50	33.9	25				12	12		M8 x 1.25
		25								63.6	45.8	35				3.5			
	40	D	N S U F GN GS	04 06 08	B8				71.1	53.3	42.5	4	M8 x 1.25	8	12	12	M8 x 1.25		
	25								63.6	45.8	35				3.5	12		12	
	40					71.1	53.3	42.5	4										

Dimensions Per Vacuum Inlet

		Model				K	L	M	Fitting part min. hole size	
	Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Vacuum inlet	④ Connection thread				
ZP	R	10	D	N S U F GN GS	04	B5	4	20.6	10.4	$\varnothing 3$
					06	B6	6	21.6	12.8	$\varnothing 4$
		16			04	B5	4	23.3	10.4	$\varnothing 3$
					06	B6	6	24.3	12.8	$\varnothing 4.5$
		25			08	B8	8	26.2	15.2	$\varnothing 6$
					06	B6	6	24.3	12.8	$\varnothing 4.5$
		40			08	B8	8	26.2	15.2	$\varnothing 6$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With adapter/barb fitting $\phi 10$ to $\phi 40$

ZPY **10** D **N** - **N4** - **A5**

①

②

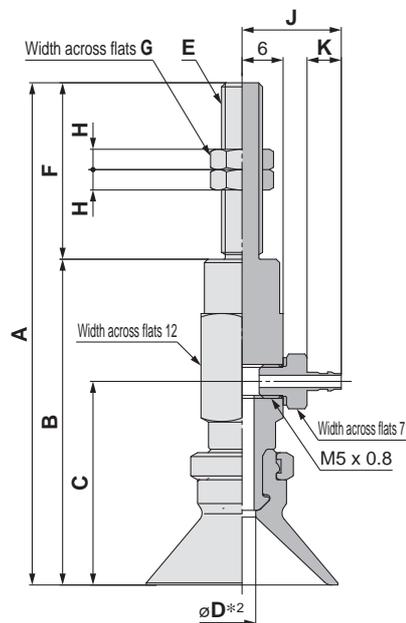
④

Connection thread
(Male thread)

Vacuum inlet ③
(Barb fitting)

N4	For $\phi 4$ nylon tubing	M-5AN-4
N6	For $\phi 6$ nylon tubing	M-5AN-6
U4	For $\phi 4$ soft tubing	M-5AU-4
U6	For $\phi 6$ soft tubing	M-5AU-6

A5	M5 x 0.8
A6	M6 x 1
A8	M8 x 1



Construction	p. 117
Adapter Assembly	p. 123

		Model				A	B	C	D*2	E	F	G	H		
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet	④ Connection thread										
ZP	Y	D	N S U F GN GS	N4 N6 U4 U6	A5	62	41	25	2.5	M5 x 0.8	21	8	4		
						63	42	26							
					A6	67	41	25	2.5		M6 x 1	26	8	3	
						68	42	26							
					A8	74	48	30	3.5			M8 x 1	16	12	3
						83	57	39							
	64	48		30											
	73	57		39											

Dimensions Per Vacuum Inlet

		Model				J	K	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet	④ Connection thread			
ZP	Y	D	N S U F GN GS	N4 U4	A5 A6	14.5	5	$\phi 1.8$
						N6 U6	A6 A8	16.5
				N6 U6	A6 A8			16.5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter/barb fitting $\phi 10$ to $\phi 40$

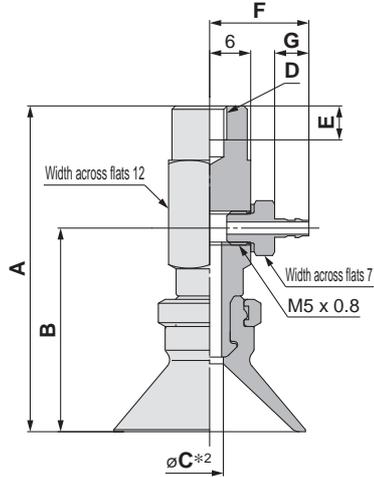
ZPY 10 D N - N4 - B5

①
②
③ Vacuum inlet (Barb fitting)

④ Connection thread (Female thread)

B5	M5 x 0.8
B6	M6 x 1
B8	M8 x 1.25

N4	For $\phi 4$ nylon tubing	M-5AN-4
N6	For $\phi 6$ nylon tubing	M-5AN-6
U4	For $\phi 4$ soft tubing	M-5AU-4
U6	For $\phi 6$ soft tubing	M-5AU-6



Construction	p. 117
Adapter Assembly	p. 123

		Model				A	B	C*2	D	E	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet							
ZP	Y	D	N S U F GN GS	N4 N6 U4 U6	B5	41	25	2.5	M5 x 0.8	5	
						42	26				
						48	30				
					B6	41	25	2.5		M6 x 1	6
						42	26				
						48	30				
	B8	57		39	6	M8 x 1.25	8				
		48		30							
		57		39							

Dimensions Per Vacuum Inlet

		Model				F	G	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Vacuum inlet				
ZP	Y	D	N S U F GN GS	N4 U4	B4	14.5	5	$\phi 1.8$
					B5	16.5	7	$\phi 2.5$
				N6 U6	B5 B6 B8	14.5	5	$\phi 1.8$
					B6 B8	16.5	7	$\phi 2.5$
				N6 U6	B6 B8	16.5	7	$\phi 2.5$
					B6 B8	16.5	7	$\phi 2.5$

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

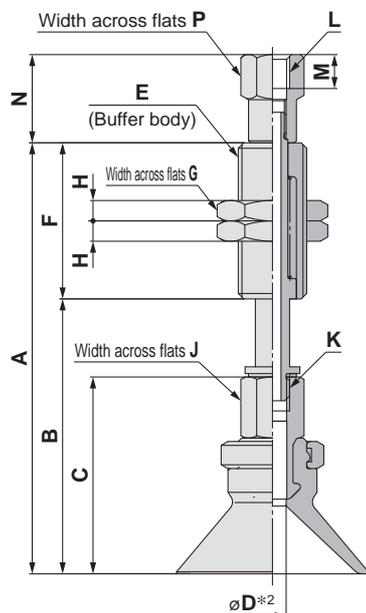
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 40$



Construction	p. 118
Buffer Assembly	p. 124

ZPT **10** D **N** **J** **10** - **B5** - **A10**

1	2	3	4	5	6
Buffer specification	Connection thread (Male thread)	Vacuum inlet (Female thread)			
J Rotating K Non-rotating	A10 M10 x 1 A14 M14 x 1	B5 M5 x 0.8 B01 Rc1/8 N01 NPT1/8 T01 NPTF1/8			

		Model																	
	Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread	A	B	C	D *2	E	F	G	H	J	K	
ZP	T	10	D	N S U F G S	J K	10	B5	A10	58.5	35.5	24	J: 2.5 K: 2	M10 x 1	23					
						20			96.5	45.5				51					
						30			106.5	55.5				77					
						40			142.5	65.5				77					
						50			152.5	75.5				23					
						10			59.5	36.5				23					
		20				97.5	46.5	51											
		30				107.5	56.5	14											
		40				143.5	66.5	3											
		50				153.5	76.5	8											
		10				63.5	40.5	77											
		20				101.5	50.5	23											
	30	111.5	60.5	51															
	40	147.5	70.5	77															
	50	157.5	80.5																
	10	105	55																
	20	115	65																
	30	125	75																
	50	170	95																
	40	T	40	D	N S U F G S	J K	10	B5	A14	105	55	42.5	4	M14 x 1	50	19	5	12	M8 x 1.25
20	N01						115	65											
30	T01						125	75											
50	06 08 N6 U6						170	95											

Dimensions Per Vacuum Inlet: Female Thread

		Model													
	Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread	L	M	N	P			
ZP	T	10	D	N S U F G S	J K	10	B5	A10	M5 x 0.8	5	13	8			
						20									
						30									
		40				B5	A14	M5 x 0.8					5	9	10
		50													
		10													
	20	B01 N01 T01	A14	Rc1/8 NPT1/8 NPTF1/8	16.5	13									
	30														
	50														

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

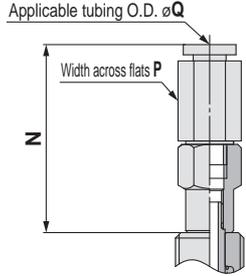
Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 40$

ZPT **10** **D** **N** **J** **10** - **04** - **A10**

① ② ③ ④ ⑤ ⑥

Vacuum inlet: One-touch fitting



Buffer specification ③

J	Rotating
K	Non-rotating

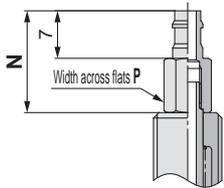
⑥ Connection thread (Male thread)

A10	M10 x 1
A14	M14 x 1

⑤ Vacuum inlet

	Vacuum inlet	One-touch fitting	Pad diameter	
			$\varnothing 10$ to $\varnothing 25$	$\varnothing 40$
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N	KQ2H06-01NS KQ2H08-01NS
06	$\varnothing 6$		KQ2H06-M5N	
08	$\varnothing 8$			
N6	For $\varnothing 6$ nylon tubing	Barb fitting		
U6	For $\varnothing 6$ soft tubing			

Vacuum inlet: Barb fitting



Construction	p. 118
Buffer Assembly	p. 124

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model						N	P	Q	Fitting part min. hole size				
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread								
ZP	T	D	N S U F GN GS	J K	10 20 30 40 50	04	A10	27.7	8	4	$\varnothing 2.5$				
												06			
													10	10	6
						08			35.9	14					
												06			
						08			24.9	14			8		
	40	D			N S U F GN GS		J K	20 30 50			06	A14		31.8	10
						08									
									06	35.9			14		
											08				19.9
						06			24.9	14			8		

Dimensions Per Vacuum Inlet: Barb Fitting

		Model						N	P	Fitting part min. hole size		
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	T	D	N S U F GN GS	J K	10 20 30 40 50	N6	A10	15	6	$\varnothing 2.5$		
											U6	
												10
						N6			12			
											U6	12

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

BelloWS Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

With buffer/One-touch fitting $\phi 10$ to $\phi 40$

ZPR **10** **D** **N** **J** **10** - **04** - **A10**

① ② ③ ④

⑥ Connection thread
(Male thread)

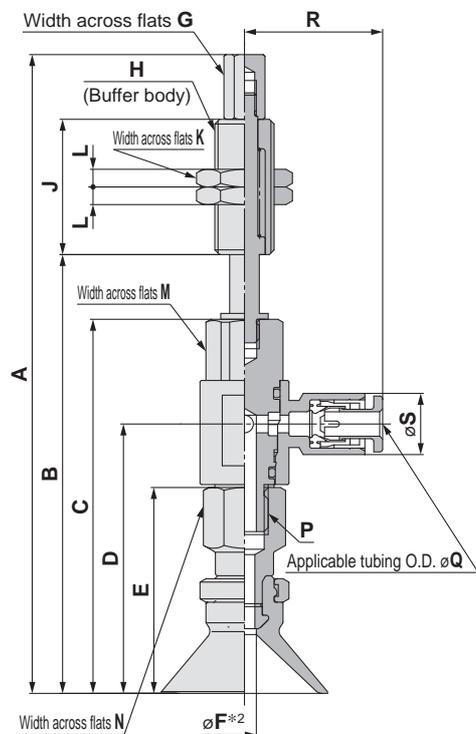
Buffer specification ③

J	Rotating
K	Non-rotating

A10	M10 x 1
A14	M14 x 1

⑤ Vacuum inlet
(One-touch fitting)

04	$\phi 4$
06	$\phi 6$
08	$\phi 8$



Construction	p. 118
Buffer Assembly	p. 125

		Model										A	B	C	D	E	F ^{*2}	G	H	J	K	L	M	N	P		
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread																				
ZP	R	D	N S U F G N S	J K	10	04	06	A10	94	60	49	32.9	24	2.5	6	M10 x1	23	51	77	14	3	10	8	M5 x 0.8			
					20				132	70																	
					30				142	80																	
					40				178	90																	
					50				188	100																	
					10				95	61																	
					20				133	71																	
					30				143	81																	
					40				179	91																	
					50				189	101																	
	10	108.6	74.6																								
	20	146.6	84.6																								
	30	156.6	94.6																								
	40	192.6	104.6																								
	50	202.6	114.6																								
	10	151.1	83.1																								
	20	148.1	93.1																								
	30	158.1	103.1																								
	50	203.1	123.1																								
	R	D	D	N S U F G N S	J K	10	04	08	A14	151.1	83.1	71.1	53.3	42.5	4	10	M14 x1	50	75	19	5	12	12	M8 x 1.25			
20						148.1				93.1																	
30						158.1				103.1																	
50						203.1				123.1																	

Dimensions Per Vacuum Inlet

		Model							Q	R	S	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread					
ZP	R	D	N S U F G N S	J K	10	04	A10	4	20.6	10.4	$\phi 3$	
					20							
					30							
					40							
					50							
					10							06
	20											
	30											
	40											
	50											
	10	08			A10	8	26.2	15.2	$\phi 6$			
	20											
30												
40												
50												
10	06		A14	6						24.3	12.8	$\phi 4.5$
20												
30												
40												
50												
10		08			A14	8	26.2	15.2	$\phi 6$			
20												
30												
40												
50												

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer/barb fitting $\varnothing 10$ to $\varnothing 40$

ZPY **10** D **N** **J** **10** - **N4** - **A10**

① ② ④

⑥ Connection thread (Male thread)

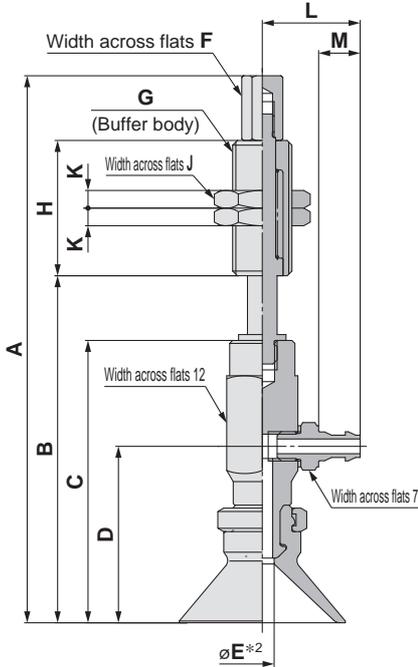
Buffer specification ③

J	Rotating
K	Non-rotating

A10	M10 x 1
A14	M14 x 1

⑤ Vacuum inlet (Barb fitting)

N4	For $\varnothing 4$ nylon tubing	M-5AN-4
N6	For $\varnothing 6$ nylon tubing	M-5AN-6
U4	For $\varnothing 4$ soft tubing	M-5AU-4
U6	For $\varnothing 6$ soft tubing	M-5AU-6



Construction	p. 118
Buffer Assembly	p. 126

		Model						A	B	C	D	*2 E	F	G	H	J	K	
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread											
ZP	Y	10	D	N S U F GN GS	J	10	N4 N6 U4 U6	A10	86	52	41	25	2.5	6	M10 x 1	14	3	23
						20			124	62								51
						30			134	72								77
						40			170	82								77
						50			180	92								23
						10			87	53								51
		20			125	63	77											
		30			135	73	51											
		40			171	83	77											
		50			181	93	23											
		10			93	59	51											
		20			131	69	77											
	30	141	79	51														
	40	177	89	77														
	50	187	99	23														
	10	137	69	51														
	20	134	79	77														
	30	144	89	51														
	50	189	109	75														
	Y	40	D	N S U F GN GS	K	10	N6 U6	A14	57	39	6	10	M14 x 1	19	5	50		
						20			134	79						75		
						30			144	89								
						40												
						50												
50																		

Dimensions Per Vacuum Inlet

		Model						L	M	Fitting part min. hole size
Vacuum inlet direction	① Pad dia.	Form	② *1 Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet	⑥ Connection thread			
ZP	Y	D	N S U F GN GS	J K	10	N4 U4	A10	14.5	5	$\varnothing 1.8$
					20					
					30					
					40					
					50					
					10					
20										
30										
40										
50										
10	N6 U6	A14	16.5	7	$\varnothing 2.5$					
20										
30										
40										
50										

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

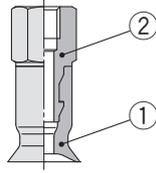
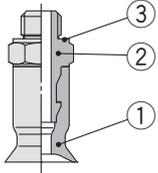
Basic Pad *ZP Series* Construction

With adapter Flat type: $\varnothing 2$ to $\varnothing 8$ Bellows type: $\varnothing 6$ to $\varnothing 8$ Thin flat type/Thin flat type with ribs: $\varnothing 10$ to $\varnothing 16$

Vacuum inlet direction **Vertical** T Type/ZPT

ZPT□-(A5/A6)

ZPT□-(B4/B5)



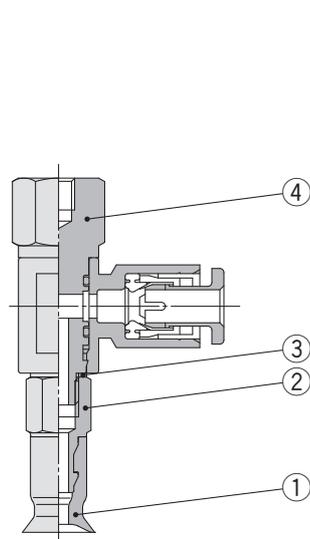
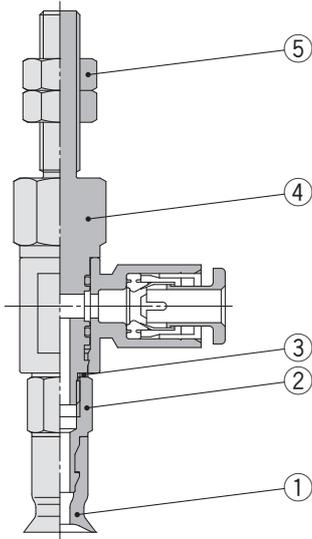
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Bellows type Thin flat type Thin flat type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel/NBR	

Vacuum inlet direction **Lateral** R Type/ZPR

ZPR□-(04/06)-(A5/A6)

ZPR□-(04/06)-(B4/B5)



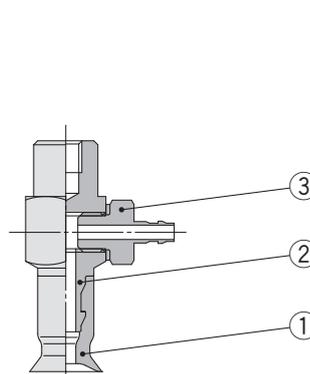
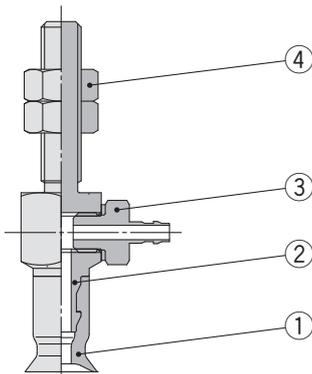
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Bellows type Thin flat type Thin flat type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel/NBR	
4	Adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
5	Nut	Rolled steel (Zinc chromated)	M5 x 0.8
		Brass (Nickel plating)	M6 x 1

Vacuum inlet direction **Lateral** Y Type/ZPY

ZPY□-(N4/N6/U4/U6)-(A5/A6)

ZPY□-(N4/N6/U4/U6)-(B4/B5)



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Bellows type Thin flat type Thin flat type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Barb fitting	—	
4	Nut	Rolled steel (Zinc chromated)	M5 x 0.8
		Brass (Nickel plating)	M6 x 1

With buffer

Flat type: $\phi 2$ to $\phi 8$

Bellows type: $\phi 6$ to $\phi 8$

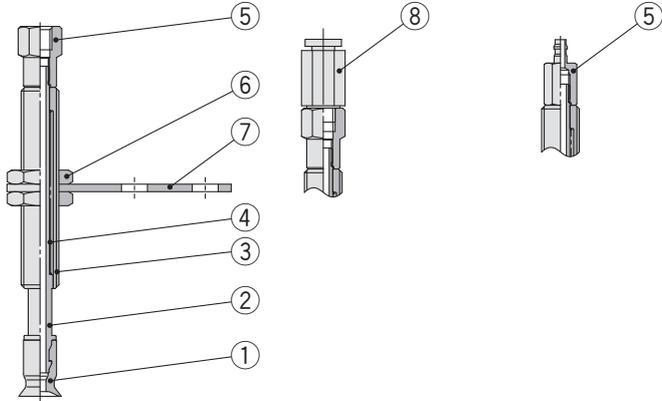
Thin flat type/Thin flat type with ribs: $\phi 10$ to $\phi 16$

Vacuum inlet direction **Vertical** T Type/ZPT

ZPT□-(B3/B5)-A8

ZPT□-(04/06)-A8

ZPT□-(N4/U4)-A8

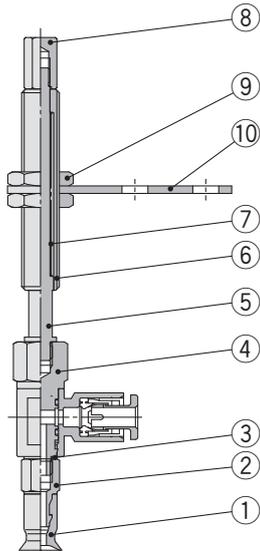


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Bellows type Thin flat type Thin flat type with ribs
2	Piston rod	Stainless steel	
3	Buffer body	Brass (Electroless nickel plating)	
4	Return spring	Stainless steel	
5	Buffer adapter	Brass (Electroless nickel plating)	
6	Nut	Brass (Electroless nickel plating)	M8 x 1
7	Buffer plate	Steel (Trivalent chromated)	
8	Fitting	—	

Vacuum inlet direction **Lateral** R Type/ZPR

ZPR□-(04/06)-A8

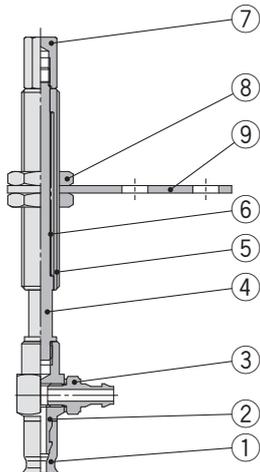


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Bellows type Thin flat type Thin flat type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel 304/NBR	
4	Adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
5	Piston rod	Stainless steel	
6	Buffer body	Brass (Electroless nickel plating)	
7	Return spring	Stainless steel	
8	Buffer adapter	Brass (Electroless nickel plating)	
9	Nut	Brass (Electroless nickel plating)	M8 x 1
10	Buffer plate	Steel (Trivalent chromated)	

Vacuum inlet direction **Lateral** Y Type/ZPY

ZPY□-(N4/N6/U4/U6)-A8



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Bellows type Thin flat type Thin flat type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Barb fitting	—	
4	Piston rod	Stainless steel	
5	Buffer body	Brass (Electroless nickel plating)	
6	Return spring	Stainless steel	
7	Buffer adapter	Brass (Electroless nickel plating)	
8	Nut	Brass (Electroless nickel plating)	M8 x 1
9	Buffer plate	Steel (Trivalent chromated)	

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

Bellows Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

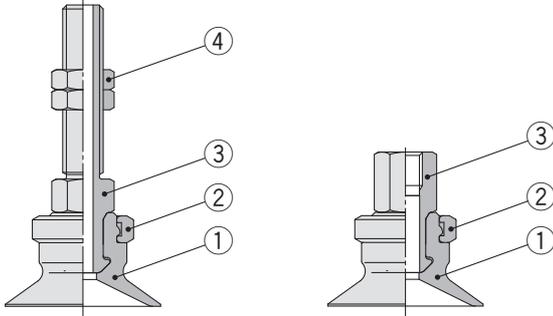
Precautions

With adapter Flat type: $\varnothing 10$ to $\varnothing 50$ Flat type with ribs: $\varnothing 10$ to $\varnothing 50$ Bellows type: $\varnothing 10$ to $\varnothing 50$ Deep type: $\varnothing 10$ to $\varnothing 40$

Vacuum inlet direction **Vertical** T Type/ZPT

ZPT□-(A5/A6/A8)

ZPT□-(B5/B6/B8/B01/N01/T01)



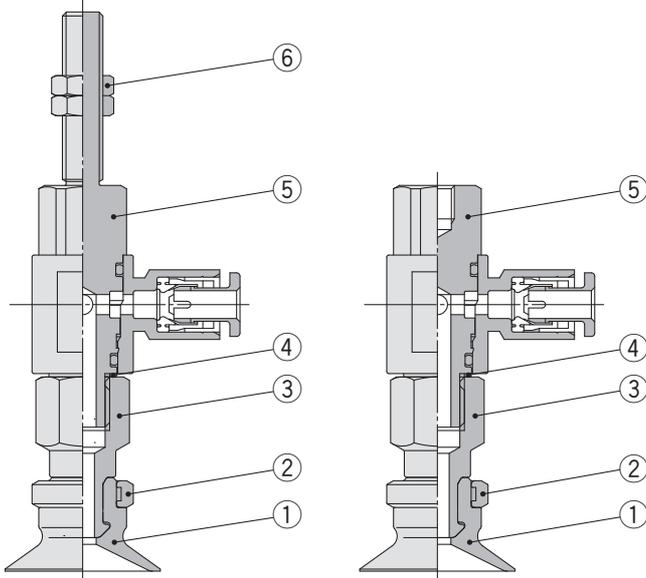
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with ribs Bellows type Deep type
2	Lock ring	Brass (Electroless nickel plating)	
3	Adapter	Brass (Electroless nickel plating)	
4	Nut	Rolled steel (Zinc chromated)	M5 x 0.8
		Brass (Electroless nickel plating)	M6 x 1 M8 x 1

Vacuum inlet direction **Lateral** R Type/ZPR

ZPR□-(04/06/08)-(A5/A6/A8)

ZPR□-(04/06/08)-(B5/B6/B8)



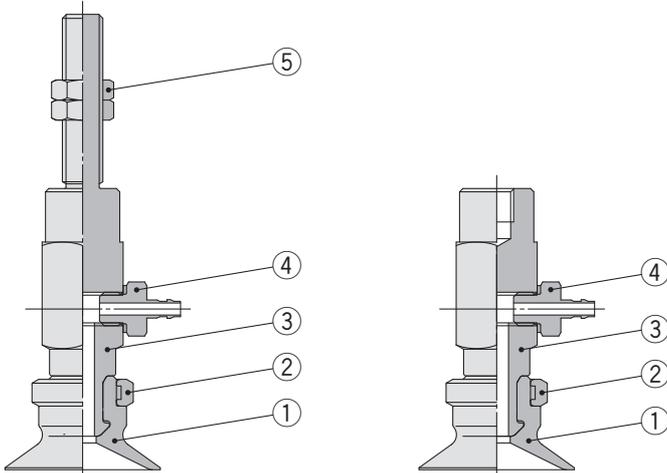
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with ribs Bellows type Deep type
2	Lock ring	Brass (Electroless nickel plating)	
3	Adapter	Brass (Electroless nickel plating)	
4	Gasket	Stainless steel 304/NBR	
5	Adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
6	Nut	Rolled steel (Zinc chromated)	M5 x 0.8
		Brass (Electroless nickel plating)	M6 x 1 M8 x 1

Vacuum inlet direction **Lateral** Y Type/ZPY

ZPY□-(N4/N6/U4/U6)-(A5/A6/A8)

ZPY□-(N4/N6/U4/U6)-(B5/B6/B8)



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with ribs Bellows type Deep type
2	Lock ring	Brass (Electroless nickel plating)	
3	Adapter	Brass (Electroless nickel plating)	
4	Barb fitting	—	
5	Nut	Rolled steel (Zinc chromated)	M5 x 0.8
		Brass (Electroless nickel plating)	M6 x 1 M8 x 1

With buffer

Flat type: $\varnothing 10$ to $\varnothing 50$

Flat type with ribs: $\varnothing 10$ to $\varnothing 50$

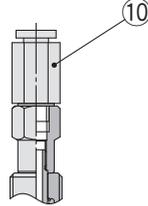
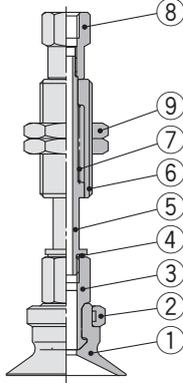
Bellows type: $\varnothing 10$ to $\varnothing 50$

Deep type: $\varnothing 10$ to $\varnothing 40$

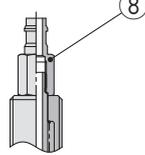
Vacuum inlet direction **Vertical** T Type/ZPT

ZPT□-(B5/B01/N01/T01)-(A10/A14)

ZPT□-(04/06/08)-(A10/A14)



ZPT□-(N6/U6)-(A10/A14)

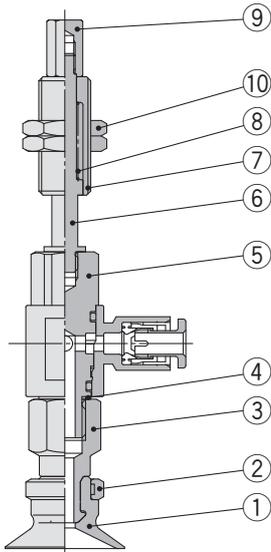


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with ribs Bellows type Deep type
2	Lock ring	Brass (Electroless nickel plating)	
3	Adapter	Brass (Electroless nickel plating)	
4	Gasket	Stainless steel/NBR	
5	Piston rod	Stainless steel	
6	Buffer body	Brass (Electroless nickel plating)	
7	Return spring	Stainless steel	
8	Buffer adapter	Brass (Electroless nickel plating)	
9	Nut	Brass (Electroless nickel plating)	M10 x 1 M14 x 1
10	Fitting	—	

Vacuum inlet direction **Lateral** R Type/ZPR

ZPR□-(04/06/08)-(A10/A14)

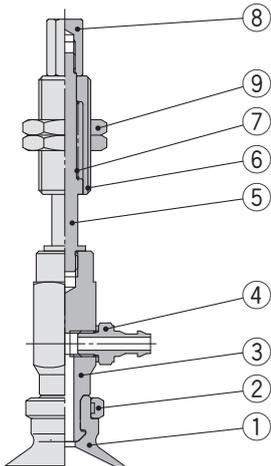


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with ribs Bellows type Deep type
2	Lock ring	Brass (Electroless nickel plating)	
3	Adapter	Brass (Electroless nickel plating)	
4	Gasket	Stainless steel/NBR	
5	Adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
6	Piston rod	Stainless steel	
7	Buffer body	Brass (Electroless nickel plating)	
8	Return spring	Stainless steel	
9	Buffer adapter	Brass (Electroless nickel plating)	
10	Nut	Brass (Electroless nickel plating)	M10 x 1 M14 x 1

Vacuum inlet direction **Lateral** Y Type/ZPY

ZPY□-(N4/N6/U4/U6)-(A10/A14)



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with ribs Bellows type Deep type
2	Lock ring	Brass (Electroless nickel plating)	
3	Adapter	Brass (Electroless nickel plating)	
4	Barb fitting	—	
5	Piston rod	Stainless steel	
6	Buffer body	Brass (Electroless nickel plating)	
7	Return spring	Stainless steel	
8	Buffer adapter	Brass (Electroless nickel plating)	
9	Nut	Brass (Electroless nickel plating)	M10 x 1 M14 x 1

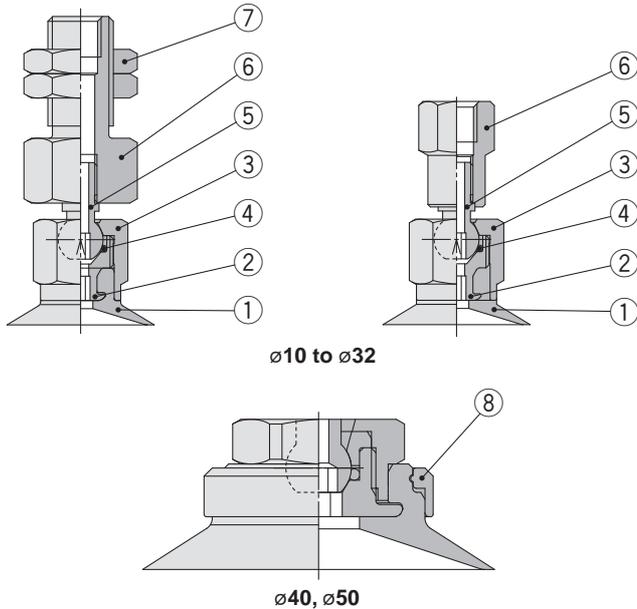
Ball Joint Type Basic Pad **ZP Series** Construction

With adapter Flat type: $\phi 10$ to $\phi 50$

Vacuum inlet direction **Vertical** T Type/ZPT□F

ZPT□F□-(B5/A8/A10/A14)

ZPT□F□-(B5/B8/B01/N01/T01)

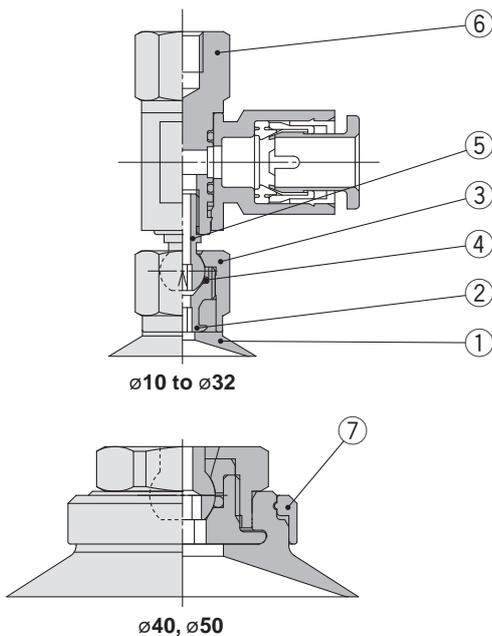


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Shaft cover	Stainless steel	
4	O-ring	FKM	
5	Shaft	Stainless steel	
6	Shaft adapter	Brass (Electroless nickel plating)	
7	Nut	Brass (Electroless nickel plating)	M8 x 1 M10 x 1 M14 x 1
8	Lock ring	Aluminum (Black anodized)	Pad diameter: ø40, ø50

Vacuum inlet direction **Lateral** R Type/ZPR□F

ZPR□F□-(04/06/08)-(B5/B8)



Component Parts

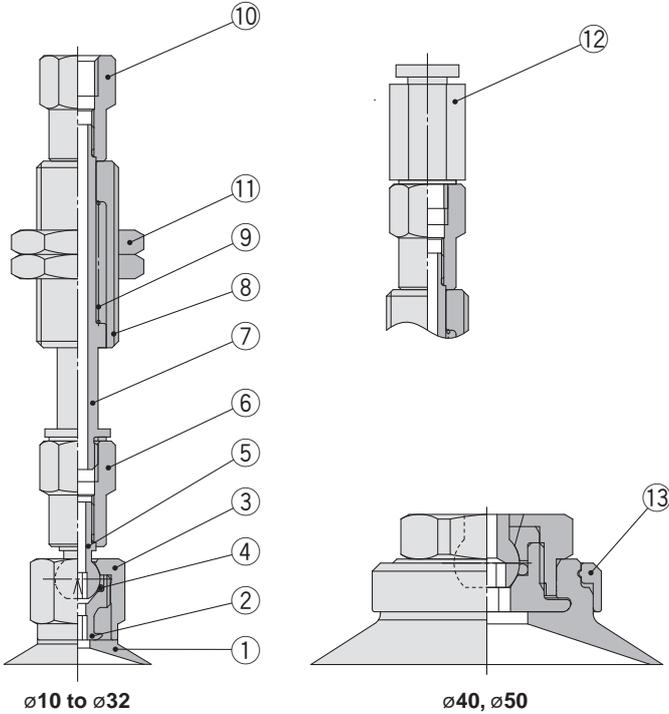
No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Shaft cover	Stainless steel	
4	O-ring	FKM	
5	Shaft	Stainless steel	
6	Shaft adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
7	Lock ring	Aluminum (Black anodized)	Pad diameter: ø40, ø50

With buffer Flat type: $\phi 10$ to $\phi 50$

Vacuum inlet direction **Vertical** T Type/ZPT□F

ZPT□F□-(B5/B01/N01/T01)-(A10/A14)

ZPT□F□-(04/06/08)-(A10/A14)

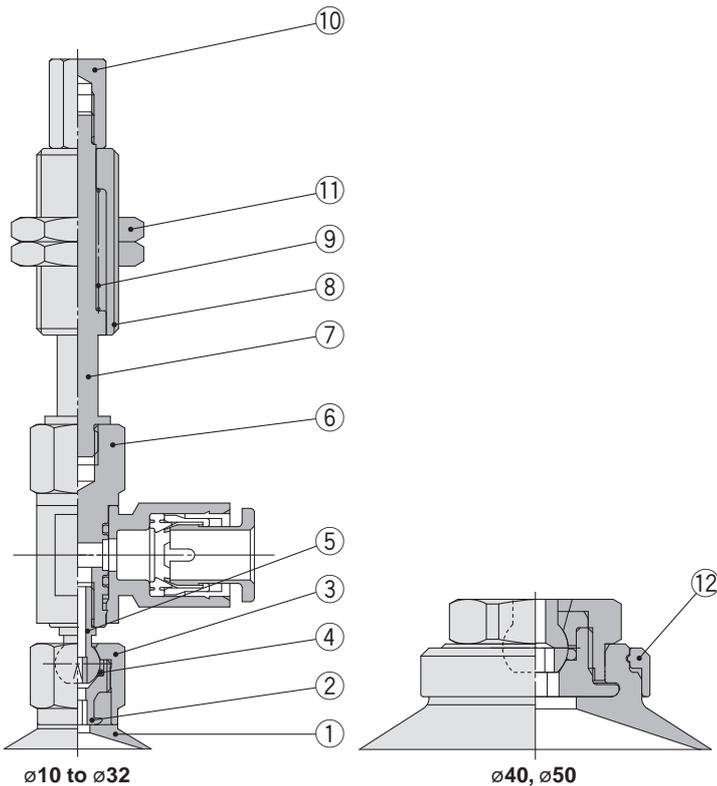


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Shaft cover	Stainless steel	
4	O-ring	FKM	
5	Shaft	Stainless steel	
6	Shaft adapter	Brass (Electroless nickel plating)	
7	Piston rod	Stainless steel	
8	Buffer body	Brass (Electroless nickel plating)	
9	Return spring	Stainless steel	
10	Buffer adapter	Brass (Electroless nickel plating)	
11	Nut	Brass (Electroless nickel plating)	M10 x 1 M14 x 1
12	Fitting	—	
13	Lock ring	Aluminum (Black anodized)	Pad diameter: $\phi 40, \phi 50$

Vacuum inlet direction **Lateral** R Type/ZPR□F

ZPR□F□-(04/06/08)-(A10/A14)



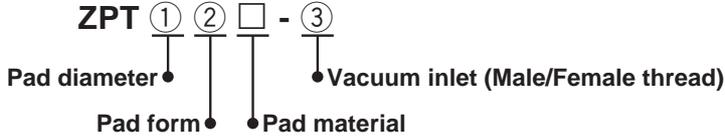
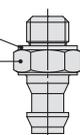
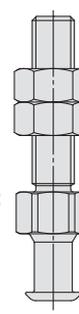
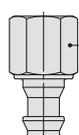
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Shaft cover	Stainless steel	
4	O-ring	FKM	
5	Shaft	Stainless steel	
6	Shaft adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
7	Piston rod	Stainless steel	
8	Buffer body	Brass (Electroless nickel plating)	
9	Return spring	Stainless steel	
10	Buffer adapter	Brass (Electroless nickel plating)	
11	Nut	Brass (Electroless nickel plating)	
12	Lock ring	Aluminum (Black anodized)	Pad diameter: $\phi 40, \phi 50$

Basic Pad *ZP Series*

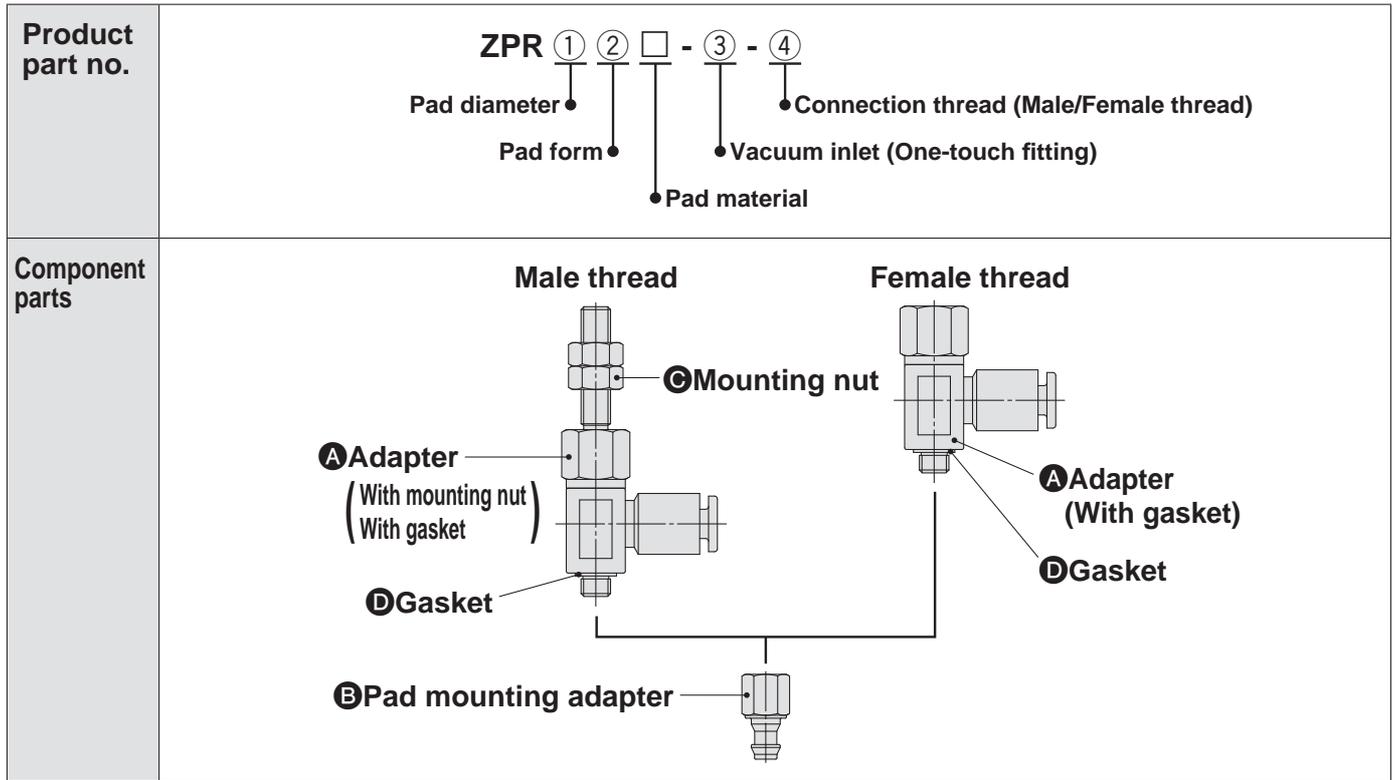
Mounting Bracket Assembly

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZPT

Product part no.	
Component parts	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Male thread</p>  <p>Ⓒ Gasket Ⓐ Adapter (With gasket)</p> <p>∅02 to ∅08 Thin flat type/Thin flat type with ribs: ∅10 to ∅16</p> </div> <div style="text-align: center;"> <p>Male thread</p>  <p>Ⓑ Mounting nut Ⓐ Adapter (With mounting nut)</p> <p>∅10 to ∅50</p> </div> <div style="text-align: center;"> <p>Female thread</p>  <p>Ⓐ Adapter</p> <p>∅02 to ∅50</p> </div> </div>

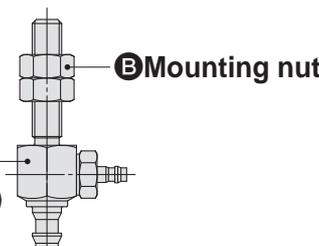
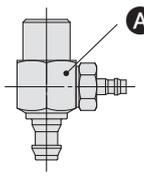
		Symbol	① Pad diameter symbol															
			02	04	06	08	10	13	16	10	13	16	20	25	32	40	50	
Ⓐ Adapter	③ Vacuum inlet	Male thread	M5 x 0.8	A5	ZPT1-A5						ZPT2-A5			—		—		
			M6 x 1	A6	ZPT1-A6						ZPT2-A6			ZPT3-A6		ZPT4-A6		
			M8 x 1	A8	—						—			ZPT3-A8		ZPT4-A8		
		Female thread	M4 x 0.7	B4	ZPT1-B4						—			—		—		
			M5 x 0.8	B5	ZPT1-B5						ZPT2-B5			ZPT3-B5		—		
			M6 x 1	B6	—						ZPT2-B6			ZPT3-B6		ZPT4-B6		
			M8 x 1.25	B8	—						—			ZPT3-B8		ZPT4-B8		
			Rc1/8	B01	—						ZPT2-B01			ZPT3-B01		ZPT4-B01		
			NPT1/8	N01	—						ZPT2-N01			ZPT3-N01		ZPT4-N01		
			NPTF1/8	T01	—						ZPT2-T01			ZPT3-T01		ZPT4-T01		
Ⓑ Mounting nut (Single unit)			M5 x 0.8		—						NTJ-015A			—		—		
			M6 x 1		—						ZPNA-M6			ZPNA-M6		ZPNA-M6		
			M8 x 1		—						—			ZPNA-M8		ZPNA-M8		
Ⓒ Gasket (Single unit)			For M5 x 0.8		M-5G2						—			—		—		
			For M6 x 1		M-6G						—			—		—		

Adapter Assembly: With One-touch Fitting, Vacuum Inlet Direction Lateral R Type/ZPR



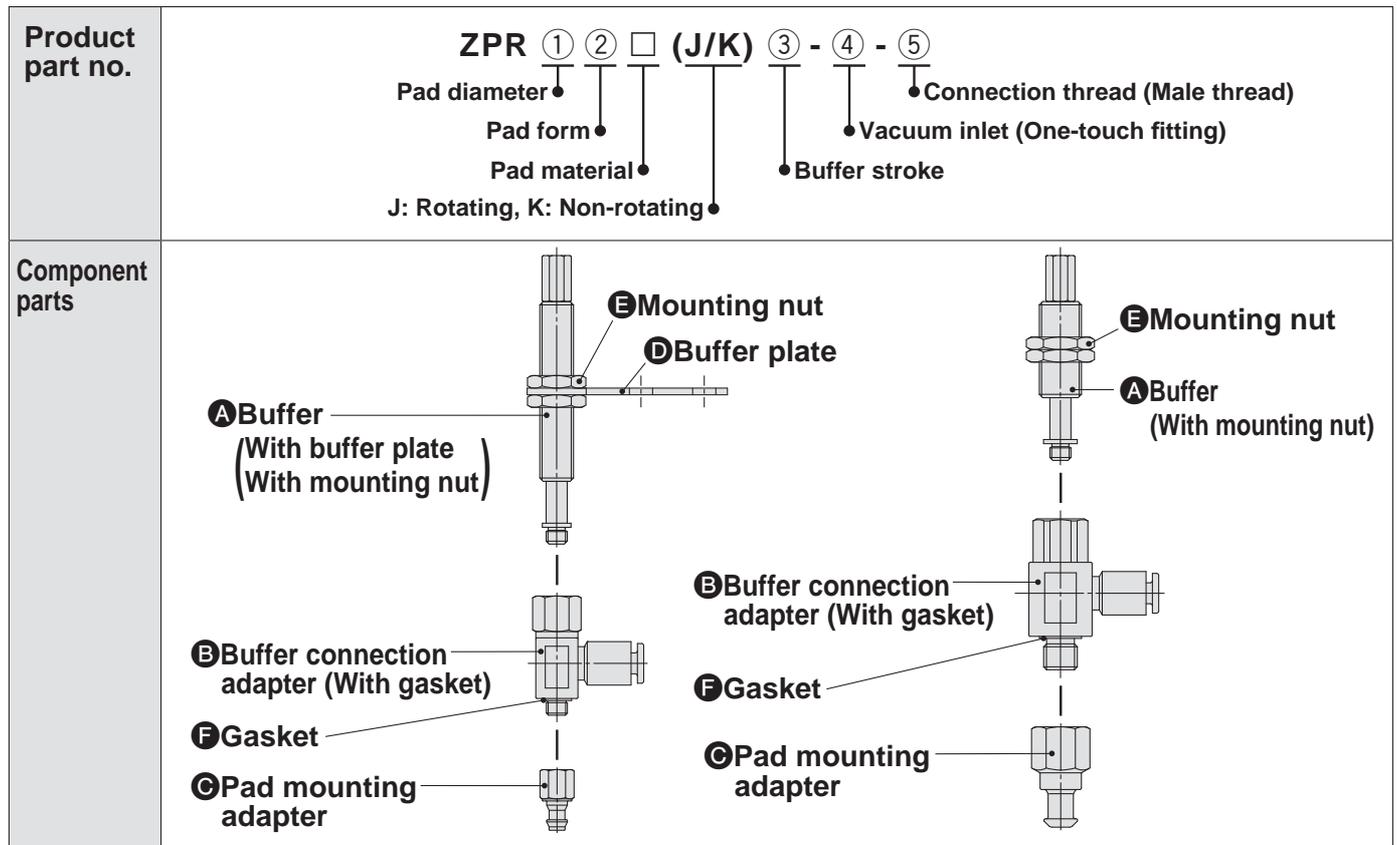
		Symbol	① Pad diameter symbol														
			02	04	06	08	10	13	16	10	13	16	20	25	32	40	50
② Pad form	Flat type	U	●	●	●	●	—	—	—	●	●	●	●	●	●	●	●
	Flat type with ribs	C	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●
	Bellows type	B	—	—	●	●	—	—	—	●	●	●	●	●	●	●	●
	Thin flat type	UT	—	—	—	—	●	●	●	—	—	—	—	—	—	—	—
	Thin flat type with ribs	CT	—	—	—	—	●	●	●	—	—	—	—	—	—	—	—
	Deep type	D	—	—	—	—	—	—	—	●	—	●	—	●	—	●	—
③ Vacuum inlet (One-touch fitting)	④ Connection thread	Male thread	∅4 04	M5 x 0.8	A5	ZPRS-04-A5				ZPRS-04-A5			—		—		
			M6 x 1	A6	ZPRS-04-A6				ZPRS-04-A6			ZPRL-04-A6		—			
			M8 x 1	A8	—				—			ZPRL-04-A8		—			
		Female thread	M4 x 0.7	B4	ZPRS-04-B4				—			—		—			
			M5 x 0.8	B5	ZPRS-04-B5				ZPRS-04-B5			ZPRL-04-B5		—			
			M6 x 1	B6	—				ZPRS-04-B6			ZPRL-04-B6		—			
	∅6 06	Male thread	M8 x 1.25	B8	—				—			ZPRL-04-B8		—			
			M5 x 0.8	A5	ZPRS-06-A5				ZPRS-06-A5			—		—			
			M6 x 1	A6	ZPRS-06-A6				ZPRS-06-A6			ZPRL-06-A6		ZPRL-06-A6			
		Female thread	M8 x 1	A8	—				—			ZPRL-06-A8		ZPRL-06-A8			
			M4 x 0.7	B4	ZPRS-06-B4				—			—		—			
			M5 x 0.8	B5	ZPRS-06-B5				ZPRS-06-B5			ZPRL-06-B5		—			
∅8 08	Male thread	M6 x 1	B6	—				ZPRS-06-B6			ZPRL-06-B6		ZPRL-06-B6				
		M8 x 1.25	B8	—				—			ZPRL-06-B8		ZPRL-06-B8				
		M6 x 1	A6	—				—			ZPRL-08-A6		ZPRL-08-A6				
	Female thread	M8 x 1	A8	—				—			ZPRL-08-A8		ZPRL-08-A8				
		M5 x 0.8	B5	—				—			ZPRL-08-B5		—				
		M6 x 1	B6	—				—			ZPRL-08-B6		ZPRL-08-B6				
⑤ Pad mounting adapter																	
⑥ Mounting nut (Single unit)		M5 x 0.8															
		M6 x 1															
		M8 x 1															
⑦ Gasket (Single unit)																	

Adapter Assembly: With Barb Fitting, Vacuum Inlet Direction Lateral Y Type/ZPY

Product part no.	<p style="text-align: center;">ZPY ① ② □ - ③ - ④</p> <p style="text-align: center;"> ● Pad diameter ● Pad form ● Vacuum inlet (Barb fitting) ● Connection thread (Male/Female thread) </p> <p style="text-align: center;">● Pad material</p>
Component parts	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Male thread</p>  <p>● A Adapter (With mounting nut)</p> <p>● B Mounting nut</p> </div> <div style="text-align: center;"> <p>Female thread</p>  <p>● A Adapter</p> </div> </div>

		Symbol	① Pad diameter symbol															
			02	04	06	08	10	13	16	10	13	16	20	25	32	40	50	
② Pad form	Flat type		U	●	●	●	●	—	—	—	●	●	●	●	●	●	●	
	Flat type with ribs		C	—	—	—	—	—	—	—	●	●	●	●	●	●	●	
	Bellows type		B	—	—	●	●	—	—	—	●	●	●	●	●	●	●	
	Thin flat type		UT	—	—	—	—	●	●	●	—	—	—	—	—	—	—	
	Thin flat type with ribs		CT	—	—	—	—	●	●	●	—	—	—	—	—	—	—	
	Deep type		D	—	—	—	—	—	—	—	●	—	●	—	●	—	●	
A Adapter	③ Vacuum inlet (Barb fitting)	For nylon tubing	ø4 N4	④ Connection thread	Male thread	M5 x 0.8	A5	ZPY1-N4-A5				ZPY2-N4-A5			—		—	
					Male thread	M6 x 1	A6	ZPY1-N4-A6				ZPY2-N4-A6			ZPY3-N4-A6		—	
					Male thread	M8 x 1	A8	—				—			ZPY3-N4-A8		—	
			Female thread		M4 x 0.7	B4	ZPY1-N4-B4				—			—		—		
			Female thread		M5 x 0.8	B5	ZPY1-N4-B5				ZPY2-N4-B5			ZPY3-N4-B5		—		
			Female thread		M6 x 1	B6	—				ZPY2-N4-B6			ZPY3-N4-B6		—		
		ø6 N6	Male thread	M5 x 0.8	A5	ZPY1-N6-A5				ZPY2-N6-A5			—		—			
			Male thread	M6 x 1	A6	ZPY1-N6-A6				ZPY2-N6-A6			ZPY3-N6-A6		ZPY4-N6-A6			
			Male thread	M8 x 1	A8	—				—			ZPY3-N6-A8		ZPY4-N6-A8			
			Female thread	M4 x 0.7	B4	ZPY1-N6-B4				—			—		—			
			Female thread	M5 x 0.8	B5	ZPY1-N6-B5				ZPY2-N6-B5			ZPY3-N6-B5		—			
			Female thread	M6 x 1	B6	—				ZPY2-N6-B6			ZPY3-N6-B6		ZPY4-N6-B6			
	For soft tubing	ø4 U4	④ Connection thread	Male thread	M5 x 0.8	A5	ZPY1-U4-A5				ZPY2-U4-A5			—		—		
				Male thread	M6 x 1	A6	ZPY1-U4-A6				ZPY2-U4-A6			ZPY3-U4-A6		—		
				Male thread	M8 x 1	A8	—				—			ZPY3-U4-A8		—		
				Female thread	M4 x 0.7	B4	ZPY1-U4-B4				—			—		—		
				Female thread	M5 x 0.8	B5	ZPY1-U4-B5				ZPY2-U4-B5			ZPY3-U4-B5		—		
				Female thread	M6 x 1	B6	—				ZPY2-U4-B6			ZPY3-U4-B6		—		
		ø6 U6	④ Connection thread	Male thread	M5 x 0.8	A5	ZPY1-U6-A5				ZPY2-U6-A5			—		—		
				Male thread	M6 x 1	A6	ZPY1-U6-A6				ZPY2-U6-A6			ZPY3-U6-A6		ZPY4-U6-A6		
				Male thread	M8 x 1	A8	—				—			ZPY3-U6-A8		ZPY4-U6-A8		
				Female thread	M4 x 0.7	B4	ZPY1-U6-B4				—			—		—		
				Female thread	M5 x 0.8	B5	ZPY1-U6-B5				ZPY2-U6-B5			ZPY3-U6-B5		—		
				Female thread	M6 x 1	B6	—				ZPY2-U6-B6			ZPY3-U6-B6		ZPY4-U6-B6		
B Mounting nut (Single unit)			M5 x 0.8	NTJ-015A				—			—		—					
			M6 x 1	ZPNA-M6				ZPNA-M6			ZPNA-M6		ZPNA-M6					
			M8 x 1	—				—			ZPNA-M8		ZPNA-M8					

Buffer Assembly: With One-touch Fitting, Vacuum Inlet Direction Lateral R Type/ZPR



		Symbol	① Pad diameter symbol																
			02	04	06	08	10	13	16	10	13	16	20	25	32	40	50		
② Pad form	Flat type	U	●	●	●	●	—	—	—	●	●	●	●	●	●	●	●		
	Flat type with ribs	C	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●		
	Bellows type	B	—	—	●	●	—	—	—	●	●	●	●	●	●	●	●		
	Thin flat type	UT	—	—	—	—	●	●	●	—	—	—	—	—	—	—	—		
	Thin flat type with ribs	CT	—	—	—	—	●	●	●	—	—	—	—	—	—	—	—		
	Deep type	D	—	—	—	—	—	—	—	●	—	●	—	●	—	●	—		
③ Buffer stroke	Stroke	6	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—		
		10	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
		15	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—		
		20	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●		
		25	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—		
		30	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●	●	
		40	—	—	—	—	—	—	—	●	●	●	●	●	●	●	—	—	
		50	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●	●	
⑤ Connection thread	Male thread	M8 x 1	A8	●							—			—					
		M10 x 1	A10	—							●			●					
		M14 x 1	A14	—							—			●					
A Buffer			ZPB1(J/K)③							ZPB2(J/K)③			ZPB2(J/K)③		ZPB3(J/K)③				
B Buffer connection adapter	④ Vacuum inlet	One-touch fitting	ø4	04	ZPRS-04-B5							ZPRS-04-B5			ZPRL-04-B5		—		
			ø6	06	ZPRS-06-B5							ZPRS-06-B5			ZPRL-06-B5		ZPRL-06-B8		
			ø8	08	—							—			ZPRL-08-B5		ZPRL-08-B8		
C Pad mounting adapter			ZPT1-B5							ZPT2-B5			ZPT3-B8		ZPT4-B8				
D Buffer plate (Single unit)			ZPB1							—			—		—				
E Mounting nut (Single unit)			ZPNA-M8							ZPNA-M10			ZPNA-M10		ZPNA-M14				
F Gasket (Single unit)			M-5G2							M-5G2			ZP-8G2		ZP-8G2				

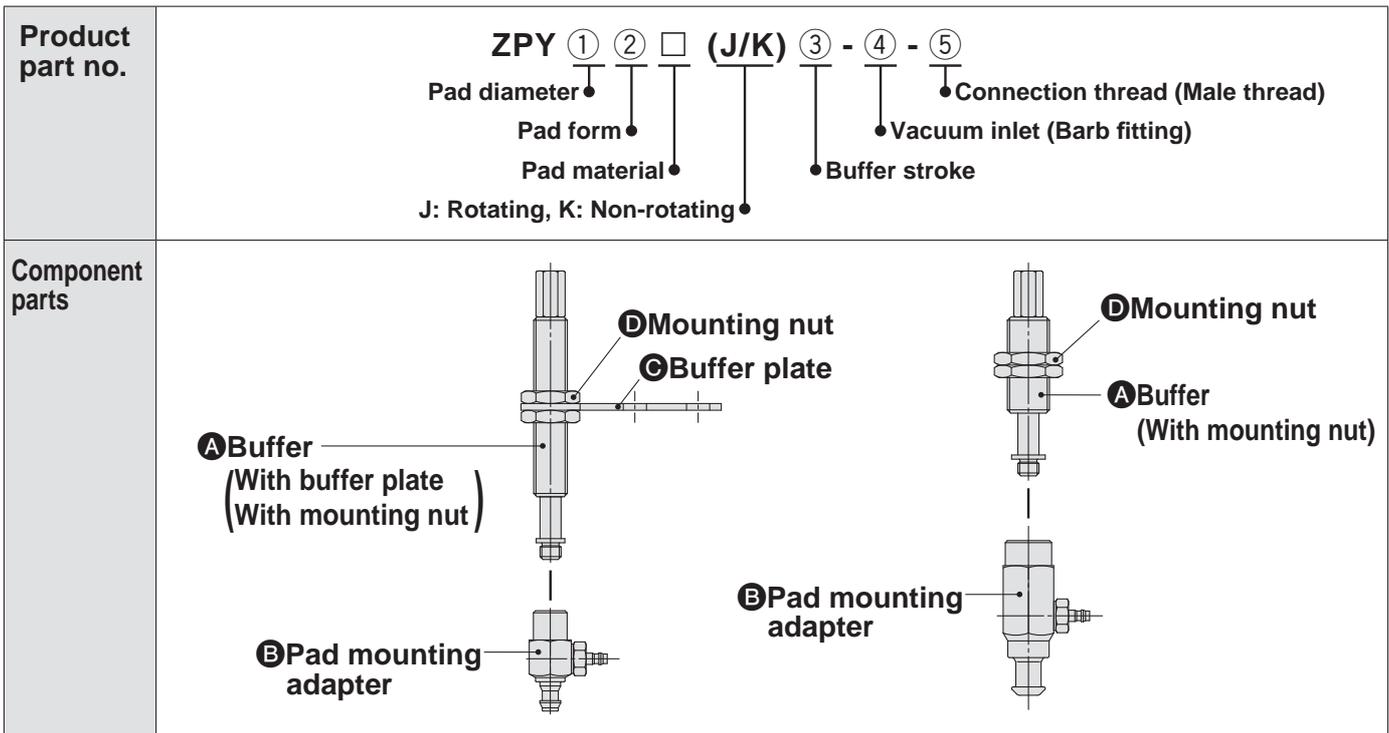
[Buffer assembly part number example]

Product part no. ZPR10BN K 20 - 04 - A10

Buffer assembly ZPB2 K 20

③ Buffer stroke

Buffer Assembly: With Barb Fitting, Vacuum Inlet Direction Lateral Y Type/ZPY



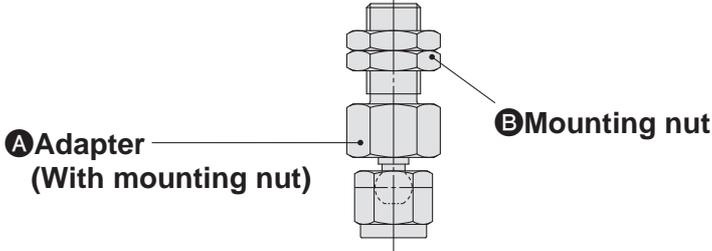
		Symbol	① Pad diameter symbol																
			02	04	06	08	10	13	16	10	13	16	20	25	32	40	50		
② Pad form	Flat type	U	●	●	●	●	—	—	—	●	●	●	●	●	●	●	●		
	Flat type with ribs	C	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●		
	Bellows type	B	—	—	●	●	—	—	—	●	●	●	●	●	●	●	●		
	Thin flat type	UT	—	—	—	—	●	●	●	—	—	—	—	—	—	—	—		
	Thin flat type with ribs	CT	—	—	—	—	●	●	●	—	—	—	—	—	—	—	—		
	Deep type	D	—	—	—	—	—	—	—	●	—	●	—	●	—	●	—		
③ Buffer stroke	Stroke	6	●	●	●	●	●	●	—	—	—	—	—	—	—	—	—		
		10	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
		15	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—		
		20	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●		
		25	●	●	●	●	●	●	●	—	—	—	—	—	—	—	—		
		30	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●		
		40	—	—	—	—	—	—	—	●	●	●	●	●	●	●	—		
		50	—	—	—	—	—	—	—	●	●	●	●	●	●	●	●		
⑤ Connection thread	Male thread	M8 x 1	A8	●				—				—							
		M10 x 1	A10	—				●				●							
		M14 x 1	A14	—				—				●							
A Buffer			ZPB1(J/K)③				ZPB2(J/K)③				ZPB2(J/K)③				ZPB3(J/K)③				
B Pad mounting adapter	④ Vacuum inlet Barb fitting	For ø4 nylon tubing	N4	ZPY1-N4-B5				ZPY2-N4-B5				ZPY3-N4-B5				—			
		For ø6 nylon tubing	N6	ZPY1-N6-B5				ZPY2-N6-B5				ZPY3-N6-B5				ZPY4-N6-B8			
		For ø4 soft tubing	U4	ZPY1-U4-B5				ZPY2-U4-B5				ZPY3-U4-B5				—			
		For ø6 soft tubing	U6	ZPY1-U6-B5				ZPY2-U6-B5				ZPY3-U6-B5				ZPY4-U6-B8			
C Buffer plate (Single unit)			ZPB1				—				—				—				
D Mounting nut (Single unit)			ZPNA-M8				ZPNA-M10				ZPNA-M10				ZPNA-M14				

[Buffer assembly part number example]

Product part no. ZPY50CN J 50 - N6 - A14
 Buffer assembly ZPB3 J 50
 ③ Buffer stroke

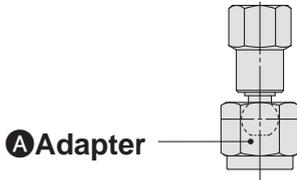
Ball Joint Type Basic Pad **ZP Series** Mounting Bracket Assembly

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZPT□F

Product part no.	<p>ZPT ① F □ - ② - ③</p> <p>Pad diameter Pad material Vacuum inlet (Female thread) Connection thread (Male thread)</p>
Component parts	 <p>Ⓐ Adapter (With mounting nut) Ⓑ Mounting nut</p>

		Symbol	Symbol	① Pad diameter symbol								
				10	13	16	20	25	32	40	50	
Ⓐ Adapter	② Vacuum inlet Female thread	M5 x 0.8	B5	③ Connection thread Male thread	M8 x 1	A8	ZPTF1-B5-A8			—		
					M10 x 1	A10	—			ZPTF2-B5-A10		
					M14 x 1	A14	—			ZPTF3-B5-A14		
					M8 x 1	ZPNA-M8			—			
					M10 x 1	—			ZPNA-M10			
					M14 x 1	—			ZPNA-M14			
					Ⓑ Mounting nut (Single unit)							

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZPT□F

Product part no.	<p>ZPT ① F □ - ②</p> <p>Pad diameter Pad material Vacuum inlet (Female thread)</p>
Component parts	 <p>Ⓐ Adapter</p>

		Symbol	① Pad diameter symbol								
			10	13	16	20	25	32	40	50	
Ⓐ Adapter	② Vacuum inlet Female thread	M5 x 0.8	B5	ZPTF1-B5			ZPTF2-B5			—	
		M8 x 1.25	B8	—			ZPTF2-B8			ZPTF3-B8	
		Rc1/8	B01	—			ZPTF2-B01			ZPTF3-B01	
		NPT1/8	N01	—			ZPTF2-N01			ZPTF3-N01	
		NPTF1/8	T01	—			ZPTF2-T01			ZPTF3-T01	

■ Adapter Assembly: With One-touch Fitting, Vacuum Inlet Direction **Lateral** R Type/ZPR□F

Product part no.	<p style="text-align: center;">ZPR ① F □ - ② - ③</p> <p style="text-align: center;"> Pad diameter ● ● Connection thread (Female thread) Pad material ● ● Vacuum inlet (One-touch fitting) </p>
Component parts	

		Symbol			Symbol	① Pad diameter symbol							
						10	13	16	20	25	32	40	50
A Adapter	2 Vacuum inlet One-touch fitting	ø4	3 Connection thread	Female thread	M5 x 0.8	B5	ZPRF1-04-B5			—		—	
		ø6		M5 x 0.8	B5	ZPRF1-06-B5			ZPRF2-06-B5		ZPRF3-06-B5		
		ø8		M8 x 1.25	B8	—			ZPRF2-06-B8		ZPRF3-06-B8		
			M5 x 0.8	B5	—			ZPRF2-08-B5		ZPRF3-08-B5			
			M8 x 1.25	B8	—			ZPRF2-08-B8		ZPRF3-08-B8			

Model Selection

ZP Basic

Flat Type

Flat Type with Ribs

Flat, Ball Joint Type

BelloWS Type

Thin Flat Type

Thin Flat Type with Ribs

Deep Type

Construction

Mounting Bracket Assembly

Precautions

Buffer Assembly: Vacuum Inlet Direction Vertical T Type/ZPT□F

Product part no.	<p>ZPT ① F □ (J/K) ② - ③ - ④</p> <p>Pad diameter ● Pad material ● J: Rotating, K: Non-rotating ● ● Buffer stroke</p> <p>● Connection thread (Male thread) ● Vacuum inlet (Female thread/One-touch fitting)</p>
Component parts	<p>③ Mounting nut</p> <p>① Buffer (With mounting nut) (With gasket)</p> <p>④ Gasket</p> <p>② Pad mounting adapter</p> <p>One-touch fitting</p>

		Symbol	① Pad diameter symbol								
			10	13	16	20	25	32	40	50	
② Buffer stroke	Stroke	10	●	●	●	●	●	●	●	●	
		20	●	●	●	●	●	●	●	●	
		30	●	●	●	●	●	●	●	●	
		40	●	●	●	—	—	—	—	—	
		50	●	●	●	●	●	●	●	●	
④ Connection thread	Male thread	M10 x 1	A10			—		—			
		M14 x 1	A14			●		●			
① Buffer	③ Vacuum inlet	Female thread	M5 x 0.8	B5			ZPB2(J/K)③-B5		—		
			Rc1/8	B01			ZPB3(J/K)③-B01		ZPB3(J/K)③-B01		
		NPT1/8	N01			ZPB3(J/K)③-N01		ZPB3(J/K)③-N01			
		NPTF1/8	T01			ZPB3(J/K)③-T01		ZPB3(J/K)③-T01			
	One-touch fitting	ø4	04			ZPB2(J/K)③-04		—			
		ø6	06			ZPB2(J/K)③-06		ZPB3(J/K)③-06		ZPB3(J/K)③-06	
		ø8	08			—		ZPB3(J/K)③-08		ZPB3(J/K)③-08	
② Pad mounting adapter				ZPTF1-B5			ZPTF2-B8		ZPTF3-B8		
③ Mounting nut (Single unit)		M10 x 1	ZPNA-M10			—		—			
		M14 x 1	—			ZPNA-M14		ZPNA-M14			
④ Gasket (Single unit)				M-5G2			ZP-8G2		ZP-8G2		

[Buffer assembly part number example]

Product part no. ZPT20FN J 10 - 06 - A14

Buffer assembly ZPB3 J 10

② Buffer stroke

Buffer Assembly: With One-touch Fitting, Vacuum Inlet Direction Lateral R Type/ZPR□F

Product part no.	<p>ZPR ① F □ (J/K) ② - ③ - ④</p> <p>● Pad diameter</p> <p>● Pad material</p> <p>J: Rotating, K: Non-rotating</p> <p>● Connection thread (Male thread)</p> <p>● Vacuum inlet (One-touch fitting)</p> <p>● Buffer stroke</p>
Component parts	<p>Ⓐ Buffer (With mounting nut)</p> <p>Ⓑ Pad mounting adapter</p> <p>Ⓒ Mounting nut</p>

		Symbol	① Pad diameter symbol								
			10	13	16	20	25	32	40	50	
② Buffer stroke	Stroke	10	●	●	●	●	●	●	●	●	
		20	●	●	●	●	●	●	●	●	
		30	●	●	●	●	●	●	●	●	
		40	●	●	●	—	—	—	—	—	
		50	●	●	●	●	●	●	●	●	
④ Connection thread	Male thread	M10 x 1	A10			—		—			
		M14 x 1	A14			●		●			
Ⓐ Buffer			ZPB2(J/K)②			ZPB3(J/K)②		ZPB3(J/K)②			
Ⓑ Pad mounting adapter	③ Vacuum inlet One-touch fitting	ø4	04	ZPRF1-04-B5			—		—		
		ø6	06	ZPRF1-06-B5			ZPRF2-06-B5		ZPRF3-06-B5		
		ø8	08	—			ZPRF2-08-B5		ZPRF3-08-B5		
Ⓒ Mounting nut (Single unit)		M10 x 1	ZPNA-M10			—		—			
		M14 x 1	—			ZPNA-M14		ZPNA-M14			

[Buffer assembly part number example]

Product part no. ZPR10FN K 30 - 06 - A10

Buffer assembly ZPB2 K 30

② Buffer stroke

Compact Type ZP3 Series

RoHS

Model Selection

ø1.5, ø2, ø3.5, ø4, ø6, ø8, ø10, ø13, ø16

Flat Type, Flat Type with Groove, Bellows Type, Bellows Type with Ribs

Overall length shortened For the flat type (Pad diameter: ø2)

ZP3 Compact

Flat Type

Flat Type with Groove

Bellows Type

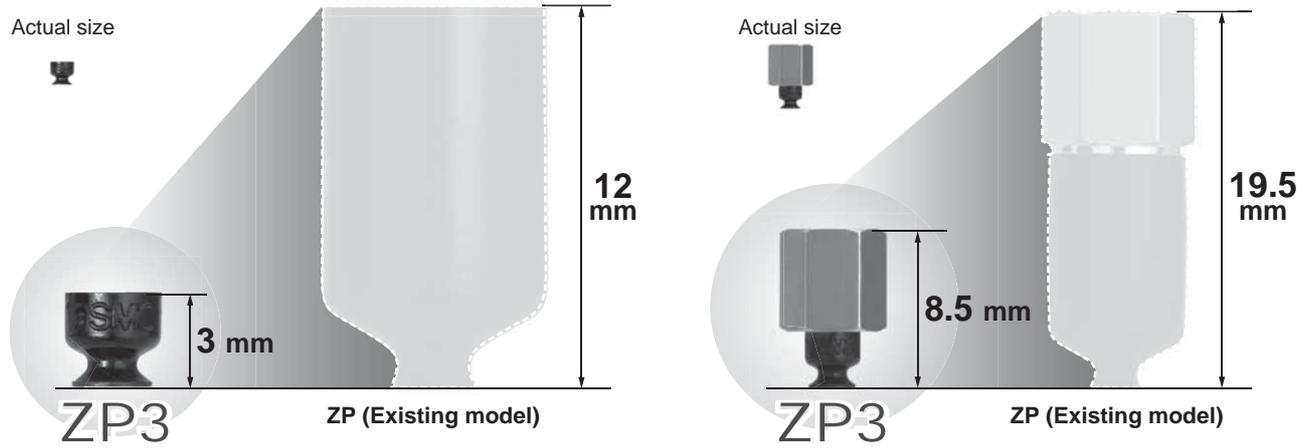
Bellows Type with Ribs

Construction

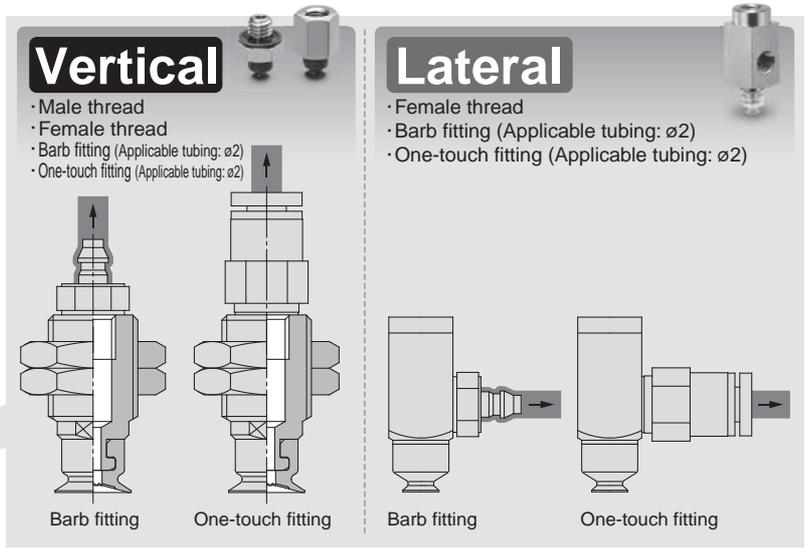
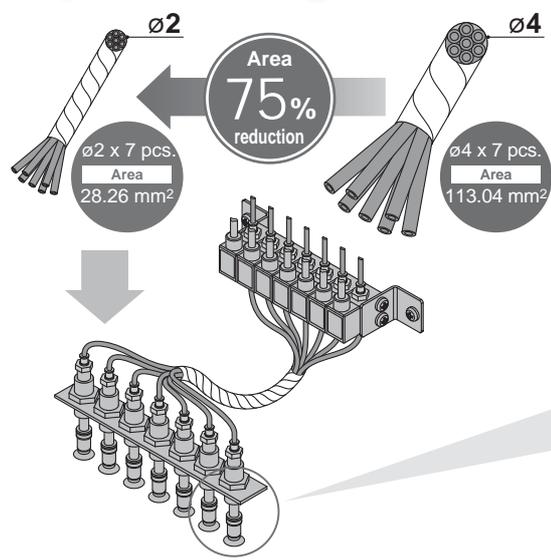
Mounting Bracket Assembly

Precautions

Pad unit **Max. 9 mm shorter** With adapter **Max. 11 mm shorter**



Space saving ø2 piping reduces working space!



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Improved functions

Improved removability

Adsorption surface is shot-blasted

Micro-dents and bumps on the surface facilitate easy removal.

With groove

Less contact surface with the workpiece makes it easy to remove.



Construction to prevent the pad from coming off

The new shape of the part which connects with the adapter prevents the pad from coming off.



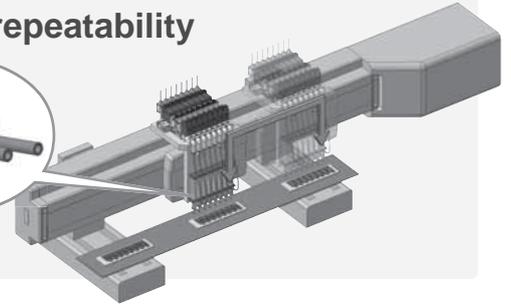
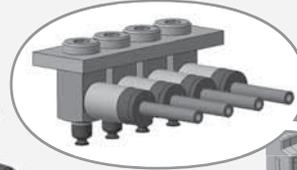
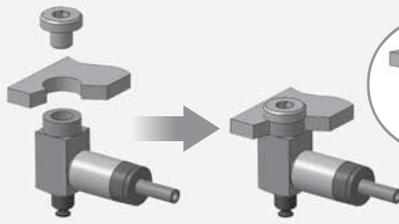
Pad diameter from $\phi 1.5$

Easier identification

SMC logo mark

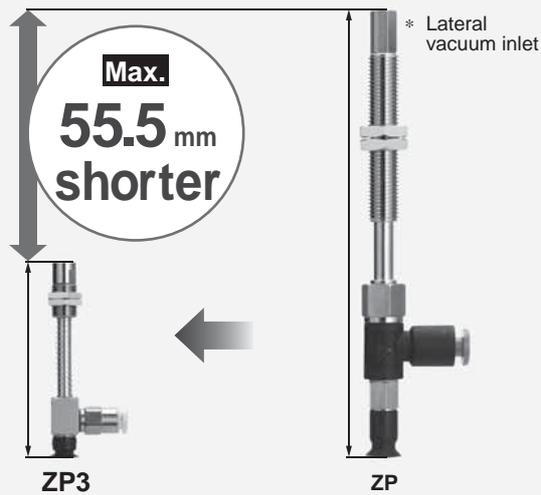


Fixing boss which allows for easy mounting and repeatability



Compact buffer body

Overall length shortened



Pad diameter $\phi 8$, Flat type, With One-touch fitting

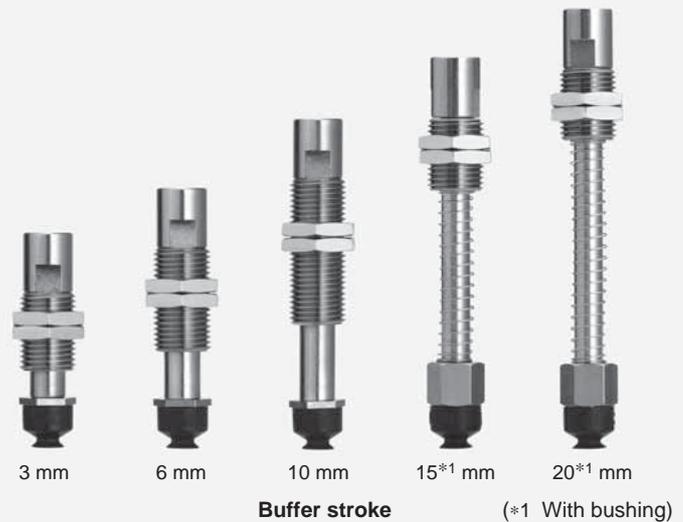
ZP3

Stroke	Overall length [mm]
3	40
6	46
10	56
15	59
20	66.5
25	—

ZP

Stroke	Overall length [mm]
3	—
6	78.5
10	109.5
15	114.5
20	—
25	124.5

Short stroke type: 3 mm available



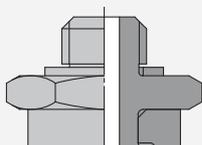
Buffer stroke

(*1 With bushing)

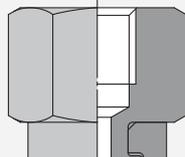
Pad diameter	Buffer specifications	Stroke [mm]				
		3	6	10	15	20
$\phi 1.5, \phi 2, \phi 3.5$	Rotating, Non-rotating	●	●	—	—	—
	Rotating	●	●	●	—	—
$\phi 4, \phi 6, \phi 8, \phi 10, \phi 13, \phi 16$	Rotating, With bushing	—	—	—	●	●
	Non-rotating	●	●	●	●	●

Wide selection of piping

Male thread



Female thread

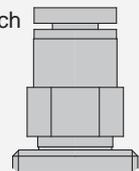


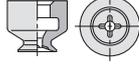
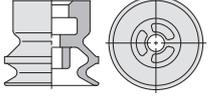
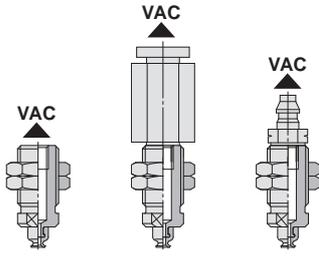
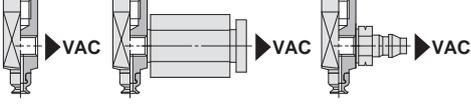
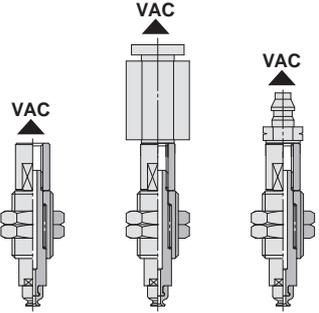
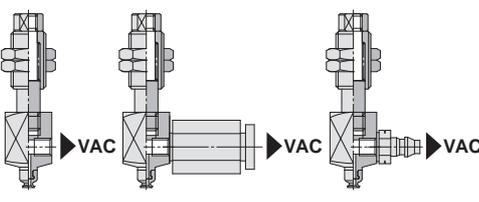
For $\phi 2$ piping!

Barb fitting



One-touch fitting



		Vacuum inlet direction							
		Flat type	Flat type with groove	Bellows type	Bellows type with ribs				
Vertical	Single unit					p. 137	p. 143	p. 149	p. 155
	ZP3-T With adapter					p. 137	p. 143	p. 149	p. 155
Vertical	ZP3-T With adapter					p. 138	p. 144	p. 150	p. 156
	ZP3-Y With adapter					p. 139	p. 145	p. 151	p. 157
Vertical	ZP3-T With buffer					p. 140	p. 146	p. 152	p. 158
	ZP3-Y With buffer					p. 141	p. 147	p. 153	p. 159

Model Selection

ZP3 Compact

Flat Type

Flat Type with Groove

Bellows Type

Bellows Type with Ribs

Construction

Mounting Bracket Assembly

Precautions

Compact Type **ZP3 Series** Specifications

Pad Material

Material	NBR (Nitrile rubber)	Silicone rubber*1	Urethane rubber	FKM (Fluoro rubber)	Conductive NBR (Nitrile rubber)	Conductive silicone rubber
Color of rubber	Black	White	Brown	Black		
Rubber hardness HS ($\pm 5^\circ$)	A60/S					
Identification (Dot)	—	—	—	· 1 green dot	· 1 silver dot	· 1 pink dot

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Adapter Specifications

Vacuum Inlet Direction **Vertical** T Type/ZP3-T

Connection		Male thread					Female thread		
Pad diameter		$\phi 1.5$ to $\phi 3.5$		$\phi 4$ to $\phi 8$		$\phi 10$ to $\phi 16$			
Connection thread		M3 x 0.5	M6 x 0.75	M5 x 0.8	M10 x 1	M5 x 0.8	M12 x 1	M3 x 0.5	M5 x 0.8
Vacuum inlet	Female thread	Use the connection thread.	M3 x 0.5	Use the connection thread.	M5 x 0.8	Use the connection thread.	M5 x 0.8	Use the connection thread.	Use the connection thread.
	One-touch fitting		$\phi 2, \phi 4$		$\phi 2, \phi 4$		$\phi 2, \phi 4, \phi 6$		
	Barb fitting*1		$\phi 2, \phi 4$		$\phi 2, \phi 4$		$\phi 2, \phi 4, \phi 6$		

*1 $\phi 2$ polyurethane tubing, $\phi 4, \phi 6$ soft tubing

Vacuum Inlet Direction **Lateral** Y Type/ZP3-Y

Connection		Female thread		
Pad diameter		$\phi 1.5$ to $\phi 3.5$	$\phi 4$ to $\phi 8$	$\phi 10$ to $\phi 16$
Connection thread		M3 x 0.5	M5 x 0.8	M5 x 0.8
Vacuum inlet	Female thread	M3 x 0.5	M5 x 0.8	M5 x 0.8
	One-touch fitting	$\phi 2, \phi 4$	$\phi 2, \phi 4$	$\phi 2, \phi 4, \phi 6$
	Barb fitting*1	$\phi 2, \phi 4$	$\phi 2, \phi 4$	$\phi 2, \phi 4, \phi 6$

*1 $\phi 2$ polyurethane tubing, $\phi 4, \phi 6$ soft tubing

Buffer Specifications

Pad diameter		$\phi 1.5$ to $\phi 3.5$		$\phi 4$ to $\phi 16$		
Non-rotating specification		J: Rotating	K: Non-rotating	J: Rotating	JB: Rotating, With bushing	K: Non-rotating
Stroke [mm]		3, 6		3, 6, 10	15, 20	3, 6, 10, 15, 20
Connection thread		M6 x 0.75	M8 x 0.75	M8 x 0.75		
Spring reactive force [N]	At 0 stroke	0.2		0.2		
	At full stroke	0.4	0.5	0.5		



Compact Type

Flat Type

ZP3 Series

Pad diameter: $\varnothing 1.5$, $\varnothing 2$, $\varnothing 3.5$



Model Selection

ZP3 Compact

Flat Type

Flat Type with Groove

Bellows Type

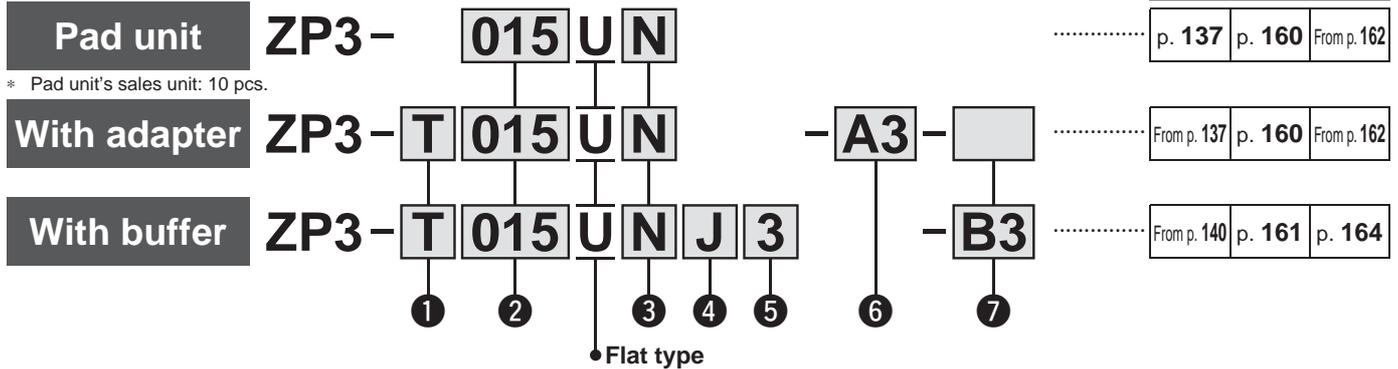
Bellows Type with Ribs

Construction

Mounting Bracket Assembly

Precautions

How to Order



① Vacuum inlet direction

Nil	Pad unit
T	Vertical
Y	Lateral

② Pad diameter

015	$\varnothing 1.5$
02	$\varnothing 2$
035	$\varnothing 3.5$

③ Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

④ Buffer specification

J	Rotating
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Pad diameter	
	All sizes	
3	●	
6	●	

With adapter

⑥ Connection thread/ ⑦ Vacuum inlet

○: ZP3-T/Vertical ●: ZP3-Y/Lateral

Type	⑥ Connection thread		Type	⑦ Vacuum inlet		Pad diameter
	Symbol	Size		Symbol	Size	
Male thread	A3	M3 x 0.5	—	Nil	—*1	○
			Female thread	B3	M3 x 0.5	○
	A6	M6 x 0.75	One-touch fitting	02	$\varnothing 2$	○
			Barb fitting	04	$\varnothing 4$	○
				U2	For $\varnothing 2$ polyurethane tubing*2	○
Female thread	B3	M3 x 0.5	—	Nil	—*1	○
			Female thread	B3	M3 x 0.5	●
	B3	M3 x 0.5	One-touch fitting	02	$\varnothing 2$	●
			Barb fitting	04	$\varnothing 4$	●
				U2	For $\varnothing 2$ polyurethane tubing	●
			U4	For $\varnothing 4$ soft tubing	●	

*1 Use the connection thread.

*2 Polyurethane tube piping

*3 Soft nylon/Polyurethane tube piping

With buffer

⑦ Vacuum inlet

○: ZP3-T/Vertical ●: ZP3-Y/Lateral

Type	Symbol	Size	Pad diameter	
			All sizes	
Female thread	B3	M3 x 0.5	○●	
One-touch fitting	02	$\varnothing 2$	○●	
	04	$\varnothing 4$	○●	
Barb fitting	U2	For $\varnothing 2$ polyurethane tubing	○●	
	U4	For $\varnothing 4$ soft tubing	○●	

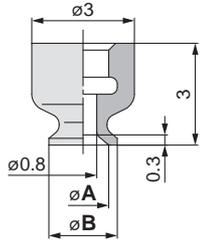
* It is not necessary to select a connection thread.

* The pad, mounting nut, and fitting are shipped together but do not come assembled.

Dimensions/Models

Single unit $\varnothing 1.5$ to $\varnothing 3.5$

ZP3 - 015 U N
① ②



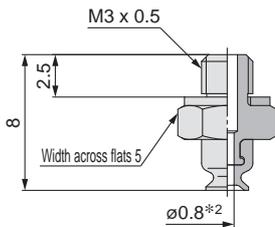
Construction	p. 160
Mounting Bracket Assembly	From p. 162

Model				A	B
① Pad dia.	Form	② Material ^{*1}			
ZP3	015	U	N S U F GN GS	1.5	2
	02			2	2.5
	035			3.5	4

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

With adapter $\varnothing 1.5$ to $\varnothing 3.5$

ZP3 - T 015 U N - A3
① ② ③



Construction	p. 160
Adapter Assembly	p. 162

③ Connection thread
(Male thread)

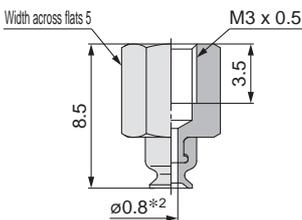
A3	M3 x 0.5
----	----------

Model					
	Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Connection thread
ZP3	T	015 02 035	U	N S U F GN GS	A3

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

ZP3 - T 015 U N - B3
① ② ③



Construction	p. 160
Adapter Assembly	p. 162

③ Connection thread
(Female thread)

B3	M3 x 0.5
----	----------

Model					
	Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Connection thread
ZP3	T	015 02 035	U	N S U F GN GS	B3

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter $\varnothing 1.5$ to $\varnothing 3.5$

ZP3 - T **015** U **N** - **A6** - **B3**

①

②

③

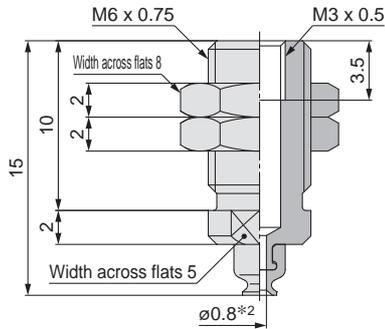
④

Vacuum inlet

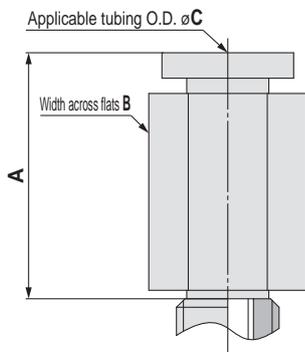
Connection thread (Male thread)

A6	M6 x 0.75
----	-----------

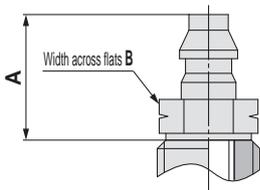
B3	M3 x 0.5	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	Barb fitting
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	



Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Construction	p. 160
Adapter Assembly	p. 163

Model		①	②	③	④
Vacuum inlet direction	Pad dia.	Form	Material*1	Connection thread	Vacuum inlet
ZP3	T	015 02 035	U N S F GN GS	A6	B3

Dimensions Per Vacuum Inlet: One-touch Fitting

Model		①	②	③	④	A	B	C	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	Pad dia.	Form	Material*1	Connection thread	Vacuum inlet					
ZP3	T	015 02 035	U N S F GN GS	A6	02	13	5.5	2	$\varnothing 1.2$	KQ2H02-M3G
					04	14.5	8	4		KQ2H04-M3G

Dimensions Per Vacuum Inlet: Barb Fitting

Model		①	②	③	④	A	B	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	Pad dia.	Form	Material*1	Connection thread	Vacuum inlet				
ZP3	T	015 02 035	U N S F GN GS	A6	U2	6.5	4.5	$\varnothing 0.9$	M-3AU-2
					U4	7.4	5	$\varnothing 1.2$	M-3AU-4-X83

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter $\varnothing 1.5$ to $\varnothing 3.5$

ZP3 - Y 015 U N - B3 - B3

1

2

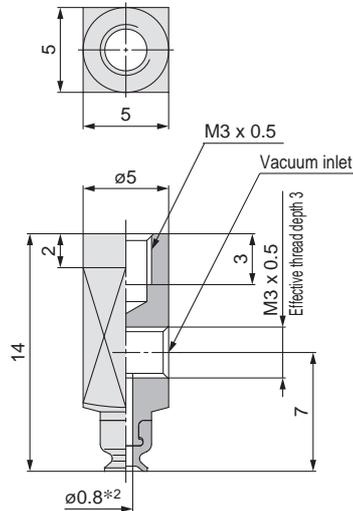
3

4

Vacuum inlet

Connection thread (Female thread)
B3 M3 x 0.5

B3	M3 x 0.5	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	One-touch fitting
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	

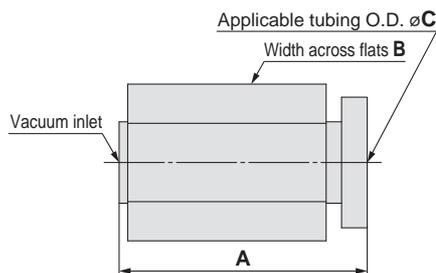


Model					
Vacuum inlet direction	1 Pad dia.	Form	2 Material*1	3 Connection thread	4 Vacuum inlet
ZP3	Y	015 02 035	U	N S U F GN GS	B3 B3

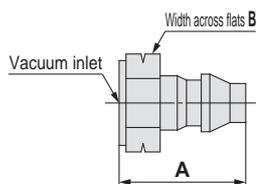
Dimensions Per Vacuum Inlet: One-touch Fitting

Model						A	B	C	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	1 Pad dia.	Form	2 Material*1	3 Connection thread	4 Vacuum inlet					
ZP3	Y	015 02 035	U	N S U F GN GS	B3	02	13	5.5	$\varnothing 1.2$	KQ2H02-M3G
							04	14.5		8

Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Dimensions Per Vacuum Inlet: Barb Fitting

Model						A	B	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	1 Pad dia.	Form	2 Material*1	3 Connection thread	4 Vacuum inlet					
ZP3	Y	015 02 035	U	N S U F GN GS	B3	U2	6.5	4.5	$\varnothing 0.9$	M-3AU-2
						U4	7.4	5	$\varnothing 1.2$	M-3AU-4-X83

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 160
Adapter Assembly	p. 162

Dimensions/Models

With buffer $\varnothing 1.5$ to $\varnothing 3.5$

ZP3 - T 015 U N J 3 - B3

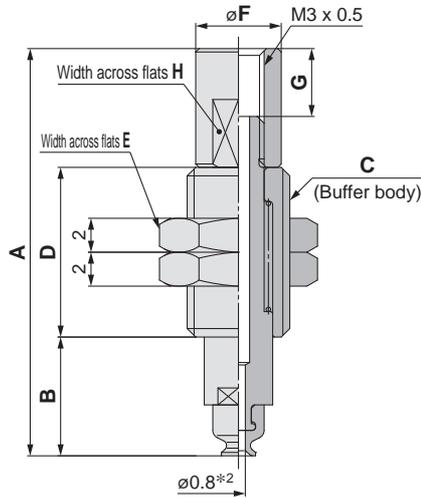
① ② ③ ④ ⑤

⑤ Vacuum inlet

Buffer specification ③

J	Rotating
K	Non-rotating

B3	M3 x 0.5	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	One-touch fitting
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	



		Model					A	B	C	D	E	F	G	H	
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet								
ZP3	T	015 02 035	U	N S U F GN GS	J	3	B3	24	7	M6 x 0.75	10	8	5	4	4
						6		31	10		14				
					K	3	26.5	8	M8 x 0.75	11	10	7	3	6	
						6	33	11		14.5					

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					J	K	L	Fitting part min. hole size	Fitting part no.	
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet					
ZP3	T	015 02 035	U	N S U F GN GS	J K	3 6	02	13	5.5	2	$\varnothing 1.2$	KQ2H02-M3G
							04	14.5	8	4		KQ2H04-M3G

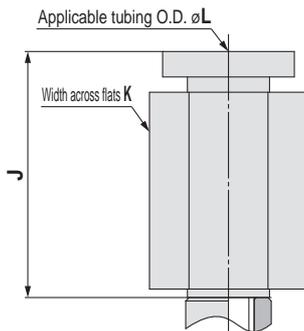
Dimensions Per Vacuum Inlet: Barb Fitting

		Model					J	K	Fitting part min. hole size	Fitting part no.	
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet				
ZP3	T	015 02 035	U	N S U F GN GS	J K	3 6	U2	6.5	4.5	$\varnothing 0.9$	M-3AU-2
							U4	7.4	5	$\varnothing 1.2$	M-3AU-4-X83

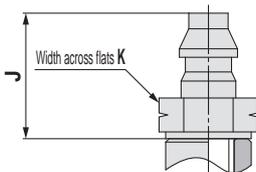
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Construction	p. 161
Buffer Assembly	p. 164

Dimensions/Models

With buffer $\varnothing 1.5$ to $\varnothing 3.5$

ZP3 - Y 015 U N J 3 - B3

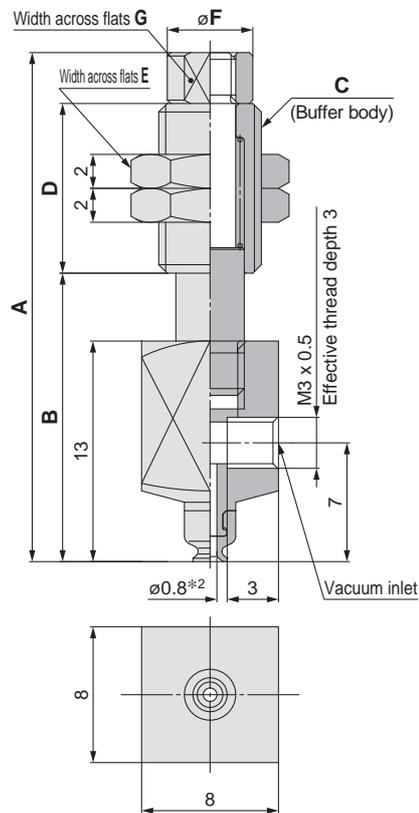
① ② ③ ④

⑤ Vacuum inlet

Buffer specification ③

J	Rotating
K	Non-rotating

B3	M3 x 0.5	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	



		Model					A	B	C	D	E	F	G	
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet							
ZP3	Y	015 02 035	U	N S U F GN GS	J	3	B3	30	17	M6 x 0.75	10	8	5	4
						6		37	20		14			
					K	3		34	17	M8 x 0.75	11	10	7	6
						6		40.5	20		14.5			

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					H	J	K	Fitting part min. hole size	Fitting part no.	
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet					
ZP3	Y	015 02 035	U	N S U F GN GS	J K	3 6	02	13	5.5	2	$\varnothing 1.2$	KQ2H02-M3G
							04	14.5	8	4		KQ2H04-M3G

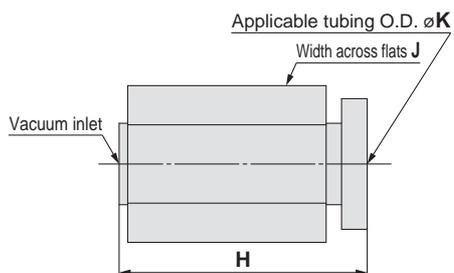
Dimensions Per Vacuum Inlet: Barb Fitting

		Model					H	J	Fitting part min. hole size	Fitting part no.	
	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet				
ZP3	Y	015 02 035	U	N S U F GN GS	J K	3 6	U2	6.5	4.5	$\varnothing 0.9$	M-3AU-2
							U4	7.4	5	$\varnothing 1.2$	M-3AU-4-X83

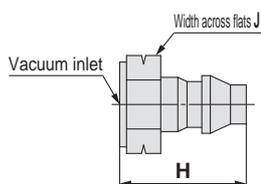
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Construction	p. 161
Buffer Assembly	p. 164



Compact Type Flat Type with Groove

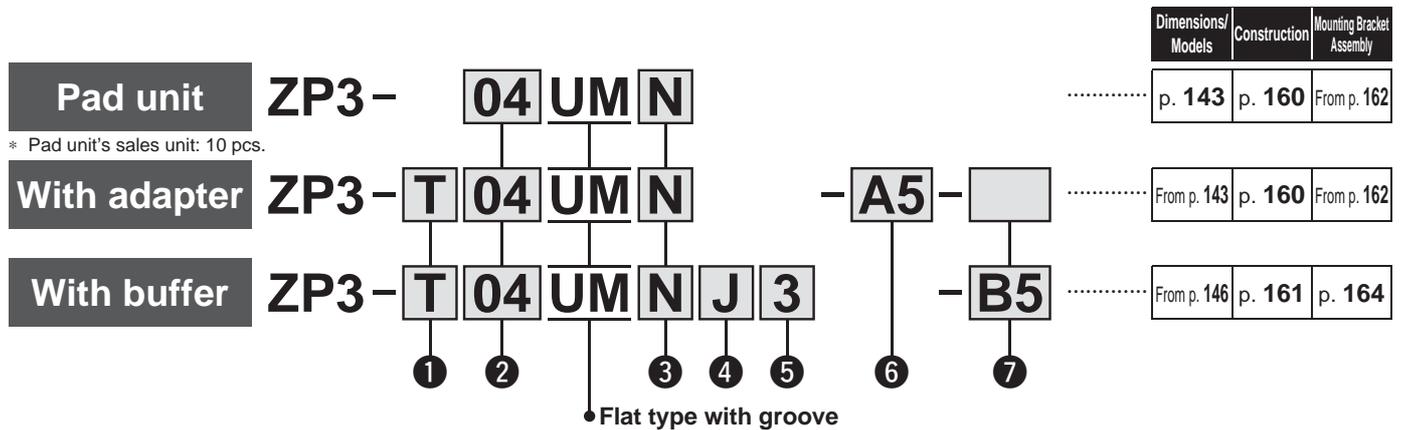
ZP3 Series

Pad diameter: $\varnothing 4, \varnothing 6, \varnothing 8, \varnothing 10, \varnothing 13, \varnothing 16$



Model Selection

How to Order



① Vacuum inlet direction

Nil	Pad unit
T	Vertical
Y	Lateral

② Pad diameter

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$
10	$\varnothing 10$
13	$\varnothing 13$
16	$\varnothing 16$

③ Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

④ Buffer specification

J	Rotating
JB	Rotating, With bushing
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Buffer specification		
	J	JB	K
3	●	—	●
6	●	—	●
10	●	—	●
15	—	●	●
20	—	●	●

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

With adapter

⑥ Connection thread/ ⑦ Vacuum inlet

○: ZP3-T/Vertical ●: ZP3-Y/Lateral

Type	⑥ Connection thread		⑦ Vacuum inlet		Pad diameter [mm]			
	Symbol	Size	Symbol	Size	$\varnothing 4$ to $\varnothing 8$	$\varnothing 10$ to $\varnothing 16$		
Male thread	A5	M5 x 0.8	—	Nil	Use the connection thread.	○ ○ ○		
			A10	M10 x 1	Female thread	B5	M5 x 0.8	○ —
					One-touch fitting	02	$\varnothing 2$	○ —
					Barb fitting	U2	For $\varnothing 2$ polyurethane tubing*1	○ —
						U4	For $\varnothing 4$ soft tubing*2	○ —
			A12	M12 x 1	Female thread	B5	M5 x 0.8	— ○
	One-touch fitting	02			$\varnothing 2$	— ○		
		04			$\varnothing 4$	— ○		
		06			$\varnothing 6$	— ○		
	Barb fitting	U2			For $\varnothing 2$ polyurethane tubing*1	— ○		
		U4			For $\varnothing 4$ soft tubing*2	— ○		
		U6	For $\varnothing 6$ soft tubing*2	— ○				
Female thread	B5	M5 x 0.8	—	Nil	Use the connection thread.	○ ○		
			Female thread	B5	M5 x 0.8	● ●		
			One-touch fitting	02	$\varnothing 2$	● ●		
				04	$\varnothing 4$	● ●		
				06	$\varnothing 6$	— ●		
			Barb fitting	U2	For $\varnothing 2$ polyurethane tubing*1	● ●		
				U4	For $\varnothing 4$ soft tubing*2	● ●		
				U6	For $\varnothing 6$ soft tubing*2	— ●		

With buffer

⑦ Vacuum inlet

○: ZP3-T/Vertical ●: ZP3-Y/Lateral

Type	Symbol	Size	Pad diameter [mm]	
			$\varnothing 4$ to $\varnothing 8$	$\varnothing 10$ to $\varnothing 16$
Female thread	B5	M5 x 0.8	○ ●	○ ●
One-touch fitting	02	$\varnothing 2$	○ ●	○ ●
	04	$\varnothing 4$	○ ●	○ ●
	06	$\varnothing 6$	—	○ ●
Barb fitting	U2	For $\varnothing 2$ polyurethane tubing*1	○ ●	○ ●
	U4	For $\varnothing 4$ soft tubing*2	○ ●	○ ●
	U6	For $\varnothing 6$ soft tubing*2	—	○ ●

*1 Polyurethane tube piping

*2 Soft nylon/Polyurethane tube piping

* It is not necessary to select a connection thread.

* The pad, mounting nut, and fitting are shipped together but do not come assembled.

ZP3 Compact

Flat Type

Flat Type with Groove

Bellows Type

Bellows Type with Ribs

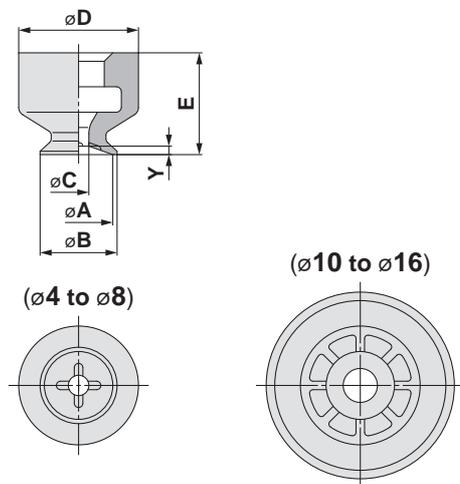
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

Single unit $\varnothing 4$ to $\varnothing 16$



ZP3 - **04** UM **N**

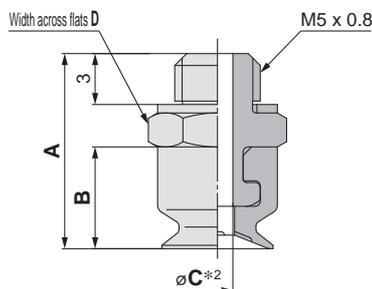
① ②

Model	① Pad dia.	Form	② ^{*1} Material	A	B	C	D	E	Y		
										ZP3	04
	06	6	6.5	2	9	7	0.8				
	08	8	8.5				1				
	10	10	11	1.2	1	1					
	13	13	14								
	16	16	17								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction	p. 160
Mounting Bracket Assembly	From p. 162

With adapter $\varnothing 4$ to $\varnothing 16$



ZP3 - T **04** UM **N** - **A5**

① ② ③

③ Connection thread
(Male thread)

A5	M5 x 0.8
-----------	----------

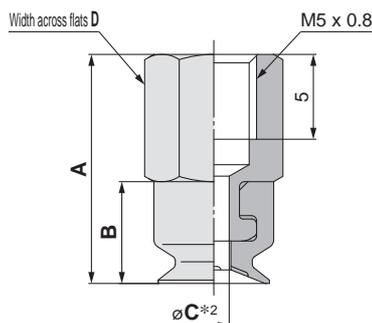
Model	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Connection thread	A	B	C*2	D
	06	1.8	10						
	08								
	10	12.5	7	1.8	10				
	13								
	16								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 160
Adapter Assembly	p. 162

With adapter $\varnothing 4$ to $\varnothing 16$



ZP3 - T **04** UM **N** - **B5**

① ② ③

③ Connection thread
(Female thread)

B5	M5 x 0.8
-----------	----------

Model	Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Connection thread	A	B	C*2	D
	06	1.8	10						
	08								
	10	14.5	7	1.8	10				
	13								
	16								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

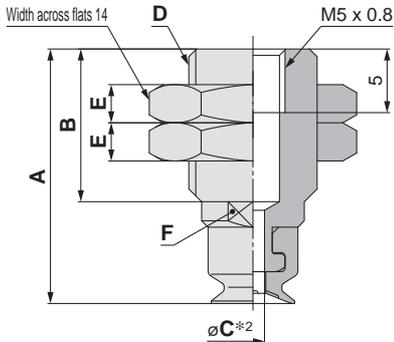
*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 160
Adapter Assembly	p. 162

Dimensions/Models

With adapter $\varnothing 4$ to $\varnothing 16$

Pad diameter: $\varnothing 4$ to $\varnothing 6$



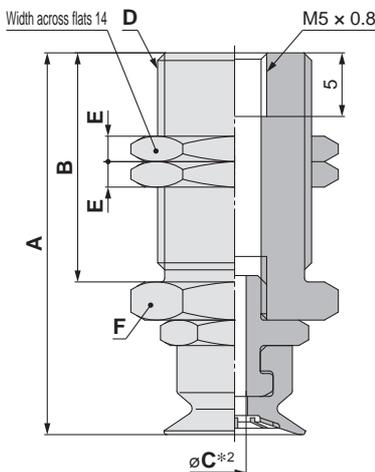
ZP3 - T **04** UM **N** - **A10** - **B5**

① Pad dia. ② Material ③ Connection thread (Male thread) ④ Vacuum inlet

A10	M10 x 1
A12	M12 x 1

B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
06	$\varnothing 6$	
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	
U6	For $\varnothing 6$ soft tubing	

Pad diameter: $\varnothing 10$ to $\varnothing 16$

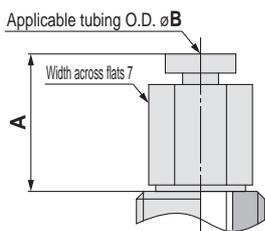


		Model				A	B	C*2	D	E	F
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread	④ Vacuum inlet						
ZP3	T	04	UM	N S U F GN GS	A10	B5	1.2	M10 x 1	3	Width across flats 7	
		06 08									
	10 13 16	A12			1.8	M12 x 1	2	Width across flats 14			

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model				A	B	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread	④ Vacuum inlet				
ZP3	T	UM	N S U F GN GS	A10	02	10.8	2	$\varnothing 1.4$	KQ2H02-M5N
					04	3	4	$\varnothing 1.8$	
					A12	02	10.8	2	$\varnothing 1.4$
				04		3	4	$\varnothing 1.8$	
				06		3.2	6	$\varnothing 1.8$	

Vacuum inlet: One-touch fitting ($\varnothing 2$)



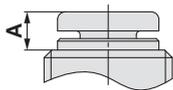
Dimensions Per Vacuum Inlet: Barb Fitting

		Model				A	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread	④ Vacuum inlet			
ZP3	T	UM	N S U F GN GS	A10	U2	6.5	$\varnothing 0.9$	M-5AU-2
					U4	8.5	$\varnothing 1.8$	M-5AU-4
					A12	U2	6.5	$\varnothing 0.9$
				U4		8.5	$\varnothing 1.8$	M-5AU-4
				U6		10.5	$\varnothing 2.5$	M-5AU-6

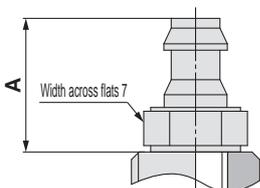
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Vacuum inlet: Built-in One-touch fitting ($\varnothing 4, \varnothing 6$)



Vacuum inlet: Barb fitting



Construction	p. 160
Adapter Assembly	p. 163

Dimensions/Models

With adapter $\varnothing 4$ to $\varnothing 16$

ZP3 - Y **04** UM **N** - **B5** - **B5**

①

②

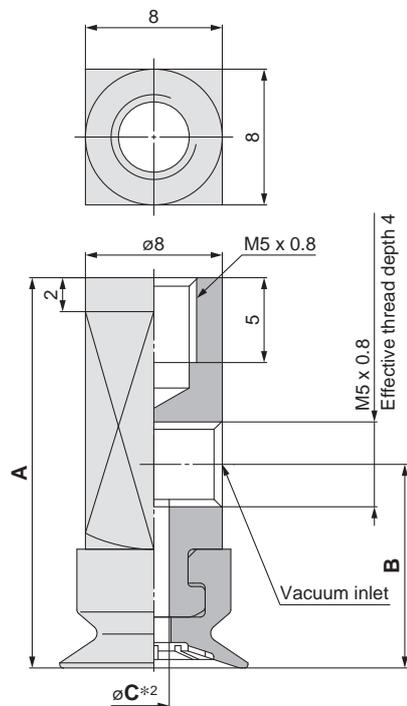
④

Vacuum inlet

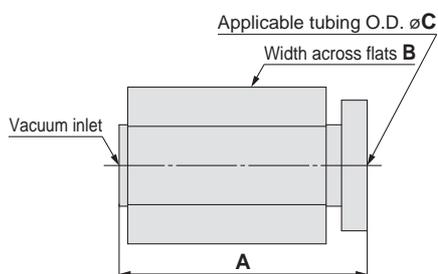
Connection thread (Female thread)

B5	M5 x 0.8
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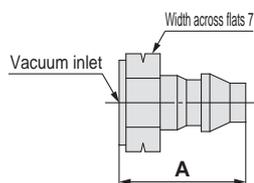
B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
06	$\varnothing 6$	
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	
U6	For $\varnothing 6$ soft tubing	



Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Construction	p. 160
Adapter Assembly	p. 162

		Model					A	B	C*2
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread	④ Vacuum inlet				
ZP3	Y	04	UM	N S U F GN GS	B5	B5	22	11	1.2
		06							
		08							
		10 13 16							2

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					A	B	C	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread	④ Vacuum inlet						
ZP3	Y	04 06 08 10 13 16	UM	N S U F GN GS	B3	02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N
						04	14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N
						02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N
						04	14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N
						06	14.7	10	6	$\varnothing 2.5$	KQ2H06-M5N

Dimensions Per Vacuum Inlet: Barb Fitting

		Model					A	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread	④ Vacuum inlet				
ZP3	Y	04 06 08 10 13 16	UM	N S U F GN GS	B5	U2	6.5	$\varnothing 0.9$	M-5AU-2
						U4	8.5	$\varnothing 1.8$	M-5AU-4
						U2	6.5	$\varnothing 0.9$	M-5AU-2
						U4	8.5	$\varnothing 1.8$	M-5AU-4
						U6	10.5	$\varnothing 2.5$	M-5AU-6

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

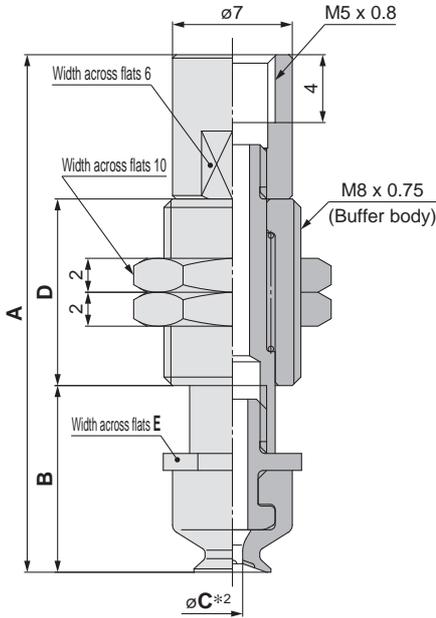
*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer $\varnothing 4$ to $\varnothing 16$

ZP3 - T **04** **UM** **N** **J** **3** - **B5**

① ② ③ ④ ⑤



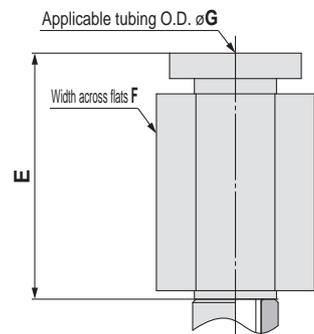
Buffer specification ③

J	Rotating
JB	Rotating, With bushing
K	Non-rotating

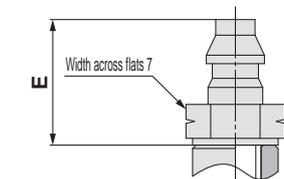
⑤ Vacuum inlet

B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
06	$\varnothing 6$	
U2	For $\varnothing 2$ polyurethane tubing	
U4	For $\varnothing 4$ soft tubing	
U6	For $\varnothing 6$ soft tubing	

Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Construction	p. 161
Buffer Assembly	p. 164

		Model					A	B	C*2	D	E
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke						
ZP3	T	04	UM	N S U F GN GS	J K	3	30.5	11	1.2	11	7
						6	37	14		14.5	
						10	47	18		20.5	
		06 08			JB K	3	30.5	11	1.8	11	
						6	37	14		14.5	
						10	47	18		20.5	
	10 13 16	JB K	B5	15	55	36.5	1.2	10			
				20	62.5	44		10			
				15	55	36.5		1.8	11		
				20	62.5	44			14.5		
				3	31.5	12			20.5		
				6	38	15		10			
10	48	19	10								
15	56	37.5	10								
20	63.5	45									

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					E	F	G	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke							
ZP3	T	04 06 08	UM	N S U F GN GS	J B K	3	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N	
						6	14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N	
						10	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N	
		10 13 16			JB K	B5	15	14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N
							20	14.7	10	6	$\varnothing 2.5$	KQ2H06-M5N

Dimensions Per Vacuum Inlet: Barb Fitting

		Model					E	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke					
ZP3	T	04 06 08	UM	N S U F GN GS	J B K	3	6.5	$\varnothing 0.9$	M-5AU-2	
						6	8.5	$\varnothing 1.8$	M-5AU-4	
						10	6.5	$\varnothing 0.9$	M-5AU-2	
		10 13 16			JB K	B5	15	8.5	$\varnothing 1.8$	M-5AU-4
							20	10.5	$\varnothing 2.5$	M-5AU-6

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer $\varnothing 4$ to $\varnothing 16$

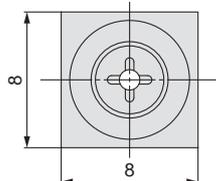
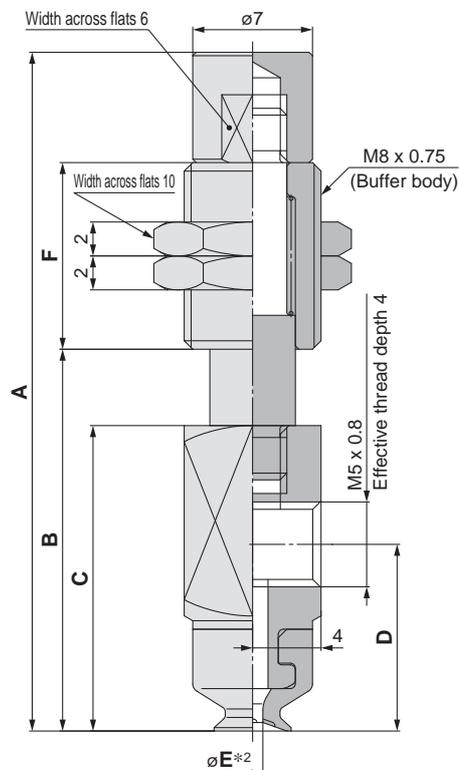
ZP3 - Y **04** **UM** **N** **J** **3** - **B5**

① ② ③ ④ ⑤ Vacuum inlet

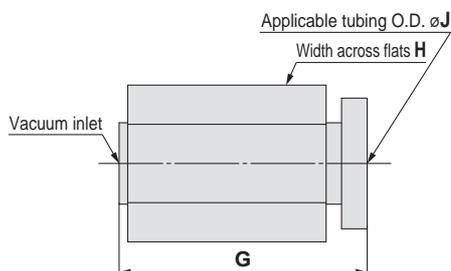
Buffer specification ③

J	Rotating
JB	Rotating, With bushing
K	Non-rotating

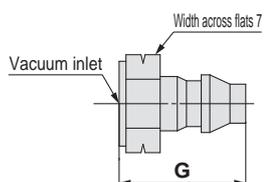
B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
06	$\varnothing 6$	
U2	For $\varnothing 2$ polyurethane tubing	
U4	For $\varnothing 4$ soft tubing	
U6	For $\varnothing 6$ soft tubing	



Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



		Model					A	B	C	D	E*2	F
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke							
ZP3	Y	04	UM	N S U F GN GS	J K	3	40	22.5	18	11	1.2	11
						6	46	25				14.5
		10			56	29	20.5					
		06 08			3	40	22.5	1.8			11	
						6	46	25			14.5	
		10			56	29	20.5					
	04	JB K	15	59	42.5	1.2	10					
			20	66.5	50							
	06 08	15	59	42.5	1.8	10						
			20	66.5	50							
	10 13 16	J K	UM	N S U F GN GS	J K	3	41	23.5	19	12	1.8	11
						6	47	26				14.5
10		57			30	20.5						
JB K		15			60	43.5	1.8	10				
		20			67.5	57						

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					G	H	J	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke							
ZP3	Y	04 06 08	UM	N S U F GN GS	J K	3	02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N
						6	04	14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N
		10 13 16			10	02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N	
						04	14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N	
		06			15	02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N	
						04						14.7
06	20	02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N					
		04						14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N
06	20	06	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N					
		06						14.7	10	6	$\varnothing 2.5$	KQ2H06-M5N

Dimensions Per Vacuum Inlet: Barb Fitting

		Model					G	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke					
ZP3	Y	04 06 08	UM	N S U F GN GS	J K	3	U2	6.5	$\varnothing 0.9$	M-5AU-2
						6	U4	8.5	$\varnothing 1.8$	M-5AU-4
		10 13 16			10	U2	6.5	$\varnothing 0.9$	M-5AU-2	
						U4	8.5	$\varnothing 1.8$	M-5AU-4	
		06			15	U2	6.5	$\varnothing 0.9$	M-5AU-2	
						U4				8.5
06	20	U6	6.5	$\varnothing 0.9$	M-5AU-2					
		U6				10.5	$\varnothing 2.5$	M-5AU-6		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 161
Buffer Assembly	p. 164



Compact Type

Bellows Type

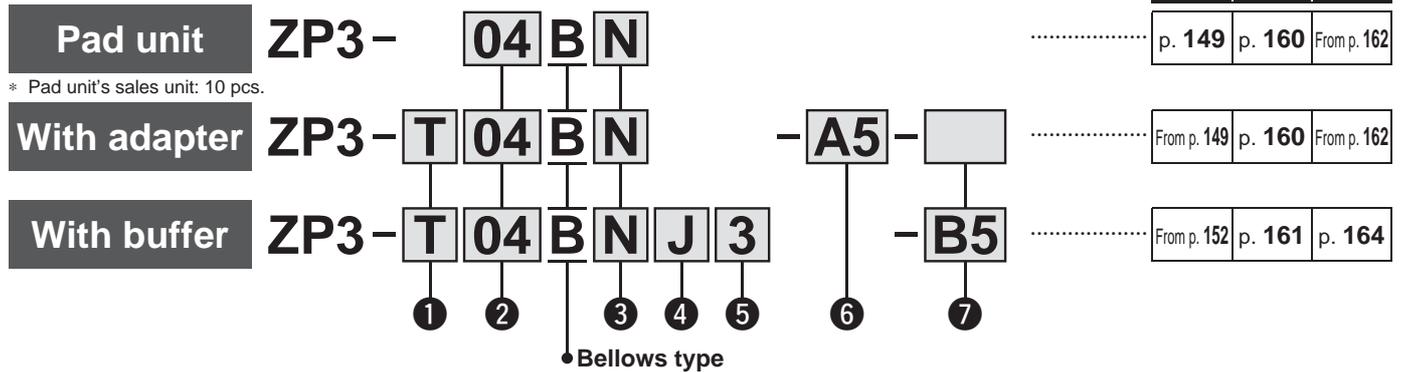
ZP3 Series

Pad diameter: $\varnothing 4$, $\varnothing 6$, $\varnothing 8$



Model Selection

How to Order



① Vacuum inlet direction

Nil	Pad unit
T	Vertical
Y	Lateral

② Pad diameter

04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

③ Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

④ Buffer specification

J	Rotating
JB	Rotating, With bushing
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Buffer specification		
	J	JB	K
3	●	—	●
6	●	—	●
10	●	—	●
15	—	●	●
20	—	●	●

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

With adapter

⑥ Connection thread/ ⑦ Vacuum inlet

○: ZP3-T/Vertical ●: ZP3-Y/Lateral

⑥ Connection thread			⑦ Vacuum inlet			Pad diameter
Type	Symbol	Size	Type	Symbol	Size	All sizes
Male thread	A5	M5 x 0.8	—	Nil	Use the connection thread.	○
			Female thread	B5	M5 x 0.8	○
	A10	M10 x 1	One-touch fitting	02	$\varnothing 2$	○
			Barb fitting	04	$\varnothing 4$	○
				U2	For $\varnothing 2$ polyurethane tubing	○
Female thread	B5	M5 x 0.8	—	Nil	Use the connection thread.	○
			Female thread	B5	M5 x 0.8	●
			One-touch fitting	02	$\varnothing 2$	●
			Barb fitting	04	$\varnothing 4$	●
				U2	For $\varnothing 2$ polyurethane tubing*1	●
U4	For $\varnothing 4$ soft tubing*2	●				

*1 Polyurethane tube piping

*2 Soft nylon/Polyurethane tube piping

With buffer

⑦ Vacuum inlet

○: ZP3-T/Vertical ●: ZP3-Y/Lateral

Type	Symbol	Size	Pad diameter
			All sizes
Female thread	B5	M5 x 0.8	○●
One-touch fitting	02	$\varnothing 2$	○●
	04	$\varnothing 4$	○●
Barb fitting	U2	For $\varnothing 2$ polyurethane tubing*1	○●
	U4	For $\varnothing 4$ soft tubing*2	○●

* It is not necessary to select a connection thread.

* The pad, mounting nut, and fitting are shipped together but do not come assembled.

ZP3 Compact

Flat Type

Flat Type with Groove

Bellows Type

Bellows Type with Ribs

Construction

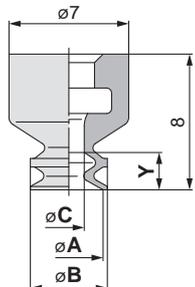
Mounting Bracket Assembly

Precautions

Dimensions/Models

Single unit $\varnothing 4$ to $\varnothing 8$

ZP3 - **04** **B** **N**
① ②



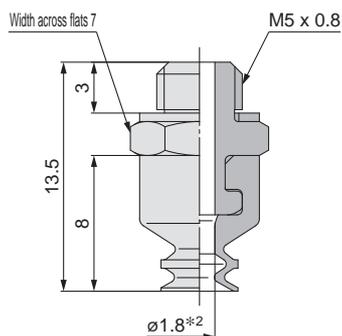
Construction	p. 160
Mounting Bracket Assembly	From p. 162

Model				A	B	C	Y
① Pad dia.	Form	② Material ^{*1}					
ZP3	04	B	N	4	4.5	1.8	2.2
	06		S	6	7	2	3
	08		U F GN GS	8	9		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

With adapter $\varnothing 4$ to $\varnothing 8$

ZP3 - T **04** **B** **N** - **A5**
① ② ③



Construction	p. 160
Adapter Assembly	p. 162

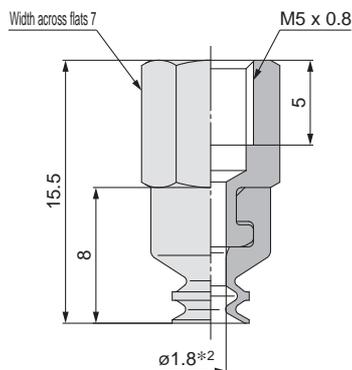
③ Connection thread
(Male thread)
A5 M5 x 0.8

Model					
	Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Connection thread
ZP3	T	04 06 08	B	N S U F GN GS	A5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

ZP3 - T **04** **B** **N** - **B5**
① ② ③



Construction	p. 160
Adapter Assembly	p. 162

③ Connection thread
(Female thread)
B5 M5 x 0.8

Model					
	Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Connection thread
ZP3	T	04 06 08	B	N S U F GN GS	B5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With adapter $\varnothing 4$ to $\varnothing 8$

ZP3 - T 04 B N - A10 - B5

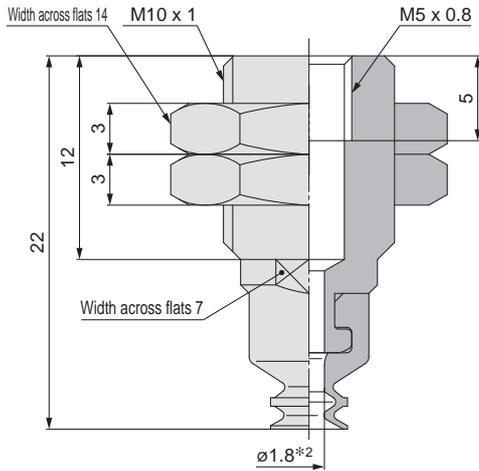
① ②

Connection thread (Female thread)

A10	M10 x 1
------------	---------

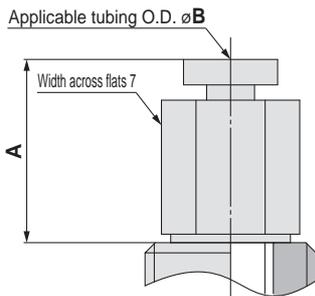
④ Vacuum inlet

B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	Barb fitting
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	



Model					
Vacuum inlet direction	① Pad dia.	Form	② Material*1	③ Connection thread	④ Vacuum inlet
ZP3	T	04 06 08	B	N S U F GN GS	A10 B5

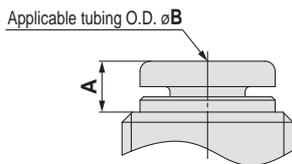
Vacuum inlet: One-touch fitting ($\varnothing 2$)



Dimensions Per Vacuum Inlet: One-touch Fitting

Model						A	B	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	① Pad dia.	Form	② Material*1	③ Connection thread	④ Vacuum inlet					
ZP3	T	04 06 08	B	N S U F GN GS	A10	02	10.8	2	$\varnothing 1.4$	KQ2H02-M5N
						04	3	4	$\varnothing 1.8$	

Vacuum inlet: Built-in One-touch fitting ($\varnothing 4$)



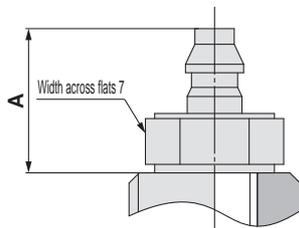
Dimensions Per Vacuum Inlet: Barb Fitting

Model						A	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	① Pad dia.	Form	② Material*1	③ Connection thread	④ Vacuum inlet				
ZP3	T	04 06 08	B	N S U F GN GS	A10	U2	6.5	$\varnothing 0.9$	M-5AU-2
						U4	8.5	$\varnothing 1.8$	M-5AU-4

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Vacuum inlet: Barb fitting



Construction	p. 160
Adapter Assembly	p. 163

Dimensions/Models

With adapter $\varnothing 4$ to $\varnothing 8$

ZP3 - Y **04** **B** **N** - **B5** - **B5**

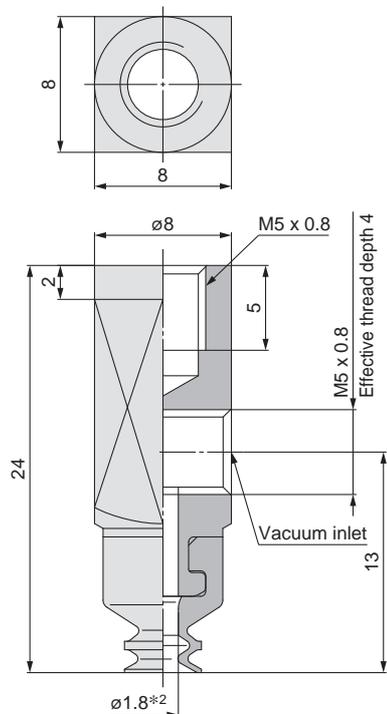
① ②

③
Connection thread
(Female thread)

B5	M5 x 0.8
-----------	----------

④ Vacuum inlet

B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	One-touch fitting
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	

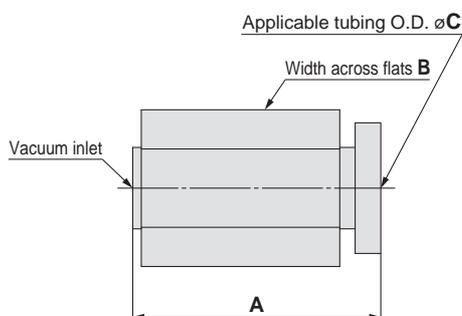


Model					
Vacuum inlet direction	① Pad dia.	Form	② Material*1	③ Connection thread	④ Vacuum inlet
ZP3	Y	04 06 08	B	N S U F GN GS	B5 B5

Dimensions Per Vacuum Inlet: One-touch Fitting

Model						A	B	C	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	① Pad dia.	Form	② Material*1	③ Connection thread	④ Vacuum inlet					
ZP3	Y	04 06 08	B	N S U F GN GS	B5				$\varnothing 1.4$	KQ2H02-M5N
										KQ2H04-M5N

Vacuum inlet: One-touch fitting



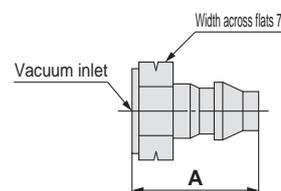
Dimensions Per Vacuum Inlet: Barb Fitting

Model						A	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	① Pad dia.	Form	② Material*1	③ Connection thread	④ Vacuum inlet				
ZP3	Y	04 06 08	B	N S U F GN GS	B5			$\varnothing 0.9$	M-5AU-2
									M-5AU-4

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Vacuum inlet: Barb fitting



Construction	p. 160
Adapter Assembly	p. 162

Dimensions/Models

With buffer $\varnothing 4$ to $\varnothing 8$

ZP3 - T **04** **B** **N** **J** **3** - **B5**

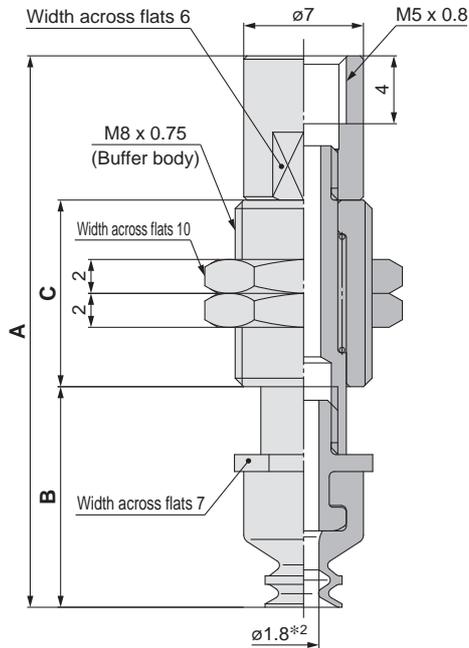
① ② ③ ④ ⑤ Vacuum inlet

Buffer specification ③

J	Rotating
JB	Rotating, With bushing
K	Non-rotating

⑤ Vacuum inlet

B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	Barb fitting
U2	For $\varnothing 2$ polyurethane tubing	
U4	For $\varnothing 4$ soft tubing	

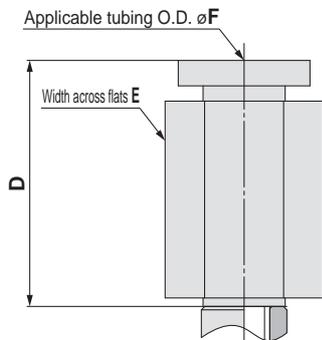


		Model					A	B	C	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet				
ZP3	T	04 06 08	B	N S U F GN GS	J	3	B5	32.5	13	11
					K	6		39	16	14.5
						10		49	20	20.5
						15		57	38.5	
						20		64.5	46	10

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					D	E	F	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet					
ZP3	T	04 06 08	B	N S U F GN GS	J	3	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N
					JB	6					
					10	14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N	
					15						
					20						

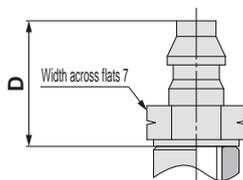
Vacuum inlet: One-touch fitting



Dimensions Per Vacuum Inlet: Barb Fitting

		Model					D	Fitting part min. hole size	Fitting part no.
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet			
ZP3	T	04 06 08	B	N S U F GN GS	J	3	6.5	$\varnothing 0.9$	M-5AU-2
					JB	6			
					10	8.5	$\varnothing 1.8$	M-5AU-4	
					15				
					20				

Vacuum inlet: Barb fitting



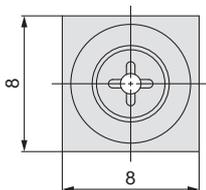
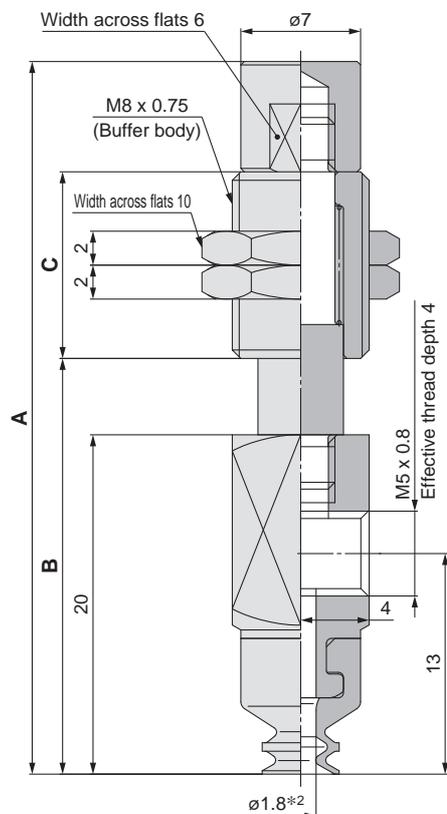
Construction	p. 161
Buffer Assembly	p. 164

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

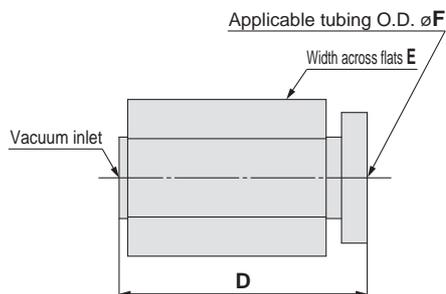
*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

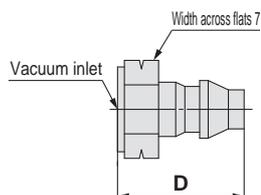
With buffer $\varnothing 4$ to $\varnothing 8$



Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



ZP3 - Y **04** **B** **N** **J** **3** - **B5**

1	2	3	4	5 Vacuum inlet		
Buffer specification 3						
J	Rotating			B5	M5 x 0.8	Female thread
JB	Rotating, With bushing			02	$\varnothing 2$	One-touch fitting
K	Non-rotating			04	$\varnothing 4$	Barb fitting
				U2	For $\varnothing 2$ polyurethane tubing	
				U4	For $\varnothing 4$ soft tubing	

		Model					A	B	C	
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet				
ZP3	Y	04 06 08	B	N S U F GN GS	J K	3	B5	42	24.5	11
						6		48	27	14.5
						10		58	31	20.5
					JB K	15		61	44.5	10
						20		68.5	52	

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					D	E	F	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet						
ZP3	Y	04 06 08	B	N S U F GN GS	J JB K	3 6 10 15 20	02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N
								14.7	8	4	$\varnothing 2.5$	KQ2H04-M5N

Dimensions Per Vacuum Inlet: Barb Fitting

		Model					D	Fitting part min. hole size	Fitting part no.	
Vacuum inlet direction	1 Pad dia.	Form	2 ^{*1} Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet				
ZP3	Y	04 06 08	B	N S U F GN GS	J JB K	3 6 10 15 20	U2	6.5	$\varnothing 0.9$	M-5AU-2
							U4	8.5	$\varnothing 1.8$	M-5AU-4

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 161
Buffer Assembly	p. 164



Compact Type Bellows Type with Ribs

ZP3 Series

Pad diameter: $\varnothing 10, \varnothing 13, \varnothing 16$



Model Selection

ZP3 Compact

Flat Type

Flat Type with Groove

Bellows Type

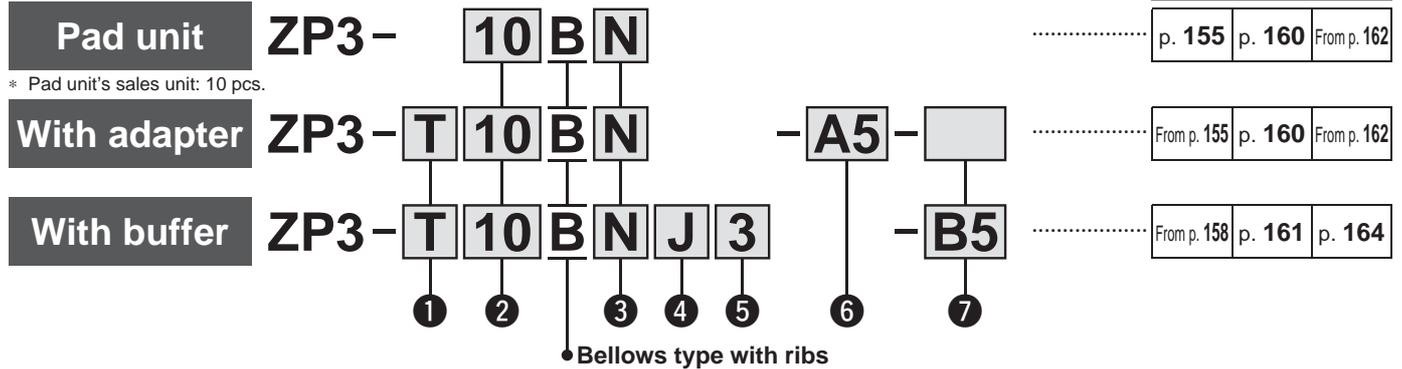
Bellows Type with Ribs

Construction

Mounting Bracket Assembly

Precautions

How to Order



① Vacuum inlet direction

Nil	Pad unit
T	Vertical
Y	Lateral

② Pad diameter

10	$\varnothing 10$
13	$\varnothing 13$
16	$\varnothing 16$

③ Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

④ Buffer specification

J	Rotating
JB	Rotating, With bushing
K	Non-rotating

⑤ Buffer stroke

Stroke [mm]	Buffer specification		
	J	JB	K
3	●	—	●
6	●	—	●
10	●	—	●
15	—	●	●
20	—	●	●

With adapter

⑥ Connection thread/⑦ Vacuum inlet ○: ZP3-T/Vertical ●: ZP3-Y/Lateral

⑥ Connection thread		⑦ Vacuum inlet		Pad diameter	
Type	Symbol	Type	Symbol	All sizes	
Male thread	A5	—	Nil	Use the connection thread. ○	
		A12	Female thread	B5	M5 x 0.8 ○
	One-touch fitting			02	$\varnothing 2$ ○
				04	$\varnothing 4$ ○
			06	$\varnothing 6$ ○	
	Barb fitting		U2	For $\varnothing 2$ polyurethane tubing ○	
			U4	For $\varnothing 4$ soft tubing ○	
		U6	For $\varnothing 6$ soft tubing ○		
Female thread	B5	—	Nil	Use the connection thread. ○	
		Female thread	B5	M5 x 0.8 ●	
	One-touch fitting		02	$\varnothing 2$ ●	
			04	$\varnothing 4$ ●	
		06	$\varnothing 6$ ●		
	Barb fitting	U2	For $\varnothing 2$ polyurethane tubing*1 ●		
		U4	For $\varnothing 4$ soft tubing*2 ●		
		U6	For $\varnothing 6$ soft tubing*2 ●		

*1 Polyurethane tube piping
*2 Soft nylon/Polyurethane tube piping

With buffer

⑦ Vacuum inlet ○: ZP3-T/Vertical ●: ZP3-Y/Lateral

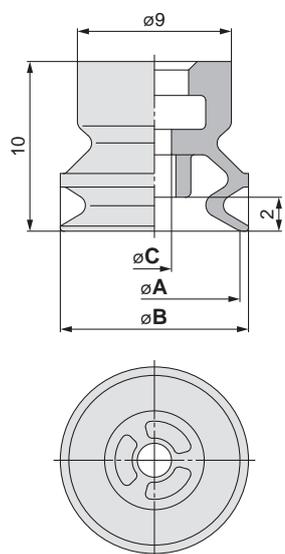
Type	Symbol	Size	Pad diameter
Female thread	B5	M5 x 0.8	○●
	One-touch fitting	02	$\varnothing 2$
04		$\varnothing 4$	○●
06		$\varnothing 6$	○●
Barb fitting	U2	For $\varnothing 2$ polyurethane tubing	○●
	U4	For $\varnothing 4$ soft tubing	○●
	U6	For $\varnothing 6$ soft tubing	○●

* It is not necessary to select a connection thread.

* The pad, mounting nut, and fitting are shipped together but do not come assembled.

Dimensions/Models

Single unit $\varnothing 10$ to $\varnothing 16$



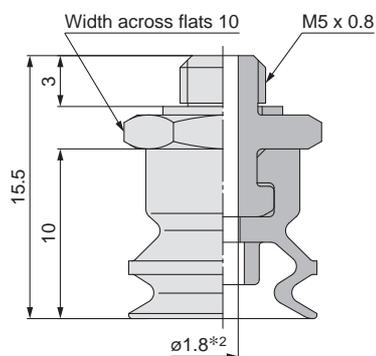
ZP3 - **10** **B** **N**
① ②

Model	Model		A	B	C	
	① Pad dia.	② Form				
ZP3	10	B	N S U F GN GS	10	11	2
	13			13	14	3
	16			16	17	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction p. 160
Mounting Bracket Assembly From p. 162

With adapter $\varnothing 10$ to $\varnothing 16$



ZP3 - T **10** **B** **N** - **A5**
① ② ③

③ Connection thread
(Male thread)

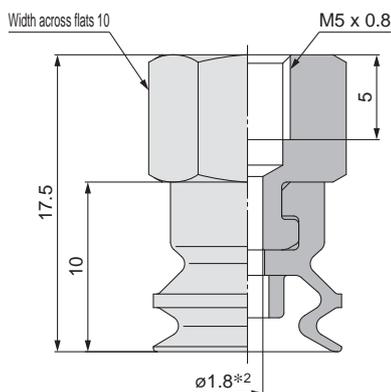
A5 M5 x 0.8

Model	Vacuum inlet direction	Model		② Material	③ Connection thread
		① Pad dia.	Form		
ZP3	T	10	B	N S U F GN GS	A5
		13			
		16			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction p. 160
Adapter Assembly p. 162



ZP3 - T **10** **B** **N** - **B5**
① ② ③

③ Connection thread
(Female thread)

B5 M5 x 0.8

Model	Vacuum inlet direction	Model		② Material	③ Connection thread
		① Pad dia.	Form		
ZP3	T	10	B	N S U F GN GS	B5
		13			
		16			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction p. 160
Adapter Assembly p. 162

Dimensions/Models

With adapter $\varnothing 10$ to $\varnothing 16$

ZP3 - T **10** B **N** - **A12** - **B5**

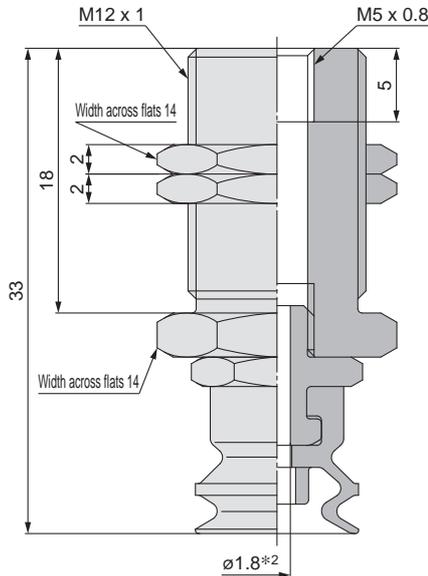
① ②

③ Connection thread (Male thread)

A12	M12 x 1
-----	---------

④ Vacuum inlet

B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
06	$\varnothing 6$	
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	
U6	For $\varnothing 6$ soft tubing	

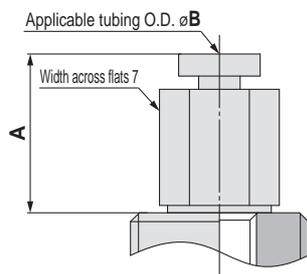


Model						
	Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread	④ Vacuum inlet
ZP3	T	10 13 16	B	N S U F GN GS	A12	B5

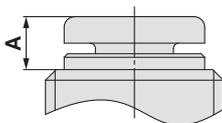
Dimensions Per Vacuum Inlet: One-touch Fitting

Model						A	B	Fitting part min. hole size	Fitting part no.	
	Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread					④ Vacuum inlet
ZP3	T	10 13 16	B	N S U F GN GS	A12	02	10.8	2	$\varnothing 1.4$	KQ2H02-M5N
						04	3	4	$\varnothing 1.8$	
						06	3.2	6		

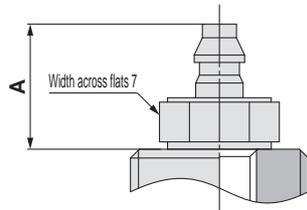
Vacuum inlet: One-touch fitting



Vacuum inlet: Built-in One-touch fitting ($\varnothing 4, \varnothing 6$)



Vacuum inlet: Barb fitting



Dimensions Per Vacuum Inlet: Barb Fitting

Model						A	Fitting part min. hole size	Fitting part no.	
	Vacuum inlet direction	① Pad dia.	Form	②*1 Material	③ Connection thread				④ Vacuum inlet
ZP3	T	10 13 16	B	N S U F GN GS	A12	U2	6.5	$\varnothing 0.9$	M-5AU-2
						U4	8.5	$\varnothing 1.8$	M-5AU-4
						U6	10.5	$\varnothing 2.5$	M-5AU-6

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 160
Adapter Assembly	p. 163

Dimensions/Models

With adapter $\varnothing 10$ to $\varnothing 16$

ZP3 - Y **10** **B** **N** - **B5** - **B5**

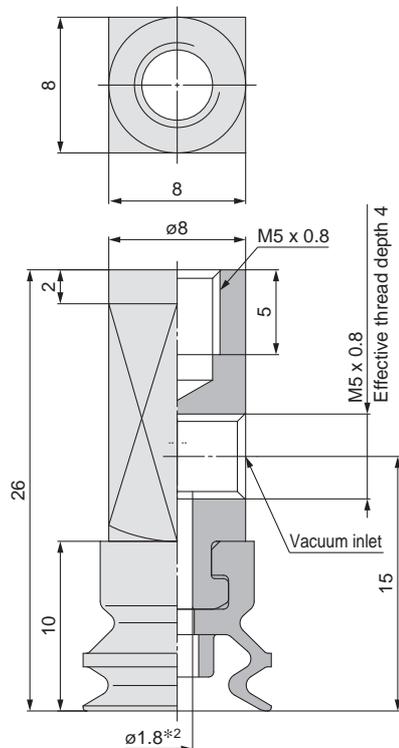
① ②

③
Connection thread
(Female thread)

B5	M5 x 0.8
----	----------

④ Vacuum inlet

B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
06	$\varnothing 6$	
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	
U6	For $\varnothing 6$ soft tubing	

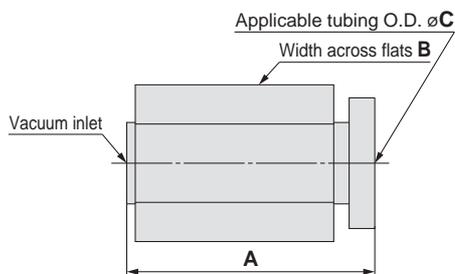


	Model					
	Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Connection thread	④ Vacuum inlet
ZP3	Y	10 13 16	B	N S U F GN GS	B5	B5

Dimensions Per Vacuum Inlet: One-touch Fitting

	Model					A	B	C	Fitting part min. hole size	Fitting part no.								
	Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Connection thread						④ Vacuum inlet							
ZP3	Y	10 13 16	B	N S U F GN GS	B5	14.7	8	4	$\varnothing 2.5$	02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N			
										04								KQ2H04-M5N
										06								KQ2H06-M5N

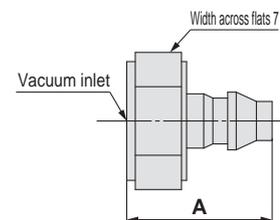
Vacuum inlet: One-touch fitting



Dimensions Per Vacuum Inlet: Barb Fitting

	Model					A	Fitting part min. hole size	Fitting part no.				
	Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Connection thread				④ Vacuum inlet			
ZP3	Y	10 13 16	B	N S U F GN GS	B5	10.5	$\varnothing 2.5$	M-5AU-6	U2	6.5	$\varnothing 0.9$	M-5AU-2
									U4	8.5	$\varnothing 1.8$	M-5AU-4
									U6			

Vacuum inlet: Barb fitting



Construction	p. 160
Adapter Assembly	p. 162

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

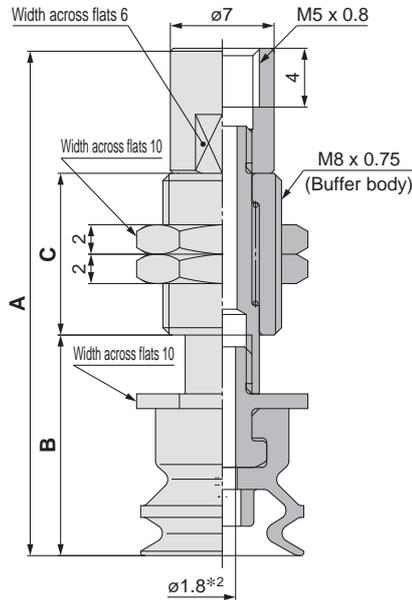
*2 Indicates the minimum hole size of the adapter or vacuum pad

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 16$

ZP3 - T **10** **B** **N** **J** **3** - **B5**

① ② ④ ⑤



Buffer specification ③

J	Rotating
JB	Rotating, With bushing
K	Non-rotating

⑤ Vacuum inlet

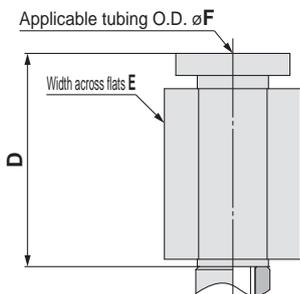
B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
06	$\varnothing 6$	
U2	For $\varnothing 2$ polyurethane tubing	
U4	For $\varnothing 4$ soft tubing	
U6	For $\varnothing 6$ soft tubing	

		Model					A	B	C	
	Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke				
ZP3	T	10 13 16	B	N S U F GN GS	J K	3	B5	34.5	15	11
						6		41	18	14.5
						10		51	22	20.5
						15		59	40.5	10
						20		66.5	48	

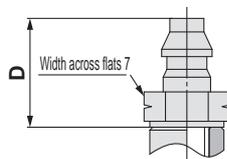
Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					D	E	F	Fitting part min. hole size	Fitting part no.						
	Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke											
ZP3	T	10 13 16	B	N S U F GN GS	J JB K	3	02	10.8	7	2	$\varnothing 1.4$	KQ2H02-M5N					
						6							04	14.7	8	4	$\varnothing 2.5$
						10											
						15	06	10	10	6	$\varnothing 2.5$	KQ2H06-M5N					
						20											

Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Dimensions Per Vacuum Inlet: Barb Fitting

		Model					D	Fitting part min. hole size	Fitting part no.					
	Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke								
ZP3	T	10 13 16	B	N S U F GN GS	J JB K	3	U2	6.5	$\varnothing 0.9$	M-5AU-2				
						6					U4	8.5	$\varnothing 1.8$	M-5AU-4
						10								
						15	U6	10.5	$\varnothing 2.5$	M-5AU-6				
						20								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Construction	p. 161
Buffer Assembly	p. 164

Dimensions/Models

With buffer $\varnothing 10$ to $\varnothing 16$

ZP3 - Y **10** **B** **N** **J** **3** - **B5**

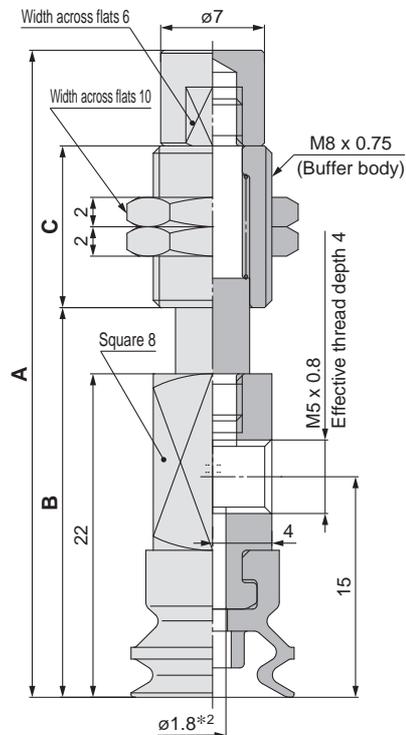
① ② ③ ④

⑤ Vacuum inlet

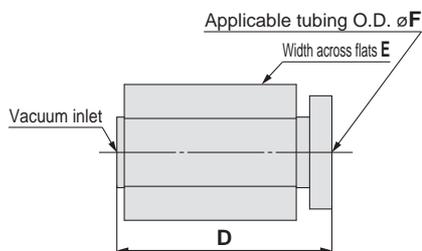
Buffer specification ③

J	Rotating
JB	Rotating, With bushing
K	Non-rotating

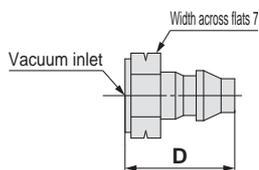
B5	M5 x 0.8	Female thread
02	$\varnothing 2$	One-touch fitting
04	$\varnothing 4$	
06	$\varnothing 6$	
U2	For $\varnothing 2$ polyurethane tubing	Barb fitting
U4	For $\varnothing 4$ soft tubing	
U6	For $\varnothing 6$ soft tubing	



Vacuum inlet: One-touch fitting



Vacuum inlet: Barb fitting



Construction	p. 161
Buffer Assembly	p. 164

		Model					A	B	C	
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet				
ZP3	Y	10 13 16	B	N S U F GN GS	J K JB K	3	B5	44	26.5	11
						6		50	29	14.5
						10		60	33	20.5
						15		63	46.5	10
						20		70.5	54	

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					D	E	F	Fitting part min. hole size	Fitting part no.		
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet							
ZP3	Y	10 13 16	B	N S U F GN GS	J JB K	3	14.7	7	2	$\varnothing 1.4$	KQ2H02-M5N		
						6						02	
						10						04	$\varnothing 2.5$
						15						06	KQ2H04-M5N
						10	8	4		KQ2H06-M5N			

Dimensions Per Vacuum Inlet: Barb Fitting

		Model					D	Fitting part min. hole size	Fitting part no.		
Vacuum inlet direction	① Pad dia.	Form	② ^{*1} Material	③ Buffer spec.	④ Buffer stroke	⑤ Vacuum inlet					
ZP3	Y	10 13 16	B	N S U F GN GS	J JB K	3	10.5	6.5	$\varnothing 0.9$	M-5AU-2	
						6					U2
						10					U4
						15	8.5	$\varnothing 1.8$	M-5AU-4		
						20	10.5	$\varnothing 2.5$	M-5AU-6		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

*2 Indicates the minimum hole size of the adapter or vacuum pad

Compact Type ZP3 Series Construction

With adapter

Flat type: $\varnothing 1.5$ to $\varnothing 3.5$

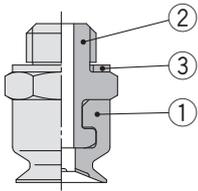
Flat type with groove: $\varnothing 4$ to $\varnothing 16$

Bellows type: $\varnothing 4$ to $\varnothing 8$

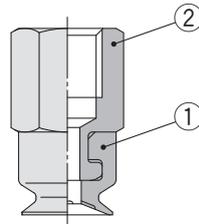
Bellows type with ribs: $\varnothing 10$ to $\varnothing 16$

Vacuum inlet direction **Vertical** T Type/ZP3-T

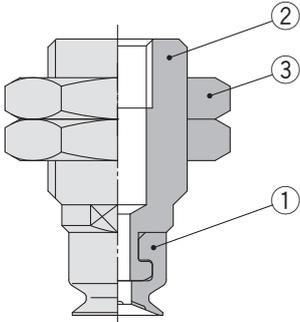
ZP3-T□-A□



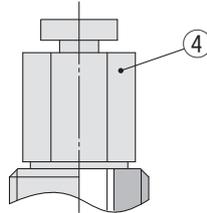
ZP3-T□-B□



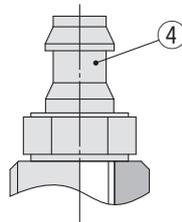
ZP3-T□-A□-B□



ZP3-T□-A□-(02/04/06)



ZP3-T□-A□-(U2/U4/U6)



Component Parts

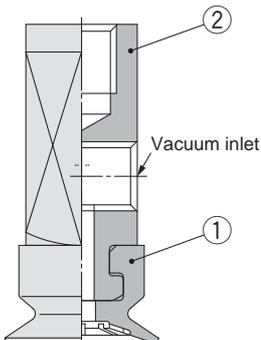
No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with groove Bellows type Bellows type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel/NBR	

Component Parts

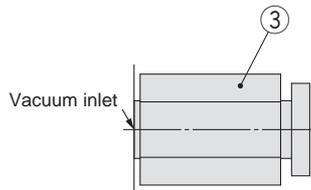
No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with groove Bellows type Bellows type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Nut	Structural steel (Trivalent chromated)	M6 x 0.75 M12 x 1
4	Fitting	Brass (Nickel plating)	M10 x 1
		—	

Vacuum inlet direction **Lateral** Y Type/ZP3-Y

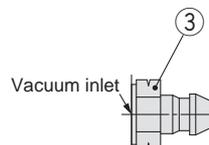
ZP3-Y□-B□-B□



ZP3-Y□-B□-(02/04/06)



ZP3-Y□-B□-(U2/U4/U6)



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with groove Bellows type Bellows type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Fitting	—	

With buffer

Flat type: $\varnothing 1.5$ to $\varnothing 3.5$

Flat type with groove: $\varnothing 4$ to $\varnothing 16$

Bellows type: $\varnothing 4$ to $\varnothing 8$

Bellows type with ribs: $\varnothing 10$ to $\varnothing 16$

Vacuum inlet direction **Vertical** T Type/ZP3-T

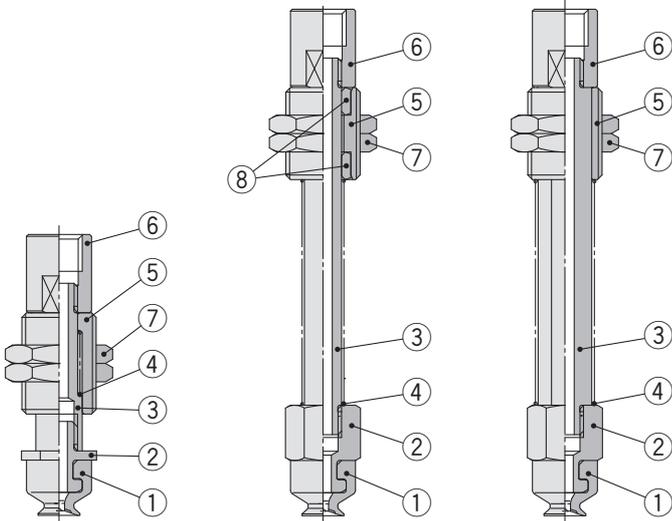
ZP3-T□(J/K)□-B□

ZP3-T□JB□-B□

ZP3-T□K(15/20)□-B□

ZP3-T□-(02/04/06)

ZP3-T□-(U2/U4/U6)



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with groove Bellows type Bellows type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Piston rod	Stainless steel	
4	Return spring	Stainless steel	
5	Buffer body	Brass (Electroless nickel plating)	
6	Buffer adapter	Brass (Electroless nickel plating)	
7	Nut	Structural steel (Trivalent chromated)	M6 x 0.75 M8 x 0.75
8	Bushing	—	
9	Fitting	—	

Vacuum inlet direction **Lateral** Y Type/ZP3-Y

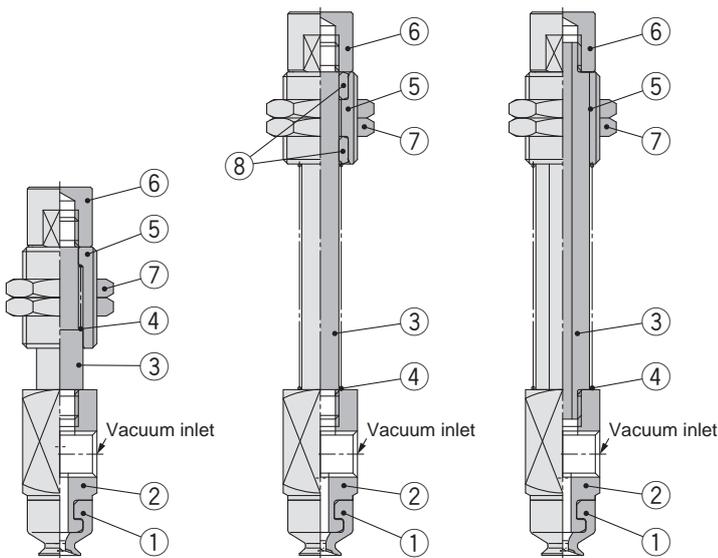
ZP3-Y□(J/K)□-B□

ZP3-Y□JP□-B□

ZP3-Y□K(15/20)□-B□

ZP3-Y□-(02/04/06)

ZP3-Y□-(U2/U4/U6)



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Flat type Flat type with groove Bellows type Bellows type with ribs
2	Adapter	Brass (Electroless nickel plating)	
3	Piston rod	Stainless steel	
4	Return spring	Stainless steel	
5	Buffer body	Brass (Electroless nickel plating)	
6	Buffer adapter	Brass (Electroless nickel plating)	
7	Nut	Structural steel (Trivalent chromated)	M6 x 0.75 M8 x 0.75
8	Bushing	—	
9	Fitting	—	

Compact Type ZP3 Series Mounting Bracket Assembly

Model Selection

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZP3-T

Product part no.

ZP3 - T ① ② □ - ③

Pad diameter Pad form Pad material Connection thread (Male/Female thread)

Component parts

Male thread

Ⓑ Gasket
Ⓐ Adapter (With gasket)

Female thread

Ⓐ Adapter

		Symbol	① Pad diameter symbol								
			015	02	035	04	06	08	10	13	16
② Pad form	Flat type	U	●	●	●	—	—	—	—	—	—
	Flat type with groove	UM	—	—	—	●	●	●	●	●	●
	Bellows type	B	—	—	—	●	●	●	●	●	●
Ⓐ Adapter	③ Connection thread	Male thread	ZP3A-T1-A3			—			—		
		M3 x 0.5	A3	—			ZP3A-T2-A5			ZP3A-T3-A5	
		M5 x 0.8	A5	—			—			—	
		M3 x 0.5	B3	ZP3A-T1-B3			—			—	
Female thread	M5 x 0.8	B5	—			ZP3A-T2-B5			ZP3A-T3-B5		
	M5 x 0.8	B5	—			ZP3A-T2-B5			ZP3A-T3-B5		
Ⓑ Gasket (Single unit)			M-3G2			M-5G2			M-5G2		

Adapter Assembly: Vacuum Inlet Direction **Lateral** Y Type/ZP3-Y

Product part no.

ZP3 - Y ① ② □ - ③ - ④

Pad diameter Pad form Pad material Vacuum inlet (Female thread)
Connection thread (Female thread)

Component parts

Ⓐ Adapter

The One-touch fitting and barb fitting should be ordered separately. Refer to the dimensions for part numbers.

		Symbol	① Pad diameter symbol								
			015	02	035	04	06	08	10	13	16
② Pad form	Flat type	U	●	●	●	—	—	—	—	—	—
	Flat type with groove	UM	—	—	—	●	●	●	●	●	●
	Bellows type	B	—	—	—	●	●	●	●	●	●
Ⓐ Adapter	③ Connection thread	Female thread	M3 x 0.5	B3	④ Vacuum inlet	M3 x 0.5	B3	ZP3A-Y1-B3		—	
		M5 x 0.8	B5	M5 x 0.8		B5	—		ZP3A-Y2-B5	ZP3A-Y3-B5	
		M5 x 0.8	B5	M5 x 0.8	B5	—		ZP3A-Y2-B5	ZP3A-Y3-B5		

ZP3 Compact

Flat Type

Flat Type with Groove

Bellows Type

Bellows Type with Ribs

Construction

Mounting Bracket Assembly

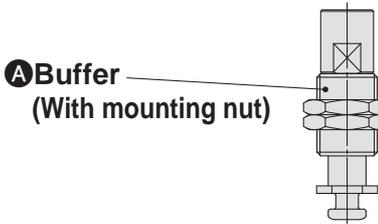
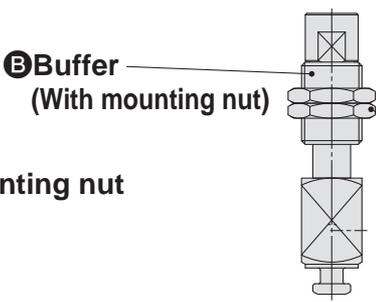
Precautions

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZP3-T

Product part no.	<p>ZP3 - T ① ② □ - ③ - ④</p> <p>● Pad diameter ● Pad form ● Vacuum inlet</p> <p>● Connection thread</p> <p>● Pad material</p>
Component parts	<p>● A Adapter (With mounting nut)</p> <p>● B Adapter (With mounting nut)</p> <p>● C Mounting nut</p> <p>The One-touch fitting and barb fitting for A adapter should be ordered separately. Refer to the dimensions for part numbers.</p>

				Symbol	① Pad diameter symbol										
					015	02	035	04	06	08	10	13	16		
② Pad form				Flat type	U	●	●	●	—	—	—	—	—	—	
				Flat type with groove	UM	—	—	—	●	●	●	●	●	●	●
				Bellows type	B	—	—	—	●	●	●	●	●	●	●
● A Adapter	③ Connection thread	Male thread	M6 x 0.75	A6	④ Vacuum inlet	Female thread	M3 x 0.5	B3	ZP3A-T1-A6-B3			—			
			M10 x 1	A10			M5 x 0.8	B5	—			ZP3A-T2-A10-B5			
			M12 x 1	A12			M5 x 0.8	B5	—			ZP3A-T3-A12-B5			
● B Adapter	③ Connection thread	Male thread	M10 x 1	A10	④ Vacuum inlet	One-touch fitting	ø4	04	—			ZP3A-T2-A10-04			
			M12 x 1	A12			ø4	04	—			ZP3A-T3-A12-04			
							ø6	06	—			ZP3A-T3-A12-06			
● C Mounting nut (Single unit)				M6 x 0.75	ZPNA-M6A			—			—				
				M10 x 1	—			ZPNA-M10			—				
				M12 x 1	—			—			ZPNA-M12A				

Buffer Assembly: Vacuum Inlet Direction **Vertical** T Type/ZP3-T, **Lateral** Y Type/ZP3-Y

Product part no.	<p style="text-align: center;">ZP3 - (T/Y) ① ② □ - (J/JB/K) - ③ - ④</p> <p>T: Vertical vacuum inlet Y: Lateral vacuum inlet</p> <p>① Pad diameter ② Pad form □ Pad material J: Rotating, JB: Rotating, With bushing, K: Non-rotating ③ Buffer stroke ④ Vacuum inlet (Female thread)</p>	
Component parts	<p>Vertical vacuum inlet</p>  <p>Ⓐ Buffer (With mounting nut) Ⓒ Mounting nut</p>	<p>Lateral vacuum inlet</p>  <p>Ⓑ Buffer (With mounting nut) Ⓒ Mounting nut</p>

The One-touch fitting and barb fitting should be ordered separately. Refer to the dimensions for part numbers.

		Symbol	① Pad diameter symbol										
			015	02	035	04	06	08	10	13	16		
② Pad form	Flat type	U	●	●	●	—	—	—	—	—	—		
	Flat type with groove	UM	—	—	—	●	●	●	●	●	●		
	Bellows type	B	—	—	—	●	●	●	●	●	●		
Vertical	Ⓐ Buffer	④ Vacuum inlet	Female thread	M3 x 0.5	B3	③ Buffer stroke	3	ZP3B-T1(J/K)3-B3		—		—	
							6	ZP3B-T1(J/K)6-B3		—		—	
							3	—		ZP3B-T2A(J/K)3-B5		ZP3B-T2B(J/K)3-B5	
							6	—		ZP3B-T2A(J/K)6-B5		ZP3B-T2B(J/K)6-B5	
							10	—		ZP3B-T2A(J/K)10-B5		ZP3B-T2B(J/K)10-B5	
							15	—		ZP3B-T2A(JB/K)15-B5		ZP3B-T2B(JB/K)15-B5	
	M5 x 0.8	B5	③ Buffer stroke	20	—		ZP3B-T2A(JB/K)20-B5		ZP3B-T2B(JB/K)20-B5				
				3	ZP3B-Y1(J/K)3-B3		—		—				
				6	ZP3B-Y1(J/K)6-B3		—		—				
				3	—		ZP3B-Y2A(J/K)3-B5		ZP3B-Y2B(J/K)3-B5				
				6	—		ZP3B-Y2A(J/K)6-B5		ZP3B-Y2B(J/K)6-B5				
				10	—		ZP3B-Y2A(J/K)10-B5		ZP3B-Y2B(J/K)10-B5				
M5 x 0.8	B5	③ Buffer stroke	15	—		ZP3B-Y2A(JB/K)15-B5		ZP3B-Y2B(JB/K)15-B5					
			20	—		ZP3B-Y2A(JB/K)20-B5		ZP3B-Y2B(JB/K)20-B5					
			Ⓒ Mounting nut (Single unit)		M6 x 0.75	ZPNA-M6A		—		—			
					M8 x 0.75	—		ZPNA-M8A		ZPNA-M8A			

[Buffer part number example]

Product part no. **ZP3 - T 08UMN J 10 - 04**

Buffer **ZP3B - T 2A J 10 - B5**

③ Buffer stroke

One-touch fitting **KQ2H04-M5N**



Basic/Compact Type Specific Product Precautions

Be sure to read this before handling the products. Refer to page 375 for safety instructions. For vacuum equipment and vacuum pad precautions, refer to pages 376 to 379.

Mounting

1. Tighten the screw within the specified torque range when mounting the buffer.

Tightening with a torque outside of the specified range may cause malfunction.

Basic Type ZP Series

Model	Connection thread	Tightening torque [N·m]
ZP□(2 to 8)□(J/K)□-□-A8	M8 x 1	1.5 to 2.0
ZP□(10 to 32)□(J/K)□-□-A10	M10 x 1	2.5 to 3.5
ZP□(40/50)□(J/K)□-□-A12	M14 x 1	6.5 to 7.5

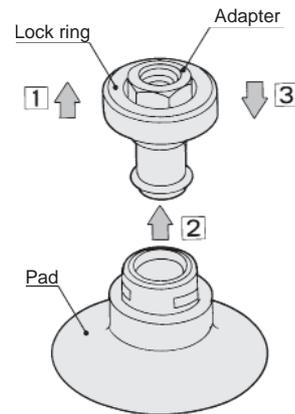
Compact Type ZP3 Series

Model	Connection thread	Tightening torque [N·m]
ZP3-□(015 to 035)□J□-□	M6 x 0.75	1.5 to 1.8
ZP3-□(015 to 035)□K□-□	M8 x 0.75	2.0 to 2.5
ZP3-□(04 to 16)□(J/JB/K)□-□		

How to Replace the Pad

1. How to replace the pad of the basic type ZP series

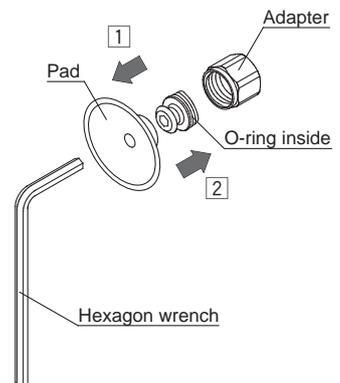
- 1 Pull the lock ring upward, and, after lifting it up to the adapter, remove the old pad by pulling it downward.
- 2 While holding the lock ring in the raised position, place a new pad onto the adapter.
- 3 Confirm that the pad is securely in place, and then return the lock ring to its original position.



2. How to replace the pad of the basic (ball joint) type ZP series

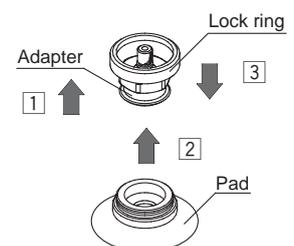
Pad diameter: $\varnothing 10$ to $\varnothing 32$

- 1 Insert a hexagon wrench into the bottom of the pad, loosen the screw, and remove the old pad from the adapter.
- 2 Place a new pad on the adapter, and, after confirming that the O-ring is in place, retighten the screw with the hexagon wrench.



Pad diameter: $\varnothing 40$, $\varnothing 50$

- 1 Pull the lock ring upward, and, after lifting it up to the adapter, remove the old pad by pulling it downward.
- 2 While holding the lock ring in the raised position, place a new pad onto the adapter.
- 3 Confirm that the pad is securely in place, and then return the lock ring to its original position.



Oval Pad *ZP/ZP2 Series*

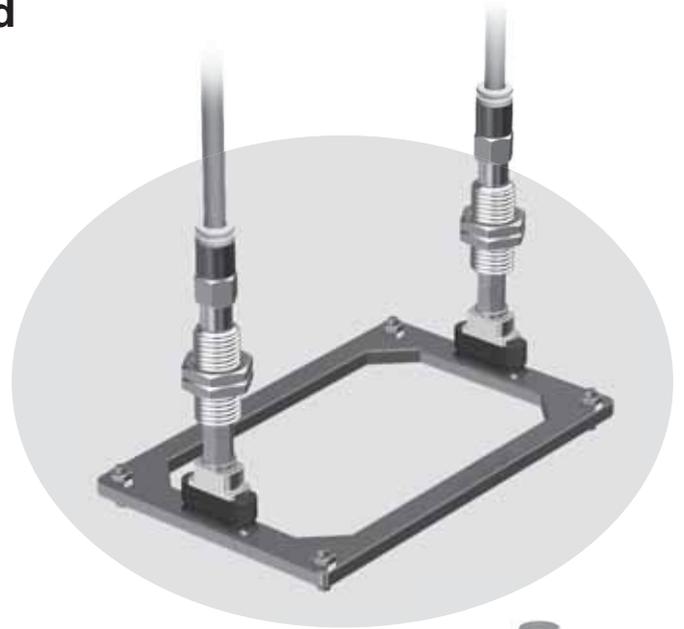
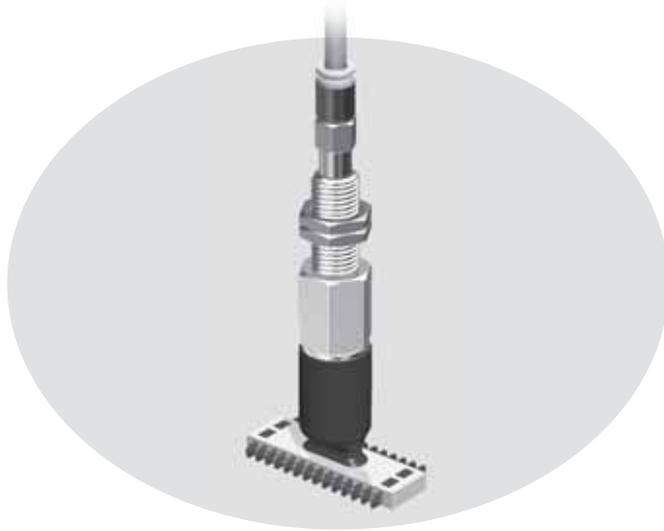
RoHS

Model Selection

2 x 4, 3.5 x 7, 4 x 10, 4 x 20, 4 x 30, 5 x 10, 5 x 20, 5 x 30, 6 x 10, 6 x 20, 6 x 30, 8 x 20, 8 x 30

Oval Flat Type

For rectangular, vertically long, and horizontally long workpieces



ZP Series



ZP2 Series

ZP Oval

ZP2 Oval

Construction

Mounting Bracket Assembly

CONTENTS

Oval Pad *ZP/ZP2 Series*

Variations	p. 167
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Oval Flat Type/ZP Series

· How to Order	p. 170
· Dimensions/Models	p. 171

Oval Flat Type/ZP2 Series

· How to Order	p. 179
· Dimensions/Models	p. 180

Construction

ZP Series	p. 185
ZP2 Series	p. 187

Mounting Bracket Assembly

ZP Series	p. 189
ZP2 Series	p. 195

Specific Product Precautions	p. 198
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Precautions

ZP Series

		Vacuum inlet direction	Oval flat type
Vacuum inlet direction	Single unit		p. 171
Vertical	ZPT With adapter		p. 171
Lateral	ZPR With adapter		p. 172 p. 173
	ZPY With adapter		p. 174 p. 175
Vertical	ZPT With buffer		p. 176
Lateral	ZPR With buffer		p. 177
	ZPY With buffer		p. 178

ZP2 Series

		Vacuum inlet direction	Oval flat type
Vacuum inlet direction	Single unit		p. 180
Vertical	ZP2-T With adapter		p. 180
Lateral	ZP2-R With adapter		p. 181 p. 182
Vertical	ZP2-T With buffer		p. 183
Lateral	ZP2-R With buffer		p. 184

Oval Pad *ZP/ZP2* Series Specifications

Pad Material: ZP/ZP2 Series

Material	NBR (Nitrile rubber)	Silicone rubber*1	Urethane rubber	FKM (Fluoro rubber)	Conductive NBR (Nitrile rubber)	Conductive silicone rubber
Color of rubber	Black	White	Brown	Black		
Rubber hardness HS (±5°)	A50/S	A40/S	A60/S		A50/S	
Identification (Dot)	—	—	—	· 1 green dot	· 1 silver dot	· 2 silver dots

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Adapter Specifications: ZP Series

Vertical



Vacuum Inlet Direction **Vertical** T Type/ZPT

Connection	Male thread	Female thread
Pad size	2004, 3507, 4010	2004, 3507, 4010
Connection thread	M5 x 0.8 M6 x 1	M4 x 0.7 M5 x 0.8
Vacuum inlet	Use the connection thread.	

Lateral



Vacuum Inlet Direction **Lateral** R Type/ZPR

Connection	Male thread	Female thread
Pad size	2004, 3507, 4010	2004, 3507, 4010
Connection thread	M5 x 0.8 M6 x 1	M4 x 0.7 M5 x 0.8
Vacuum inlet	One-touch fitting	ø4, ø6

Lateral

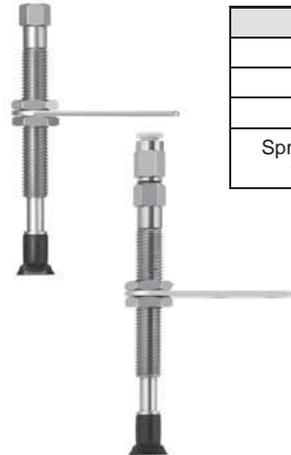


Vacuum Inlet Direction **Lateral** Y Type/ZPY

Connection	Male thread	Female thread
Pad size	2004, 3507, 4010	2004, 3507, 4010
Connection thread	M5 x 0.8 M6 x 1	M4 x 0.7 M5 x 0.8
Vacuum inlet	Barb fitting (Nylon tubing)	ø4, ø6
	Barb fitting (Soft tubing)	

Buffer Specifications: ZP Series

Lateral Vertical



Pad size		2004, 3507, 4010
Non-rotating specification		J: Rotating, K: Non-rotating
Stroke [mm]		6, 10, 15, 25
Connection thread		M8 x 1
Spring reactive force [N]	At 0 stroke	0.8
	At full stroke	1.2

Adapter Specifications: ZP2 Series

Vertical



Vacuum Inlet Direction **Vertical** T Type/ZP2-T

Connection	Female thread
Pad size	3507 to 8030
Connection thread	M5 x 0.8
Vacuum inlet	Use the connection thread.

Lateral



Vacuum Inlet Direction **Lateral** R Type/ZP2-R

Connection	Male thread	Female thread
Pad size	3507 to 8030	3507 to 8030
Connection thread	M5 x 0.8	M5 x 0.8
Vacuum inlet	One-touch fitting	ø4, ø6

Buffer Specifications: ZP2 Series

Vertical

Lateral

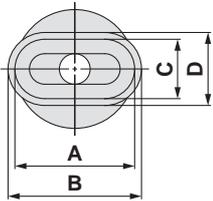
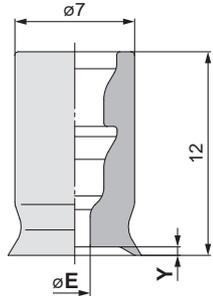


Pad diameter	3507 to 8030	
Non-rotating specification	K: Non-rotating	
Stroke [mm]	10, 20, 30, 40, 50	
Connection thread	M10 x 1	
Spring reactive force [N]	At 0 stroke	1.0
	At full stroke	3.0

Dimensions/Models

Single unit **2 x 4 to 4 x 10**

ZP **2004** U **N**
① ②



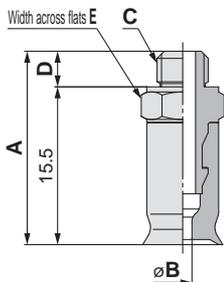
Model			A	B	C	D	E	Y	
① Pad size	Form	② Material ^{*1}							
ZP	2004	U	N S U F GN GS	4	4.6	2	2.6	1.2	0.3
	3507			7	7.8	3.5	4.3	1.8	0.5
	4010			10	11	4	5	2	0.8

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction p. 185
Mounting Bracket Assembly From p. 189

With adapter **2 x 4 to 4 x 10**

ZPT **2004** U **N** - **A5**
① ② ③ Vacuum inlet (Male thread)

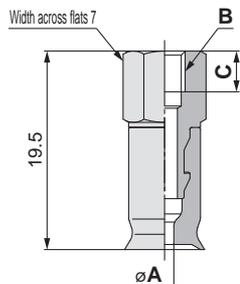


A5	M5 x 0.8
A6	M6 x 1

Model						A	B	C	D	E
Vacuum inlet direction	① Pad size	Form	② Material ^{*1}	③ Vacuum inlet						
ZP	T	U	N S U F GN GS	A5	19	1.2	M5 x 0.8	3.5	7	
						1.8				
						2				
	A6			20	1.2	M6 x 1	4.5	8		
					1.8					
					2					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction p. 185
Adapter Assembly p. 189



ZPT **2004** U **N** - **B4**
① ② ③ Vacuum inlet (Female thread)

B4	M4 x 0.7
B5	M5 x 0.8

Model						A	B	C
Vacuum inlet direction	① Pad size	Form	② Material ^{*1}	③ Vacuum inlet				
ZP	T	U	N S U F GN GS	B4	4	1.2	M4 x 0.7	5
						1.8		
						2		
				B5	5	1.2	M5 x 0.8	5
						1.8		
						2		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction p. 185
Adapter Assembly p. 189

Dimensions/Models

With adapter/One-touch fitting 2 x 4 to 4 x 10

ZPR **2004** **U** **N** - **04** - **A5**

①

②

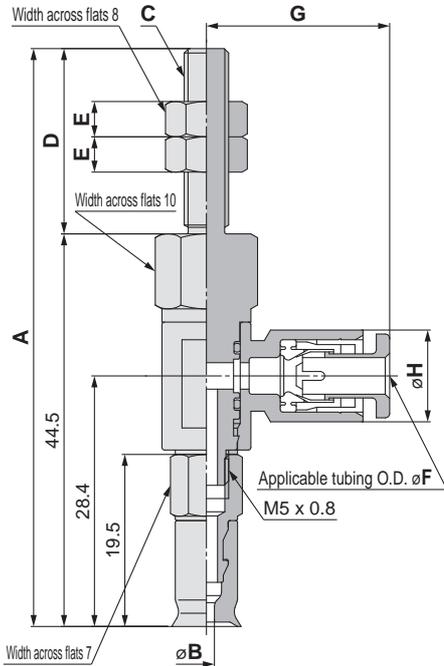
④

Connection thread
(Male thread)

Vacuum inlet
(One-touch fitting)

04	ø4
06	ø6

A5	M5 x 0.8
A6	M6 x 1



Construction	p. 185
Adapter Assembly	p. 190

Model						A	B	C	D	E
Vacuum inlet direction	① Pad size	Form	②*1 Material	③ Vacuum inlet	④ Connection thread					
ZP	R	U	N S U F GN GS	04 06	A5	65.5	1.2	M5 x 0.8	21	4
							1.8			
					A6		2			
							1.2			
							1.8			
		2	70.5		M6 x 1	26	3			

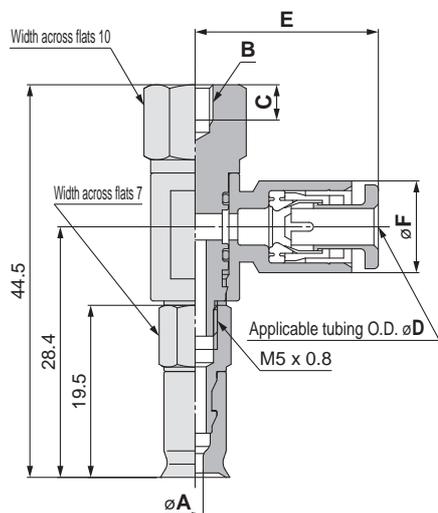
Dimensions Per Vacuum Inlet

Model						F	G	H	Fitting part min. hole size
Vacuum inlet direction	① Pad size	Form	②*1 Material	③ Vacuum inlet	④ Connection thread				
ZP	R	U	N S U F GN GS	04 06	A5 A6	4	20.6	10.4	ø3
						6	21.6	12.8	ø4

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Dimensions/Models

With adapter/One-touch fitting 2 x 4 to 4 x 10



Construction	p. 185
Adapter Assembly	p. 190

ZPR **2004** **U** **N** - **04** - **B4**

1	2	3	4 Connection thread (Female thread)
Vacuum inlet (One-touch fitting)			
04	ø4		B4 M4 x 0.7
06	ø6		B5 M5 x 0.8

		Model				A	B	C	
Vacuum inlet direction	1 Pad size	Form	2 *1 Material	3 Vacuum inlet	4 Connection thread				
ZP	R	2004	U	N S U F GN GS	04 06	B4	1.2	M4 x 0.7	4
		3507					1.8		
		4010					2		
		2004				B5	1.2	M5 x 0.8	5
		3507					1.8		
		4010					2		

Dimensions Per Vacuum Inlet

		Model				D	E	F	Fitting part min. hole size	
Vacuum inlet direction	1 Pad size	Form	2 *1 Material	3 Vacuum inlet	4 Connection thread					
ZP	R	2004	U	N S U F GN GS	04	B4	4	20.6	10.4	ø3
		3507					B5			
		4010			06			6	21.6	12.8

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Dimensions/Models

With adapter/barb fitting 2 x 4 to 4 x 10

ZPY **2004** **U** **N** - **N4** - **A5**

①

②

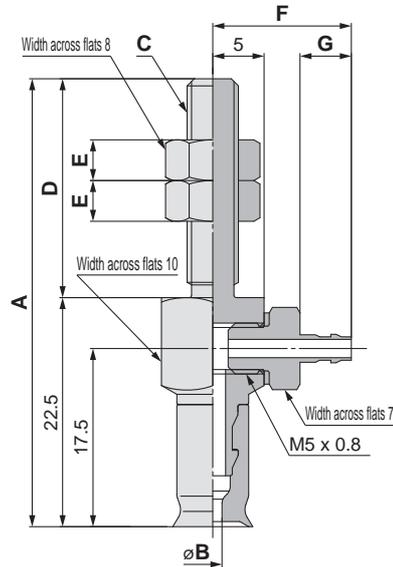
④

Connection thread (Male thread)

Vacuum inlet (Barb fitting)

A5	M5 x 0.8
A6	M6 x 1

N4	For ø4 nylon tubing	M-5AN-4
N6	For ø6 nylon tubing	M-5AN-6
U4	For ø4 soft tubing	M-5AU-4
U6	For ø6 soft tubing	M-5AU-6



Construction	p. 185
Adapter Assembly	p. 191

		Model				A	B	C	D	E
Vacuum inlet direction	① Pad size	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread					
ZP	Y	2004	U	N S U F GN GS	N4 N6 U4 U6	A5	M5 x 0.8	21.5	4	
		3507								44
		2004			A6	M6 x 1	27	3		
		3507							49.5	1.2 1.8 2
4010										

Dimensions Per Vacuum Inlet

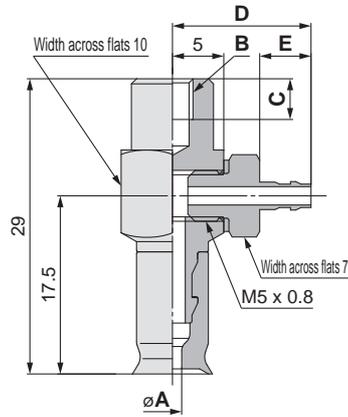
		Model				F	G	Fitting part min. hole size	
Vacuum inlet direction	① Pad size	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread				
ZP	Y	2004 3507 4010	U	N S U F GN GS	N4 U4 N6 U6	A5 A6	13.5	5	ø1.8
							15.5	7	ø2.5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Dimensions/Models

With adapter/barb fitting 2 x 4 to 4 x 10

ZPY **2004** U **N** - **N4** - **B4**



Construction	p. 185
Adapter Assembly	p. 191

①
②
③ Vacuum inlet (Barb fitting)
④ Connection thread (Female thread)

N4	For ø4 nylon tubing	M-5AN-4
N6	For ø6 nylon tubing	M-5AN-6
U4	For ø4 soft tubing	M-5AU-4
U6	For ø6 soft tubing	M-5AU-6

B4	M4 x 0.7
B5	M5 x 0.8

		Model				A	B	C	
Vacuum inlet direction	① Pad size	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread				
ZP	Y	2004	U	N S U F GN GS	N4 N6 U4 U6	B4	1.2	M4 x 0.7	4
		3507					1.8		
		4010					2		
		2004			B5	1.2	M5 x 0.8	5	
		3507				1.8			
		4010				2			

Dimensions Per Vacuum Inlet

		Model				D	E	Fitting part min. hole size	
Vacuum inlet direction	① Pad size	Form	② ^{*1} Material	③ Vacuum inlet	④ Connection thread				
ZP	Y	2004 3507 4010	U	N S U F GN GS	N4 U4 N6 U6	B4 B5	13.5	5	ø1.8
							15.5	7	ø2.5

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Dimensions/Models

With buffer/One-touch fitting **2 x 4 to 4 x 10**

ZPR **2004** **U** **N** **J** **6** - **04** - **A8**

1

2

4

6

Connection thread
(Male thread)

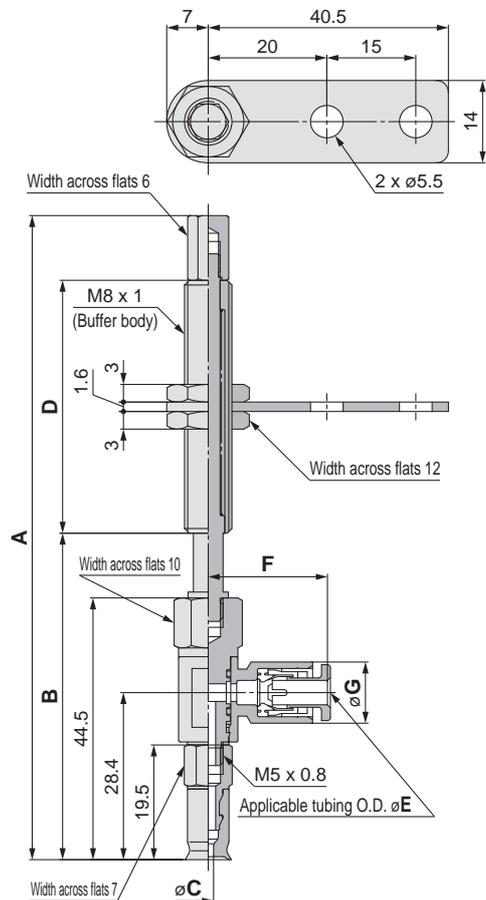
Buffer specification 3

J	Rotating
K	Non-rotating

A8	M8 x 1
----	--------

5 Vacuum inlet
(One-touch fitting)

04	ø4
06	ø6



Construction	p. 186
Buffer Assembly	p. 193

		Model						A	B	C	D								
Vacuum inlet direction	1 Pad size	Form	2 *1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread												
ZP	R	2004	U	N S U F G N S	J	6	04	A8	78.5	52.5	1.2	15							
						10			109.5	55.5		43							
						15			114.5	60.5									
												25				124.5	70.5		
												6				78.5	52.5	1.8	15
												10				109.5	55.5		43
							15				114.5	60.5							
							25				124.5	70.5							
							6				78.5	52.5	2	15					
							10				109.5	55.5		43					
							15				114.5	60.5							
							25				124.5	70.5							

Dimensions Per Vacuum Inlet

		Model						E	F	G	Fitting part min. hole size	
Vacuum inlet direction	1 Pad size	Form	2 *1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread					
ZP	R	2004 3507 4010	U	N S U F G N S	J	6	04	A8	4	20.6	10.4	ø3
						10			6	21.6	12.8	ø4
					15							
					25							

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Dimensions/Models

With buffer/barb fitting 2 x 4 to 4 x 10

ZPY **2004** **U** **N** **J** **6** - **N4** - **A8**

1

2

4

6 **Connection thread (Male thread)**

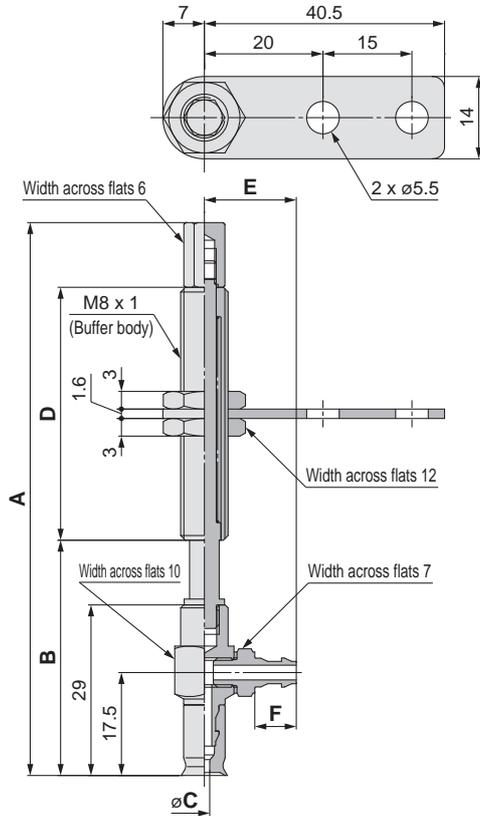
Buffer specification 3

J	Rotating
K	Non-rotating

A8	M8 x 1
-----------	--------

5 **Vacuum inlet (Barb fitting)**

N4	For ø4 nylon tubing	M-5AN-4
N6	For ø6 nylon tubing	M-5AN-6
U4	For ø4 soft tubing	M-5AU-4
U6	For ø6 soft tubing	M-5AU-6



Construction	p. 186
Buffer Assembly	p. 194

		Model						A	B	C	D					
Vacuum inlet direction	1 Pad size	Form	2 *1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread									
ZP	Y	2004	U	N S U F GN GS	J K	6	N4 N6 U4 U6	A8	63	37	1.2	15				
						10			94	40		43				
						15			99	45		43				
												25	109	55	1.8	15
						6			63	37	43					
						10			94	40	43					
					15	99	45	2	15							
	25	109	55	43												
	6	63	37	43												
					10	94	40	2	15							
					15	99	45		43							
					25	109	55		43							

Dimensions Per Vacuum Inlet

		Model						E	F	Fitting part min. hole size	
Vacuum inlet direction	1 Pad size	Form	2 *1 Material	3 Buffer spec.	4 Buffer stroke	5 Vacuum inlet	6 Connection thread				
ZP	Y	2004 3507 4010	U	N S U F GN GS	J K	6	N4 U4	A8	13.5	5	ø1.8
						10 15 25			N6 U6	15.5	7

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber



Oval Pad

Oval Flat Type

ZP2 Series



How to Order

	Dimensions/Models	Construction	Mounting Bracket Assembly
Pad unit ZP2- 35 07 W N	p. 180	p. 187	From p. 195
With adapter ZP2- T 35 07 W N - B5 -	From p. 180	p. 187	p. 195
With buffer ZP2- T 35 07 W N K 10 - B5	From p. 183	p. 188	From p. 196

* Pad unit's sales unit: 10 pcs.

① Vacuum inlet direction ②/③ Pad size ④ Material ⑤ Buffer stroke

Oval flat type • Buffer specification: Non-rotating

① Vacuum inlet direction

Nil	Pad unit
T	Vertical
R	Lateral

②/③ Pad size

Symbol	③ Length			
	07	10	20	30
② Breadth	35 (3.5 x 7)	—	—	—
	40	(4 x 10)	(4 x 20)	(4 x 30)
	50	(5 x 10)	(5 x 20)	(5 x 30)
	60	(6 x 10)	(6 x 20)	(6 x 30)
	80	—	(8 x 20)	(8 x 30)

④ Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

⑤ Buffer stroke

Stroke [mm]	Pad size	
	All sizes	
10	●	
20	●	
30	●	
40	●	
50	●	

With adapter

⑥ Vacuum inlet/⑦ Connection thread

○: ZP2-T/Vertical ●: ZP2-R/Lateral

⑥ Vacuum inlet			⑦ Connection thread			Pad size
Type	Symbol	Size	Type	Symbol	Size	All sizes
Female thread	B5	M5 x 0.8	—	Nil	—*1	○
One-touch fitting	04	ø4	Male thread	A5	M5 x 0.8	●
			Female thread	B5	M5 x 0.8	●
	06	ø6	Male thread	A5	M5 x 0.8	●
			Female thread	B5	M5 x 0.8	●

*1 Use the vacuum inlet.

With buffer

⑥ Vacuum inlet/⑦ Connection thread

○: ZP2-T/Vertical ●: ZP2-R/Lateral

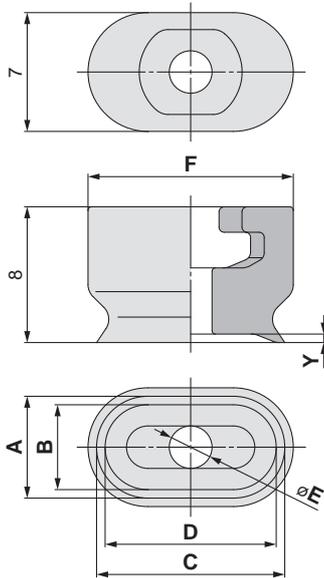
⑥ Vacuum inlet			⑦ Connection thread			Pad size
Type	Symbol	Size	Type	Symbol	Size	All sizes
Female thread	B5	M5 x 0.8	Male thread	Nil	M10 x 1	○
One-touch fitting	04	ø4		Nil		○●
	06	ø6		Nil		○●

* The pad, mounting nut, and fitting are shipped together but do not come assembled.

Dimensions/Models

Single unit **3.5 x 7 to 8 x 30**

ZP2 - 3507 W N
① ②



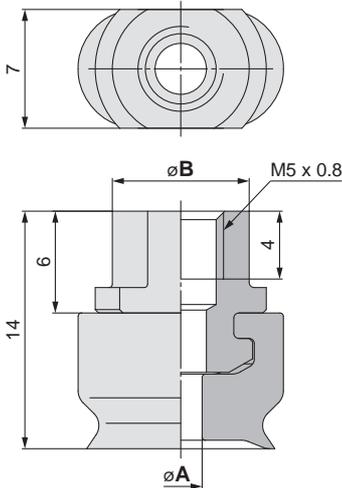
Model	① Pad size		Form	② *1 Material	A	B	C	D	E	F	Y	
	Breadth	Length										
	ZP2	35										07
40		10	4.8	4	10.8	10	2.5					
50			6	5	11							
60			7	6								
40		20	4.8	4	20.8	20	2 x 1.8	20	0.8			
50			6	5	2 x 2							
60			7	6	2.5							
80			9	8	3							
40		30	4.8	4	30.8	30	2 x 1.8	30	0.5			
50			6	5	31		2 x 2.5					
60			7	6								
80			9	8								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction p. 187
Mounting Bracket Assembly From p. 195

With adapter **3.5 x 7 to 8 x 30**

ZP2 - T 3507 W N - B5
① ② ③



③ Vacuum inlet (Female thread)

B5 M5 x 0.8

Model	Vacuum inlet direction	① Pad size		Form	② *1 Material	③ Vacuum inlet	A	B				
		Breadth	Length									
		ZP2	T						W	N S U F GN GS	B5	B5
35	07											
40	10			2.5								
50				2 x 1.8								
60				2 x 2								
40	20			4.8	20	2.5	11					
50				6		3						
60				7		2 x 1.8						
80				9								
40	30			4.8	30	2 x 1.8	19					
50				6		2 x 2.5						
60				7								
80		9										

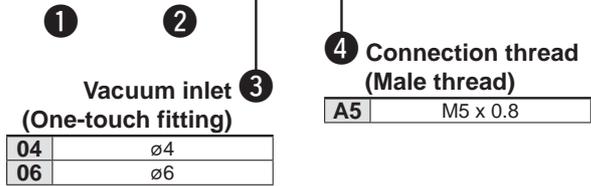
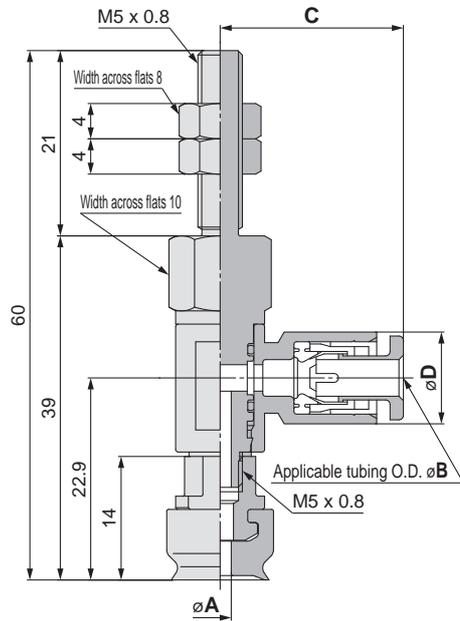
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Construction p. 187
Adapter Assembly p. 195

Dimensions/Models

With adapter/One-touch fitting 3.5 x 7 to 8 x 30

ZP2 - R **3507** W **N** - **04** - **A5**



Model							A		
Vacuum inlet direction	1 Pad size Breadth Length		Form	2 Material *1	3 Vacuum inlet	4 Connection thread			
ZP2	R	35	07	W	N S U F GN GS	04 06	A5	2 x 1.5	
			10					2.5	
		20	40					2 x 1.8	
			50					2 x 2	
		30	60					2.5	
			80					3	
	40		2 x 1.8						
	50		2 x 2.5						
			60						
			80						

Construction	p. 187
Adapter Assembly	p. 195

Dimensions Per Vacuum Inlet

Model							B	C	D	Fitting part min. hole size	
Vacuum inlet direction	1 Pad size Breadth Length		Form	2 Material *1	3 Vacuum inlet	4 Connection thread					
ZP2	R	35	07	W	N S U F GN GS	04	A5	4	20.6	10.4	ø3
						06		6	21.6	12.4	ø4
		20	40			4		20.6	10.4	ø3	
			50			6		21.6	12.4	ø4	
		30	60			4		20.6	10.4	ø3	
			80			6		21.6	12.4	ø4	
	40		4	20.6		10.4	ø3				
	50		6	21.6		12.4	ø4				
			60								
			80								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Dimensions/Models

With adapter/One-touch fitting 3.5 x 7 to 8 x 30

ZP2 - R **3507** W **N** - **04** - **B5**

①

②

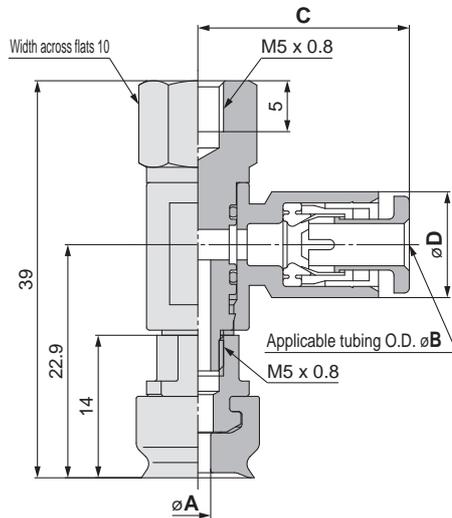
④

Connection thread (Female thread)

Vacuum inlet (One-touch fitting)

04	ø4
06	ø6

B5	M5 x 0.8
----	----------



Construction	p. 187
Adapter Assembly	p. 195

		Model						A
Vacuum inlet direction	Form	① Pad size		② Material	③ Vacuum inlet	④ Connection thread		
		Breadth	Length					
ZP2	R	35	07	W	N S U F GN GS	04	B5	2 x 1.5
		40						2.5
		50	10					2 x 1.8
		60						2 x 2
		40	20					2.5
		60						3
	80		2 x 1.8					
	40	30					2 x 1.8	
	50						2 x 2.5	
	60							
	80							

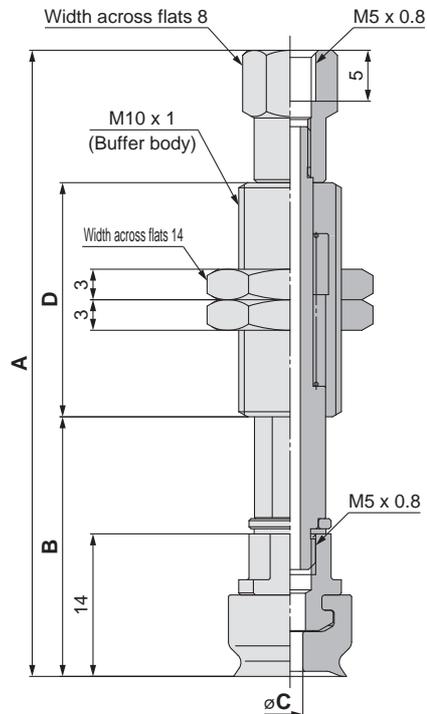
Dimensions Per Vacuum Inlet

		Model						B	C	D	Fitting part min. hole size
Vacuum inlet direction	Form	① Pad size		② Material	③ Vacuum inlet	④ Connection thread					
		Breadth	Length								
ZP2	R	35	07	W	N S U F GN GS	04	B5	4	20.6	10.4	ø3
						06		6	21.6	12.4	ø4
		40	10			04		4	20.6	10.4	ø3
						06		6	21.6	12.4	ø4
		50	20			04		4	20.6	10.4	ø3
						06		6	21.6	12.4	ø4
	60	30	04			4	20.6	10.4	ø3		
			06			6	21.6	12.4	ø4		
	80		04			4	20.6	10.4	ø3		
			06			6	21.6	12.4	ø4		

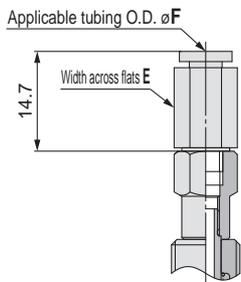
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

Dimensions/Models

With buffer 3.5 x 7 to 8 x 30



Vacuum inlet: One-touch fitting



Construction	p. 188
Buffer Assembly	p. 196

Dimensions Per Vacuum Inlet: One-touch Fitting

		Model					E	F	Fitting part min. hole size				
Vacuum inlet direction		① Pad size Breadth Length	Form	② Material	③ Buffer spec.	④ Buffer stroke				⑤ Vacuum inlet			
ZP2	T	35	07	W	N S U F G S	K	10 20 30 40 50	04	8	4	$\varnothing 2.5$		
								06	10	6			
		40	10					04	8	4			
								06	10	6			
								50	20	04		8	4
										06		10	6
	60	30	04					8	4				
			06					10	6				

ZP2 - T **3507** W **N** **K** **10** - **B5**

① ② ④
Buffer specification ③
K Non-rotating

Vacuum inlet ⑤

B5	M5 x 0.8	Female thread	
04	$\varnothing 4$	One-touch fitting	KQ2H04-M5N
06	$\varnothing 6$		KQ2H06-M5N

		Model					A	B	C	D														
Vacuum inlet direction		① Pad size Breadth Length	Form	② Material	③ Buffer spec.	④ Buffer stroke					⑤ Vacuum inlet													
ZP2	T	35	07	W	N S U F G S	K	10 20 30 40 50 10 20 30 40 50 10 20 30 40 50 10 20 30 40 50 10 20 30 40 50 10 20 30 40 50	B5	61.5	25.5	2 x 1.5	23												
									99.5	35.5		51												
									109.5	45.5		77												
									145.5	55.5	2 x 1.5	23												
									155.5	65.5		51												
									61.5	25.5		77												
									40	10	50	60	10	2.5	51	61.5	25.5	2.5	23					
																99.5	35.5		51					
																109.5	45.5		77					
																145.5	55.5	2 x 1.8	23					
																155.5	65.5		51					
																61.5	25.5		77					
		50	20													60	80	30	2.5	51	61.5	25.5	2 x 2	23
																					99.5	35.5		51
																					109.5	45.5		77
																					145.5	55.5	2 x 1.8	23
																					155.5	65.5		51
																					61.5	25.5		77
									60	30	80	80	30	2.5	51						61.5	25.5	2.5	23
																					99.5	35.5		51
																					109.5	45.5		77
																					145.5	55.5	3	23
																					155.5	65.5		51
																					61.5	25.5		77
		80	40													80	80	30	2.5	51	61.5	25.5	2 x 1.8	23
																					99.5	35.5		51
																					109.5	45.5		77
																					145.5	55.5	2 x 1.8	23
																					155.5	65.5		51
																					61.5	25.5		77
									80	40	80	80	30	2.5	51						61.5	25.5	2 x 2.5	23
																					99.5	35.5		51
																					109.5	45.5		77
																					145.5	55.5	2 x 2.5	23
																					155.5	65.5		51
																					61.5	25.5		77

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, GN: Conductive NBR, GS: Conductive silicone rubber

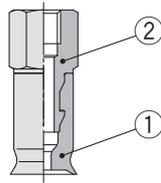
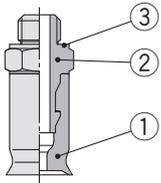
Oval Pad **ZP** Series Construction

With adapter Oval flat type: 2004/3507/4010

Vacuum inlet direction **Vertical** T Type/ZPT

ZPT□-(A5/A6)

ZPT□-(B4/B5)



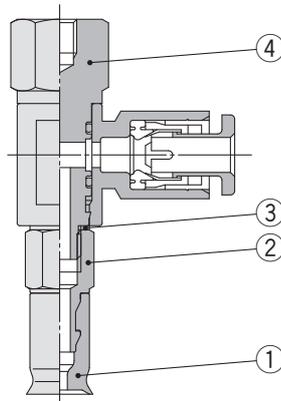
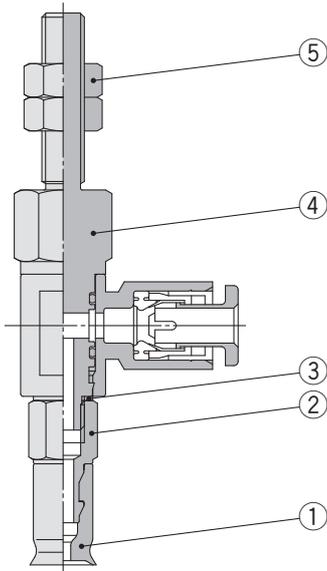
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel/NBR	

Vacuum inlet direction **Lateral** R Type/ZPR

ZPR□-(04/06)-(A5/A6)

ZPR□-(04/06)-(B4/B5)



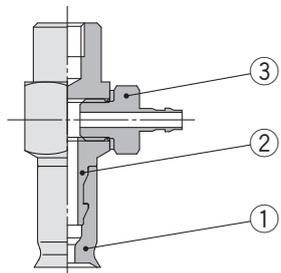
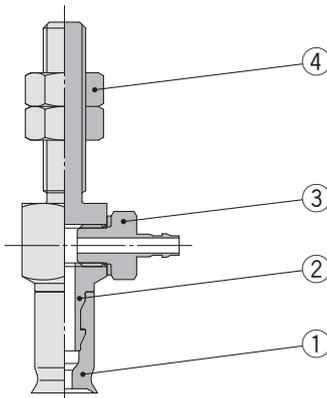
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel 304/NBR	
4	Adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
5	Nut	Roller steel (Zinc chromated)	M5 x 0.8
		Brass (Nickel plating)	M6 x 1

Vacuum inlet direction **Lateral** Y Type/ZPY

ZPY□-(N4/N6/U4/U6)-(A5/A6)

ZPY□-(N4/N6/U4/U6)-(B4/B5)



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Barb fitting	—	
4	Nut	Roller steel (Zinc chromated)	M5 x 0.8
		Brass (Nickel plating)	M6 x 1

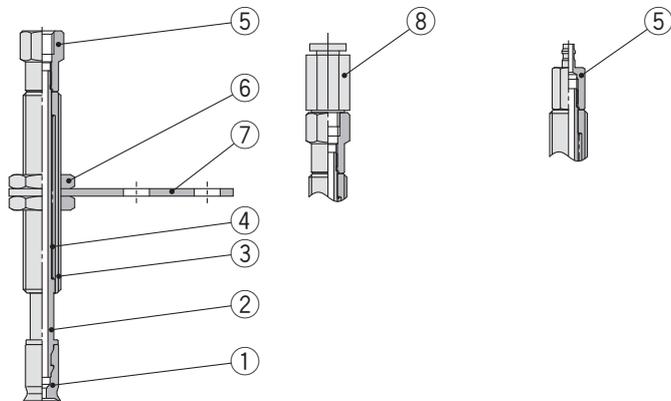
With buffer Oval flat type: 2004/3507/4010

Vacuum inlet direction **Vertical** T Type/ZPT

ZPT□-(B3/B5)-A8

ZPT□-(04/06)-A8

ZPT□-(N4/U4)-A8

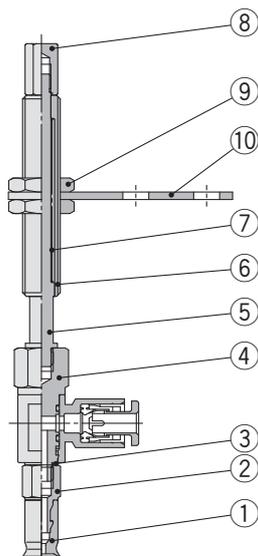


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Piston rod	Stainless steel	
3	Buffer body	Brass (Electroless nickel plating)	
4	Return spring	Stainless steel	
5	Buffer adapter	Brass (Electroless nickel plating)	
6	Nut	Brass (Electroless nickel plating)	M8 x 1
7	Buffer plate	Steel (Trivalent chromated)	
8	One-touch fitting	—	

Vacuum inlet direction **Lateral** R Type/ZPR

ZPR□-(04/06)-A8

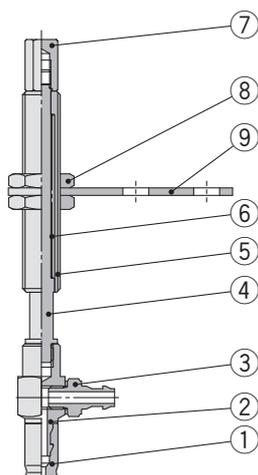


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel 304/NBR	
4	Adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
5	Piston rod	Stainless steel	
6	Buffer body	Brass (Electroless nickel plating)	
7	Return spring	Stainless steel	
8	Buffer adapter	Brass (Electroless nickel plating)	
9	Nut	Brass (Electroless nickel plating)	M8 x 1
10	Buffer plate	Steel (Trivalent chromated)	

Vacuum inlet direction **Lateral** Y Type/ZPY

ZPY□-(N4/N6/U4/U6)-A8



Component Parts

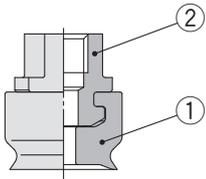
No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Barb fitting	—	
4	Piston rod	Stainless steel	
5	Buffer body	Brass (Electroless nickel plating)	
6	Return spring	Stainless steel	
7	Buffer adapter	Brass (Electroless nickel plating)	
8	Nut	Brass (Electroless nickel plating)	M8 x 1
9	Buffer plate	Steel (Trivalent chromated)	

Oval Pad *ZP2* Series Construction

With adapter Oval flat type: 3507 to 8030

Vacuum inlet direction **Vertical** T Type/ZP2-T

ZP2-T□-B5



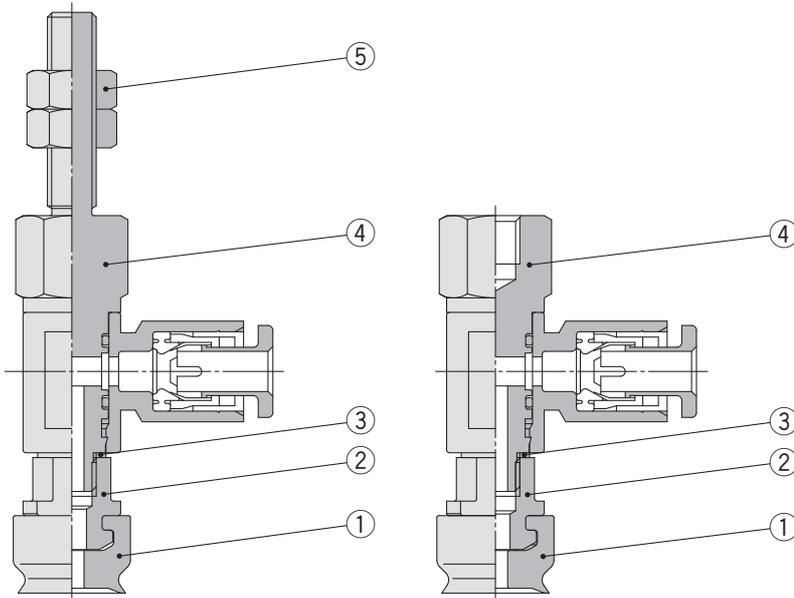
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	

Vacuum inlet direction **Lateral** R Type/ZP2-R

ZP2-R□-(04/06)-A5

ZP2-R□-(04/06)-B5



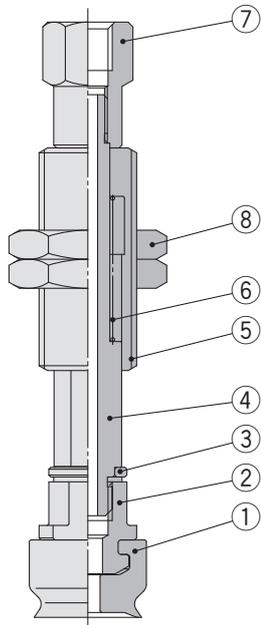
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel/NBR	
4	Adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
5	Nut	Rolled steel (Zinc chromated)	M5 x 0.8

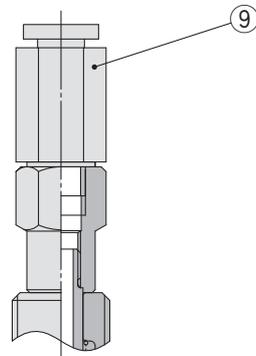
With buffer Oval flat type: 3507 to 8030

Vacuum inlet direction **Vertical** T Type/ZP2-T

ZP2-T□-B5



ZP2-T□-(04/06)

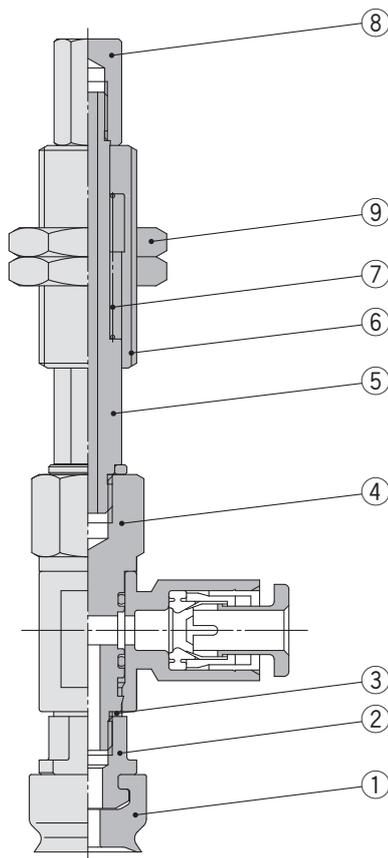


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel/NBR	
4	Piston rod	Stainless steel	
5	Buffer body	Brass (Electroless nickel plating)	
6	Return spring	Stainless steel	
7	Buffer adapter	Brass (Electroless nickel plating)	
8	Nut	Brass (Electroless nickel plating)	M10 x 1
9	One-touch fitting	—	

Vacuum inlet direction **Lateral** R Type/ZP2-R

ZP2-R□-(04/06)



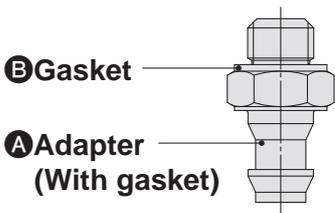
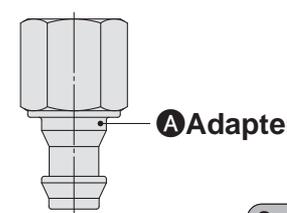
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Conductive NBR, Conductive silicone rubber	Oval flat type
2	Adapter	Brass (Electroless nickel plating)	
3	Gasket	Stainless steel/NBR	
4	Adapter (With One-touch fitting)	Brass (Electroless nickel plating), PBT, NBR, Stainless steel, POM	
5	Piston rod	Stainless steel	
6	Buffer body	Brass (Electroless nickel plating)	
7	Return spring	Stainless steel	
8	Buffer adapter	Brass (Electroless nickel plating)	
9	Nut	Brass (Electroless nickel plating)	M10 x 1

Oval Pad *ZP Series*

Mounting Bracket Assembly

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZPT

Product part no.	<p style="text-align: center;">ZPT ① U □ - ②</p> <p style="text-align: center;"> Pad size ● Vacuum inlet (Male/Female thread) ● ● Pad material </p>	
Component parts	<p>Male thread</p>  <p>B Gasket</p> <p>A Adapter (With gasket)</p>	<p>Female thread</p>  <p>A Adapter</p>
<div style="border: 1px solid black; border-radius: 15px; padding: 2px 10px; display: inline-block;">Same for the ZP/Basic type</div>		

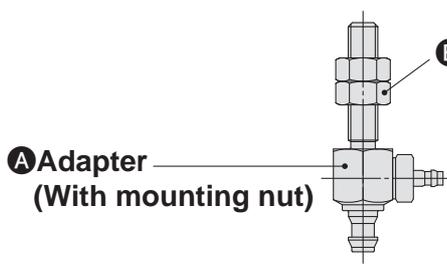
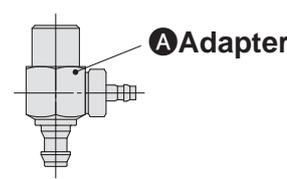
		Symbol	① Pad size symbol		
			2004	3507	4010
A Adapter	② Vacuum inlet	Male thread	M5 x 0.8	A5	ZPT1-A5
		Female thread	M6 x 1	A6	ZPT1-A6
	Male thread	M4 x 0.7	B4	ZPT1-B4	
	Female thread	M5 x 0.8	B5	ZPT1-B5	
B Gasket (Single unit)	For M5 x 0.8		M-5G2		
	For M6 x 1		M-6G		

Adapter Assembly: With One-touch Fitting, Vacuum Inlet Direction Lateral R Type/ZPR

Product part no.	<p style="text-align: center;">ZPR ① U □ - ② - ③</p> <p style="text-align: center;"> Pad size Pad material Connection thread (Male/Female thread) </p> <p style="text-align: center;"> Vacuum inlet (One-touch fitting) </p>
Component parts	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Male thread</p> </div> <div style="text-align: center;"> <p>Female thread</p> </div> </div> <p style="text-align: center; margin-top: 10px;"> A Adapter (With mounting nut) (With gasket) D Gasket </p> <p style="text-align: center; margin-top: 10px;"> B Pad mounting adapter </p> <p style="text-align: right; border: 1px solid gray; border-radius: 10px; padding: 2px; display: inline-block;">Same for the ZP/Basic type</p>

		Symbol	① Pad size symbol						
			2004	3507	4010				
A Adapter	2 Vacuum inlet	One-touch fitting	ø4	04	3 Connection thread	Male thread	M5 x 0.8	A5	ZPRS-04-A5
						Female thread	M6 x 1	A6	ZPRS-04-A6
	ø6	06	Male thread	M4 x 0.7	B4	ZPRS-04-B4			
				M5 x 0.8	B5	ZPRS-04-B5			
			Female thread	M5 x 0.8	A5	ZPRS-06-A5			
				M6 x 1	A6	ZPRS-06-A6			
				M4 x 0.7	B4	ZPRS-06-B4			
				M5 x 0.8	B5	ZPRS-06-B5			
	B Pad mounting adapter					ZPT1-B5			
	C Mounting nut (Single unit)			M5 x 0.8		NTJ-015A			
			M6 x 1		ZPNA-M6				
D Gasket (Single unit)					M-5G2				

Adapter Assembly: With Barb Fitting, Vacuum Inlet Direction Lateral Y Type/ZPY

Product part no.	<p>ZPY ① U □ - ② - ③</p> <p>Pad size ● Pad material ● Vacuum inlet (Barb fitting) ● Connection thread (Male/Female thread) ●</p>
Component parts	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Male thread</p>  <p>● A Adapter (With mounting nut)</p> </div> <div style="text-align: center;"> <p>Female thread</p>  <p>● A Adapter</p> </div> </div> <p style="text-align: right; border: 1px solid black; border-radius: 10px; padding: 2px; margin-top: 10px;">Same for the ZP/Basic type</p>

		Symbol			Symbol	① Pad size symbol			
						2004	3507	4010	
A Adapter	2 Vacuum inlet	Barb fitting	N4	Male thread	M5 x 0.8	A5	ZPY1-N4-A5		
					M6 x 1	A6	ZPY1-N4-A6		
	Female thread	M4 x 0.7		B4	ZPY1-N4-B4				
		M5 x 0.8		B5	ZPY1-N4-B5				
	N6	Male thread	M5 x 0.8	A5	ZPY1-N6-A5				
			M6 x 1	A6	ZPY1-N6-A6				
		Female thread	M4 x 0.7	B4	ZPY1-N6-B4				
			M5 x 0.8	B5	ZPY1-N6-B5				
	U4	Male thread	M5 x 0.8	A5	ZPY1-U4-A5				
			M6 x 1	A6	ZPY1-U4-A6				
		Female thread	M4 x 0.7	B4	ZPY1-U4-B4				
			M5 x 0.8	B5	ZPY1-U4-B5				
	U6	Male thread	M5 x 0.8	A5	ZPY1-U6-A5				
			M6 x 1	A6	ZPY1-U6-A6				
		Female thread	M4 x 0.7	B4	ZPY1-U6-B4				
			M5 x 0.8	B5	ZPY1-U6-B5				
B Mounting nut (Single unit)					M5 x 0.8		NTJ-015A		
					M6 x 1		ZPNA-M6		

Buffer Assembly: Vacuum Inlet Direction Vertical T Type/ZPT

Product part no.	<p>ZPT ① U □ (J/K) ② - ③ - A8</p> <p>Pad size ● Pad material ● J: Rotating, K: Non-rotating ● ● Vacuum inlet (Female thread/One-touch fitting/Barb fitting) ● Buffer stroke</p>
Component parts	<p>① Buffer (With buffer plate / With mounting nut) ② Mounting nut ③ Buffer plate</p> <p>One-touch fitting Barb fitting</p> <p>Same for the ZP/Basic type</p>

		Symbol	① Pad size symbol		
			2004	3507	4010
② Buffer stroke	Stroke	6	●	●	●
		10	●	●	●
		15	●	●	●
		25	●	●	●
③ Buffer	③ Vacuum inlet	Female thread	M3 x 0.5	B3	ZPB1(J/K)②-B3
		M5 x 0.8	B5	ZPB1(J/K)②-B5	
	One-touch fitting	ø4	04	ZPB1(J/K)②-04	
		ø6	06	ZPB1(J/K)②-06	
	Barb fitting	For ø4 nylon tubing	N4	ZPB1(J/K)②-N4	
		For ø4 soft tubing	U4	ZPB1(J/K)②-U4	
③ Buffer plate (Single unit)				ZPB1	
③ Mounting nut (Single unit)		M8 x 1		ZPNA-M8	

[Buffer assembly part number example]

Product part no. ZPT2004UN J 10 - B5 - A8

Buffer assembly ZPB1 J 10 - B5

② Buffer stroke

Oval Pad
Mounting Bracket Assembly **ZP Series**

■ Buffer Assembly: With One-touch Fitting, Vacuum Inlet Direction **Lateral** R Type/ZPR

Product part no.	<p>ZPR ① U □ (J/K) ② - ③ - A8</p> <p>Pad size ● Pad material ● J: Rotating, K: Non-rotating ● ● Vacuum inlet (One-touch fitting) ● Buffer stroke</p>
Component parts	<p>Same for the ZP/Basic type</p>

		Symbol	① Pad size symbol			
			2004	3507	4010	
② Buffer stroke	Stroke	6	●	●	●	
		10	●	●	●	
		15	●	●	●	
		25	●	●	●	
A Buffer			ZPB1(J/K)②			
B Buffer connection adapter	③ Vacuum inlet One-touch fitting	ø4	04	ZPRS04-B5		
		ø6	06	ZPRS06-B5		
C Pad mounting adapter			ZPT1-B5			
D Buffer plate (Single unit)			ZPB1			
E Mounting nut (Single unit)		M8 x 1	ZPNA-M8			
F Gasket (Single unit)			M-5G2			

[Buffer assembly part number example]

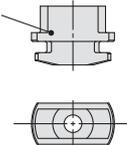
Product part no. ZPR3507UN **K** 15 - 04 - A8

Buffer assembly ZPB1 **K** 15

② Buffer stroke

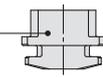
Oval Pad **ZP2 Series** Mounting Bracket Assembly

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZP2-T

Product part no.	<p>ZP2 - T ① W □ - ②</p> <p>Pad size ● Vacuum inlet (Female thread)</p> <p>Oval flat type ● Pad material</p>	
Component parts	<p>A Adapter </p>	

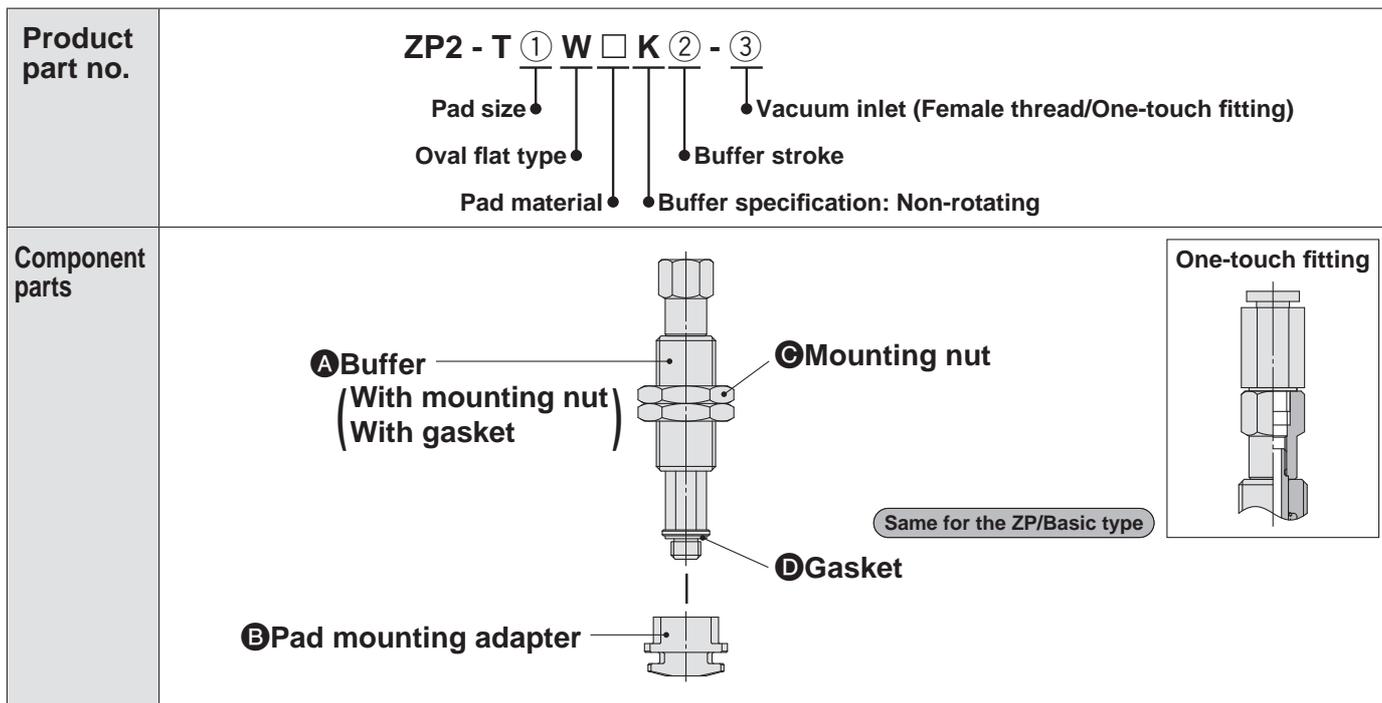
		Symbol	① Pad size symbol													
			3507	4010	5010	6010	4020	5020	6020	8020	4030	5030	6030	8030		
A Adapter	② Vacuum inlet	Female thread	M5 x 0.8	B5	ZP2A-001				ZP2A-002				ZP2A-003			

Adapter Assembly: With One-touch Fitting, Vacuum Inlet Direction **Lateral** R Type/ZP2-R

Product part no.	<p>ZP2 - R ① W □ - ② - ③</p> <p>Pad size ● Connection thread (Male/Female thread)</p> <p>Oval flat type ● Vacuum inlet (One-touch fitting)</p> <p>Pad material ●</p>	
Component parts	<p>Male thread Female thread</p> <p>C Mounting nut A Adapter (With gasket)</p> <p>A Adapter (With mounting nut With gasket) D Gasket</p> <p>B Pad mounting adapter </p> <p style="text-align: right;">Same for the ZP/Basic type</p>	

		Symbol	Symbol	① Pad size symbol														
				3507	4010	5010	6010	4020	5020	6020	8020	4030	5030	6030	8030			
A Adapter	② Vacuum inlet	One-touch fitting	ø4	04	③ Connection thread	Male thread	M5 x 0.8	A5	ZPRS-04-A5									
						Female thread	M5 x 0.8	B5	ZPRS-04-B5									
			ø6	06		Male thread	M5 x 0.8	A5	ZPRS-06-A5									
						Female thread	M5 x 0.8	B5	ZPRS-06-B5									
B Pad mounting adapter									ZP2A-001			ZP2A-002				ZP2A-003		
C Mounting nut (Single unit)							M5 x 0.8		NTJ-015A									
D Gasket (Single unit)									M-5G2									

Buffer Assembly: Vacuum Inlet Direction Vertical T Type/ZP2-T



		Symbol	① Pad size symbol														
			3507	4010	5010	6010	4020	5020	6020	8020	4030	5030	6030	8030			
② Buffer stroke	Stroke	10						●									
		20						●									
		30						●									
		40						●									
		50						●									
A Buffer	③ Vacuum inlet	Female thread	M5 x 0.8	B5												ZPB2K②-B5	
		One-touch fitting	ø4	04													ZPB2K②-04
			ø6	06													
B Pad mounting adapter				ZP2A-001			ZP2A-002									ZP2A-003	
C Mounting nut (Single unit)		M10 x 1														ZPNA-M10	
D Gasket (Single unit)																M-5G2	

[Buffer assembly part number example]

Product part no. ZP2-T6010WN K 10 - B5

Buffer assembly ZPB2 K 10 - B5

② Buffer stroke

Oval Pad Mounting Bracket Assembly **ZP2 Series**

■ Buffer Assembly: With One-touch Fitting, Vacuum Inlet Direction **Lateral** R Type/ZP2-R

Product part no.	<p style="text-align: center;">ZP2 - R ① W □ K ② - ③</p> <p style="text-align: center;"> Pad size ● Oval flat type ● Pad material ● Vacuum inlet (One-touch fitting) ● Buffer stroke ● Buffer specification: Non-rotating ● </p>
Component parts	<p style="text-align: center;"> A Buffer (With mounting nut) D Mounting nut B Buffer connection adapter (With gasket) E Gasket C Pad mounting adapter </p> <p style="text-align: right;">Same for the ZP/Basic type</p> <p style="text-align: right;">Same for the ZP/Basic type</p>

		Symbol	① Pad size symbol												
			3507	4010	5010	6010	4020	5020	6020	8020	4030	5030	6030	8030	
② Buffer stroke	Stroke	10						●							
		20						●							
		30						●							
		40						●							
		50						●							
③ Buffer			ZPB2K②												
④ Buffer connection adapter	⑤ Vacuum inlet One-touch fitting	ø4	04		ZPRS-04-B5										
		ø6	06		ZPRS-06-B5										
⑥ Pad mounting adapter			ZP2A-001			ZP2A-002			ZP2A-003						
⑦ Mounting nut (Single unit)		M10 x 1	ZPNA-M10												
⑧ Gasket (Single unit)			M-5G2												

[Buffer assembly part number example]

Product part no. **ZP2-R8030WF** **K** **30** - 06

Buffer assembly **ZPB2** **K** **30**

② Buffer stroke



Oval Pad Specific Product Precautions

Be sure to read this before handling the products. Refer to page 375 for safety instructions. For vacuum equipment and vacuum pad precautions, refer to pages 376 to 379.

Mounting

1. Tighten the screw within the specified torque range when mounting the buffer.

Tightening with a torque outside of the specified range may cause malfunction.

Oval Pad ZP Series

Model	Connection thread	Tightening torque [N·m]
ZP□(J/K)□-□-A8	M8 x 1	1.5 to 2.0

Oval Pad ZP2 Series

Model	Connection thread	Tightening torque [N·m]
ZP2-□K□-□	M10 x 1	2.5 to 3.5

High Rigidity Pad **ZP3E Series** RoHS

Model Selection

∅32, ∅40, ∅50, ∅63, ∅80, ∅100, ∅125

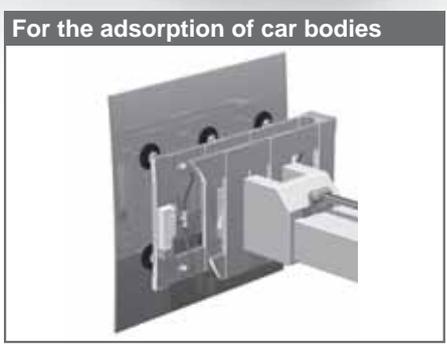
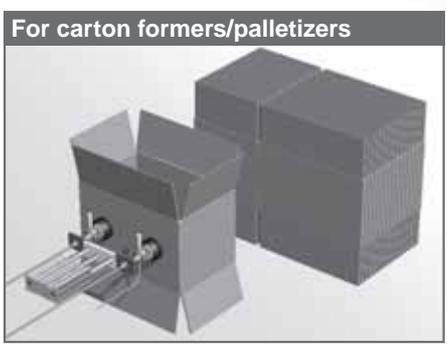
Flat Type with Groove, Bellows Type with Ribs and Groove

Stable suction position, Improved ease of removal

**Number of mounting screws reduced
(4 pcs. ◆ 1 pc.)**

**Pad and metal parts can
be disposed of separately.**

**Improved uneven workpiece
surface suction**



ZP3E
High Rigidity
Flat Type with Groove
Ball Joint, Flat Type with Groove
Bellows Type with Ribs and Groove
Ball Joint, Bellows Type with Ribs and Groove

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Construction

Mounting Bracket Assembly

Precautions



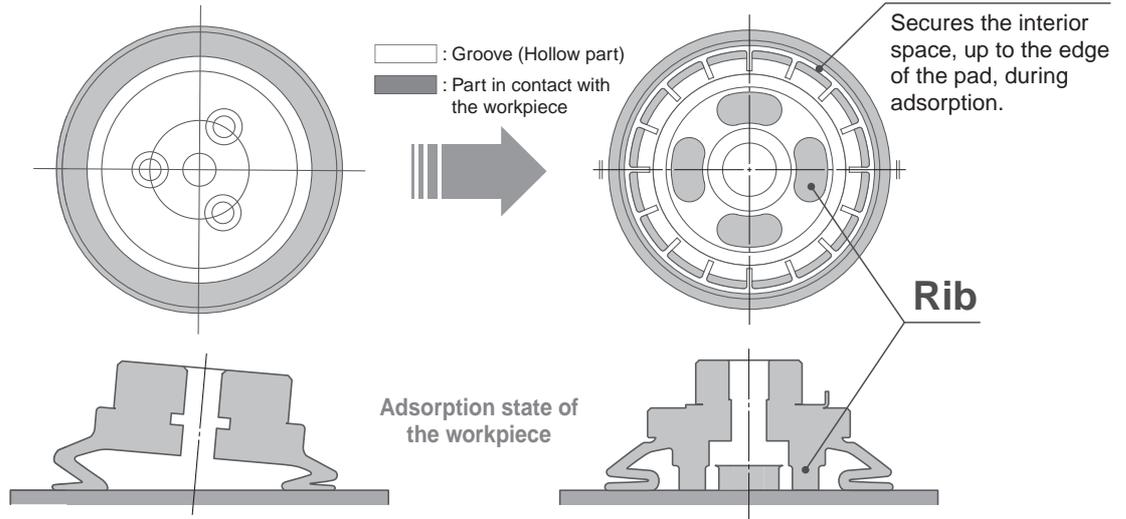
Stability of suction position

Groove and rib formed to adsorb with entire surface

- Groove on the adsorption surface secures the interior space.
- The ribs reduce inclinations during the transport of workpieces.

ZP (Existing model/Bellows pad)

ZP3E (Bellows pad)



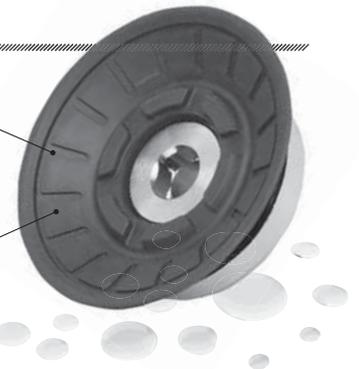
Improved ease of removal

With groove

The dents and bumps on the adsorption surface prevent workpieces from sticking to the pad. This facilitates easy removal.

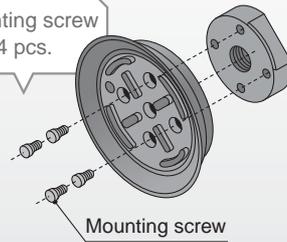
Shot-blasted

Micro-dents and bumps are formed on the adsorption surface. Workpieces can be removed easily.



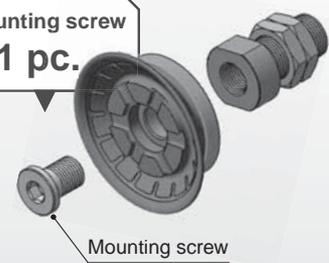
Reduced number of mounting screws

Mounting screw
4 pcs.



ZP series (Heavy-duty type)

Mounting screw
1 pc.

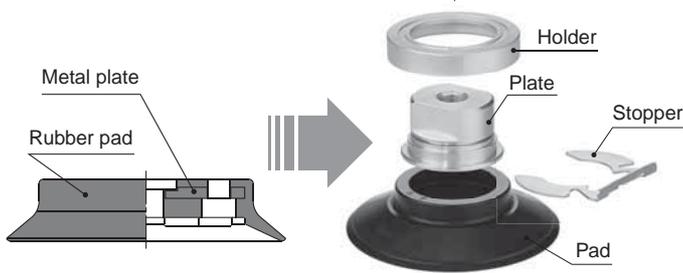


ZP3E

Can be disposed of separately

The rubber pad and metal parts can be separated.

The metal parts and rubber parts can be separated completely.

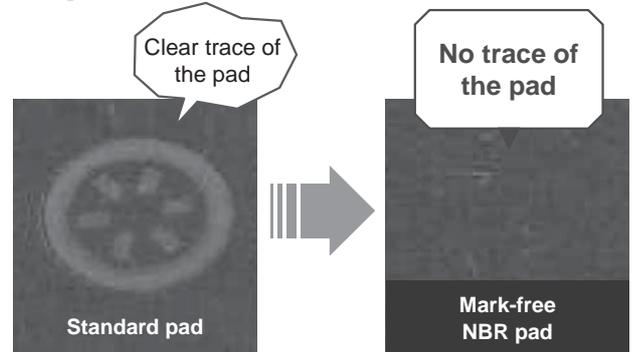


ZP series (Heavy-duty type)

ZP3E

Mark-free

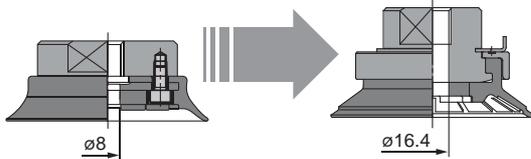
For use where adsorption marks must not be left on workpieces



Suction flow rate increased

Applicable to workpieces with large suction flow rates and high permeability and to vacuum blow pumps with large suction flow rates

Double suction port size
(Pad diameter: $\phi 63, \phi 80$)
Compared with the ZP series



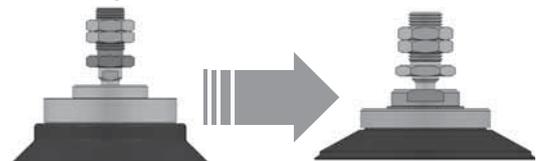
Pad diameter	ZP (Existing model)		ZP3E	
	Suction port	Area [mm ²]	Suction port	Area [mm ²]
$\phi 32$	—	—		
$\phi 40$	$\phi 6$	28.3	$\phi 8.4$	55.4
$\phi 50$				
$\phi 63$	$\phi 8$	50.2		
$\phi 80$			$\phi 16.4$	211
$\phi 100$	$\phi 10$	78.52		
$\phi 125$				

Ball joint type pad with reduced weight

Weight reduced by changes to the internal structure and materials

* The pad material weighed was NBR.

Weight reduced by up to **290 g**



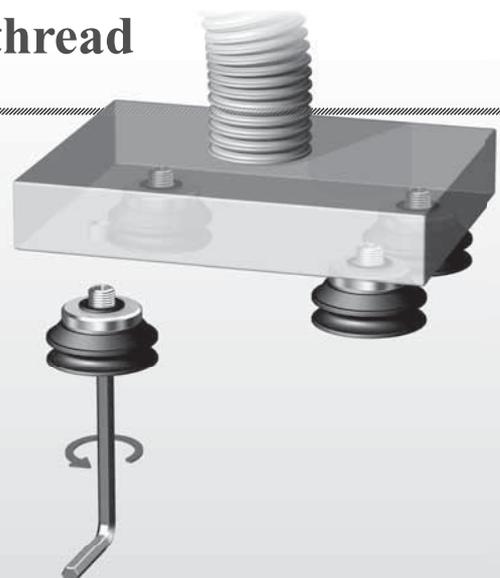
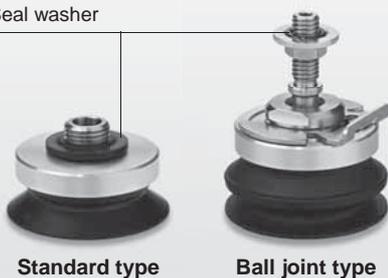
Pad diameter	ZP2/Flat type	ZP3E/Flat type with groove
	Weight [g]	Weight [g]
$\phi 32$	—	56
$\phi 40$	91	57
$\phi 50$	110	75
$\phi 63$	230	150
$\phi 80$	270	160
$\phi 100$	430	190
$\phi 125$	560	270

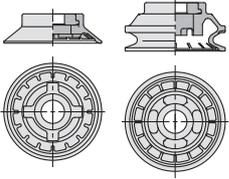
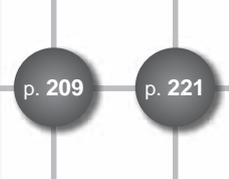
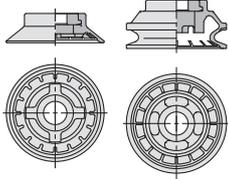
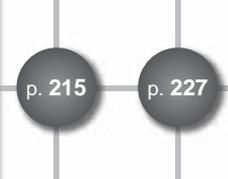
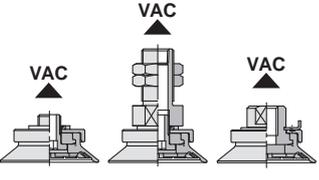
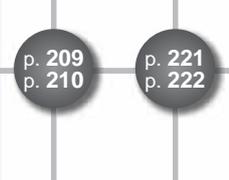
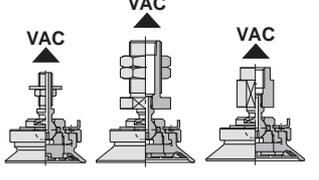
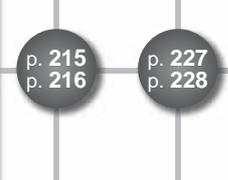
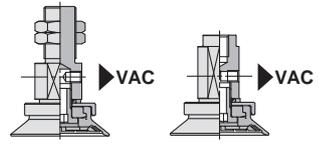
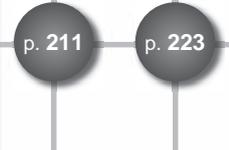
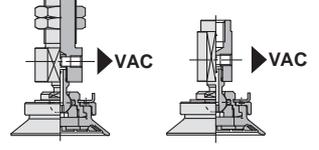
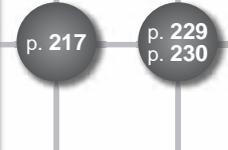
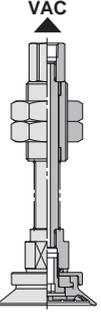
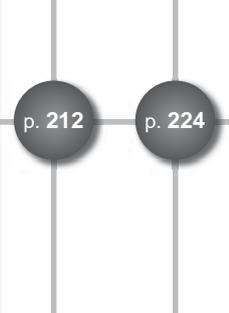
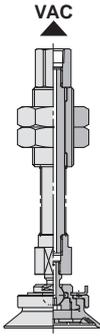
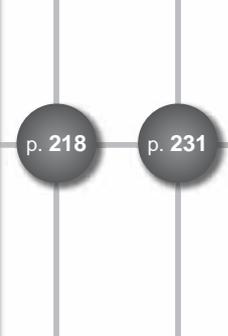
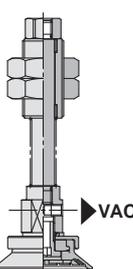
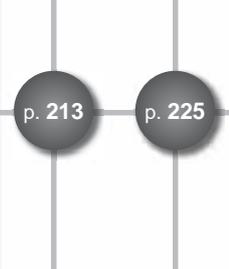
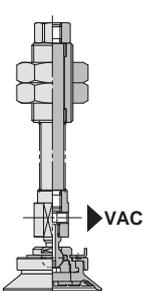
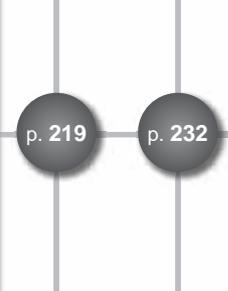
Direct mounting type with a male thread has been added.

Direct mounting

- Reduced height
- Easy mounting due to tightening only requiring a hexagonal wrench

Seal washer



		Standard Type		Ball Joint Type	
		Vacuum inlet direction		Vacuum inlet direction	
		Flat type with groove	Bellows type with ribs and groove	Flat type with groove	Bellows type with ribs and groove
Vacuum inlet direction	Single unit				
		p. 209	p. 221	p. 215	p. 227
Vertical	ZP3E-T With adapter				
		p. 209 p. 210	p. 221 p. 222	p. 215 p. 216	p. 227 p. 228
Lateral	ZP3E-Y With adapter				
		p. 211	p. 223	p. 217	p. 229 p. 230
Vertical	ZP3E-T With buffer				
		p. 212	p. 224	p. 218	p. 231
Lateral	ZP3E-Y With buffer				
		p. 213	p. 225	p. 219	p. 232

High Rigidity Pad *ZP3E* Series Specifications

Pad Material

Material	NBR (Nitrile rubber)	Silicone rubber*1	Urethane rubber	FKM (Fluoro rubber)	Mark-free NBR
Color of rubber	Black	White	Brown	Black	
Rubber hardness (±5°)	A55/S	A50/S		A60/S	
Identification (Symbol)	—	—	—	Ⓕ	—

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Adapter Specifications



Vacuum Inlet Direction **Vertical** T Type/ZP3E-T

Connection	Male thread				Female thread	
Pad diameter	ø32 to ø50		ø63 to ø125		ø32 to ø50	ø63 to ø125
Connection thread	M10 x 1	M14 x 1	M16 x 1.5	M16 x 1.5	M8 x 1.25 M10 x 1.5	M12 x 1.75 M18 x 1.5
Vacuum inlet	Female thread	Use the connection thread.	Rc1/8	Use the connection thread.	Rc1/8	Use the connection thread.



Vacuum Inlet Direction **Lateral** Y Type/ZP3E-Y

Connection	Male thread		Female thread		
Pad diameter	ø32 to ø50	ø63 to ø125	ø32 to ø50	ø63 to ø125	
Connection thread	M14 x 1	M16 x 1.5	M8 x 1.25	M12 x 1.75	
Vacuum inlet	Female thread	M5 x 0.8	Rc1/8	M5 x 0.8	Rc1/8

Buffer Specifications



Pad diameter	ø32 to ø50			ø63 to ø125		
Non-rotating specification	JB: Rotating, With bushing					
Stroke [mm]	10	30	50	10	30	50
Connection thread	M18 x 1.5			M22 x 1.5		
Spring reactive force [N]	At 0 stroke		10.0			
	At full stroke	6.5	8.5	10.5	11.5	13.5

Adapter Specifications (Ball Joint Type)

Ball joint rotating angle	30°
---------------------------	-----



Vacuum Inlet Direction **Vertical** T Type/ZP3E-TF

Connection		Male thread				Female thread	
Pad diameter		ø32 to ø50		ø63 to ø125		ø32 to ø50	ø63 to ø125
Connection thread		M6 x 1	M14 x 1	M12 x 1.25	M16 x 1.5	M8 x 1.25	M12 x 1.75
Vacuum inlet	Female thread	Use the connection thread.	Rc1/8	Use the connection thread.	Rc1/8	Use the connection thread.	Use the connection thread.



Vacuum Inlet Direction **Lateral** Y Type/ZP3E-YF

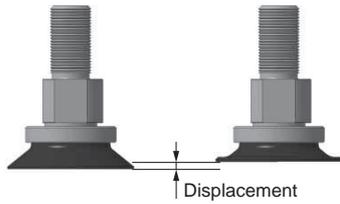
Connection		Male thread		Female thread	
Pad diameter		ø32 to ø50	ø63 to ø125	ø32 to ø50	ø63 to ø125
Connection thread		M14 x 1	M16 x 1.5	M8 x 1.25	M12 x 1.75
Vacuum inlet	Female thread	M5 x 0.8	Rc1/8	M5 x 0.8	Rc1/8

Buffer Specifications (Ball Joint Type)



Pad diameter		ø32 to ø50			ø63 to ø125		
Non-rotating specification		JB: Rotating, With bushing					
Stroke [mm]		10	30	50	10	30	50
Connection thread		M18 x 1.5			M22 x 1.5		
Spring reactive force [N]	At 0 stroke	5.0			10.0		
	At full stroke	6.5	8.5	10.5	11.5	13.5	15.5

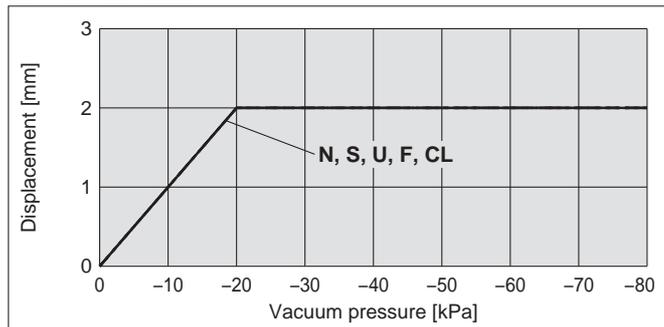
Pad Displacement to Vacuum Pressure (Flat Type with Groove)



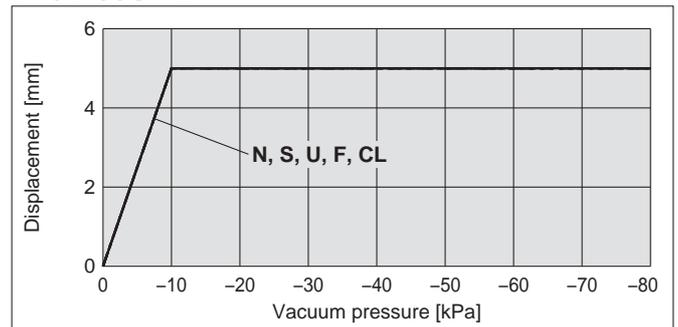
The data shown below are only for reference and are not guaranteed. These values depend on the operating environment, workpiece mass and transfer method. Therefore, thorough research and confirmation are necessary before use.

NBR (N): ——— Silicone rubber (S): ······· Urethane rubber (U): - - - - - FKM (F): - · - · - · Mark-free NBR (CL): - - - - -

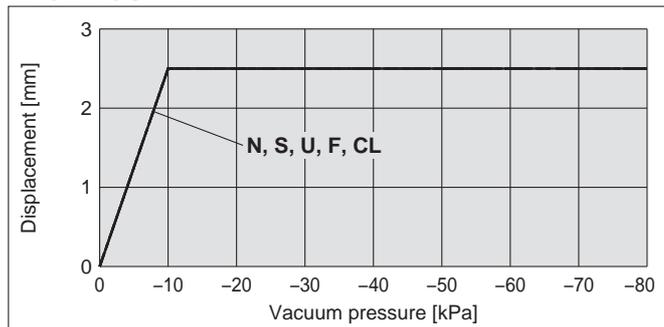
ZP3E-32UM □



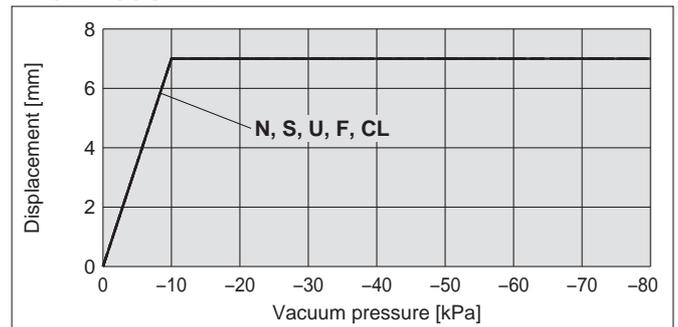
ZP3E-80UM □



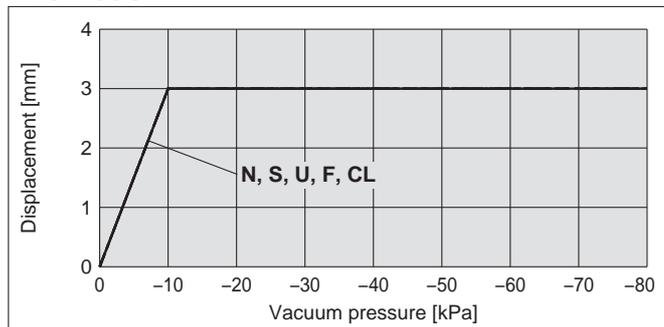
ZP3E-40UM □



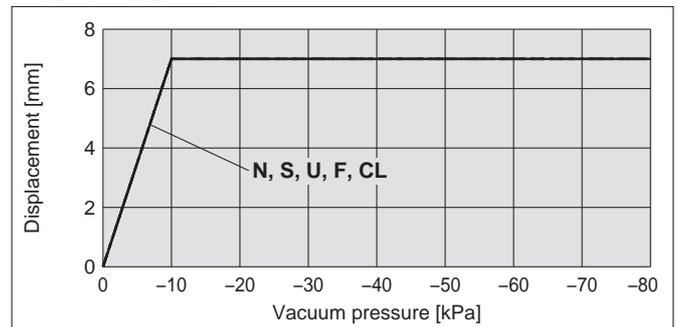
ZP3E-100UM □



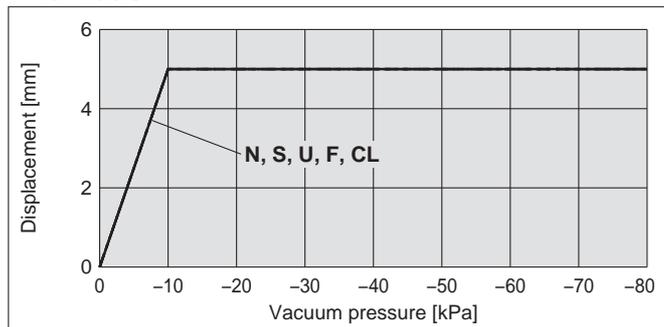
ZP3E-50UM □



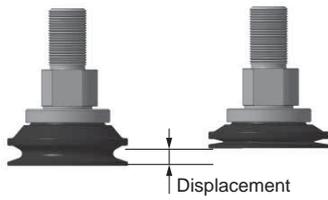
ZP3E-125UM □



ZP3E-63UM □



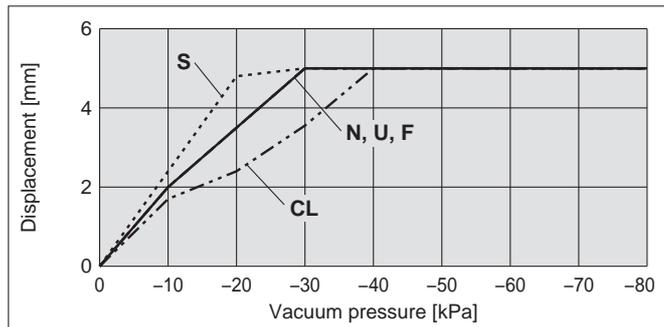
Pad Displacement to Vacuum Pressure (Bellows Type with Groove)



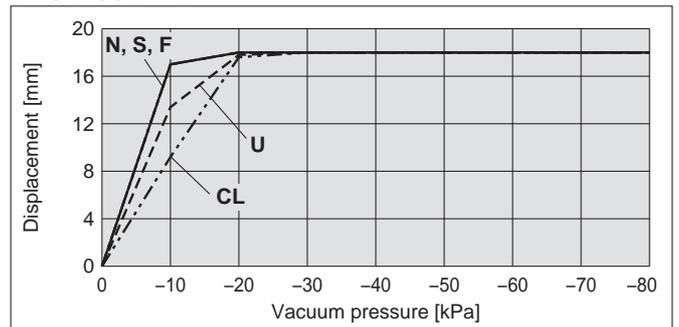
The data shown below are only for reference and are not guaranteed. These values depend on the operating environment, workpiece mass and transfer method. Therefore, thorough research and confirmation are necessary before use.

NBR (N): ——— Silicone rubber (S): ······ Urethane rubber (U): - - - - FKM (F): - · - · - Mark-free NBR (CL): - - - - -

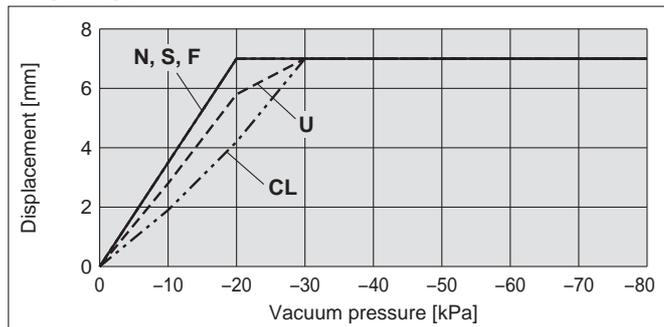
ZP3E-32BM □



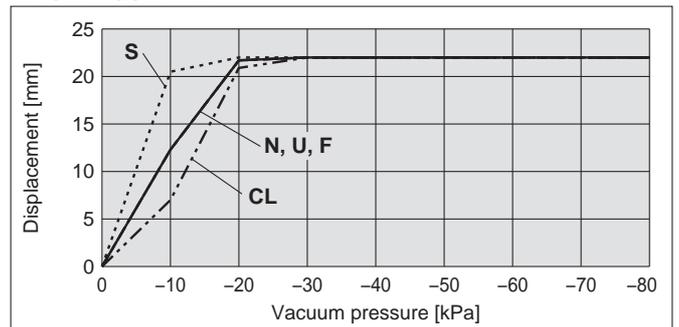
ZP3E-80BM □



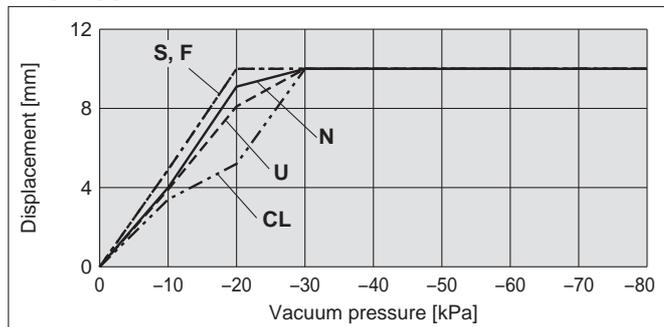
ZP3E-40BM □



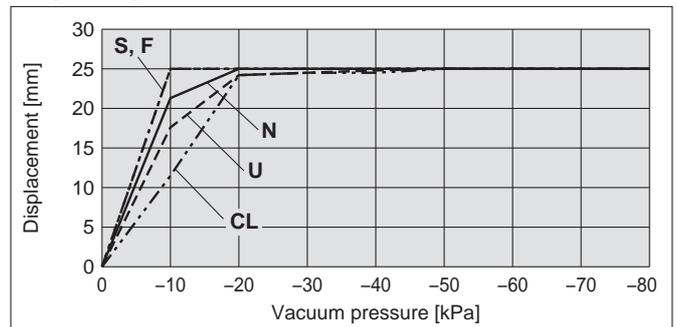
ZP3E-100BM □



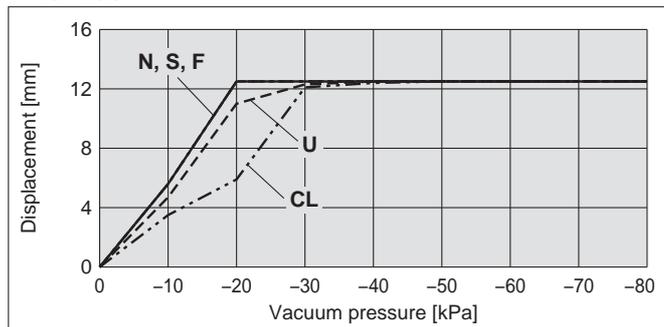
ZP3E-50BM □



ZP3E-125BM □



ZP3E-63BM □





High Rigidity Pad

Flat Type with Groove

ZP3E Series



Model Selection

How to Order

	Dimensions/Models	Construction	Mounting Bracket Assembly
Pad unit	ZP3E - 32 UM N - P	p. 209	p. 233 From p. 237
With adapter	ZP3E - T 32 UM N - A10	From p. 209	From p. 233 From p. 237
With buffer	ZP3E - T 32 UM N JB 10	From p. 212	p. 234 p. 240

● Flat type with groove

1 Vacuum inlet direction

Nil	Pad unit
T	Vertical
Y	Lateral

2 Pad diameter

32	ø32
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

3 Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
CL	Mark-free NBR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

4 Buffer specification

JB	Rotating, With bushing
----	------------------------

5 Buffer stroke

Stroke [mm]	Pad diameter
	All sizes
10	●
30	●
50	●

6 Connection thread

○: ZP3E-T/Vertical ●: ZP3E-Y/Lateral

6 Connection thread			Vacuum inlet		Pad diameter [mm]	
Type	Symbol	Size	Type	Size	ø32 to ø50	ø63 to ø125
Male thread	A10	M10 x 1	Use the connection thread.		○	—
	A16	M16 x 1.5			—	○
Female thread	B8	M8 x 1.25			○	—
	B10	M10 x 1.5			○	—
	B12	M12 x 1.75			—	○
	B18	M18 x 1.5			—	○
Male thread	AL14	M14 x 1	Female thread	Rc1/8	○	—
	AL16	M16 x 1.5		M5 x 0.8	●	—
Female thread	B8	M8 x 1.25		Rc1/8	—	○●
	B12	M12 x 1.75		M5 x 0.8	●	—
				Rc1/8	—	●

7 Plate

Nil	Without plate
P	With plate

ZP3E High Rigidity

Flat Type with Groove

Ball Joint, Flat Type with Groove

Bellows Type with Ribs and Groove

Ball Joint, Bellows Type with Ribs and Groove

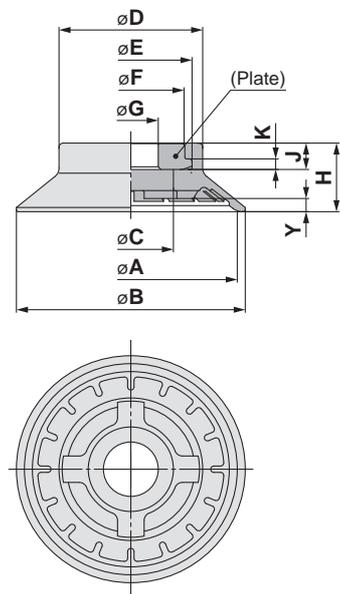
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

Single unit $\varnothing 32$ to $\varnothing 125$



ZP3E - **32** UM **N** - **P**

① ② ③ Plate

Nil	Without plate
P	With plate

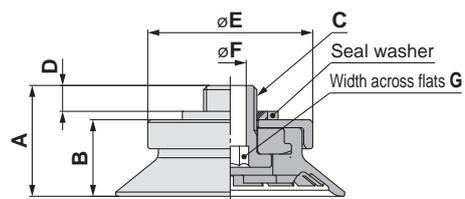
Model	① Pad dia.	Form	② Material	③ Plate	A	B	C	D	E	F	G	H	J	K	Y
	40		S	P	40	43									
	50		U		50	53	36	31	27	13.5	3				
	63		F		63	66	24	45	39	34	16.3	19.5	8	3	5
	80		CL		80	83									
	100				100	103									
	125				125	128		73	65	58					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Construction p. 233
Mounting Bracket Assembly From p. 237

With adapter $\varnothing 32$ to $\varnothing 125$

Vacuum inlet direction **Vertical**



Construction p. 233
Adapter Assembly p. 237

ZP3E - T **32** UM **N** - **A10**

① ② ③ Connection thread (Male thread)

A10	M10 x 1
A16	M16 x 1.5

Model	Vacuum inlet direction	① Pad dia.	Form	② Material	③ Connection thread	A	B	C	D	E	F	G
		40		S	A10	21.5	15	40				
		50		U		30.5	21.1	M16 x 1.5	7.4	48.9	10	10
		80		F						60.1		
		100		CL	A16	33	23.6			77.8		
		125										

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

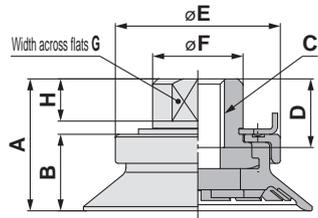
Dimensions/Models

With adapter $\varnothing 32$ to $\varnothing 125$

ZP3E - T **32** UM **N** - **B8**

① ② ③

Vacuum inlet direction **Vertical**



Construction	p. 233
Adapter Assembly	p. 238

③ Connection thread
(Female thread)

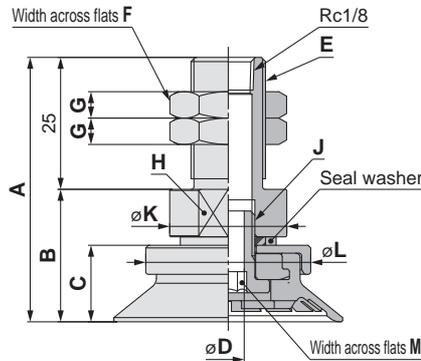
B8	M8 x 1.25
B10	M10 x 1.5
B12	M12 x 1.75
B18	M18 x 1.5

Model				A	B	C	D	E	F	G	H				
Vacuum inlet direction	① Pad dia.	② Form	③ Material												
ZP3E	T	UM	N S U F CL	B8	25	14.5	M8 x 1.25	9.5	31	17	14	8			
					25.5	15			40						
				B10	25	14.5	M10 x 1.5	13	31						
					25.5	15			40						
				B12	36	21.5	M12 x 1.75	12	50				32	24	12
					38.5	24			61						
	B18	36		21.5	M18 x 1.5	18	50								
		38.5		24			61								
							78.6								

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

ZP3E - T **32** UM **N** - **AL14**

① ② ③



Construction	p. 233
Adapter Assembly	p. 237

③ Connection thread
(Male thread)

AL14	M14 x 1
AL16	M16 x 1.5

Model				A	B	C	D	E	F	G	H	J	K	L	M					
Vacuum inlet direction	① Pad dia.	② Form	③ Material																	
ZP3E	T	UM	N S U F CL	AL14	50.1	25.1	14.5	6	M14 x 1	19	5	Width across flats 19	M10 x 1	22	31	6				
					50.6	25.6	15								40					
				AL16	63.1	38.1	21.1	10	M16 x 1.5	22	6	Width across flats 24	M16 x 1.5	48.9						
					65.6	40.6	23.6								60.1					

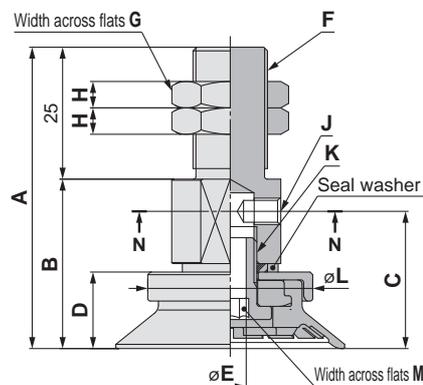
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

With adapter $\varnothing 32$ to $\varnothing 125$

ZP3E - Y **32** **UM** **N** - **AL14**

Vacuum inlet direction **Lateral**



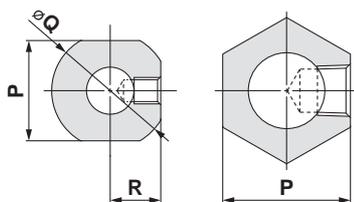
3 Connection thread
(Male thread)

AL14	M14 x 1
AL16	M16 x 1.5

		Model																				
	Vacuum inlet direction	1 Pad dia.	Form	2 Material	3 Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R		
ZP3E	Y	32	UM	N S U F CL	AL14	57.1	32.1	26	14.5	6	M14 x 1	19	5	M5 x 0.8/ Effective thread depth 5	M10 x 1	31	6	Width across flats 19	22	9.5		
		40				57.6	32.6	26.5	15							40						
		63			AL16	72.6	47.6	37.6	21.1	10	M16 x 1.5	22	6	Rc1/8	M16 x 1.5	48.9	10	Width across flats 24				
		80				75.1	50.1	40.1	23.6							60.1						
		125																				

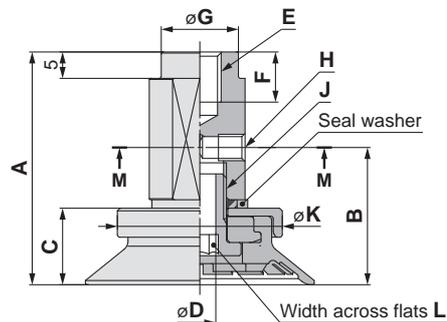
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

N-N ($\varnothing 32$ to $\varnothing 50$) **N-N** ($\varnothing 63$ to $\varnothing 125$)



Construction	p. 233
Adapter Assembly	p. 239

ZP3E - Y **32** **UM** **N** - **B8**

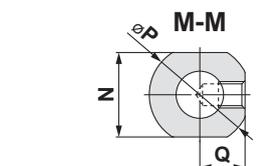


3 Connection thread
(Female thread)

B8	M8 x 1.25
B12	M12 x 1.75

		Model																	
	Vacuum inlet direction	1 Pad dia.	Form	2 Material	3 Connection thread	A	B	C	D	E	F	G	H	J	K	L	N	P	Q
ZP3E	Y	32	UM	N S U F CL	B8	44.1	26	14.5	6	M8 x 1.25	9.5	14.5	M5 x 0.8/ Effective thread depth 5	M10 x 1	31	6	16	19	8.5
		40				44.6	26.5	15							40				
		63			B12	61.6	37.6	21.1	10	M12 x 1.75	12	19	Rc1/8	M16 x 1.5	48.9	10	24	28	12.5
		80				64.1	40.1	23.6							60.1				
		125																	

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR



Construction	p. 234
Adapter Assembly	p. 239

Dimensions/Models

With buffer $\varnothing 32$ to $\varnothing 125$

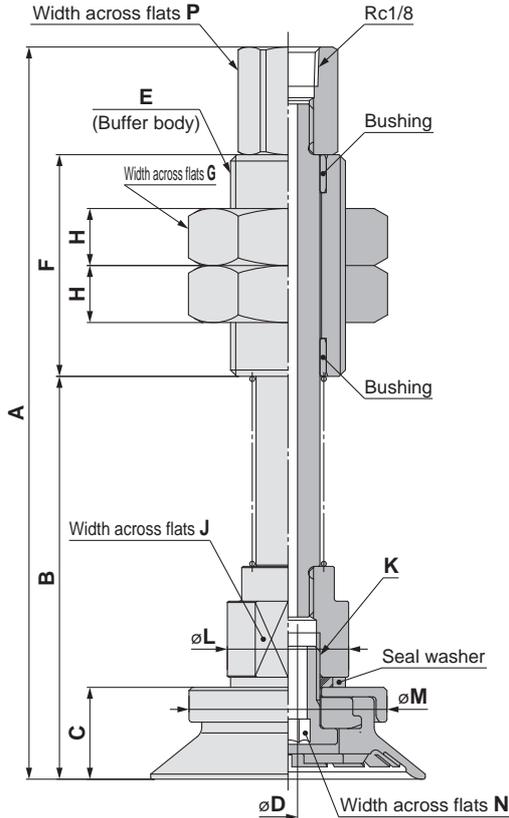
ZP3E - T **32** UM **N** **JB** **10**

① ② ④

③ Buffer specification

JB Rotating, With bushing

Vacuum inlet direction **Vertical**



Construction	p. 234
Buffer Assembly	p. 240

	Vacuum inlet direction	Model				A	B	C	D	E	F	G	H	J	K	L	M	N	P		
		① Pad dia.	② Form	③ Material	④ Buffer spec.																
ZP3E	T	32 40	UM	N S U F CL	JB	10	115.6	63.6	3	M18 x 1.5	35	27	9	16	M10 x 1	19	31	6	14		
						30	140.6	88.6												14.5	
						50	160.6	108.6													
						10	116.1	64.1												15	
							30	141.1													89.1
						50	161.1	109.1													
		63 80	UM	N S U F CL	JB	10	151.1	81.1	21.1	4	M22 x 1.5	50	30	8	24	M16 x 1.5	28	48.9	10	17	
						30	176.1	106.1													
						50	196.1	126.1													
						10	153.6	83.6													23.6
							30	178.6													
						50	198.6	128.6													
		100	UM	N S U F CL	JB	10	153.6	83.6	23.6	4	M22 x 1.5	50	30	8	24	M16 x 1.5	28	60.1	10	17	
						30	178.6	108.6													
						50	198.6	128.6													
						10	153.6	83.6													
125	UM	N S U F CL	JB	30	178.6	108.6	23.6	4	M22 x 1.5	50	30	8	24	M16 x 1.5	28	77.8	10	17			
				50	198.6	128.6															

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

With buffer $\varnothing 32$ to $\varnothing 125$

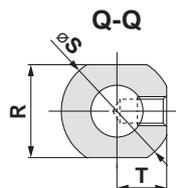
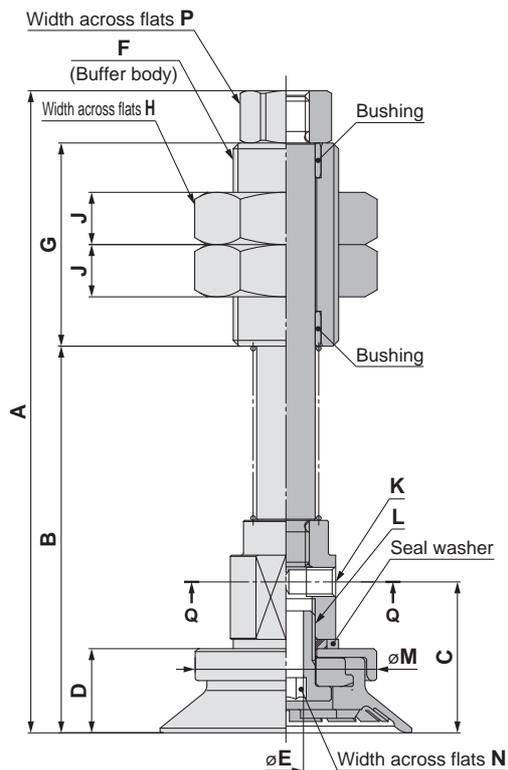
ZP3E - Y **32** UM **N** **JB** **10**

① ② ④

③ Buffer specification

JB Rotating, With bushing

Vacuum inlet direction **Lateral**



Construction	p. 234
Buffer Assembly	p. 240

	Vacuum inlet direction	Model				A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T					
		① Pad dia.	② Form	②*1 Material	③ Buffer spec.																		④ Buffer stroke				
ZP3E	Y	32 40	UM	N S U F CL	JB	10	110.6	66.6	26	14.5	6	M18 x 1.5	35	27	9	M5 x 0.8/ Effective thread depth 5	M10 x 1	31	6	14	16	19	8.5				
						30	135.6	91.6																			
		50				10	111.1	67.1	26.5	15	10	M22 x 1.5	50	30	8	Rc1/8	M16 x 1.5	60.1	10	17	24	28	12.5				
						30	136.1	92.1																			
		63 80				10	148.1	88.1	37.6	21.1	10	M22 x 1.5	50	30	8	Rc1/8	M16 x 1.5	60.1	10	17	24	28	12.5				
						30	173.1	113.1																			
		100				10	150.6	90.6	40.1	23.6	10	M22 x 1.5	50	30	8	Rc1/8	M16 x 1.5	60.1	10	17	24	28	12.5				
						30	175.6	115.6																			
		125				10	150.6	90.6	40.1	23.6	10	M22 x 1.5	50	30	8	Rc1/8	M16 x 1.5	60.1	10	17	24	28	12.5				
						30	175.6	115.6																			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR



High Rigidity Pad

Flat Type with Groove Ball Joint Type

ZP3E Series



Model Selection

How to Order

	Pad unit	With adapter	With buffer	Dimensions/Models	Construction	Mounting Bracket Assembly
	ZP3E - 32 UM N - P	ZP3E - T F 32 UM N - AL6	ZP3E - T F 32 UM N JB 10	p. 215	p. 235	From p. 241
				From p. 215	From p. 235	From p. 241
				From p. 218	p. 236	p. 244

1 Ball joint 2 Flat type with groove

1 Vacuum inlet direction

Nil	Pad unit
T	Vertical
Y	Lateral

2 Pad diameter

32	ø32
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

3 Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
CL	Mark-free NBR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

4 Buffer specification

JB	Rotating, With bushing
----	------------------------

5 Buffer stroke

Stroke [mm]	Pad diameter
	All sizes
10	●
30	●
50	●

6 Connection thread

○: ZP3E-T/Vertical ●: ZP3E-Y/Lateral

6 Connection thread			Vacuum inlet		Pad diameter [mm]	
Type	Symbol	Size	Type	Size	ø32 to ø50	ø63 to ø125
Male thread	AL6	M6 x 1	Use the connection thread.		○	—
	AL12	M12 x 1.25			—	○
	AL14	M14 x 1	Female thread	Rc1/8	○	—
				M5 x 0.8	●	—
AL16	M16 x 1.5		Rc1/8	—	○●	
Female thread	B8	M8 x 1.25	Use the connection thread.		○	—
	B12	M12 x 1.75			—	○
	B8	M8 x 1.25	Female thread	M5 x 0.8	●	—
				Rc1/8	—	●

7 Plate

Nil	Without plate
P	With plate

ZP3E High Rigidity

Flat Type with Groove

Ball Joint, Flat Type with Groove

Bellows Type with Ribs and Groove

Ball Joint, Bellows Type with Ribs and Groove

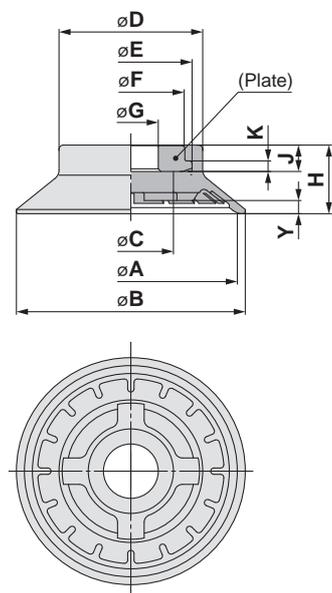
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

Single unit $\varnothing 32$ to $\varnothing 125$



ZP3E - **32** UM **N** - **P**

①

②

③ Plate

Nil	Without plate
P	With plate

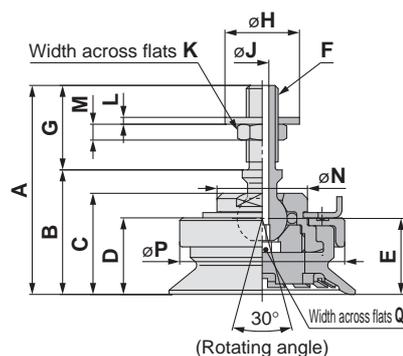
Model	① Pad dia.	Form	② Material	③ Plate	A	B	C	D	E	F	G	H	J	K	Y
ZP3E	32	UM	N S U F CL	Nil P	32	35	16	27	23	20	10.3	13	5	2	2
	40				43	2.5									
	50				53	3									
	63				66	24	45	39	34	16.3	19.5	8	3	5	
	80				83									7	
	100				103									7	
125	128	73	65	58	22										

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Construction p. 235
Mounting Bracket Assembly From p. 241

With adapter $\varnothing 32$ to $\varnothing 125$

Vacuum inlet direction **Vertical**



ZP3E - T F **32** UM **N** - **AL6**

①

②

③ Connection thread (Male thread)

AL6	M6 x 1
AL12	M12 x 1.25

Model	Vacuum inlet direction	① Pad dia.	Form	② Material	③ Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
ZP3E	TF	32	UM	N S U F CL	AL6	39.6	23.6	19.2	14.5	14.4	M6 x 1	16	14	2.5	8	1.3	3	17	31	2.5
		40				24.1	19.7	15	14.9	40										
		50				24.1	19.7	15	14.9	40										
		63				36.5	30.5	21.5	22.6	M12 x 1.25	20	24.3	4	19	2	7	32	50	4	
		80				39	33	24	25.1											61
		100				39	33	24	25.1											78.6
125	59	39	33	24	25.1															

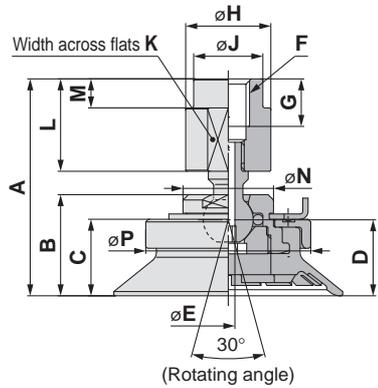
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Construction p. 235
Adapter Assembly p. 241

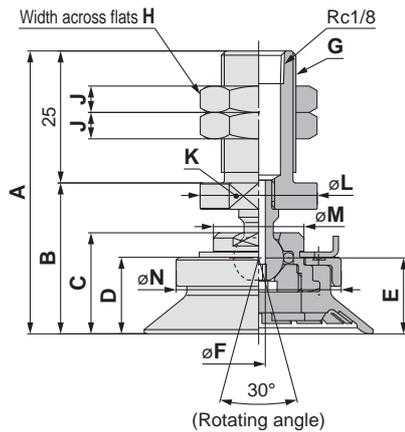
Dimensions/Models

With adapter $\varnothing 32$ to $\varnothing 125$

Vacuum inlet direction **Vertical**



Construction	p. 235
Adapter Assembly	p. 242



Construction	p. 235
Adapter Assembly	p. 242

ZP3E - T F **32** U M **N** - **B8**

1

2

3 Connection thread (Female thread)

B8	M8 x 1.25
B12	M12 x 1.75

Model	Vacuum inlet direction	1 Pad dia.	Form	2 Material	3 Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	N	P		
						ZP3E	TF	32	UM	N S U F CL	B8	41.1	19.2	14.5	14.4	2.5	M8 x 1.25	9	16	13	14
		40				41.6	19.7	15	14.9												40
		63			B12	63.5	30.5	21.5	22.6		4	M12 x 1.75	11	26	18	22	27	6	32	50	
		80					66	33	24		25.1										61
		100																			78.6
		125																			

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

ZP3E - T F **32** U M **N** - **AL14**

1

2

3 Connection thread (Male thread)

AL14	M14 x 1
AL16	M16 x 1.5

Model	Vacuum inlet direction	1 Pad dia.	Form	2 Material	3 Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	N		
						ZP3E	TF	32	UM	N S U F CL	AL14	53.6	28.6	19.2	14.5	14.4	2.5	M14 x 1	19	5
		40				54.1	29.1	19.7	15			14.9								40
		63			AL16	66.5	41.5	30.5	21.5		22.6	4	M16 x 1.5	22	6	Width across flats 24	32	50		
		80					69	44	33		24	25.1								61
		125																		78.6

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

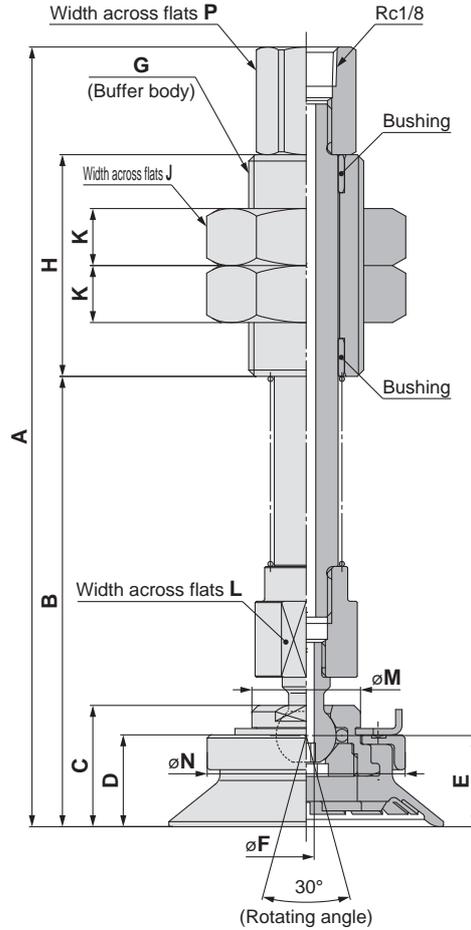
With buffer $\varnothing 32$ to $\varnothing 125$

ZP3E - T F **32** U M **N** **JB** **10**

① ② ④

③ Buffer specification
JB Rotating, With bushing

Vacuum inlet direction **Vertical**



Construction p. 236
 Buffer Assembly p. 244

	Vacuum inlet direction	Model				A	B	C	D	E	F	G	H	J	K	L	M	N	P			
		① Pad dia.	② Form	③ Material	④ Buffer spec.																	
ZP3E	TF	32 40	UM	N S U F C L	JB	10	123.1	71.1	19.2	14.5	14.4	2.5	M18 x 1.5	35	27	9	14	17	31	14		
						30	148.1	96.1														
						50	168.1	116.1														
						10	123.6	71.6														
						30	148.6	96.6														
						50	168.6	116.6														
		63 80	UM	N S U F C L	JB	10	168.5	98.5	30.5	21.5	22.6	4	M22 x 1.5	50	30	8	22	32	61	17	50	17
						30	193.5	123.5														
						50	213.5	143.5														
						10	171	101														
						30	196	126														
						50	216	146														
		100	UM	N S U F C L	JB	10	171	101	33	24	25.1	4	M22 x 1.5	50	30	8	22	32	61	17	50	17
						30	196	126														
						50	216	146														
						10	171	101														
30	196					126																
50	216					146																
125	UM	N S U F C L	JB	10	171	101	33	24	25.1	4	M22 x 1.5	50	30	8	22	32	61	17	50	17		
				30	196	126																
				50	216	146																
				10	171	101																
				30	196	126																
				50	216	146																

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

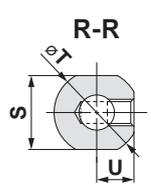
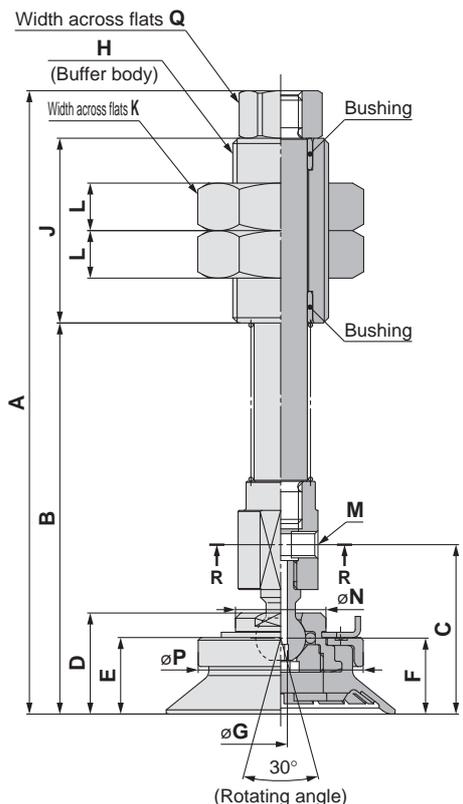
With buffer $\varnothing 32$ to $\varnothing 125$

ZP3E - Y F **32** UM **N** **JB** **10**

① ② ④

③ Buffer specification
JB Rotating, With bushing

Vacuum inlet direction **Lateral**



Construction	p. 236
Buffer Assembly	p. 244

	Vacuum inlet direction	Model				A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	S	T	U					
		① Pad dia.	② Form	②*1 Material	③ Buffer spec.																			④ Buffer stroke				
ZP3E	YF	32 40	UM	N S U F CL	JB	10	118.1	74.1																				
						30	143.1	99.1	32.1	19.2	14.5	14.4																
						50	163.1	119.1																				
						10	118.6	74.6																				
						30	143.6	99.6	32.6	19.7	15	14.9	2.5	M18 x 1.5	35	27	9	M5 x 0.8/ Effective thread depth 5	17				31	14	14	16	7	
						50	163.6	119.6																40				
		63 80	UM	N S U F CL	JB	10	165	105																				
						30	190	130	53.5	30.5	21.5	22.6											50					
						50	210	150																				
						10	167.5	107.5																				
						30	192.5	132.5																				
						50	212.5	152.5																				
						10	167.5	107.5	56	33	24	25.1	4	M22 x 1.5	50	30	8	Rc1/8	32				61	17	22	26	11	
						125	UM	N S U F CL	JB	10	167.5	107.5																
										30	192.5	132.5																
50	212.5	152.5																										

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR





High Rigidity Pad

Bellows Type with Ribs and Groove

ZP3E Series



Model Selection

How to Order

	Dimensions/Models	Construction	Mounting Bracket Assembly
Pad unit	ZP3E - 32 BM N - P	p. 221	p. 233
With adapter	ZP3E - T 32 BM N - A10	From p. 221	From p. 233
With buffer	ZP3E - T 32 BM N JB 10	From p. 224	p. 234

● Bellows type with ribs and groove

1 Vacuum inlet direction

Nil	Pad unit
T	Vertical
Y	Lateral

2 Pad diameter

32	ø32
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

3 Material

N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
CL	Mark-free NBR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

4 Buffer specification

JB	Rotating, With bushing
----	------------------------

5 Buffer stroke

Stroke [mm]	Pad diameter	
	All sizes	
10	●	●
30	●	●
50	●	●

6 Connection thread

○: ZP3E-T/Vertical ●: ZP3E-Y/Lateral

6 Connection thread			Vacuum inlet		Pad diameter [mm]	
Type	Symbol	Size	Type	Size	ø32 to ø50	ø63 to ø125
Male thread	A10	M10 x 1	Use the connection thread.		○	—
	A16	M16 x 1.5			—	○
	B8	M8 x 1.25			○	—
Female thread	B10	M10 x 1.5			○	—
	B12	M12 x 1.75			—	○
	B18	M18 x 1.5			—	○
Male thread	AL14	M14 x 1	Female thread	Rc1/8	○	—
	AL16	M16 x 1.5		M5 x 0.8	●	—
Female thread	B8	M8 x 1.25		Rc1/8	—	○●
	B12	M12 x 1.75		M5 x 0.8	●	—
			Rc1/8	—	●	

7 Plate

Nil	Without plate
P	With plate

ZP3E High Rigidity

Flat Type with Groove

Ball Joint, Flat Type with Groove

Bellows Type with Ribs and Groove

Ball Joint, Bellows Type with Ribs and Groove

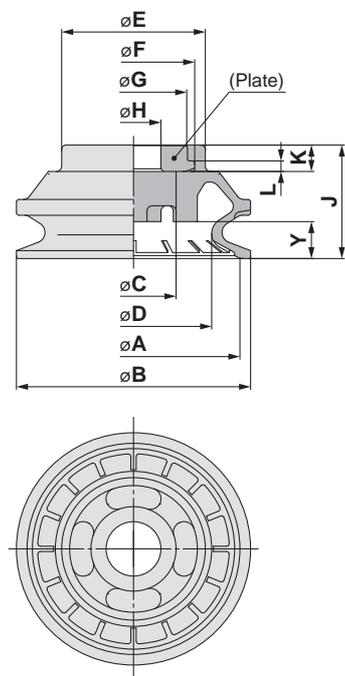
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

Single unit $\varnothing 32$ to $\varnothing 125$



ZP3E - **32** BM **N** - **P**

① ② ③ Plate

Nil	Without plate
P	With plate

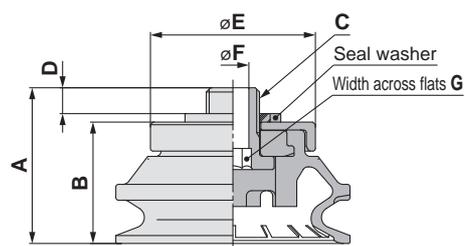
Model	① Pad dia.	Form	② Material	③ Plate	A	B	C	D	E	F	G	H	J	K	L	Y
	40		S		40	44		29.4					21.5			7
	50		U		50	54		37	36	31	27		25			10
	63		F		63	68		45.8	45	39	34		33			12.5
	80		CL		80	85	24	57	56	49.5	43	16.3	41	8	3	18
	100				100	106		71.5	73	65	58		50.5			22
	125				125	133		90.3	88	80	71		60			25

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Construction	p. 233
Mounting Bracket Assembly	From p. 237

With adapter $\varnothing 32$ to $\varnothing 125$

Vacuum inlet direction **Vertical**



Construction	p. 233
Adapter Assembly	p. 237

ZP3E - T **32** BM **N** - **A10**

① ② ③ Connection thread (Male thread)

A10	M10 x 1
A16	M16 x 1.5

Model	Vacuum inlet direction	① Pad dia.	Form	② Material	③ Connection thread	A	B	C	D	E	F	G
		40		S		29.5	23	40				
		50		U		33	26.5	48.9				
		63		F		44	34.6	M16 x 1.5	7.4	60.1	10	10
		80		CL	A16	52	42.6			77.8		
		100				61.5	52.1			93		
		125				71	61.6					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

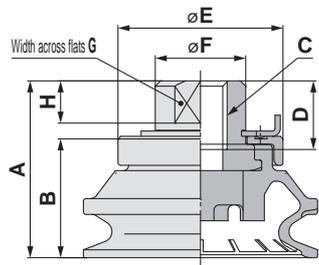
Dimensions/Models

With adapter $\varnothing 32$ to $\varnothing 125$

ZP3E - T **32** BM **N** - **B8**

① ② ③

Vacuum inlet direction **Vertical**



Construction	p. 233
Adapter Assembly	p. 238

③ Connection thread (Female thread)

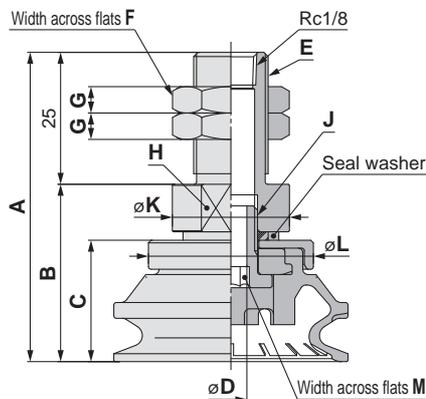
B8	M8 x 1.25
B10	M10 x 1.5
B12	M12 x 1.75
B18	M18 x 1.5

		Model				A	B	C	D	E	F	G	H	
ZP3E	T	① Pad dia.	② Form	③ Material	③ Connection thread	A	B	C	D	E	F	G	H	
														Material
ZP3E	T	32	BM	N	B8	31.5	21	M8 x 1.25	9.5	31	17	14	8	
						33.5	23							
						37	26.5							
						32	31.5	21	M10 x 1.5	13				31
						40	33.5	23						
						50	37	26.5						
		63	49.5	35	M12 x 1.75	12	50	32	24	12				
		80	57.5	43										
		100	67	52.5										
		125	76.5	62	M18 x 1.5	18	93.8							
		63	49.5	35										
		80	57.5	43										
100	67	52.5												
125	76.5	62												

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

ZP3E - T **32** BM **N** - **AL14**

① ② ③



Construction	p. 233
Adapter Assembly	p. 237

③ Connection thread (Male thread)

AL14	M14 x 1
AL16	M16 x 1.5

		Model																
ZP3E	T	① Pad dia.	② Form	③ Material	③ Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	
																		Material
ZP3E	T	32	BM	N	AL14	56.6	31.6	21	6	M14 x 1	19	5	Width across flats 19	M10 x 1	22	31	6	
						58.6	33.6	23										
						62.1	37.1	26.5										
						63	76.6	51.6	34.6	10	M16 x 1.5	22	6					Width across flats 24
						80	84.6	59.6	42.6									
						100	94.1	69.1	52.1									
		125	103.6	78.6	61.6													

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

With adapter $\varnothing 32$ to $\varnothing 125$

ZP3E - Y $\boxed{32}$ BM \boxed{N} - $\boxed{AL14}$

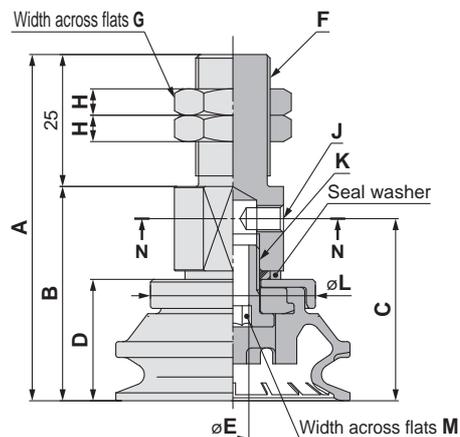
①

②

③ **Connection thread (Male thread)**

AL14	M14 x 1
AL16	M16 x 1.5

Vacuum inlet direction **Lateral**

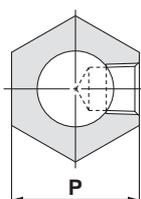
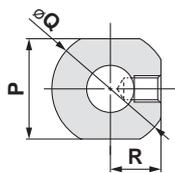


Model		①	②	③	A	B	C	D	E	F	G	H	J	K	L	M	P	Q	R
Vacuum inlet direction	Pad dia.	Form	Material	Connection thread															
ZP3E	Y	BM	N S U F CL	AL14	63.6	38.6	32.5	21	6	M14 x 1	19	5	M5 x 0.8/ Effective thread depth 5	M10 x 1	31	6	Width across flats 19	22	9.5
					40	40.6	34.5	23							40				
					50	44.1	38	26.5							40				
					63	61.1	51.1	34.6							48.9				
					80	69.1	59.1	42.6							60.1				
	Y	BM		AL16	100	78.6	68.6	52.1	10	M16 x 1.5	22	6	Rc1/8	M16 x 1.5	77.8	10	Width across flats 24		
					125	88.1	78.1	61.6							93				

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

N-N
($\varnothing 32$ to $\varnothing 50$)

N-N
($\varnothing 63$ to $\varnothing 125$)



Construction	p. 233
Adapter Assembly	p. 239

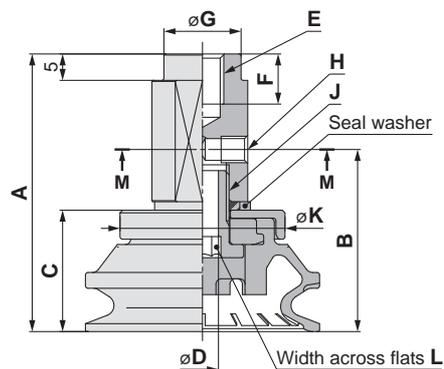
ZP3E - Y $\boxed{32}$ BM \boxed{N} - $\boxed{B8}$

①

②

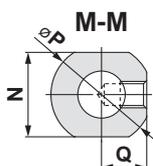
③ **Connection thread (Female thread)**

B8	M8 x 1.25
B12	M12 x 1.75



Model		①	②	③	A	B	C	D	E	F	G	H	J	K	L	N	P	Q	
Vacuum inlet direction	Pad dia.	Form	Material	Connection thread															
ZP3E	Y	BM	N S U F CL	B8	50.6	32.5	21	6	M8 x 1.25	9.5	14.5	M5 x 0.8/ Effective thread depth 5	M10 x 1	31	6	16	19	8.5	
					40	34.5	23							40					
					50	38	26.5							40					
					63	51.1	34.6							48.9					
					80	59.1	42.6							60.1					
	Y	BM		B12	100	68.6	52.1	10	M12 x 1.75	12	19	Rc1/8	M16 x 1.5	77.8	10	24	28	12.5	
					125	78.1	61.6							93					

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR



Construction	p. 234
Adapter Assembly	p. 239

Dimensions/Models

With buffer $\varnothing 32$ to $\varnothing 125$

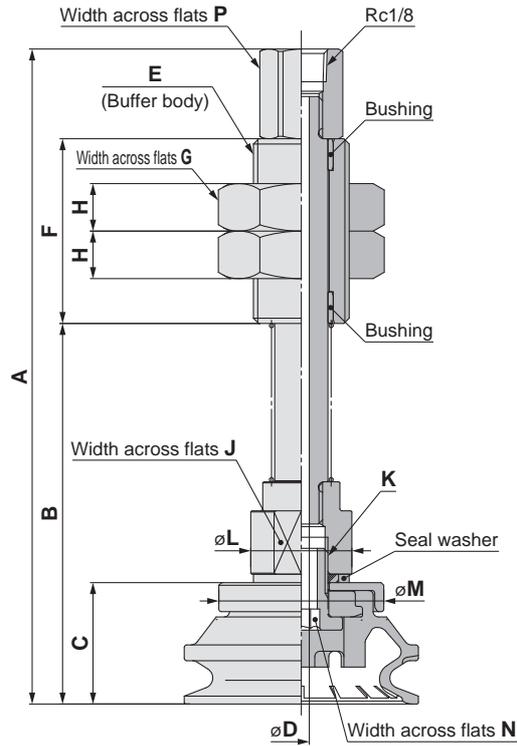
ZP3E - T **32** **BM** **N** **JB** **10**

① ② ④

③ Buffer specification

JB Rotating, With bushing

Vacuum inlet direction **Vertical**



Construction	p. 234
Buffer Assembly	p. 240

	Vacuum inlet direction	Model				A	B	C	D	E	F	G	H	J	K	L	M	N	P										
		① Pad dia.	② Form	③ Material	④ Buffer spec.																								
ZP3E	T	32	BM	N S U F CL	JB	10	122.1	70.1	21	M18 x 1.5	35	27	9	16	M10 x 1	19	31	6	14										
						30	147.1	95.1																					
						50	167.1	115.1																					
						10	124.1	72.1	23																				
						30	149.1	97.1																					
						50	169.1	117.1																					
						10	127.6	75.6	26.5																				
						30	152.6	100.6																					
						50	172.6	120.6																					
						10	164.6	94.6	34.6											M22 x 1.5	50	30	8	24	M16 x 1.5	28	48.9	10	17
						30	189.6	119.6																					
						50	209.6	139.6																					
		10	172.6	102.6	42.6																								
		30	197.6	127.6																									
		50	217.6	147.6																									
		10	182.1	112.1	52.1																								
		30	207.1	137.1																									
		50	227.1	157.1																									
		10	191.6	121.6	61.6																								
		30	216.6	146.6																									
50	236.6	166.6																											

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

With buffer $\varnothing 32$ to $\varnothing 125$

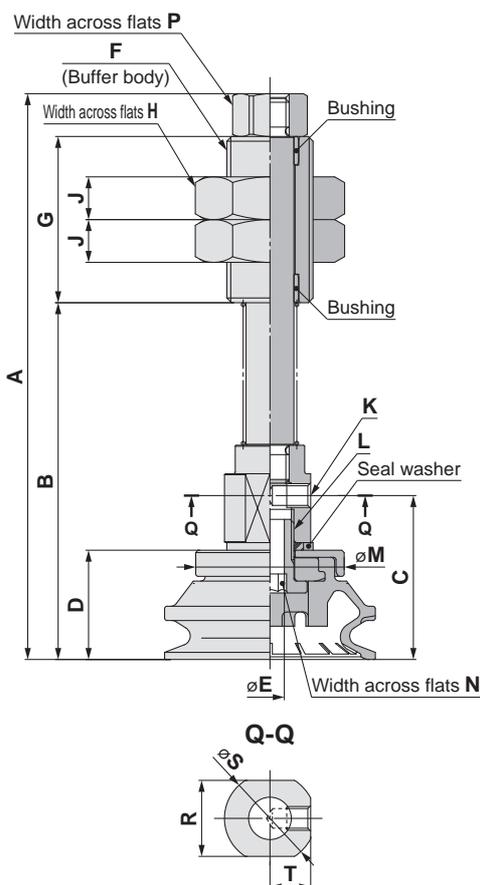
ZP3E - Y **32** BM **N** **JB** **10**

① ② ④

③ Buffer specification

JB Rotating, With bushing

Vacuum inlet direction **Lateral**



Construction	p. 234
Buffer Assembly	p. 240

Model	Vacuum inlet direction	① Pad dia.	② Form	③ Material	④ Buffer spec.	⑤ Buffer stroke	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T					
ZP3E	Y	32	BM	N S U F CL	JB	10	117.1	73.1																				
						30	142.1	98.1	32.5	21																		
						50	162.1	118.1																				
						10	119.1	75.1																				
						30	144.1	100.1	34.5	23	6	M18 x 1.5	35	27	9	M5 x 0.8/ Effective thread depth 5						31						
						50	164.1	120.1																				
		10	122.6			78.6																						
		30	147.6			103.6	38	26.5													40							
		50	167.6			123.6																						
		10	161.6			101.6																						
		30	186.6			126.6	51.1	34.6														48.9						
		50	206.6			146.6																						
		10	169.6			109.6																						
		30	194.6			134.6	59.1	42.6																				
		50	214.6			154.6																						
		10	179.1			119.1								10	M22 x 1.5	50	30	8	Rc1/8	M16 x 1.5		60.1						
		30	204.1			144.1	68.6	52.1																				
		50	224.1			164.1																						
		10	188.6			128.6																						
		30	213.6			153.6	78.1	61.6																				
		50	233.6			173.6																93						

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR



High Rigidity Pad

Bellows Type with Ribs and Groove Ball Joint Type

ZP3E Series



Model Selection

How to Order

	Dimensions/Models	Construction	Mounting Bracket Assembly
Pad unit	ZP3E - 32 BM N - P	p. 227	p. 235 From p. 241
With adapter	ZP3E - T F 32 BM N - AL6	From p. 227	From p. 235 From p. 241
With buffer	ZP3E - T F 32 BM N JB 10	From p. 231	p. 236 p. 244

①
②
③
④
⑤

● Ball joint
● Bellows type with ribs and groove

① Vacuum inlet direction

Symbol	Pad unit
Nil	Pad unit
T	Vertical
Y	Lateral

② Pad diameter

Symbol	Pad diameter
32	ø32
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

③ Material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
CL	Mark-free NBR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

④ Buffer specification

Symbol	Buffer specification
JB	Rotating, With bushing

⑤ Buffer stroke

Stroke [mm]	Pad diameter
	All sizes
10	●
30	●
50	●

⑥ Connection thread

○: ZP3E-T/Vertical ●: ZP3E-Y/Lateral

⑥ Connection thread		Vacuum inlet		Pad diameter [mm]	
Type	Symbol	Type	Size	ø32 to ø50	ø63 to ø125
Male thread	AL6	Use the connection thread.		○	—
	AL12	Use the connection thread.		—	○
	AL14	Female thread	Rc1/8	○	—
	AL16		M5 x 0.8	●	—
Female thread	B8	Use the connection thread.	Rc1/8	—	○●
	B12		—	○	—
	B8	Female thread	M5 x 0.8	●	—
	B12		Rc1/8	—	●

⑦ Plate

Symbol	Plate
Nil	Without plate
P	With plate

ZP3E High Rigidity

Flat Type with Groove

Ball Joint, Flat Type with Groove

Bellows Type with Ribs and Groove

Ball Joint, Bellows Type with Ribs and Groove

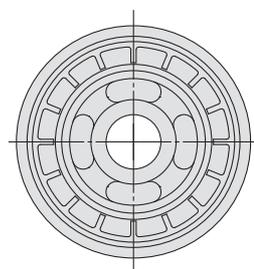
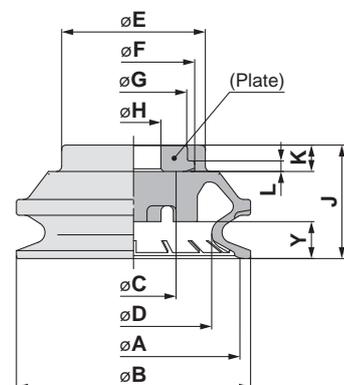
Construction

Mounting Bracket Assembly

Precautions

Dimensions/Models

Single unit $\varnothing 32$ to $\varnothing 125$



ZP3E - $\boxed{32}$ BM \boxed{N} - \boxed{P}

① ② ③ Plate

Nil	Without plate
P	With plate

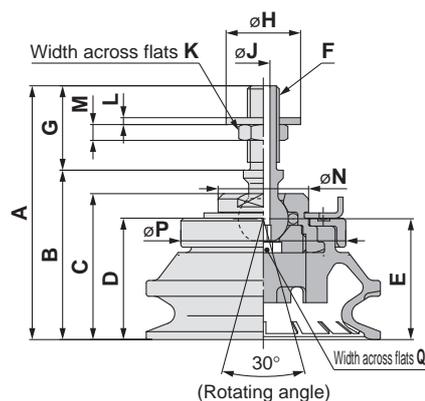
Model	① Pad dia.	Form	② Material	③ Plate	A	B	C	D	E	F	G	H	J	K	L	Y
	40				40	44		29.4					21.5			7
	50				50	54		37	36	31	27		25			10
	63				63	68		45.8	45	39	34		33			12.5
	80				80	85	24	57	56	49.5	43	16.3	41	8	3	18
	100				100	106		71.5	73	65	58		50.5			22
	125				125	133		90.3	88	80	71		60			25

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Construction	p. 235
Mounting Bracket Assembly	From p. 241

With adapter $\varnothing 32$ to $\varnothing 125$

Vacuum inlet direction **Vertical**



ZP3E - TF $\boxed{32}$ BM \boxed{N} - $\boxed{AL6}$

① ② ③ Connection thread (Male thread)

AL6	M6 x 1
AL12	M12 x 1.25

Model	Vacuum inlet direction	① Pad dia.	Form	② Material	③ Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		40				48.1	32.1	27.7	23	22.9									40	
		50				51.6	35.6	31.2	26.5	26.4									50	
		63				70	50	44	35	36.1	M12 x 1.25	20	24.3	4	19	2	7	32	61	4
		80				78	58	52	43	44.1									78.6	
		100				87.5	67.5	61.5	52.5	53.6									93.8	
		125				97	77	71	62	63.1										

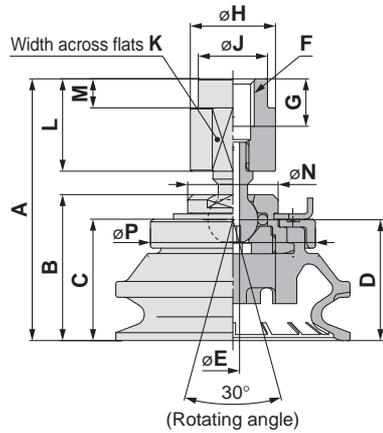
*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Construction	p. 235
Adapter Assembly	p. 241

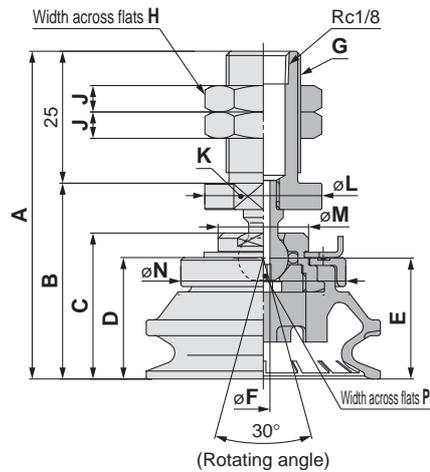
Dimensions/Models

With adapter $\varnothing 32$ to $\varnothing 125$

Vacuum inlet direction **Vertical**



Construction	p. 235
Adapter Assembly	p. 242



Construction	p. 235
Adapter Assembly	p. 242

ZP3E - T F **32** BM **N** - **B8**

1

2

3 Connection thread (Female thread)

B8	M8 x 1.25
B12	M12 x 1.75

Model	Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	N	P	
						ZP3E	TF	32	BM	N S U F CL	B8	47.6	25.7	21	20.9	2.5	M8 x 1.25	9	16	13
40	49.6	27.7	23	22.9	40															
50	53.1	31.2	26.5	26.4	40															
63	77	44	35	36.1	4	M12 x 1.75	11	26	18		22	27	6	32	50					
80	85	52	43	44.1											61					
100	94.5	61.5	52.5	53.6											78.6					
125	104	71	62	63.1																93.8

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

ZP3E - T F **32** BM **N** - **AL14**

1

2

3 Connection thread (Male thread)

AL14	M14 x 1
AL16	M16 x 1.5

Model	Vacuum inlet direction	1 Pad dia.	Form	2 *1 Material	3 Connection thread	A	B	C	D	E	F	G	H	J	K	L	M	N		
						ZP3E	TF	32	BM	N S U F CL	AL14	60.1	35.1	25.7	21	20.9	2.5	M14 x 1	19	5
40	62.1	37.1	27.7	23	22.9	40														
50	65.6	40.6	31.2	26.5	26.4	40														
63	80	55	44	35	36.1	4	M16 x 1.5	22	6		Width across flats 24	32	50							
80	88	63	52	43	44.1								61							
100	97.5	72.5	61.5	52.5	53.6								78.6							
125	107	82	71	62	63.1															93.8

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

With adapter $\varnothing 32$ to $\varnothing 125$

ZP3E - Y F **32** BM **N** - **AL14**

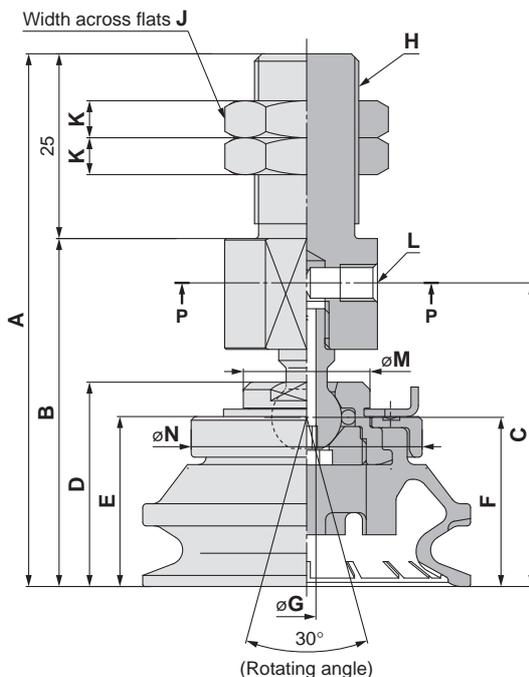
①

②

③ Connection thread
(Male thread)

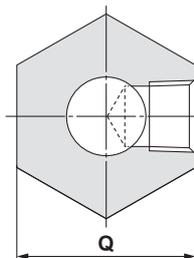
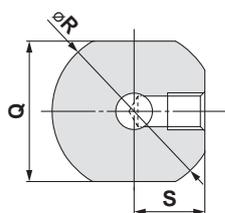
AL14	M14 x 1
AL16	M16 x 1.5

Vacuum inlet direction **Lateral**



P-P
($\varnothing 32$ to $\varnothing 50$)

P-P
($\varnothing 63$ to $\varnothing 125$)



Construction	p. 235
Adapter Assembly	p. 243

Model					A	B	C	D	E	F	G	H	J	K	L	M	N	Q	R	S	
Vacuum inlet direction	① Pad dia.	Form	② Material ^{*1}	③ Connection thread																	
ZP3E	YF	BM	N S U F CL	AL14	32	70.1	45.1	39.1	25.7	21	20.9	2.5	M14 x 1	19	5	M5 x 0.8/ Effective thread depth 5	17	31	19	22	9.5
					40	72.1	47.1	41.1	27.7	23	22.9							40			
					50	75.6	50.6	44.6	31.2	26.5	26.4							50			
				AL16	63	102	77	67	44	35	36.1	4	M16 x 1.5	22	6	Rc1/8	32	61	24	24	93.8
					80	110	85	75	52	43	44.1							78.6			
					100	119.5	94.5	84.5	61.5	52.5	53.6							93.8			
125	129	104	94	71	62	63.1															

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

With adapter $\varnothing 32$ to $\varnothing 125$

ZP3E - Y F **32** BM **N** - **B8**

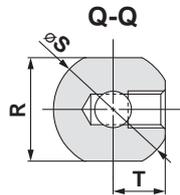
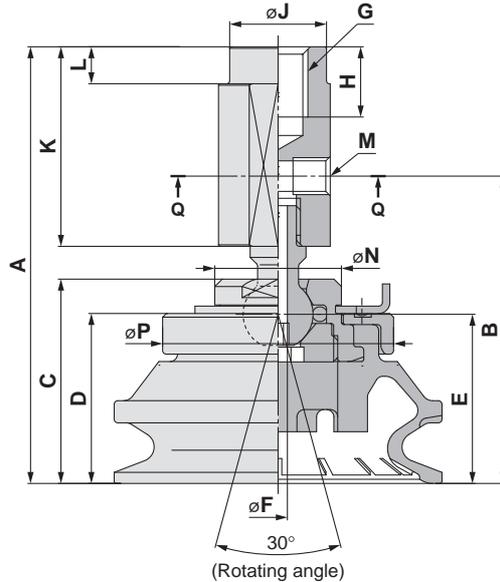
1

2

3 Connection thread (Female thread)

B8	M8 x 1.25
B12	M12 x 1.75

Vacuum inlet direction **Lateral**



Construction	p. 236
Adapter Assembly	p. 243

Model					A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	
Vacuum inlet direction	1 Pad dia.	Form	2 Material*1	3 Connection thread																		
ZP3E	YF	BM	N S U F CL	B8	32	57.1	39.6	25.7	21	20.9	2.5	M8 x 1.25	9.5	13	27	5	M5 x 0.8/ Effective thread depth 5	17	31	14	16	7
					40	59.1	41.6	27.7	23	22.9									40			
					50	62.6	45.1	31.2	26.5	26.4									50			
					63	90	67	44	35	36.1	4	M12 x 1.75	11.5	18	40	6	Rc1/8	32	61	22	26	11
					80	98	75	52	43	44.1									61			
					100	107.5	84.5	61.5	52.5	53.6									78.6			
125	117	94	71	62	63.1	93.8																

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

With buffer $\varnothing 32$ to $\varnothing 125$

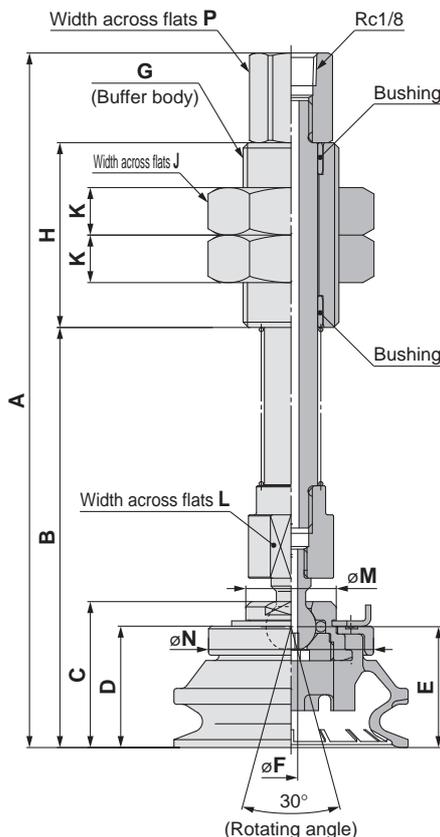
ZP3E - T F **32** BM **N** **JB** **10**

① ② ④

③ Buffer specification

JB Rotating, With bushing

Vacuum inlet direction **Vertical**



Construction	p. 236
Buffer Assembly	p. 244

	Vacuum inlet direction	Model				A	B	C	D	E	F	G	H	J	K	L	M	N	P																	
		① Pad dia.	② Form	③ Material	④ Buffer spec.																															
ZP3E	TF	32	BM	N S U F CL	JB	10	129.6	77.6	25.7	21	20.9	2.5	M18 x 1.5	35	27	9	14	17	31	14																
						30	154.6	102.6																												
						50	174.6	122.6																												
						10	131.6	79.6	27.7	23	22.9								4		M22 x 1.5	50	30	8	22	32	61	17								
						30	156.6	104.6																												
						50	176.6	124.6																												
						10	135.1	83.1	31.2	26.5	26.4																4		M22 x 1.5	50	30	8	22	32	78.6	17
						30	160.1	108.1																												
						50	180.1	128.1																												
						10	182	112	44	35	36.1																								4	
		30	207	137																																
		50	227	157																																
		10	190	120	52	43	44.1	4	M22 x 1.5	50	30	8	22	32	93.8	17																				
		30	215	145																																
		50	235	165																																
		10	199.5	129.5	61.5	52.5	53.6								4		M22 x 1.5	50	30	8	22	32	93.8	17												
		30	224.5	154.5																																
		50	244.5	174.5																																
		10	209	139	71	62	63.1																4		M22 x 1.5	50	30	8	22	32	93.8	17				
		30	234	164																																
50	254	184																																		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

Dimensions/Models

With buffer $\varnothing 32$ to $\varnothing 125$

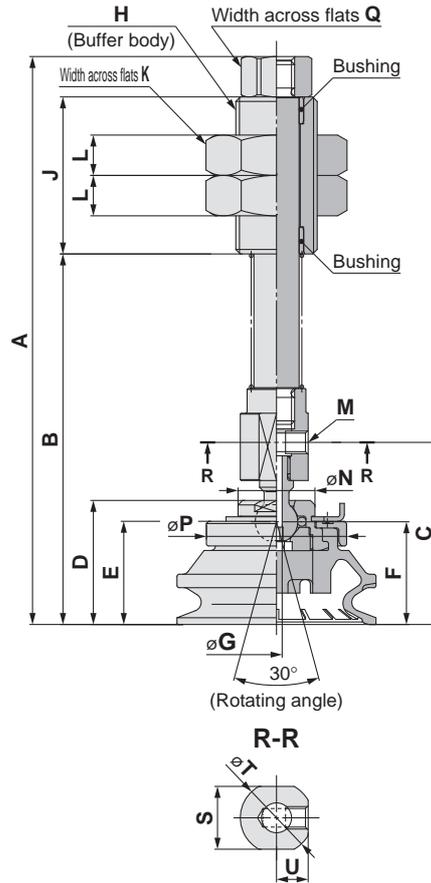
ZP3E - Y F **32** BM **N** **JB** **10**

① ② ④

③ Buffer specification

JB Rotating, With bushing

Vacuum inlet direction **Lateral**



Construction p. 236
Buffer Assembly p. 244

Model	Vacuum inlet direction	① Pad dia.	Form	② Material	③ Buffer spec.	④ Buffer stroke	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	S	T	U	
ZP3E	YF	32	BM	N S U F CL	JB	10	124.6	80.6	38.6	25.7	21	20.9	2.5	M18 x 1.5	35	27	9	M5 x 0.8/ Effective thread depth 5	17	31	14	14	16	7	
						30	149.6	105.6																	
						50	169.6	125.6																	
						10	126.6	82.6																	
						30	151.6	107.6																	
						50	171.6	127.6																	
		10				130.1	86.1																		
		30				155.1	111.1																		
		50				175.1	131.1																		
		10				178.5	118.5																		
		30				203.5	143.5	67	44	35	36.1														
		50				223.5	163.5																		
		10				186.5	126.5																		
		30				211.5	151.5	75	52	43	44.1														
		50				231.5	171.5																		
		10				196	136																		
		30				221	161	84.5	61.5	52.5	53.6														
		50				241	181																		
		10				205.5	145.5																		
		30				230.5	170.5	94	71	62	63.1														
		50				250.5	190.5																		

*1 N: NBR, S: Silicone rubber, U: Urethane rubber, F: FKM, CL: Mark-free NBR

High Rigidity Pad **ZP3E** Series

Standard Type

Construction

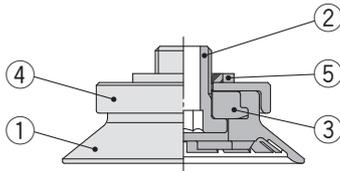
With adapter

Flat type with groove: $\phi 32$ to $\phi 125$

Bellows type with ribs and groove: $\phi 32$ to $\phi 125$

Vacuum inlet direction **Vertical** T Type/ZP3E-T

ZP3E-T□-A□

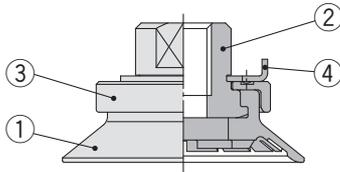


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Set screw	Brass (Electroless nickel plating)	
3	Plate	Aluminum alloy (Clear anodized)	
4	Holder	Aluminum alloy (Clear anodized)	Pad diameter: $\phi 32$ to $\phi 50$
		Structural steel (Electroless nickel plating)	Pad diameter: $\phi 63$ to $\phi 125$
5	Seal washer	Steel strip/NBR	

Vacuum inlet direction **Vertical** T Type/ZP3E-T

ZP3E-T□-B□

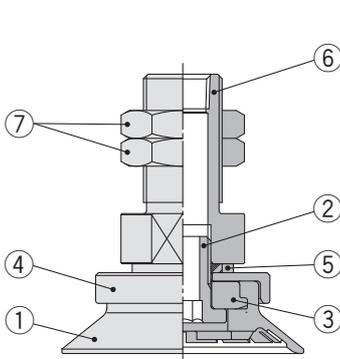


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Plate	Aluminum alloy (Clear anodized)	
3	Holder	Aluminum alloy (Clear anodized)	
4	Stopper	Stainless steel	

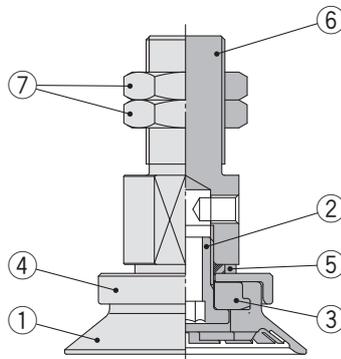
Vacuum inlet direction **Vertical**
T Type/ZP3E-T

ZP3E-T□-AL□



Vacuum inlet direction **Lateral**
Y Type/ZP3E-Y

ZP3E-Y□-AL□



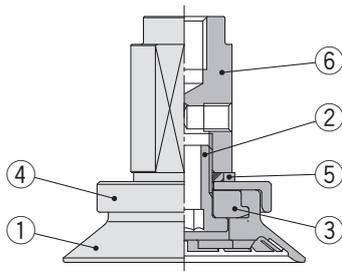
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Set screw	Brass (Electroless nickel plating)	
3	Plate	Aluminum alloy (Clear anodized)	
4	Holder	Aluminum alloy (Clear anodized)	Pad diameter: $\phi 32$ to $\phi 50$
		Structural steel (Electroless nickel plating)	Pad diameter: $\phi 63$ to $\phi 125$
5	Seal washer	Steel strip/NBR	
6	Adapter	Aluminum alloy (Clear anodized)	Pad diameter: $\phi 32$ to $\phi 50$
		Brass (Electroless nickel plating)	Pad diameter: $\phi 63$ to $\phi 125$
7	Nut	Brass (Electroless nickel plating)	Pad diameter: $\phi 32$ to $\phi 50$ M14 x 1
		Structural steel (Electroless nickel plating)	Pad diameter: $\phi 63$ to $\phi 125$ M16 x 1.5

With adapter Flat type with groove: $\phi 32$ to $\phi 125$ | Bellows type with ribs and groove: $\phi 32$ to $\phi 125$

Vacuum inlet direction **Lateral** Y Type/ZP3E-Y

ZP3E-Y□-B□



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Set screw	Brass (Electroless nickel plating)	
3	Plate	Aluminum alloy (Clear anodized)	
4	Holder	Aluminum alloy (Clear anodized) Structural steel (Electroless nickel plating)	Pad diameter: $\phi 32$ to $\phi 50$ Pad diameter: $\phi 63$ to $\phi 125$
5	Seal washer	Steel strip/NBR	
6	Adapter	Aluminum alloy (Clear anodized)	

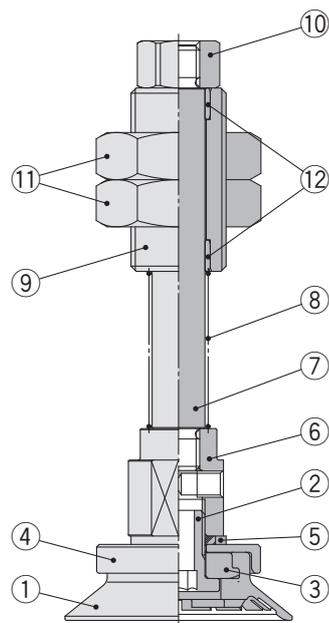
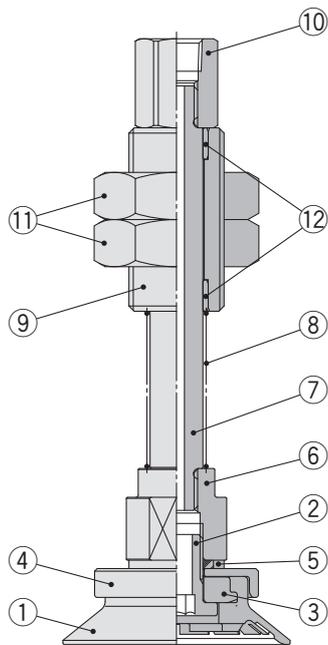
With buffer Flat type with groove: $\phi 32$ to $\phi 125$ | Bellows type with ribs and groove: $\phi 32$ to $\phi 125$

Vacuum inlet direction **Vertical**
T Type/ZP3E-T

Vacuum inlet direction **Lateral**
Y Type/ZP3E-Y

ZP3E-T□

ZP3E-Y□



Component Parts

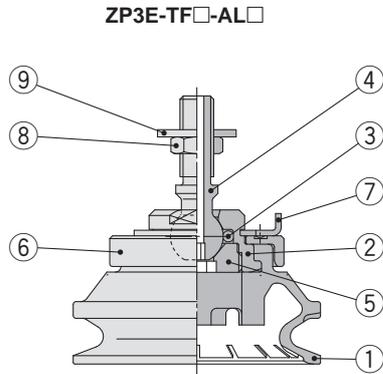
No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Set screw	Brass (Electroless nickel plating)	
3	Plate	Aluminum alloy (Clear anodized)	
4	Holder	Aluminum alloy (Clear anodized) Structural steel (Electroless nickel plating)	Pad diameter: $\phi 32$ to $\phi 50$ Pad diameter: $\phi 63$ to $\phi 125$
5	Seal washer	Soft iron/NBR (Zinc chromated)	
6	Adapter	Aluminum alloy (Clear anodized)	
7	Piston rod	Structural steel (Hard chrome plating)	
8	Return spring	Stainless steel	
9	Buffer body	Brass (Electroless nickel plating)	
10	Buffer adapter	Brass (Electroless nickel plating)	
11	Nut	Structural steel (Nickel plating)	M18 x 1.5 M22 x 1.5
12	Bushing	—	

High Rigidity Pad **ZP3E Series** Construction

Ball Joint Type

With adapter Flat type with groove: $\phi 32$ to $\phi 125$ Bellows type with ribs and groove: $\phi 32$ to $\phi 125$

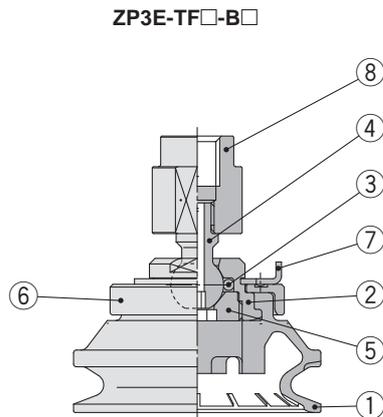
Vacuum inlet direction **Vertical** T Type/ZP3E-TF



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Plate	Stainless steel	Pad diameter: $\phi 32$ to $\phi 50$
		Aluminum alloy (Clear anodized)	Pad diameter: $\phi 63$ to $\phi 125$
3	O-ring	FKM	
4	Shaft	Stainless steel	
5	Shaft ring	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Nut	Brass (Electroless nickel plating)	
9	Seal washer	Soft iron/NBR (Zinc chromated)	

Vacuum inlet direction **Vertical** T Type/ZP3E-TF

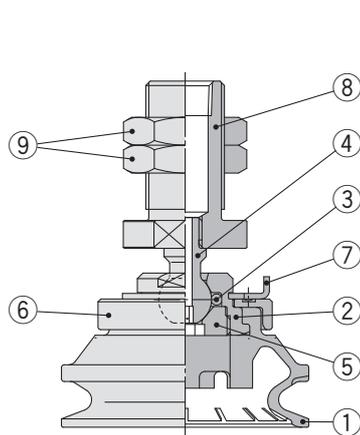


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Plate	Stainless steel	
3	O-ring	FKM	
4	Shaft	Stainless steel	
5	Shaft ring	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Adapter	Aluminum alloy (Clear anodized)	

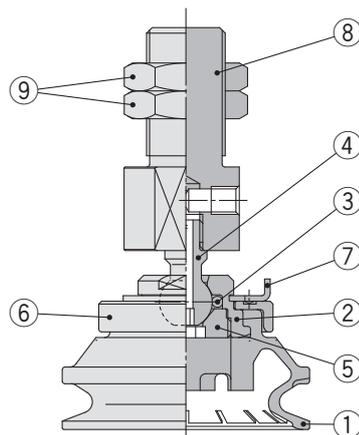
Vacuum inlet direction **Vertical** T Type/ZP3E-TF

ZP3E-TF□-AL□



Vacuum inlet direction **Lateral** Y Type/ZP3E-YF

ZP3E-YF□-AL□



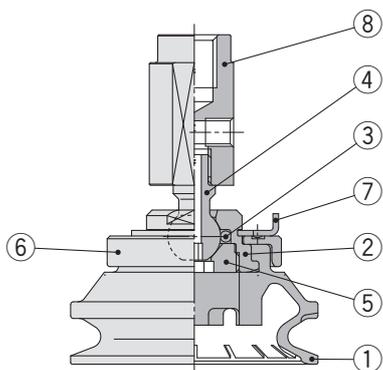
Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Plate	Stainless steel	
3	O-ring	FKM	
4	Shaft	Stainless steel	
5	Shaft ring	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Adapter	Aluminum alloy (Clear anodized)	Pad diameter: $\phi 32$ to $\phi 50$ M14 x 1
		Brass (Electroless nickel plating)	Pad diameter: $\phi 63$ to $\phi 125$ M16 x 1.5
9	Nut	Brass (Electroless nickel plating)	

With adapter Flat type with groove: $\phi 32$ to $\phi 125$ Bellows type with ribs and groove: $\phi 32$ to $\phi 125$

Vacuum inlet direction **Lateral** Y Type/ZP3E-YF

ZP3E-YF□-B□



Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Plate	Stainless steel	
3	O-ring	FKM	
4	Shaft	Stainless steel	
5	Shaft ring	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Adapter	Aluminum alloy (Clear anodized)	

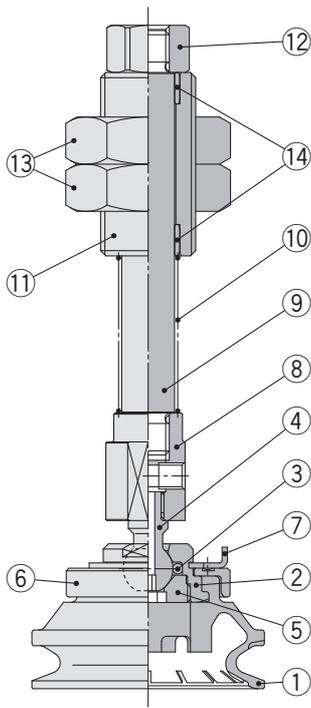
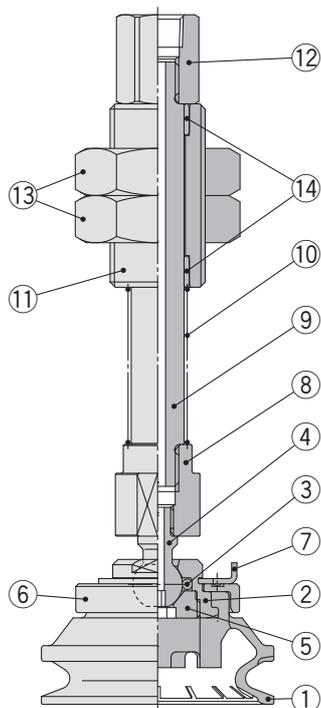
With buffer Flat type with groove: $\phi 32$ to $\phi 125$ Bellows type with ribs and groove: $\phi 32$ to $\phi 125$

Vacuum inlet direction **Vertical**
T Type/ZP3E-TF

Vacuum inlet direction **Lateral**
Y Type/ZP3E-YF

ZP3E-TF□

ZP3E-YF□

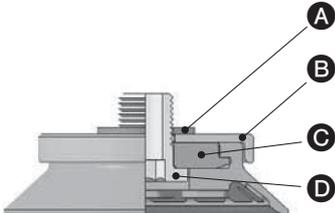
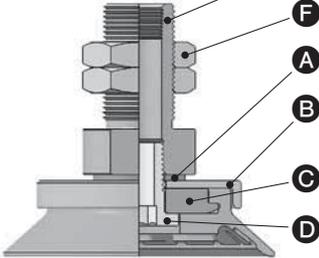


Component Parts

No.	Description	Material	Note
1	Pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Flat type with groove Bellows type with ribs and groove
2	Plate	Stainless steel	Pad diameter: $\phi 32$ to $\phi 50$
		Aluminum alloy (Clear anodized)	Pad diameter: $\phi 63$ to $\phi 125$
3	O-ring	FKM	
4	Shaft	Stainless steel	
5	Shaft ring	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Adapter	Aluminum alloy (Clear anodized)	
9	Piston rod	Structural steel (Electroless nickel plating)	
10	Return spring	Stainless steel	
11	Buffer body	Brass (Electroless nickel plating)	
12	Buffer adapter	Brass (Electroless nickel plating)	
13	Nut	Structural steel (Nickel plating)	M18 x 1.5 M22 x 1.5
14	Bushing	—	

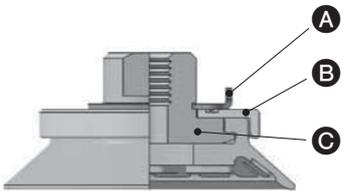
Standard Type High Rigidity Pad **ZP3E Series** Mounting Bracket Assembly

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZP3E-T

Product part no.	<p>ZP3E - T ① ② □ - ③ (A10/A16/AL14/AL16)</p> <p>Pad diameter Pad form Pad material Connection thread (Male thread)</p>
Component parts	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>ZP3E-T(32 to 50)(UM/BM)□-A10 ZP3E-T(63 to 125)(UM/BM)□-A16</p> </div> <div style="text-align: center;">  <p>ZP3E-T(32 to 50)(UM/BM)□-AL14 ZP3E-T(63 to 125)(UM/BM)□-AL16</p> </div> </div> <div style="margin-top: 20px;"> <p>A Seal washer E Male thread adapter (With mounting nut)</p> <p>B Holder</p> <p>C Plate</p> <p>D Set screw</p> <p style="text-align: right;">F Mounting nut</p> </div>

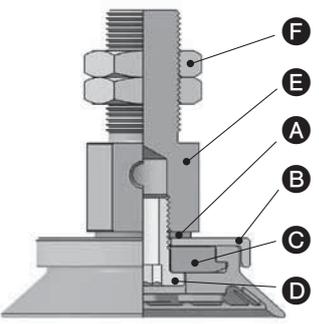
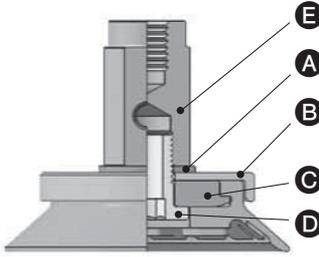
		Symbol	① Pad diameter symbol							
			32	40	50	63	80	100	125	
A Seal washer	M10 x 1		ZP3EA-SW10			—				
	M16 x 1.5		—			ZP3EA-SW16				
B Holder	② Pad form	Flat type with groove UM	ZP3EA-H1A		ZP3EA-H2A	ZP3EA-H3A		ZP3EA-H4A	ZP3EA-H5A	
		Bellows type with ribs and groove BM	—		—	ZP3EA-H3A	ZP3EA-H4A	ZP3EA-H5A	ZP3EA-H6A	
C Plate	② Pad form	Flat type with groove UM	ZP3EA-P1		ZP3EA-P2	ZP3EA-P3		ZP3EA-P4	ZP3EA-P5	
		Bellows type with ribs and groove BM	—		—	ZP3EA-P3	ZP3EA-P4	ZP3EA-P5	ZP3EA-P6	
D Set screw			ZP3EA-A10			ZP3EA-A16				
E Male thread adapter	③ Connection thread	M10 x 1	A10		—					
		M16 x 1.5	A16		—					
		M14 x 1	AL14		ZP3EA-TAL14		—			
		M16 x 1.5	AL16		—		ZP3EA-TAL16			
F Mounting nut (Single unit)		M14 x 1	ZPNA-M14			—				
		M16 x 1.5	—			ZPNA-M16				

Adapter Assembly: Vacuum Inlet Direction Vertical T Type/ZP3E-T

Product part no.	<p>ZP3E - T ① ② □ - ③ (B8/B10/B12/B18)</p> <p>Pad diameter Pad form Pad material Connection thread (Female thread)</p>
Component parts	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>A Stopper</p>  <p>B Holder</p>  <p>C Female thread plate</p>  </div> </div>

		Symbol	① Pad diameter symbol								
			32	40	50	63	80	100	125		
			ZP3EA-S1			ZP3EA-S2					
A Stopper											
B Holder	2 Pad form	Flat type with groove	UM	ZP3EA-H1B	ZP3EA-H2B	ZP3EA-H3B		ZP3EA-H4B	ZP3EA-H5B		
		BelloWS type with ribs and groove	BM			ZP3EA-H3B	ZP3EA-H4B	ZP3EA-H5B	ZP3EA-H6B		
C Female thread plate	2 Pad form	Flat type with groove	UM	3 Connection thread	M8 x 1.25	B8	ZP3EA-PT1-B8	ZP3EA-PT2-B8	—		
					M10 x 1.5	B10	ZP3EA-PT1-B10	ZP3EA-PT2-B10	—		
					M12 x 1.75	B12	—		ZP3EA-PT3-B12	ZP3EA-PT4-B12	ZP3EA-PT5-B12
					M18 x 1.5	B18	—		ZP3EA-PT3-B18	ZP3EA-PT4-B18	ZP3EA-PT5-B18
	BelloWS type with ribs and groove	BM	M8 x 1.25		B8	ZP3EA-PT1-B8	ZP3EA-PT2-B8	—			
			M10 x 1.5		B10	ZP3EA-PT1-B10	ZP3EA-PT2-B10	—			
			M12 x 1.75		B12	—		ZP3EA-PT3-B12	ZP3EA-PT4-B12	ZP3EA-PT5-B12	ZP3EA-PT6-B12
			M18 x 1.5		B18	—		ZP3EA-PT3-B18	ZP3EA-PT4-B18	ZP3EA-PT5-B18	ZP3EA-PT6-B18

Adapter Assembly: Vacuum Inlet Direction Lateral Y Type/ZP3E-Y

Product part no.	<p>ZP3E - Y ① ② □ - ③</p> <p>Pad diameter Pad form Pad material Connection thread (Male/Female thread)</p>
Component parts	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>③ Male thread adapter (With mounting nut)</p>  </div> <div style="text-align: center;"> <p>③ Female thread adapter</p>  </div> </div> <div style="display: flex; justify-content: center; margin-top: 20px;"> <div style="text-align: center; margin-right: 20px;"> <p>① Seal washer</p>  </div> <div style="text-align: center; margin-right: 20px;"> <p>② Holder</p>  </div> <div style="text-align: center; margin-right: 20px;"> <p>③ Plate</p>  </div> <div style="text-align: center;"> <p>④ Set screw</p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>ZP3E-Y(32 to 50)(UM/BM)□-AL14 ZP3E-Y(63 to 125)(UM/BM)□-AL16</p> </div> <div style="text-align: center;">  <p>ZP3E-Y(32 to 50)(UM/BM)□-B8 ZP3E-Y(63 to 125)(UM/BM)□-B12</p> </div> </div>

		Symbol	① Pad diameter symbol							
			32	40	50	63	80	100	125	
① Seal washer	M10 x 1		ZP3EA-SW10				—			
	M16 x 1.5		—				ZP3EA-SW16			
② Holder	② Pad form	Flat type with groove UM	ZP3EA-H1A		ZP3EA-H2A		ZP3EA-H3A		ZP3EA-H4A	ZP3EA-H5A
		Bellows type with ribs and groove BM					ZP3EA-H3A	ZP3EA-H4A	ZP3EA-H5A	ZP3EA-H6A
③ Plate	② Pad form	Flat type with groove UM	ZP3EA-P1		ZP3EA-P2		ZP3EA-P3		ZP3EA-P4	ZP3EA-P5
		Bellows type with ribs and groove BM					ZP3EA-P3	ZP3EA-P4	ZP3EA-P5	ZP3EA-P6
④ Set screw			ZP3EA-A10				ZP3EA-A16			
⑤ Adapter	③ Connection thread	Male thread	M14 x 1	AL14		ZP3EA-YAL14		—		
			M16 x 1.5	AL16		—		ZP3EA-YAL16		
		Female thread	M8 x 1.25	B8		ZP3EA-YB8		—		
			M12 x 1.75	B12		—		ZP3EA-YB12		
⑥ Mounting nut (Single unit)	M14 x 1		ZPNA-M14				—			
	M16 x 1.5		—				ZPNA-M16			

Buffer Assembly: Vacuum Inlet Direction **Vertical** T Type/ZP3E-T, **Lateral** Y Type/ZP3E-Y

Product part no. ZP3E - (T/Y) ① ② □ JB ③

Pad diameter ● Pad form ● Pad material ● Buffer stroke ●

Component parts

⑤ Buffer assembly (Vacuum inlet: Vertical) (With mounting nut) ⑤ Buffer assembly (Vacuum inlet: Lateral) (With mounting nut)

Mounting nut Mounting nut

① Seal washer

② Holder

③ Plate

④ Set screw

ZP3E-T(32 to 125)(UM/BM)□JB(10 to 50) ZP3E-Y(32 to 125)(UM/BM)□JB(10 to 50)

		Symbol	① Pad diameter symbol							
			32	40	50	63	80	100	125	
① Seal washer	M10 x 1		ZP3EA-SW10				—			
	M16 x 1.5		—				ZP3EA-SW16			
② Holder	Flat type with groove	UM	ZP3EA-H1A		ZP3EA-H2A		ZP3EA-H3A		ZP3EA-H4A	ZP3EA-H5A
	Bellows type with ribs and groove	BM					ZP3EA-H3A	ZP3EA-H4A	ZP3EA-H5A	ZP3EA-H6A
③ Plate	Flat type with groove	UM	ZP3EA-P1		ZP3EA-P2		ZP3EA-P3		ZP3EA-P4	ZP3EA-P5
	Bellows type with ribs and groove	BM					ZP3EA-P3	ZP3EA-P4	ZP3EA-P5	ZP3EA-P6
④ Set screw			ZP3EA-A10				ZP3EA-A16			
⑤ Buffer assembly			ZP3EB-(T/Y)1JB③				ZP3EB-(T/Y)2JB③			
⑥ Mounting nut (Single unit)	M18 x 1.5		ZPNA-M18				—			
	M22 x 1.5		—				ZPNA-M22			

[Buffer assembly part number example]

Product part no. ZP3E-T32UMN JB 10

Buffer assembly ZP3EB-T1 JB 10

③ Buffer stroke

High Rigidity Pad *ZP3E* Series Ball Joint Type Mounting Bracket Assembly

Adapter Assembly: Vacuum Inlet Direction **Vertical** T Type/ZP3E-TF

Product part no.	<p>ZP3E - TF ① ② □ - ③ (AL6/AL12)</p> <p>Pad diameter Pad form Pad material Connection thread (Male thread)</p>	
Component parts	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>A Stopper</p> </div> <div style="text-align: center;"> <p>B Holder</p> </div> <div style="text-align: center;"> <p>C Ball joint unit (With seal washer With mounting nut)</p> </div> </div>	

		Symbol	① Pad diameter symbol							
			32	40	50	63	80	100	125	
A Stopper			ZP3EA-S1				ZP3EA-S2			
B Holder	② Pad form	Flat type with groove	UM	ZP3EA-H1B		ZP3EA-H2B	ZP3EA-H3B		ZP3EA-H4B	ZP3EA-H5B
		Bellows type with ribs and groove	BM				ZP3EA-H3B	ZP3EA-H4B	ZP3EA-H5B	ZP3EA-H6B
C Ball joint unit	② Pad form	Flat type with groove	UM	ZP3EA-F1-AL6		ZP3EA-F2-AL6	ZP3EA-F3-AL12		ZP3EA-F4-AL12	ZP3EA-F5-AL12
		Bellows type with ribs and groove	BM				ZP3EA-F3-AL12	ZP3EA-F4-AL12	ZP3EA-F5-AL12	ZP3EA-F6-AL12
D Seal washer (Single unit)		M6 x 1		ZP3EA-SW6			—			
		M12 x 1.25		—			ZP3EA-SW12			
E Mounting nut (Single unit)		M6 x 1		ZPNA-M6			—			
		M12 x 1.25		—			ZPNA-M12			

Adapter Assembly: Vacuum Inlet Direction Vertical T Type/ZP3E-TF

Product part no. ZP3E - TF ① ② □ - ③ (AL14/AL16/B8/B12)

Pad diameter ● Pad form ● Pad material ● Connection thread (Male/Female thread)

Component parts

ZP3E-TF(32 to 125)(UM/BM)□-(AL14/AL16) ZP3E-TF(32 to 125)(UM/BM)□-(B8/B12)

A Stopper

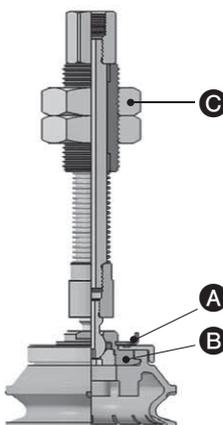
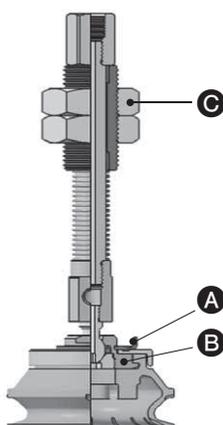
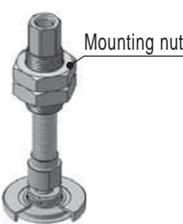
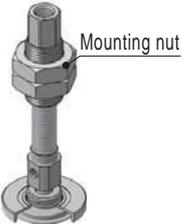
B Ball joint unit (Male thread) (With mounting nut)

B Ball joint unit (Female thread)

Mounting nut

		Symbol	① Pad diameter symbol									
			32	40	50	63	80	100	125			
		A Stopper	ZP3EA-S1				ZP3EA-S2					
B Ball joint unit	2 Pad form Flat type with groove	UM	3 Connection thread	Male thread	M14 x 1	AL14	ZP3EU-F1-TAL14	ZP3EU-F2-TAL14	—			
				Female thread	M16 x 1.5	AL16	—		ZP3EU-F3-TAL16	ZP3EU-F4-TAL16	ZP3EU-F5-TAL16	
		BM	3 Connection thread	Male thread	M8 x 1.25	B8	ZP3EU-F1-TB8	ZP3EU-F2-TB8	—			
				Female thread	M12 x 1.75	B12	—		ZP3EU-F3-TB12	ZP3EU-F4-TB12	ZP3EU-F5-TB12	
	2 Pad form Bellows type with ribs and groove	UM	3 Connection thread	Male thread	M14 x 1	AL14	ZP3EU-F1-TAL14	ZP3EU-F2-TAL14	—			
					M16 x 1.5	AL16	—		ZP3EU-F3-TAL16	ZP3EU-F4-TAL16	ZP3EU-F5-TAL16	ZP3EU-F6-TAL16
		BM	3 Connection thread	Female thread	M8 x 1.25	B8	ZP3EU-F1-TB8	ZP3EU-F2-TB8	—			
					M12 x 1.75	B12	—		ZP3EU-F3-TB12	ZP3EU-F4-TB12	ZP3EU-F5-TB12	ZP3EU-F6-TB12
C Mounting nut (Single unit)		M14 x 1	ZPNA-M14				—					
		M16 x 1.5	—				ZPNA-M16					

Buffer Assembly: Vacuum Inlet Direction **Vertical** T Type/ZP3E-TF, **Lateral** Y Type/ZP3E-YF

Product part no.	<p style="text-align: center;">ZP3E - (T/Y) F ① ② □ JB ③</p> <p style="text-align: center;"> Pad diameter ● ● Pad form ● ● Pad material ● </p>		
Component parts	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>ZP3E-TF(32 to 125)(UM/BM)□JB(10 to 50)</p> </div> <div style="text-align: center;">  <p>ZP3E-YF(32 to 125)(UM/BM)□JB(10 to 50)</p> </div> </div> <div style="text-align: right; margin-top: 20px;"> <p>A Stopper</p>  <p>B Ball joint buffer unit (Male thread) (With mounting nut)</p> <p>B Ball joint buffer unit (Female thread) (With mounting nut)</p>  <p>Mounting nut</p>  <p>Mounting nut</p> </div>		

		Symbol	① Pad diameter symbol							
			32	40	50	63	80	100	125	
A Stopper			ZP3EA-S1				ZP3EA-S2			
B Ball joint buffer unit	② Pad form	Flat type with groove	UM	ZP3EU-(T/Y)F1JB③	ZP3EU-(T/Y)F2JB③	ZP3EU-(T/Y)F3JB③		ZP3EU-(T/Y)F4JB③	ZP3EU-(T/Y)F5JB③	
		Bellows type with ribs and groove	BM	ZP3EU-(T/Y)F1JB③	ZP3EU-(T/Y)F2JB③	ZP3EU-(T/Y)F3JB③	ZP3EU-(T/Y)F4JB③	ZP3EU-(T/Y)F5JB③	ZP3EU-(T/Y)F6JB③	
C Mounting nut (Single unit)		M18 x 1.5		ZPNA-M18				—		
		M22 x 1.5		—				ZPNA-M22		

[Buffer unit part number example]

Product part no. ZP3E-TF32UMN **JB** 10

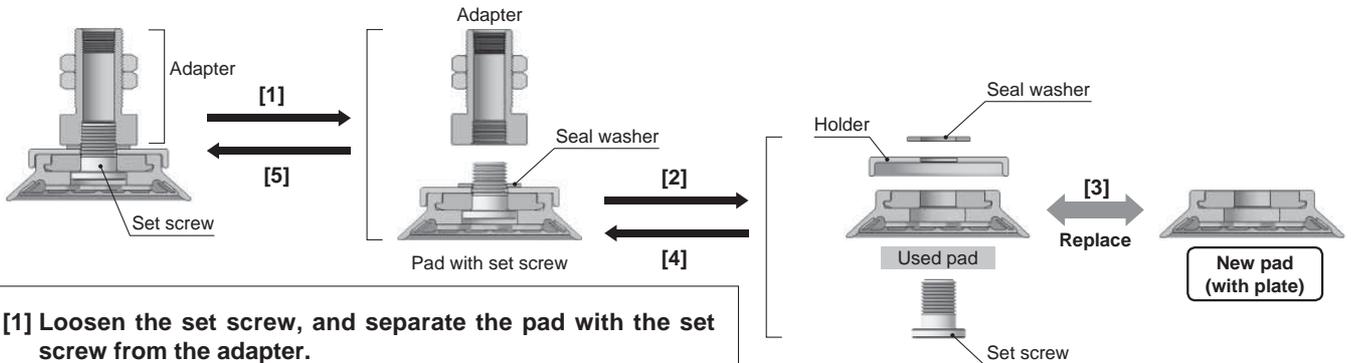
Buffer assembly ZP3EU-TF1 **JB** 10

③ Buffer stroke

ZP3E Series

How to Replace the Pad

With Set Screw



- [1] Loosen the set screw, and separate the pad with the set screw from the adapter.
- [2] Remove the seal washer from the pad with the set screw and separate it into seal washer, holder, pad and set screw. *1
- [3] Replace the pad (with plate) with a new one.
- [4] Insert the set screw from the suction surface side of the new pad, and mount the holder and seal washer in order.
- [5] Mount the adapter onto the set screw. *2

*1 When mounting and removing the seal washer, rotate the set screw while the seal washer is being held.

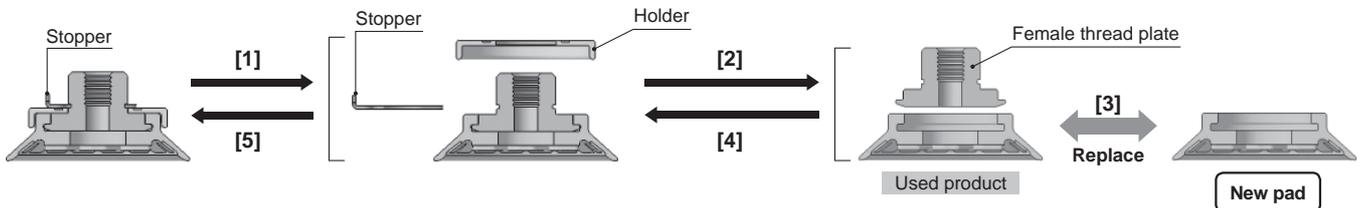
*2 Refer to the tightening torque shown in Table 1 for adapter mounting.

Table 1: Recommended Set Screw Tightening Torque

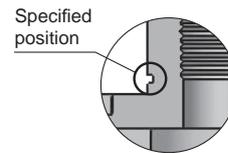
Pad diameter	Product specifications		Tightening torque [N·m]
	Product part no.	Mounting thread size	
ø32 to ø50	ZP3E-(32 to 50)UM□□	M10 x 1	8 to 10
	ZP3E-(32 to 50)BM□□		
ø63 to ø125	ZP3E-(63 to 125)UM□□	M16 x 1.5	13 to 15
	ZP3E-(63 to 125)BM□□		

* Refer to "Pad Unit (with Plate)" shown below for the replacement method for pads with plate.

With Stopper (with Female Thread Plate/with Ball Joint Unit)

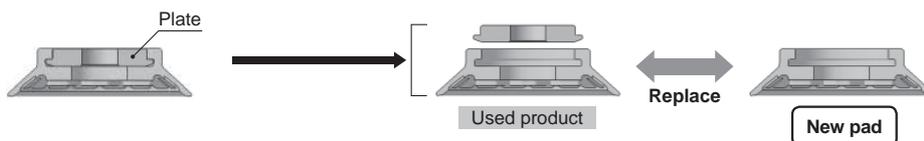


- [1] Pull out the stopper horizontally and remove the holder from the product.
- [2] Remove the female plate.
- [3] Replace the pad with a new one.
- [4] Insert the female thread plate into the new pad.
- [5] Mount the holder and insert the stopper into the specified position.



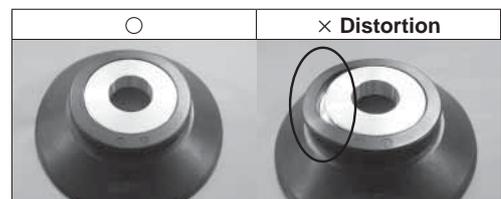
* Refer to "Pad Unit (with Plate)" shown below for the replacement method for pads with plate.

Pad Unit (with Plate)



Remove the plate and replace the pad with a new one. Reassemble the product.

* Press the outer circumference of the plate insertion area by hand to eliminate distortion.



* The same replacement method is applicable to the replacement of the pad unit with a female thread plate or ball joint unit.



High Rigidity Pad Specific Product Precautions

Be sure to read this before handling the products.

Refer to page 375 for safety instructions. For vacuum equipment and vacuum pad precautions, refer to pages 376 to 379.

Mounting

1. Tighten the screw within the specified torque range when mounting the buffer.

Tightening with a torque outside of the specified range may cause malfunction.

High Rigidity ZP3E Series

Model	Connection thread	Tightening torque [N·m]
ZP3E-□(32 to 50)□JB□	M18 x 1.5	28 to 32
ZP3E-□(63 to 125)□JB□	M22 x 1.5	45 to 50

Pads for Special Applications **ZP2/ZP3P Series**

Ø0.8 to Ø125

Mark-free, For Film Adsorption, Multistage, Flat, Nozzle, Sponge, For Disk Adsorption, For Panel Holding, Ball Spline Buffer

Mark-free Ø4 to Ø125

For use where adsorption marks must not be left on workpieces p. 251



For Film Adsorption Ø20 to Ø50

Good for film packaging applications p. 266



Multistage Ø6 to Ø46

For spherical workpieces or workpieces with inclined surfaces p. 276



Flat Ø10 to Ø30

For flexible sheets or vinyl p. 286



Nozzle Ø0.8/Ø1.1

Compact, Space saving p. 289



Sponge Ø4 to Ø15

For workpieces with bumps p. 290



For Disk Adsorption p. 294

- For the adsorption of circular components like CDs and DVDs
- The bellows mechanism in the pad helps to dampen the impact to workpieces.



For Panel Holding p. 295

- For the adsorption and holding of the stage of panels, glass circuit boards, etc.
- The bellows mechanism allows for complete contact with curved work surfaces.



Ball Spline Buffer Ø2 to Ø8

The ball spline guide is used for buffers. p. 297



Pad Material: ZP2 Series

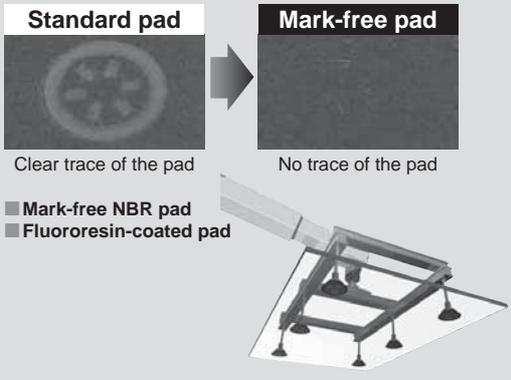
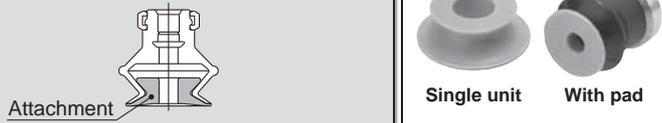
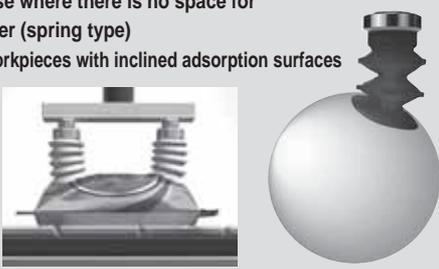
Material	NBR (Nitrile rubber)	Silicone rubber*1	Urethane rubber	FKM (Fluoro rubber)	Conductive NBR (Nitrile rubber)	Conductive silicone rubber	Conductive silicone sponge	Conductive CR sponge (Chloroprene sponge)
Color of rubber	Black	White	Brown		Black			
Rubber hardness HS (±5°)	A50/S	A40/S	A60/S		A50/S		20	15
Identification (Dot)	—	—	—	· 1 green dot	· 1 silver dot	· 2 silver dots	—	—

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Pad Material: ZP3P Series

Material	Silicone rubber*1
Color of rubber	Blue
Rubber hardness HS (±5°)	A40/S
Identification (Dot)	—

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

	Application	Symbol	Pad		Page	
			Form	Diameter		
Mark-free	Mark-free Pad For use where adsorption marks must not be left on workpieces  <p>Standard pad → Mark-free pad</p> <p>Clear trace of the pad No trace of the pad</p> <p>■ Mark-free NBR pad ■ Fluororesin-coated pad</p>	 Single unit	U	Flat type	ø4, ø6, ø8 ø10, ø16 ø25, ø32 ø40, ø50	253
		 Single unit	H	High rigidity (Flat type with ribs)	ø40, ø50 ø63, ø80 ø100, ø125	254
	Resin Attachment Mark-free, Prevents the rubber from sticking to workpieces  <p>Attachment</p>	 Single unit	—	Bellows type	ø6, ø8 ø10, ø13 ø16, ø20 ø25, ø32	264
For Film Adsorption	For Film Adsorption Good for film packaging applications 	 Single unit	PT		ø20, ø25 ø35, ø50	267
Multistage	Bellows Pad For use where there is no space for a buffer (spring type) For workpieces with inclined adsorption surfaces 	 Single unit With adapter	ZJ	Bellows type (Multistage type)	ø15, ø20 ø30, ø40 ø46	276
		 Single unit	J	Bellows type (Multistage type)	ø6, ø9, ø10 ø14, ø15 ø16, ø25 ø30	282
Flat	Flat Pad For the adsorption of flexible sheets or film Reduced deformation of flat surfaces during adsorption 	 Single unit With adapter	MT	Thin flat type (With groove)	ø10, ø15 ø20, ø25 ø30	286
Nozzle	Nozzle Pad For the adsorption of small components such as IC chips 	 Single unit With adapter	AN	Nozzle type	ø0.8, ø1.1	289

	Application	Symbol	Pad		Page
			Form	Diameter	
Sponge	Sponge Pad For the adsorption of workpieces with bumps 	S	Sponge	$\varnothing 4, \varnothing 6, \varnothing 8$ $\varnothing 10, \varnothing 15$	290
					 With adapter 291
For Disk Adsorption	Vacuum Pad for Disk Adsorption <ul style="list-style-type: none"> For the adsorption of circular components like CDs and DVDs The bellows mechanism in the pad helps to dampen the impact to workpieces. 			20 x 25 (ID x OD: PCD 22.5)	294
For Panel Holding	Vacuum Pad for Panel Holding <ul style="list-style-type: none"> For the adsorption and holding of the stage of panels, glass circuit boards, etc. The bellows mechanism allows for complete contact with curved work surfaces. 			—	295
Ball Spine Buffer	Pad with Ball Spine Buffer The ball spline guide is used for buffers. 	U	Flat type	$\varnothing 2, \varnothing 4$ $\varnothing 6, \varnothing 8$	297

Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

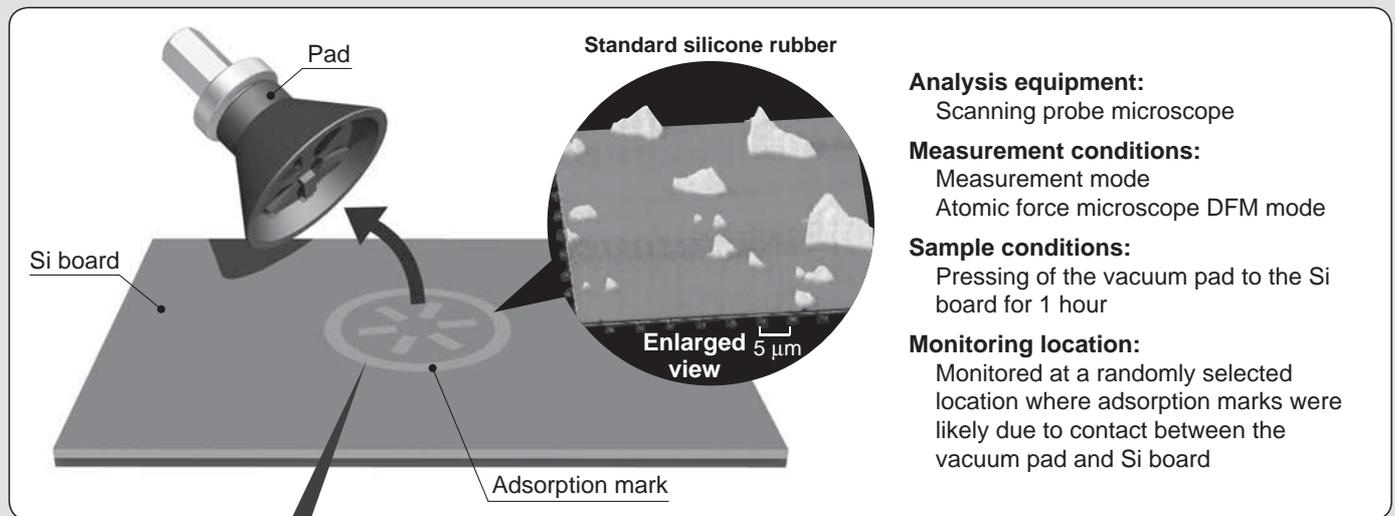
Construction

Mounting Bracket Assembly

Precautions

Mark-free Pad Series ZP2/ZP3E Series

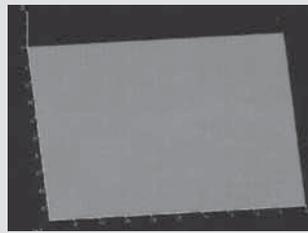
Minimizes the transfer of rubber constituents to workpieces



1 Mark-free NBR Pad

Minimizes the transfer of rubber constituents which are said to be the cause of adsorption marks

Pad diameter: $\phi 4$ to $\phi 125$



2 Fluororesin-coated Pad

A fluororesin sheet is baked onto the pad adsorption surface. Prevents the transfer of rubber constituents

Pad diameter: $\phi 40$ to $\phi 125$

Pad material: NBR, FKM



3 Resin Attachment

PEEK material is used for the pad adsorption surface. Prevents the transfer of rubber constituents

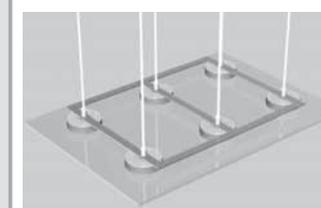
Applicable pad diameter: $\phi 6$ to $\phi 32$

Attachment



The above images of adsorption marks are sample data. Actual results will depend on the actual conditions.

Related Product



4 Non-contact Gripper

No adsorption marks are left because the vacuum pad does not come into contact with workpieces.



p. 353

	Pad type	Series	Pad form	Material of the adsorption part (Part in contact with workpieces)	Adsorption mark ^{*1}		Operating temperature range (°C)	Static friction ratio ^{*5}
					Condition ^{*2} (Initial value)			
					Visual checking	Vapor method ^{*3}		
Mark-free Pad Series	 Mark-free NBR 	ZP2 ZP3E	Flat type Flat type with groove Bellows type with ribs and groove	Mark-free NBR (Specially treated ^{*4})	●	●	5 to 40	0.15 to 0.2
	 Fluororesin-coated 	ZP2	Flat type with ribs	NBR + Fluororesin coating	●	●	5 to 60	0.1
				FKM + Fluororesin coating	●	●	5 to 100	
	 Resin attachment 	ZP2	Applicable for the bellows type	PEEK	●	●	5 to 40	0.15 to 0.2
			Conductive PEEK (Volume resistivity: $1 \times 10^6 \Omega \text{cm}$)	●	●			
	 Non-contact gripper 			—	●	●	Standard: -5 to 60 (No freezing)	—
Standard	ZP Series (Standard material) 			NBR FKM Conductive NBR/ Silicone rubber	×	×	—	—
				Silicone rubber Urethane rubber	○	×		

Adsorption mark characteristics [●: Little or no influence ○: Can be used depending on the conditions ×: Not suitable]

- *1 **Adsorption mark** ——— Indicates the transfer of rubber constituents from the pad
- *2 **Condition** ——— Visual evaluation of the adsorption mark
- *3 **Vapor method** ——— Method of applying vapor to workpieces to visually check for adsorption marks
- *4 **Specially treated** ——— The NBR is specially treated to modify and reduce the transfer of rubber constituents.
- *5 **Static friction ratio** ——— Static friction ratio when a workpiece (glass) is adsorbed by the pad (NBR = 1 as a benchmark)
When a cyclone pad is used, the pad does not come into contact with workpieces (glass).
The customer needs to install a guide for holding.

* The above table is only for reference when selecting a pad.
Values and evaluation are reference data only. Preparatory testing under actual operating conditions is recommended.

Cleaning method [Mark-free NBR pad/Fluororesin-coated pad/Resin attachment]

- Always clean the product before operation and when carrying out regular maintenance.
- 1) Hold a part other than the adsorption surface.
 - * Non particle-generating vinyl gloves are recommended.
- 2) Soak a non particle-generating cloth in 2-propanol (isopropyl alcohol) (purity > 99.5%).
 - * Please use the solution recommended above.
- 3) Wipe the adsorption surface (pad/resin attachment) and the part that comes into contact with workpieces.
- 4) Dry with clean air blow. (Or, wipe again with a dry, non particle-generating cloth.)

Model Selection
 For Special Applications
 Mark-free
 For Film Adsorption
 Multistage
 Flat
 Nozzle
 Sponge
 For Disk Adsorption
 For Panel Holding
 Ball Spine Buffer
 Construction
 Mounting Bracket Assembly
 Precautions



Mark-free Pad

Symbol/Form

Pad diameter $\varnothing 4, \varnothing 6, \varnothing 8, \varnothing 10, \varnothing 16, \varnothing 25, \varnothing 32, \varnothing 40, \varnothing 50$

U: Flat type

- Pad which reduces the number of adsorption marks left on workpieces by the rubber
- The pad is made from mark-free NBR, and the NBR is then specially treated to minimize the transfer of rubber constituents to workpieces.

The mounting bracket assembly (adapter, buffer) is the same as that of the ZP series. Refer to the following pages and order it separately.

Mounting Bracket Part Nos.

Adapter Assembly	p. 121 to 123
Buffer Assembly	p. 124 to 126
Lock Ring Unit	p. 31

How to Order

Pad unit **ZP2-04 U CL-X19**

* Pad unit's sales unit: 10 pcs.



Pad diameter

Symbol	Pad diameter
04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$
10	$\varnothing 10$
16	$\varnothing 16$
25	$\varnothing 25$
32	$\varnothing 32$
40	$\varnothing 40$
50	$\varnothing 50$

With/Without lock ring

Nil	With lock ring
X19	Without lock ring *1

*1 $\varnothing 10$ or larger

Pad material

Symbol	Material
CL	Mark-free NBR

Pad form

Symbol	Form
U	Flat type

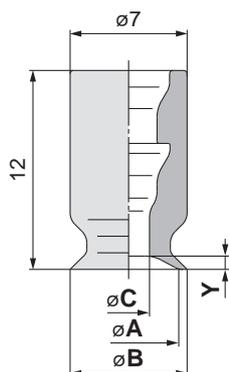
* The lock ring is shipped together but does not come assembled.

Dimensions: Pad Unit

* The dimensions of the model with a mounting bracket are the same as those of the ZP series. Refer to the following pages.

With Adapter	p. 33 to 42
With Buffer	p. 43 to 49

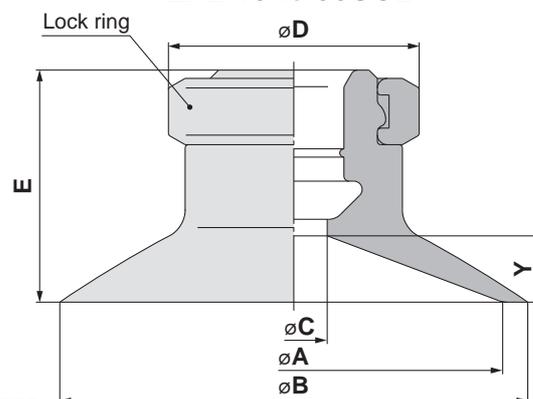
ZP2-04 to 08UCL



Dimensions

Model	A	B	C	Y
ZP2-04UCL	4	4.8	1.6	0.8
ZP2-06UCL	6	7	2.5	
ZP2-08UCL	8	9		1

ZP2-10 to 50UCL



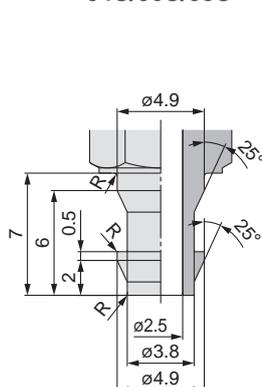
Dimensions

Model	A	B	C	D	E	Y
ZP2-10UCL	10	12	4	13	12	3
ZP2-16UCL	16	18		12.5	3.5	
ZP2-25UCL	25	28	7	15	14	4
ZP2-32UCL	32	35		14.5	4.5	
ZP2-40UCL	40	43	18	18	18.5	6.5
ZP2-50UCL	50	53		19.5	7.5	

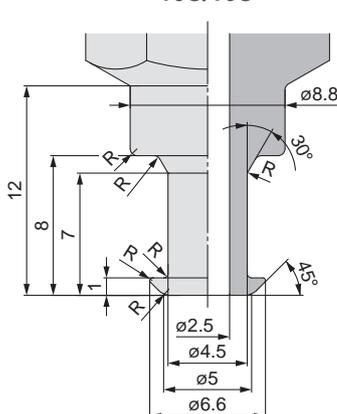
Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.

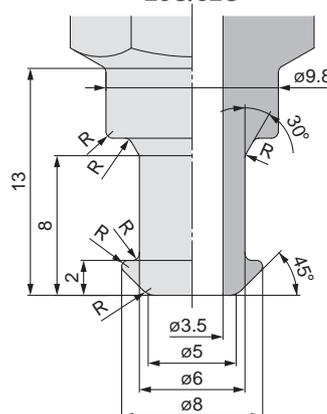
Applicable pad
04U/06U/08U



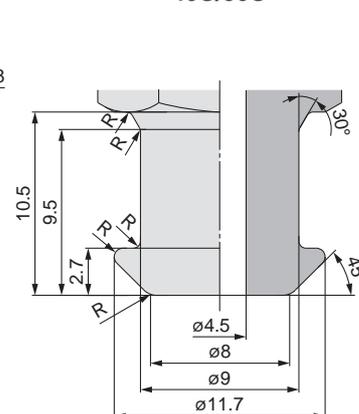
Applicable pad
10U/16U



Applicable pad
25U/32U



Applicable pad
40U/50U



* The R part has to be smooth with no corners.



Mark-free Pad/High Rigidity

Symbol/Form

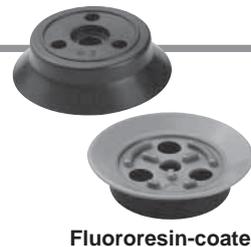
H: Flat type with ribs

Pad diameter $\varnothing 40, \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100, \varnothing 125$

- Pad which reduces the number of adsorption marks left on workpieces by the rubber
- The pad is made from mark-free NBR, and the NBR is then specially treated to minimize the transfer of rubber constituents to workpieces.
- Prevents the rubber constituents of the pad from transferring to workpieces by baking a fluororesin sheet to the adsorption surface

How to Order

Pad unit **ZP2-40 H CL**



Fluororesin-coated

Pad diameter

Symbol	Pad diameter
40	$\varnothing 40$
50	$\varnothing 50$
63	$\varnothing 63$
80	$\varnothing 80$
100	$\varnothing 100$
125	$\varnothing 125$

Pad material

Symbol	Material
CL	Mark-free NBR
NT	NBR + Fluororesin coating
FT	FKM + Fluororesin coating

Pad form

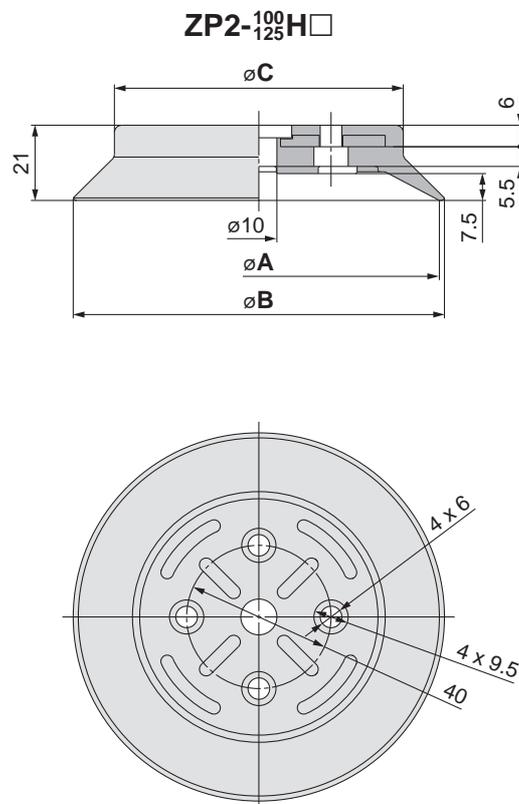
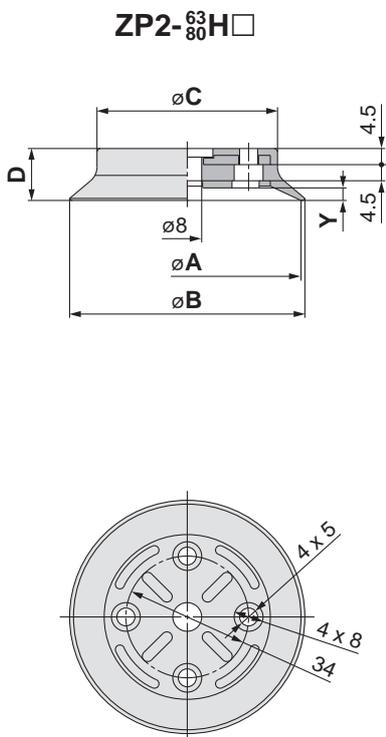
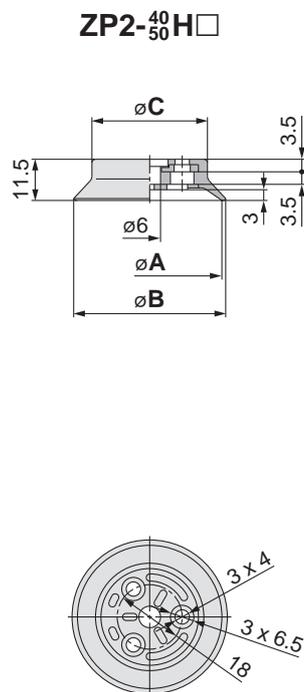
Symbol	Form
H	High rigidity (Flat type with ribs)

For the mounting bracket assembly, refer to the following pages and order it separately.

Mounting Bracket Part Nos./Dimensions

Adapter Assembly	p. 255, 256
Buffer Assembly	p. 257 to 260
Ball Joint Type	p. 261 to 263

Dimensions: Pad Unit



Dimensions

Model	A	B	C
ZP2-40H□	40	42	32
ZP2-50H□	50	53	42

Dimensions

Model	A	B	C	D	Y
ZP2-63H□	63	65	50	14.5	3.5
ZP2-80H□	80	82	61	16.5	4.5

Dimensions

Model	A	B	C
ZP2-100H□	100	103	80
ZP2-125H□	125	128	104

Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

Construction

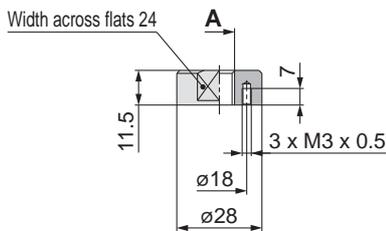
Mounting Bracket Assembly

Precautions

Mark-free Pad/High Rigidity ZP2 Series Mounting Bracket Assembly

Adapter Assembly

Adapter assembly part no.	Applicable pad part no.
ZPA-T1-B8	ZP2-40H(CL/NT/FT) ZP2-50H(CL/NT/FT) ZP2-3050HW
ZPA-T1-B10	

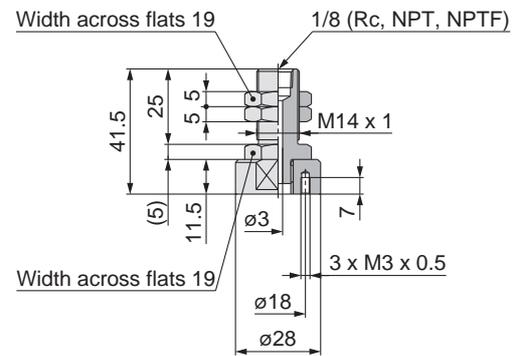


Dimensions

Part no.	A
ZPA-T1-B8	M8 x 1.25
ZPA-T1-B10	M10 x 1.5

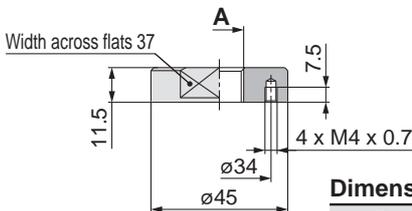
* With three M3 bolts

Adapter assembly part no.	Applicable pad part no.
ZPA-T1-B01	ZP2-40H(CL/NT/FT) ZP2-50H(CL/NT/FT) ZP2-3050HW
ZPA-T1-N01	
ZPA-T1-T01	



* With three M3 bolts

Adapter assembly part no.	Applicable pad part no.
ZPA-T2-B8	ZP2-63H(CL/NT/FT) ZP2-80H(CL/NT/FT)
ZPA-T2-B10	
ZPA-T2-B12	
ZPA-T2-B16	

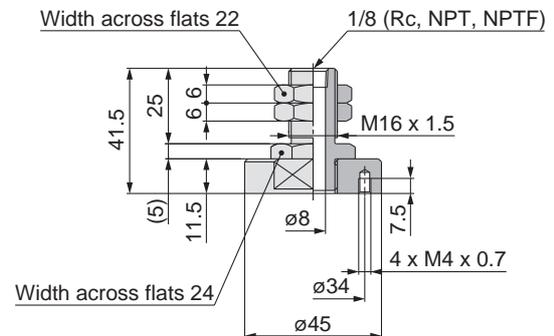


Dimensions

Part no.	A
ZPA-T2-B8	M8 x 1.25
ZPA-T2-B10	M10 x 1.5
ZPA-T2-B12	M12 x 1.75
ZPA-T2-B16	M16 x 1.5

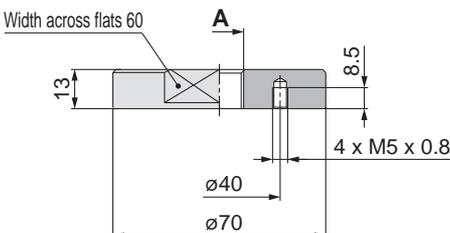
* With four M4 bolts

Adapter assembly part no.	Applicable pad part no.
ZPA-T2-B01	ZP2-63H(CL/NT/FT) ZP2-80H(CL/NT/FT)
ZPA-T2-N01	
ZPA-T2-T01	



* With four M4 bolts

Adapter assembly part no.	Applicable pad part no.
ZPA-T3-B12	ZP2-100H(CL/NT/FT) ZP2-125H(CL/NT/FT)
ZPA-T3-B16	

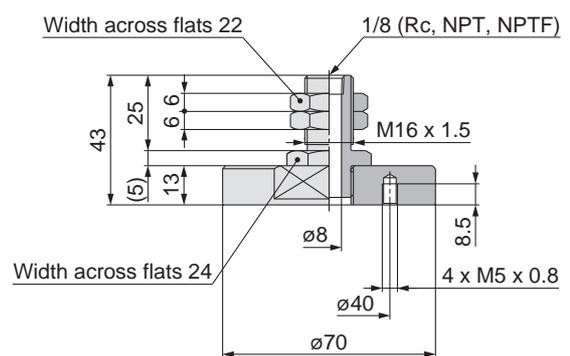


Dimensions

Part no.	A
ZPA-T3-B12	M12 x 1.75
ZPA-T3-B16	M16 x 1.5

* With four M5 bolts

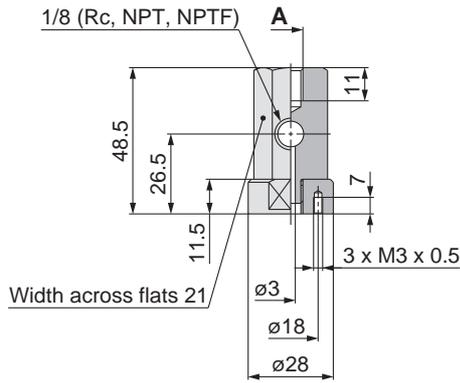
Adapter assembly part no.	Applicable pad part no.
ZPA-T3-B01	ZP2-100H(CL/NT/FT) ZP2-125H(CL/NT/FT)
ZPA-T3-N01	
ZPA-T3-T01	



* With four M5 bolts

Adapter Assembly

Adapter assembly part no.	Applicable pad part no.
ZPA-X1-B01-B8	ZP2-40H(CL/NT/FT) ZP2-50H(CL/NT/FT) ZP2-3050HW
ZPA-X1-N01-B8	
ZPA-X1-T01-B8	
ZPA-X1-B01-B10	
ZPA-X1-N01-B10	
ZPA-X1-T01-B10	

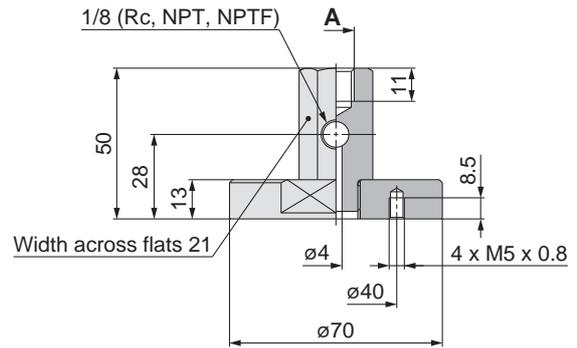


Dimensions

Part no.	A
ZPA-X1-□01-B8	M8 x 1.25
ZPA-X1-□01-B10	M10 x 1.5

* With three M3 bolts

Adapter assembly part no.	Applicable pad part no.
ZPA-X3-B01-B10	ZP2-100H(CL/NT/FT) ZP2-125H(CL/NT/FT)
ZPA-X3-N01-B10	
ZPA-X3-T01-B10	
ZPA-X3-B01-B12	
ZPA-X3-N01-B12	
ZPA-X3-T01-B12	

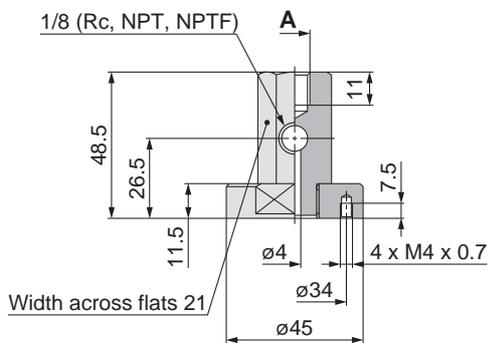


Dimensions

Part no.	A
ZPA-X3-□01-B10	M10 x 1.5
ZPA-X3-□01-B12	M12 x 1.75

* With four M5 bolts

Adapter assembly part no.	Applicable pad part no.
ZPA-X2-B01-B10	ZP2-63H(CL/NT/FT) ZP2-80H(CL/NT/FT)
ZPA-X2-N01-B10	
ZPA-X2-T01-B10	
ZPA-X2-B01-B12	
ZPA-X2-N01-B12	
ZPA-X2-T01-B12	



Dimensions

Part no.	A
ZPA-X2-□01-B10	M10 x 1.5
ZPA-X2-□01-B12	M12 x 1.75

* With four M4 bolts

Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spline Buffer

Construction

Mounting Bracket Assembly

Precautions

■ Buffer Assembly

* Refer to page 343 for nut tightening torque.

Buffer assembly part no. Buffer body (Material: Aluminum alloy)		Applicable pad part no. ZP2-40H(CL/NT/FT) ZP2-50H(CL/NT/FT) ZP2-3050HW												
ZPB-T1J25-B01 ZPB-T1J25-N01 ZPB-T1J25-T01 ZPB-T1J50-B01 ZPB-T1J50-N01 ZPB-T1J50-T01 ZPB-T1J75-B01 ZPB-T1J75-N01 ZPB-T1J75-T01														
		Dimensions <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Part no.</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>ZPB-T1J25-□01</td> <td>40</td> <td>107</td> </tr> <tr> <td>ZPB-T1J50-□01</td> <td>75</td> <td>142</td> </tr> <tr> <td>ZPB-T1J75-□01</td> <td>111</td> <td>178</td> </tr> </tbody> </table> <p>* With three M3 bolts</p>	Part no.	A	B	ZPB-T1J25-□01	40	107	ZPB-T1J50-□01	75	142	ZPB-T1J75-□01	111	178
Part no.	A	B												
ZPB-T1J25-□01	40	107												
ZPB-T1J50-□01	75	142												
ZPB-T1J75-□01	111	178												

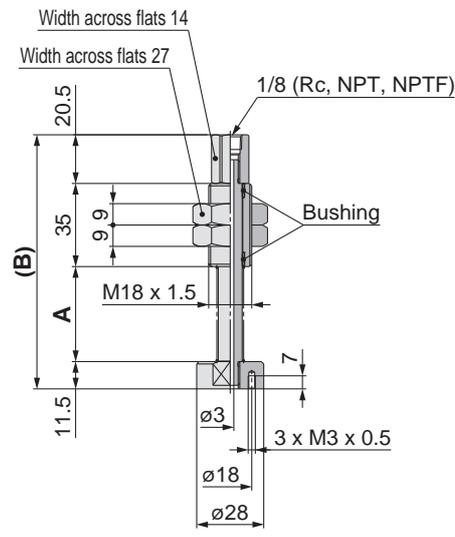
Buffer assembly part no. Buffer body (Material: Aluminum alloy)		Applicable pad part no. ZP2-63H(CL/NT/FT) ZP2-80H(CL/NT/FT)												
ZPB-T2J25-B01 ZPB-T2J25-N01 ZPB-T2J25-T01 ZPB-T2J50-B01 ZPB-T2J50-N01 ZPB-T2J50-T01 ZPB-T2J75-B01 ZPB-T2J75-N01 ZPB-T2J75-T01														
		Dimensions <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Part no.</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>ZPB-T2J25-□01</td> <td>40</td> <td>107</td> </tr> <tr> <td>ZPB-T2J50-□01</td> <td>75</td> <td>142</td> </tr> <tr> <td>ZPB-T2J75-□01</td> <td>111</td> <td>178</td> </tr> </tbody> </table> <p>* With four M4 bolts</p>	Part no.	A	B	ZPB-T2J25-□01	40	107	ZPB-T2J50-□01	75	142	ZPB-T2J75-□01	111	178
Part no.	A	B												
ZPB-T2J25-□01	40	107												
ZPB-T2J50-□01	75	142												
ZPB-T2J75-□01	111	178												

Buffer assembly part no. Buffer body (Material: Aluminum alloy)		Applicable pad part no. ZP2-100H(CL/NT/FT) ZP2-125H(CL/NT/FT)															
ZPB-T3J25-B01 ZPB-T3J25-N01 ZPB-T3J25-T01 ZPB-T3J50-B01 ZPB-T3J50-N01 ZPB-T3J50-T01 ZPB-T3J75-B01 ZPB-T3J75-N01 ZPB-T3J75-T01 ZPB-T3J100-B01 ZPB-T3J100-N01 ZPB-T3J100-T01																	
		Dimensions <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Part no.</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>ZPB-T3J25-□01</td> <td>44</td> <td>131</td> </tr> <tr> <td>ZPB-T3J50-□01</td> <td>80</td> <td>167</td> </tr> <tr> <td>ZPB-T3J75-□01</td> <td>120</td> <td>207</td> </tr> <tr> <td>ZPB-T3J100-□01</td> <td>155</td> <td>242</td> </tr> </tbody> </table> <p>* With four M5 bolts</p>	Part no.	A	B	ZPB-T3J25-□01	44	131	ZPB-T3J50-□01	80	167	ZPB-T3J75-□01	120	207	ZPB-T3J100-□01	155	242
Part no.	A	B															
ZPB-T3J25-□01	44	131															
ZPB-T3J50-□01	80	167															
ZPB-T3J75-□01	120	207															
ZPB-T3J100-□01	155	242															

Buffer Assembly

* Refer to page 343 for nut tightening torque.

Buffer assembly part no.	
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)
ZPB-T1JB25-B01	ZPB-T1JF25-B01
ZPB-T1JB25-N01	ZPB-T1JF25-N01
ZPB-T1JB25-T01	ZPB-T1JF25-T01
ZPB-T1JB50-B01	ZPB-T1JF50-B01
ZPB-T1JB50-N01	ZPB-T1JF50-N01
ZPB-T1JB50-T01	ZPB-T1JF50-T01
ZPB-T1JB75-B01	ZPB-T1JF75-B01
ZPB-T1JB75-N01	ZPB-T1JF75-N01
ZPB-T1JB75-T01	ZPB-T1JF75-T01

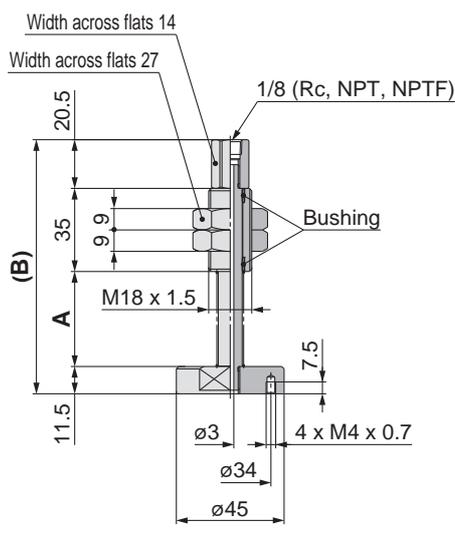


Applicable pad part no.
ZP2-40H(CL/NT/FT)
ZP2-50H(CL/NT/FT)
ZP2-3050HW

Dimensions		
Part no.	A	B
ZPB-T1(JB/JF)25-□01	40	107
ZPB-T1(JB/JF)50-□01	75	142
ZPB-T1(JB/JF)75-□01	111	178

* With three M3 bolts

Buffer assembly part no.	
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)
ZPB-T2JB25-B01	ZPB-T2JF25-B01
ZPB-T2JB25-N01	ZPB-T2JF25-N01
ZPB-T2JB25-T01	ZPB-T2JF25-T01
ZPB-T2JB50-B01	ZPB-T2JF50-B01
ZPB-T2JB50-N01	ZPB-T2JF50-N01
ZPB-T2JB50-T01	ZPB-T2JF50-T01
ZPB-T2JB75-B01	ZPB-T2JF75-B01
ZPB-T2JB75-N01	ZPB-T2JF75-N01
ZPB-T2JB75-T01	ZPB-T2JF75-T01

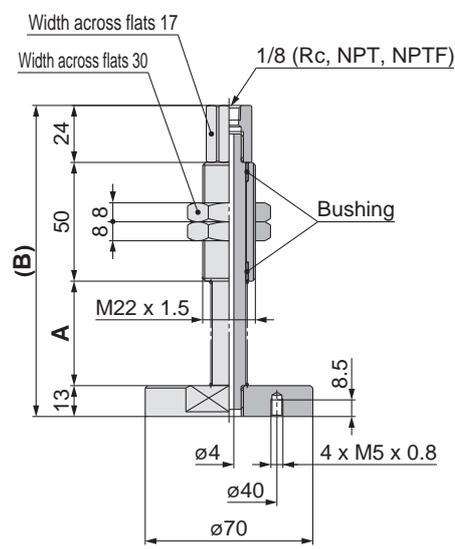


Applicable pad part no.
ZP2-63H(CL/NT/FT)
ZP2-80H(CL/NT/FT)

Dimensions		
Part no.	A	B
ZPB-T2(JB/JF)25-□01	40	107
ZPB-T2(JB/JF)50-□01	75	142
ZPB-T2(JB/JF)75-□01	111	178

* With four M4 bolts

Buffer assembly part no.	
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)
ZPB-T3JB25-B01	ZPB-T3JF25-B01
ZPB-T3JB25-N01	ZPB-T3JF25-N01
ZPB-T3JB25-T01	ZPB-T3JF25-T01
ZPB-T3JB50-B01	ZPB-T3JF50-B01
ZPB-T3JB50-N01	ZPB-T3JF50-N01
ZPB-T3JB50-T01	ZPB-T3JF50-T01
ZPB-T3JB75-B01	ZPB-T3JF75-B01
ZPB-T3JB75-N01	ZPB-T3JF75-N01
ZPB-T3JB75-T01	ZPB-T3JF75-T01
ZPB-T3JB100-B01	ZPB-T3JF100-B01
ZPB-T3JB100-N01	ZPB-T3JF100-N01
ZPB-T3JB100-T01	ZPB-T3JF100-T01



Applicable pad part no.
ZP2-100H(CL/NT/FT)
ZP2-125H(CL/NT/FT)

Dimensions		
Part no.	A	B
ZPB-T3(JB/JF)25-□01	44	131
ZPB-T3(JB/JF)50-□01	80	167
ZPB-T3(JB/JF)75-□01	120	207
ZPB-T3(JB/JF)100-□01	155	242

* With four M5 bolts

■ Buffer Assembly

* Refer to page 343 for nut tightening torque.

Buffer assembly part no.		Applicable pad part no.												
Buffer body (Material: Aluminum alloy)		ZP2-40H(CL/NT/FT) ZP2-50H(CL/NT/FT) ZP2-3050HW												
ZPB-X1J25-B01														
ZPB-X1J25-N01														
ZPB-X1J25-T01														
ZPB-X1J50-B01														
ZPB-X1J50-N01														
ZPB-X1J50-T01														
ZPB-X1J75-B01														
ZPB-X1J75-N01														
ZPB-X1J75-T01														
		Dimensions <table border="1"> <thead> <tr> <th>Part no.</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>ZPB-X1J25-□01</td> <td>40</td> <td>139.5</td> </tr> <tr> <td>ZPB-X1J50-□01</td> <td>75</td> <td>174.5</td> </tr> <tr> <td>ZPB-X1J75-□01</td> <td>111</td> <td>210.5</td> </tr> </tbody> </table> <p>* With three M3 bolts</p>	Part no.	A	B	ZPB-X1J25-□01	40	139.5	ZPB-X1J50-□01	75	174.5	ZPB-X1J75-□01	111	210.5
Part no.	A	B												
ZPB-X1J25-□01	40	139.5												
ZPB-X1J50-□01	75	174.5												
ZPB-X1J75-□01	111	210.5												

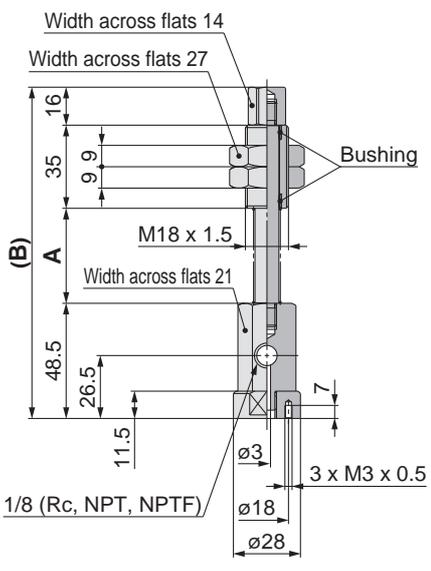
Buffer assembly part no.		Applicable pad part no.												
Buffer body (Material: Aluminum alloy)		ZP2-63H(CL/NT/FT) ZP2-80H(CL/NT/FT)												
ZPB-X2J25-B01														
ZPB-X2J25-N01														
ZPB-X2J25-T01														
ZPB-X2J50-B01														
ZPB-X2J50-N01														
ZPB-X2J50-T01														
ZPB-X2J75-B01														
ZPB-X2J75-N01														
ZPB-X2J75-T01														
		Dimensions <table border="1"> <thead> <tr> <th>Part no.</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>ZPB-X2J25-□01</td> <td>40</td> <td>139.5</td> </tr> <tr> <td>ZPB-X2J50-□01</td> <td>75</td> <td>174.5</td> </tr> <tr> <td>ZPB-X2J75-□01</td> <td>111</td> <td>210.5</td> </tr> </tbody> </table> <p>* With four M4 bolts</p>	Part no.	A	B	ZPB-X2J25-□01	40	139.5	ZPB-X2J50-□01	75	174.5	ZPB-X2J75-□01	111	210.5
Part no.	A	B												
ZPB-X2J25-□01	40	139.5												
ZPB-X2J50-□01	75	174.5												
ZPB-X2J75-□01	111	210.5												

Buffer assembly part no.		Applicable pad part no.															
Buffer body (Material: Aluminum alloy)		ZP2-100H(CL/NT/FT) ZP2-125H(CL/NT/FT)															
ZPB-X3J25-B01																	
ZPB-X3J25-N01																	
ZPB-X3J25-T01																	
ZPB-X3J50-B01																	
ZPB-X3J50-N01																	
ZPB-X3J50-T01																	
ZPB-X3J75-B01																	
ZPB-X3J75-N01																	
ZPB-X3J75-T01																	
ZPB-X3J100-B01																	
ZPB-X3J100-N01																	
ZPB-X3J100-T01																	
		Dimensions <table border="1"> <thead> <tr> <th>Part no.</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>ZPB-X3J25-□01</td> <td>44</td> <td>165</td> </tr> <tr> <td>ZPB-X3J50-□01</td> <td>80</td> <td>201</td> </tr> <tr> <td>ZPB-X3J75-□01</td> <td>120</td> <td>241</td> </tr> <tr> <td>ZPB-X3J100-□01</td> <td>155</td> <td>276</td> </tr> </tbody> </table> <p>* With four M5 bolts</p>	Part no.	A	B	ZPB-X3J25-□01	44	165	ZPB-X3J50-□01	80	201	ZPB-X3J75-□01	120	241	ZPB-X3J100-□01	155	276
Part no.	A	B															
ZPB-X3J25-□01	44	165															
ZPB-X3J50-□01	80	201															
ZPB-X3J75-□01	120	241															
ZPB-X3J100-□01	155	276															

Buffer Assembly

* Refer to page 343 for nut tightening torque.

Buffer assembly part no.	
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)
ZPB-X1JB25-B01	ZPB-X1JF25-B01
ZPB-X1JB25-N01	ZPB-X1JF25-N01
ZPB-X1JB25-T01	ZPB-X1JF25-T01
ZPB-X1JB50-B01	ZPB-X1JF50-B01
ZPB-X1JB50-N01	ZPB-X1JF50-N01
ZPB-X1JB50-T01	ZPB-X1JF50-T01
ZPB-X1JB75-B01	ZPB-X1JF75-B01
ZPB-X1JB75-N01	ZPB-X1JF75-N01
ZPB-X1JB75-T01	ZPB-X1JF75-T01

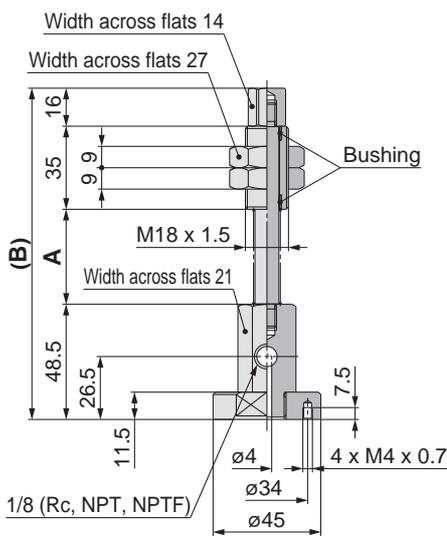


Applicable pad part no.
ZP2-40H(CL/NT/FT)
ZP2-50H(CL/NT/FT)
ZP2-3050HW

Dimensions		
Part no.	A	B
ZPB-X1(JB/JF)25-□01	40	139.5
ZPB-X1(JB/JF)50-□01	75	174.5
ZPB-X1(JB/JF)75-□01	111	210.5

* With three M3 bolts

Buffer assembly part no.	
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)
ZPB-X2JB25-B01	ZPB-X2JF25-B01
ZPB-X2JB25-N01	ZPB-X2JF25-N01
ZPB-X2JB25-T01	ZPB-X2JF25-T01
ZPB-X2JB50-B01	ZPB-X2JF50-B01
ZPB-X2JB50-N01	ZPB-X2JF50-N01
ZPB-X2JB50-T01	ZPB-X2JF50-T01
ZPB-X2JB75-B01	ZPB-X2JF75-B01
ZPB-X2JB75-N01	ZPB-X2JF75-N01
ZPB-X2JB75-T01	ZPB-X2JF75-T01

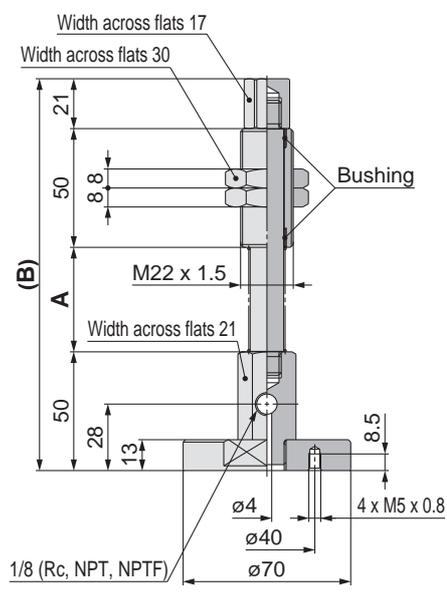


Applicable pad part no.
ZP2-63H(CL/NT/FT)
ZP2-80H(CL/NT/FT)

Dimensions		
Part no.	A	B
ZPB-X2(JB/JF)25-□01	40	139.5
ZPB-X2(JB/JF)50-□01	75	174.5
ZPB-X2(JB/JF)75-□01	111	210.5

* With four M4 bolts

Buffer assembly part no.	
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)
ZPB-X3JB25-B01	ZPB-X3JF25-B01
ZPB-X3JB25-N01	ZPB-X3JF25-N01
ZPB-X3JB25-T01	ZPB-X3JF25-T01
ZPB-X3JB50-B01	ZPB-X3JF50-B01
ZPB-X3JB50-N01	ZPB-X3JF50-N01
ZPB-X3JB50-T01	ZPB-X3JF50-T01
ZPB-X3JB75-B01	ZPB-X3JF75-B01
ZPB-X3JB75-N01	ZPB-X3JF75-N01
ZPB-X3JB75-T01	ZPB-X3JF75-T01
ZPB-X3JB100-B01	ZPB-X3JF100-B01
ZPB-X3JB100-N01	ZPB-X3JF100-N01
ZPB-X3JB100-T01	ZPB-X3JF100-T01



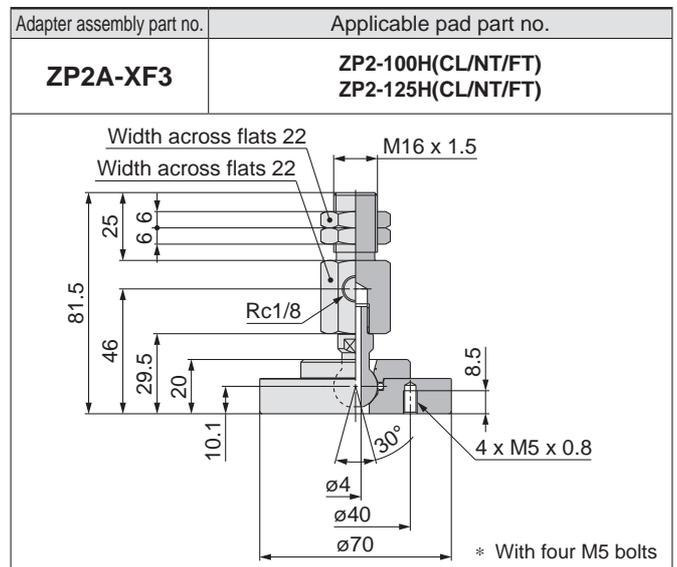
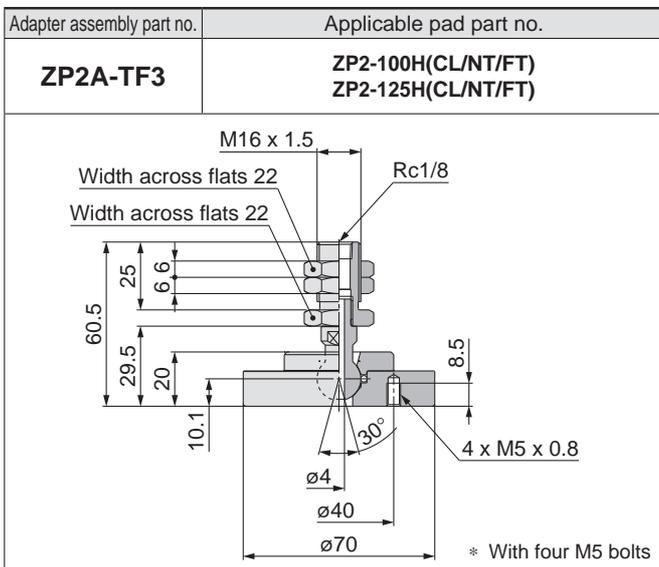
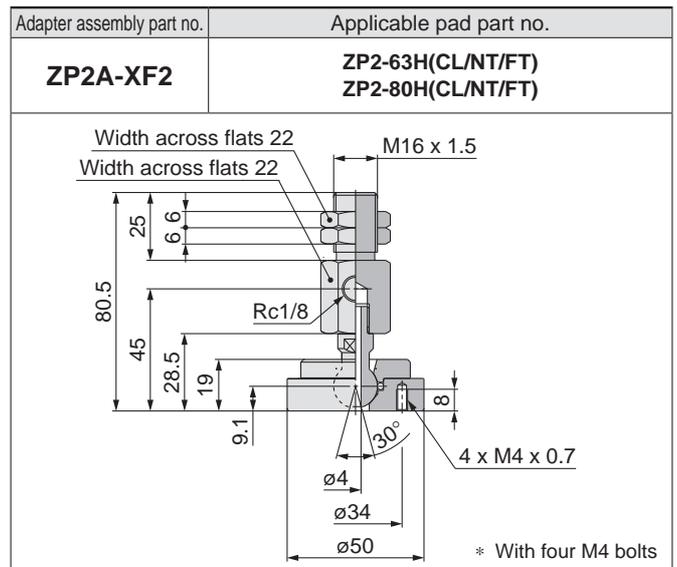
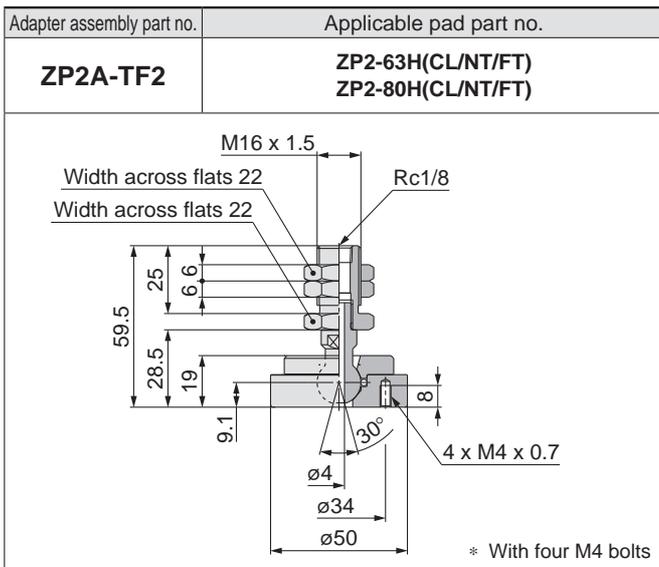
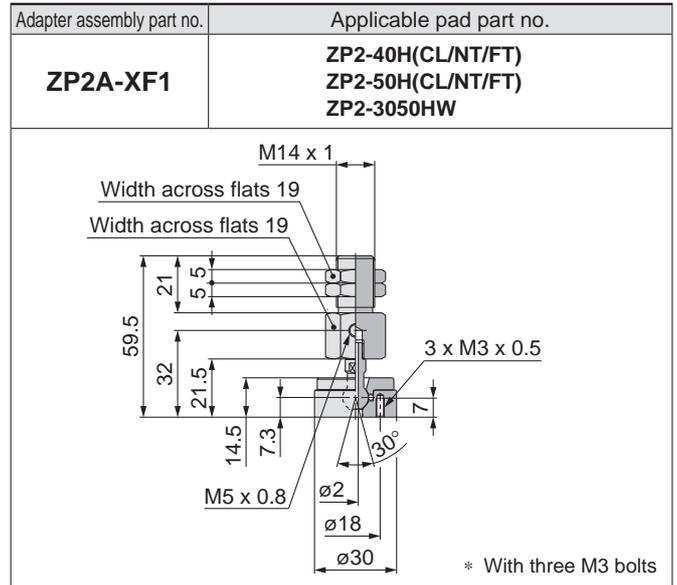
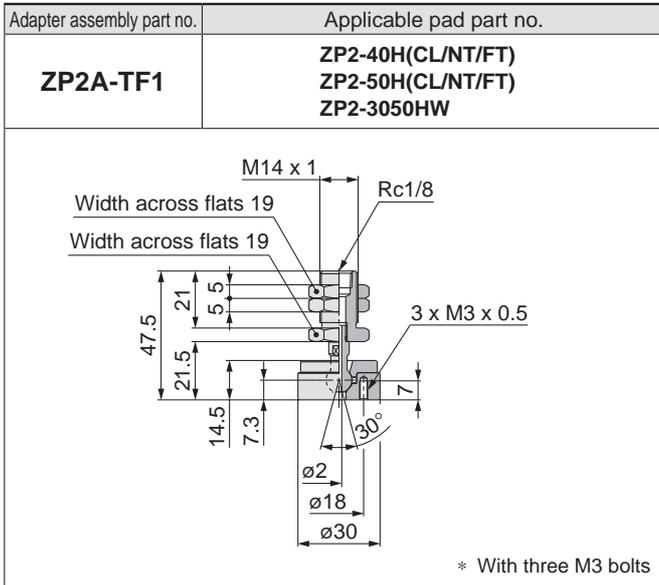
Applicable pad part no.
ZP2-100H(CL/NT/FT)
ZP2-125H(CL/NT/FT)

Dimensions		
Part no.	A	B
ZPB-X3(JB/JF)25-□01	44	165
ZPB-X3(JB/JF)50-□01	80	201
ZPB-X3(JB/JF)75-□01	120	241
ZPB-X3(JB/JF)100-□01	155	276

* With four M5 bolts

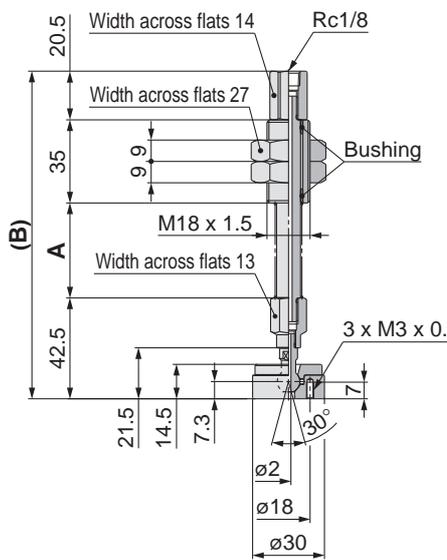
Mark-free Pad/High Rigidity **ZP2 Series** Ball Joint Type Mounting Bracket Assembly

Adapter Assembly



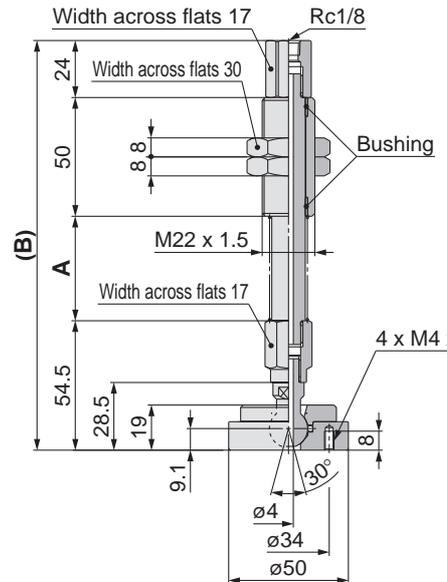
Buffer Assembly

* Refer to page 343 for nut tightening torque.

Buffer assembly part no.			Applicable pad part no.		
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)		ZP2-40H(CL/NT/FT)		
ZP2B-TF1JB25	ZP2B-TF1JF25		ZP2-50H(CL/NT/FT)		
ZP2B-TF1JB50	ZP2B-TF1JF50		ZP2-3050HW		
ZP2B-TF1JB75	ZP2B-TF1JF75				

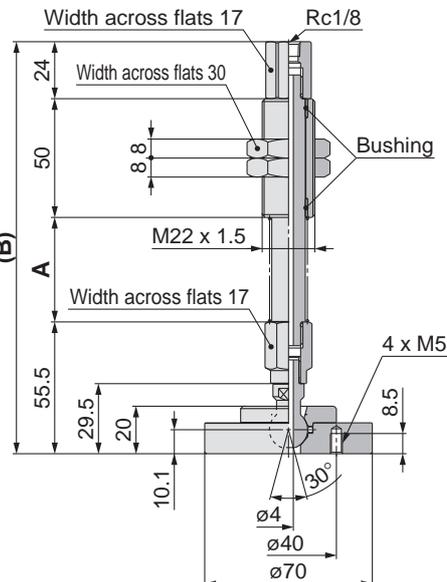
Dimensions		
Part no.	A	B
ZP2B-TF1(JB/JF)25	40	138
ZP2B-TF1(JB/JF)50	75	173
ZP2B-TF1(JB/JF)75	111	209

* With three M3 bolts

Buffer assembly part no.			Applicable pad part no.		
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)		ZP2-63H(CL/NT/FT)		
ZP2B-TF2JB25	ZP2B-TF2JF25		ZP2-80H(CL/NT/FT)		
ZP2B-TF2JB50	ZP2B-TF2JF50				
ZP2B-TF2JB75	ZP2B-TF2JF75				
ZP2B-TF2JB100	ZP2B-TF2JF100				

Dimensions		
Part no.	A	B
ZP2B-TF2(JB/JF)25	44	172.5
ZP2B-TF2(JB/JF)50	80	208.5
ZP2B-TF2(JB/JF)75	120	248.5
ZP2B-TF2(JB/JF)100	155	283.5

* With four M4 bolts

Buffer assembly part no.			Applicable pad part no.		
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)		ZP2-100H(CL/NT/FT)		
ZP2B-TF3JB25	ZP2B-TF3JF25		ZP2-125H(CL/NT/FT)		
ZP2B-TF3JB50	ZP2B-TF3JF50				
ZP2B-TF3JB75	ZP2B-TF3JF75				
ZP2B-TF3JB100	ZP2B-TF3JF100				

Dimensions		
Part no.	A	B
ZP2B-TF3(JB/JF)25	44	173.5
ZP2B-TF3(JB/JF)50	80	209.5
ZP2B-TF3(JB/JF)75	120	249.5
ZP2B-TF3(JB/JF)100	155	284.5

* With four M5 bolts

Model Selection
 For Special Applications
 Mark-free
 For Film Adsorption
 Multistage
 Flat
 Nozzle
 Sponge
 For Disk Adsorption
 For Panel Holding
 Ball Spine Buffer
 Construction
 Mounting Bracket Assembly
 Precautions

Buffer Assembly

* Refer to page 343 for nut tightening torque.

Buffer assembly part no.		Applicable pad part no.
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)	
ZP2B-XF1JB25	ZP2B-XF1JF25	ZP2-40H(CL/NT/FT) ZP2-50H(CL/NT/FT) ZP2-3050HW
ZP2B-XF1JB50	ZP2B-XF1JF50	
ZP2B-XF1JB75	ZP2B-XF1JF75	

Dimensions

Part no.	A	B
ZP2B-XF1(JB/JF)25	40	141.5
ZP2B-XF1(JB/JF)50	75	176.5
ZP2B-XF1(JB/JF)75	111	212.5

* With three M3 bolts

Buffer assembly part no.		Applicable pad part no.
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)	
ZP2B-XF2JB25	ZP2B-XF2JF25	ZP2-63H(CL/NT/FT) ZP2-80H(CL/NT/FT)
ZP2B-XF2JB50	ZP2B-XF2JF50	
ZP2B-XF2JB75	ZP2B-XF2JF75	
ZP2B-XF2JB100	ZP2B-XF2JF100	

Dimensions

Part no.	A	B
ZP2B-XF2(JB/JF)25	44	182.5
ZP2B-XF2(JB/JF)50	80	218.5
ZP2B-XF2(JB/JF)75	120	258.5
ZP2B-XF2(JB/JF)100	155	293.5

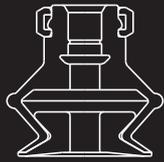
* With four M4 bolts

Buffer assembly part no.		Applicable pad part no.
Buffer body (Material: Brass)	Buffer body (Material: Structural steel)	
ZP2B-XF3JB25	ZP2B-XF3JF25	ZP2-100H(CL/NT/FT) ZP2-125H(CL/NT/FT)
ZP2B-XF3JB50	ZP2B-XF3JF50	
ZP2B-XF3JB75	ZP2B-XF3JF75	
ZP2B-XF3JB100	ZP2B-XF3JF100	

Dimensions

Part no.	A	B
ZP2B-XF3(JB/JF)25	44	183.5
ZP2B-XF3(JB/JF)50	80	219.5
ZP2B-XF3(JB/JF)75	120	259.5
ZP2B-XF3(JB/JF)100	155	294.5

* With four M5 bolts



Resin Attachment

Pad diameter $\varnothing 6, \varnothing 8, \varnothing 10, \varnothing 13, \varnothing 16, \varnothing 20, \varnothing 25, \varnothing 32$

No adsorption marks (rubber constituents) are left on workpieces.

Direct contact between workpieces and the rubber can be avoided by mounting a PEEK attachment inside the bellows pad to prevent the transfer of rubber constituents.

Prevents the pad (rubber) from sticking to workpieces

Ideal for the bellows pad ZP series ($\varnothing 6$ to $\varnothing 32$)

The mounting bracket assembly (adapter) is the same as that of the ZP series. Refer to the following pages and order it separately.

Mounting Bracket Part Nos.

Adapter Assembly p. 121 to 123



How to Order

ZP2-06K P

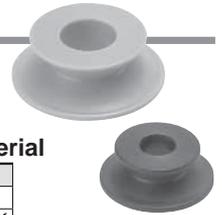
Pad diameter

Symbol	Applicable pad
06	ZP06B□
08	ZP08B□
10	ZP10B□
13	ZP13B□
16	ZP16B□
20	ZP20B□
25	ZP25B□
32	ZP32B□

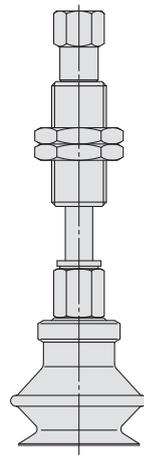
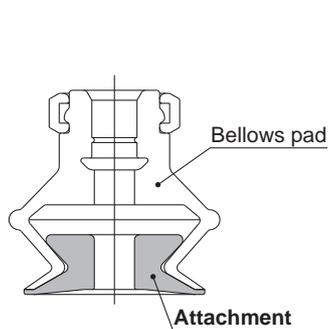
* Sales unit: 10 pcs.

Attachment material

Symbol	Material
P	PEEK
GP	Conductive PEEK



How to Order (When ordering with a pad)



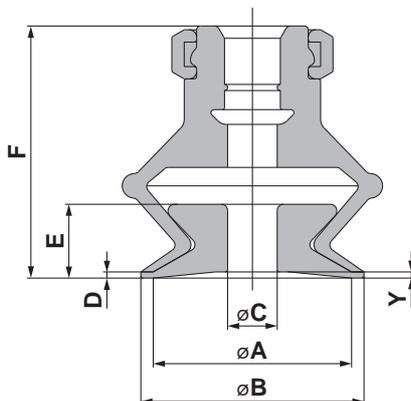
- When ordering with a pad, put "*" below the part number of the pad as shown below. Note that the pad is not delivered with the attachment assembled.
- This attachment can only be mounted inside SMC's standard bellows pads.
- When the attachment is made of conductive PEEK, use conductive material for the pad.

Ordering example **ZPT10BNJ10-B5-A10** ← Bellows pad part no.
 * **ZP2-10KP** ← Resin attachment part no.

Dimensions/Single Unit

* The dimensions of the mounting bracket are the same as the ZP series. Refer to the mounting bracket dimensions on the following pages.

With Adapter p. 69 to 78



Dimensions

Model	Applicable pad	A	B	C	D	E	F	Y
ZP2-06K■	ZP06B□	6	7	1.6	0.5	3	13.5	0.5
ZP2-08K■	ZP08B□	8	9	3		3.5	16.5	
ZP2-10K■	ZP10B□	10	12	3.5		5.5	19	
ZP2-13K■	ZP13B□	13	15	4	1	6	20.5	1
ZP2-16K■	ZP16B□	16	18			8.5	24.5	
ZP2-20K■	ZP20B□	20	22	8		25	30	
ZP2-25K■	ZP25B□	25	27	10	1	11.5	30	1
ZP2-32K■	ZP32B□	32	34					

* ■ in the table indicates the attachment material
 * □ in the table indicates the pad material

«Precautions»

- 1) Clean the product before using the attachment.
 This product is not cleaned before shipment. If the product is used in the condition in which it was shipped, residual material may be left on workpieces. Clean before use. If you have any questions, please contact SMC.
- 2) The workpiece contact part of this product is made of resin and, therefore, there may be more vacuum pressure leakage during adsorption compared to general rubber pads. Therefore, maintain as large a flow rate as possible to minimize the pressure drop due to leakage.
- 3) Cannot be used for vacuum retention
- 4) Customers are required to conduct an evaluation to judge whether or not the product should be used.

• If contact with hard material is a problem, do not use this product.



Pads for Special Applications/Mark-free Pad

Specific Product Precautions

Be sure to read this before handling the products.

Refer to page 375 for safety instructions. For vacuum equipment and vacuum pad precautions, refer to pages 376 to 379.

Design

1. Although the adsorption marks (transfer of rubber components to workpieces) left by this product have been minimized compared with existing rubber pads, confirm whether the adsorption marks have any effect on the actual workpieces before use.
2. High vacuum pressure leaks from the lip may occur in the mark-free pad series due to the manufacturing method compared with common rubber pads.
3. Note that this product cannot be used to hold vacuum.
4. Secure as high a flow rate as possible to suppress the pressure effect caused by leakage to a minimum.
5. The fluoro-resin-coated pad is a molded product where a fluoro-resin sheet is integrated with the rubber (NBR, FKM). Therefore, the height of the product may decrease due to the deterioration of the rubber and elongation of the fluoro-resin sheet after repeated usage. This is caused by the pad coming into contact with workpieces vertically (load is applied equally to the pad skirt).

For example, if the pad performs an operation where the shape changes as in the following conditions, the pad skirt may be deformed.

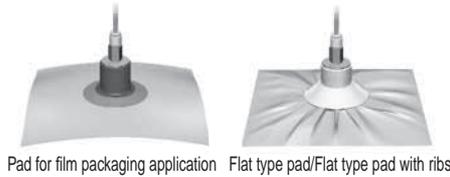
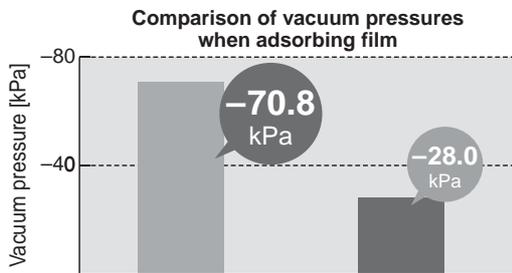
- 1) When the pad contacts a workpiece from a diagonal direction
- 2) When a load cannot be applied equally to the pad due to the uneven surface of a workpiece, or the pad is pressed against an irregularly shaped workpiece for adsorption
- 3) When the pad is used in a stretched condition due to insufficient lifting force

When any of the above problems occur, please reconsider the usage method.

ø20, ø25, ø35, ø50

Good for film packaging applications

- This product uses silicone rubber compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for “Rubber articles intended for repeated use.”
- **Blue colored pad**
Easy to distinguish the vacuum pad by color during contamination inspection
- **Reduced leakage**
Sealing skirt design, better sealing performance even for thin films



- **Reduction of wrinkles made on thin workpieces (film, vinyl, etc.) during adsorption**

Wrinkle prevention with the stopper in the center of the vacuum pad



Variations

	Form	Pad diameter				Vacuum inlet/Mounting	Buffer stroke	Page
		ø20	ø25	ø35	ø50			
Pad Unit		●	●	●	●	—	—	267
With Adapter	Male thread	●	●	●	●	M5 x 0.8, M12 x 1.75 G1/8, G1/4, G3/8	—	268
	Female thread	●	●	●	●	M5 x 0.8 M8 x 1.25	—	
With Buffer	Female thread	●	●	●	●	Vacuum inlet: M5 x 0.8, Rc1/8 Mounting: M10 x 1, M14 x 1	10 mm/20 mm	271



Vacuum Pad

Symbol/Form

Pad diameter \rightarrow $\varnothing 20, \varnothing 25, \varnothing 35, \varnothing 50$

How to Order



Pad unit **ZP3P-20PTSF**

* Pad unit's sales unit: 10 pcs.

Pad diameter

Symbol	Pad diameter
20	$\varnothing 20$
25	$\varnothing 25$
35	$\varnothing 35$
50	$\varnothing 50$

Mounting Bracket Part Nos.

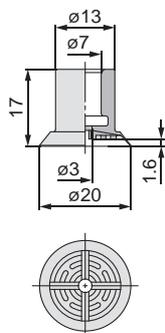
Adapter Assembly	p. 275
Buffer Assembly	p. 275

Pad material

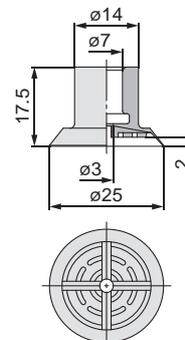
Symbol	Material
SF	Silicone rubber Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Dimensions: Pad Unit

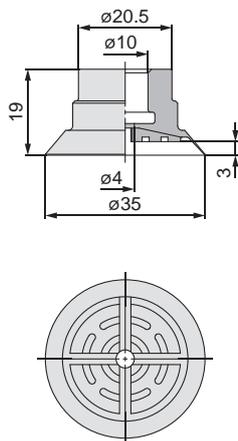
ZP3P-20PTSF [Weight: 1.8 g]



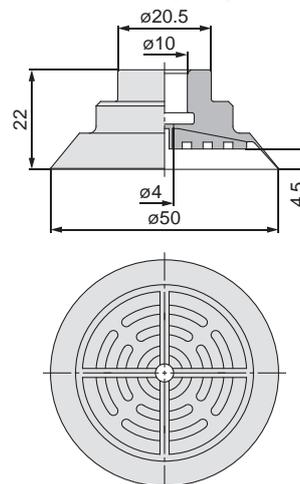
ZP3P-25PTSF [Weight: 2.2 g]



ZP3P-35PTSF [Weight: 4.7 g]



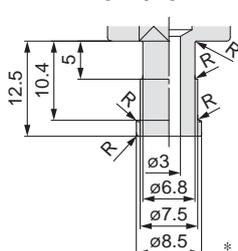
ZP3P-50PTSF [Weight: 12.4 g]



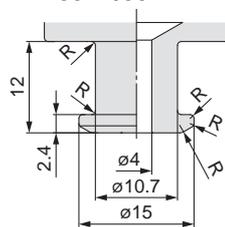
Pad Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.

Applicable pad 20PT/25PT



Applicable pad 35PT/50PT



* The R part has to be smooth with no corners.

How to Order

Vertical vacuum inlet
With adapter

ZP3P-T 20 PT SF-A5

Pad diameter

Symbol	Pad diameter
20	ø20
25	ø25
35	ø35
50	ø50

Pad material

Symbol	Material
SF	Silicone rubber Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

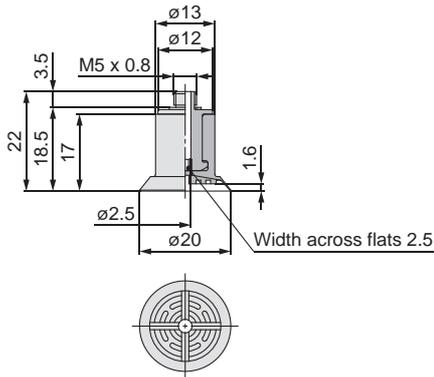
Mounting thread size

Type	Symbol	Size	ø20	ø25	ø35	ø50
Male thread	A5	M5 x 0.8	●	●	—	—
	A12	M12 x 1.75	—	—	●	●
	AG1	G1/8	●	●	—	—
	AG2	G1/4	—	—	●	●
Female thread	B5	M5 x 0.8	●	●	—	—
	B8	M8 x 1.25	—	—	●	●

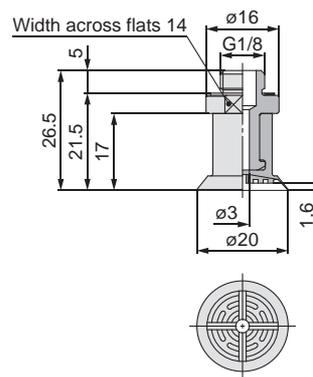
* The pad is shipped together but does not come assembled.

Dimensions: With Male Thread Adapter

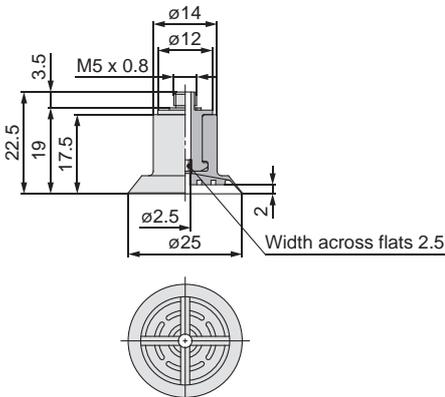
ZP3P-T20PTSF-A5 [Weight: 3.9 g]



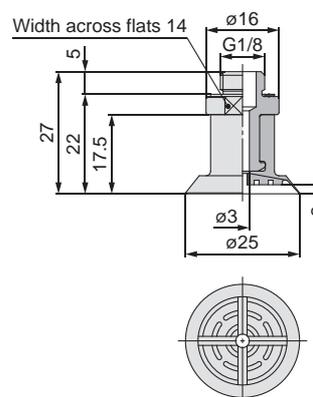
ZP3P-T20PTSF-AG1 [Weight: 5.9 g]



ZP3P-T25PTSF-A5 [Weight: 4.3 g]



ZP3P-T25PTSF-AG1 [Weight: 6.3 g]



Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spline Buffer

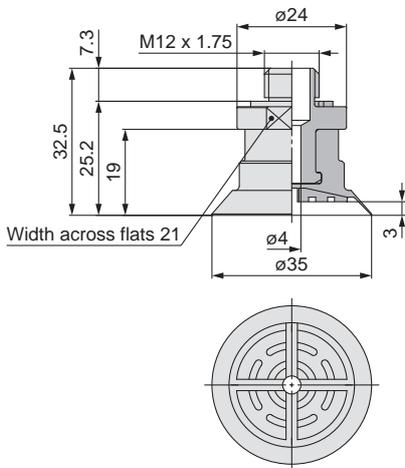
Construction

Mounting Bracket Assembly

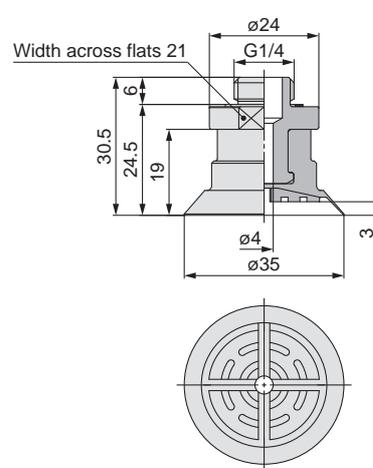
Precautions

Dimensions: With Male Thread Adapter

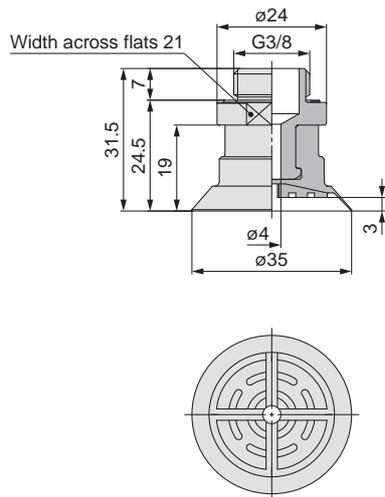
ZP3P-T35PTSF-A12 [Weight: 20.7 g]



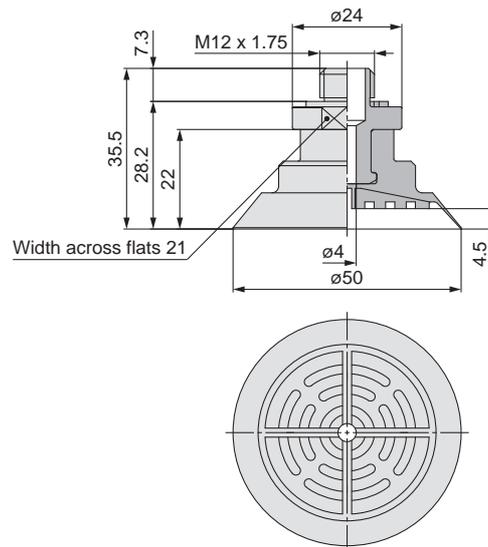
ZP3P-T35PTSF-AG2 [Weight: 14.5 g]



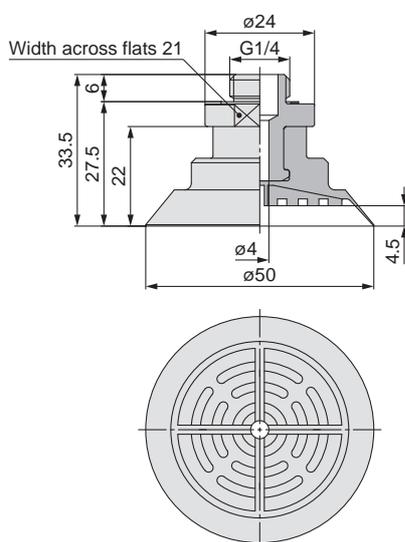
ZP3P-T35PTSF-AG3 [Weight: 21.1 g]



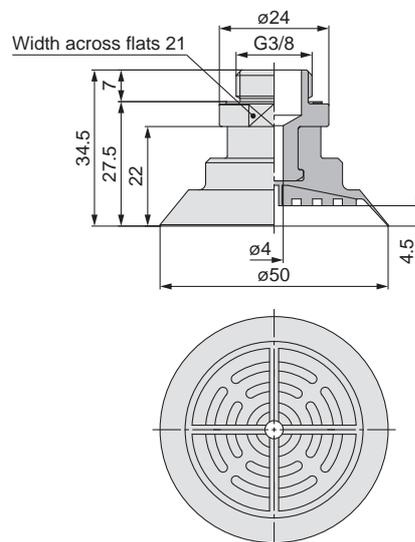
ZP3P-T50PTSF-A12 [Weight: 28.4 g]



ZP3P-T50PTSF-AG2 [Weight: 22.2 g]

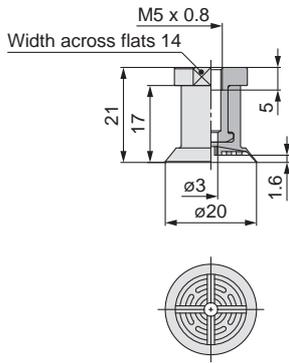


ZP3P-T50PTSF-AG3 [Weight: 28.8 g]

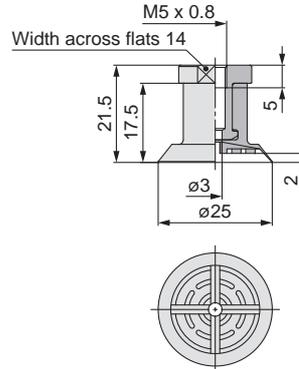


Dimensions: With Female Thread Adapter

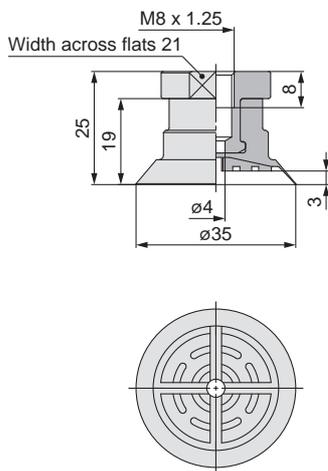
ZP3P-T20PTSF-B5 [Weight: 4.9 g]



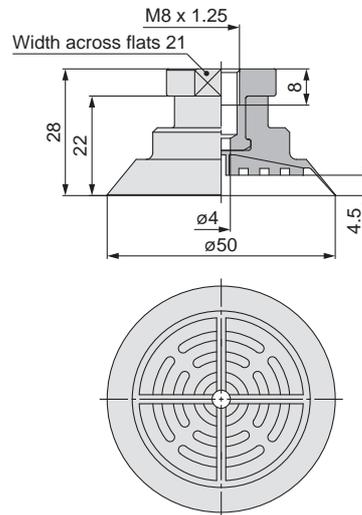
ZP3P-T25PTSF-B5 [Weight: 5.3 g]



ZP3P-T35PTSF-B8 [Weight: 13.2 g]



ZP3P-T50PTSF-B8 [Weight: 20.9 g]



Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

Construction

Mounting Bracket Assembly

Precautions

How to Order

Vertical vacuum inlet
With buffer

ZP3P-T 20 PT SF J 10-B5



Pad diameter

Symbol	Pad diameter
20	ø20
25	ø25
35	ø35
50	ø50

Pad material

Symbol	Material
SF	Silicone rubber Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Vacuum inlet

Type	Symbol	Size	ø20, ø25	ø35, ø50
Female thread	B5	M5 x 0.8	●	—
	B01	Rc1/8	—	●

Buffer specification

Symbol	Buffer specification
J	Rotating
K	Non-rotating

Stroke

Symbol	Stroke	ø20, ø25	ø35, ø50
10	10 mm	●	●
20	20 mm	●	●

Specifications

Pad diameter	Buffer specification	Stroke [mm]	Tightening torque [N·m]	Connection thread	Spring reactive force [N]	
					At 0 stroke	At full stroke
ø20, ø25	J/K	10, 20	2.5 to 3.5	M10 x 1	1.0	3.0
ø35, ø50	J/K	10, 20	6.5 to 7.5	M14 x 1	2.0	5.0

* The pad and mounting nut are shipped together but do not come assembled.

⚠ Specific Product Precautions

Be sure to read this before handling the products. Refer to page 375 for safety instructions. For vacuum equipment and vacuum pad precautions, refer to pages 376 to 379.

Operating Precautions

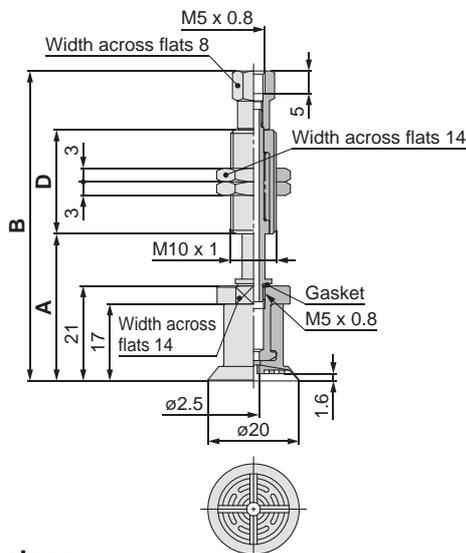
⚠ Caution

1. When selecting a buffer

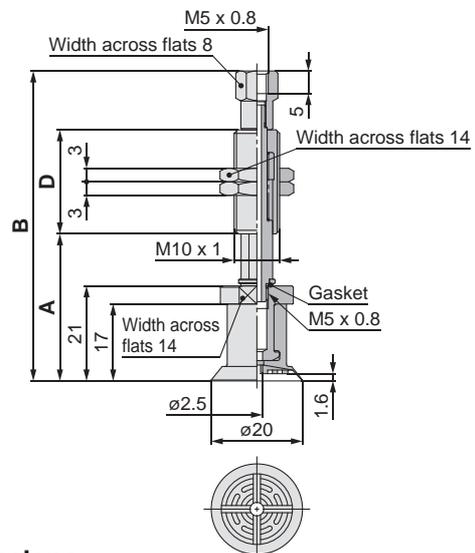
Buffers come with general industrial grease applied to them and are therefore not compliant with FDA regulations. Metal wear particles will be generated due to the sliding motion of the buffer. Please take this into consideration when deciding whether this pad is suitable for your application.

Dimensions: With Buffer

ZP3P-T20PTSFJ■-B5



ZP3P-T20PTSFK■-B5



Dimensions

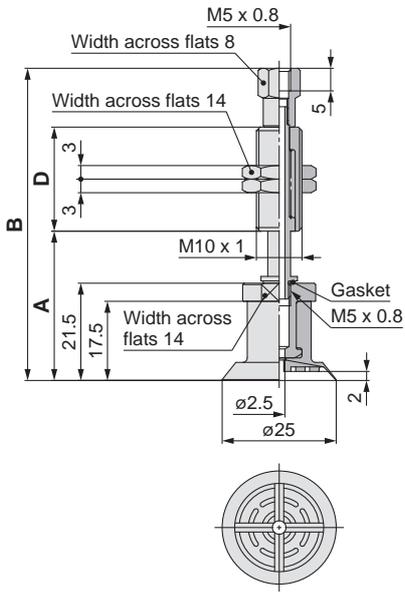
Part no.	A	B	D	Weight [g]
ZP3P-T20PTSFJ10-B5	32.5	68.5	23	26.7
ZP3P-T20PTSFJ20-B5	42.5	106.5	51	40.8

Dimensions

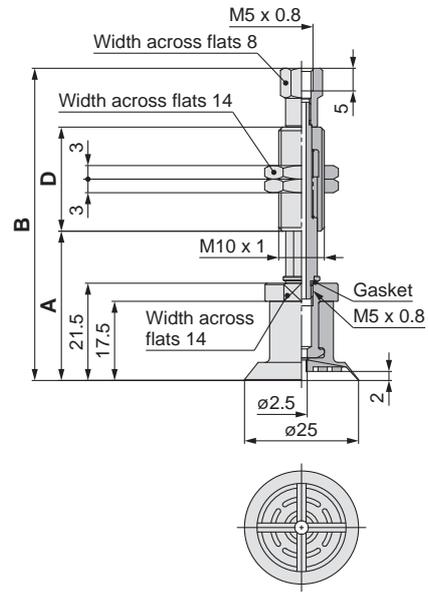
Part no.	A	B	D	Weight [g]
ZP3P-T20PTSFK10-B5	32.5	68.5	23	28.5
ZP3P-T20PTSFK20-B5	42.5	106.5	51	41.8

Dimensions: With Buffer

ZP3P-T25PTSFJ■-B5



ZP3P-T25PTSFK■-B5



Dimensions

Part no.	A	B	D	Weight [g]
ZP3P-T25PTSFJ10-B5	33	69	23	27.1
ZP3P-T25PTSFJ20-B5	43	107	51	41.2

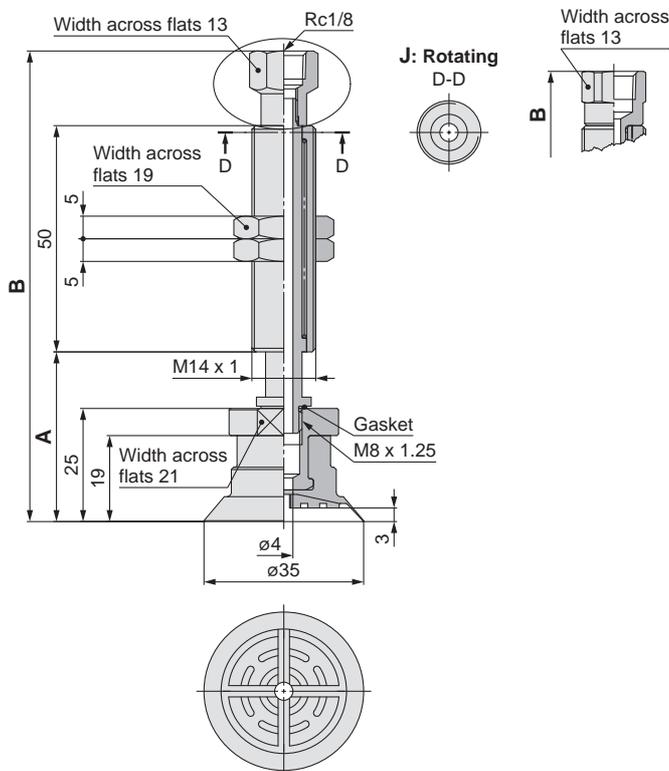
Dimensions

Part no.	A	B	D	Weight [g]
ZP3P-T25PTSFK10-B5	33	69	23	28.5
ZP3P-T25PTSFK20-B5	43	107	51	42.2

ZP3P-T35PTSFJ■-B01

ZP3P-T35PTSFJ10-B01

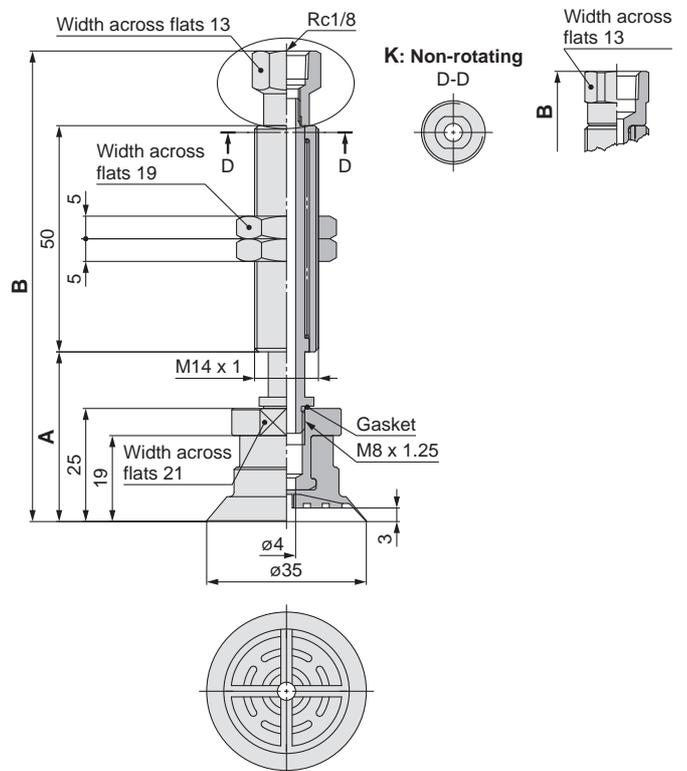
ZP3P-T35PTSFJ20-B01



ZP3P-T35PTSFK■-B01

ZP3P-T35PTSFK10-B01

ZP3P-T35PTSFK20-B01



Dimensions

Part no.	A	B	Weight [g]
ZP3P-T35PTSFJ10-B01	37.5	104	93.6
ZP3P-T35PTSFJ20-B01	47.5	109.5	94.6

Dimensions

Part no.	A	B	Weight [g]
ZP3P-T35PTSFK10-B01	37.5	104	93.0
ZP3P-T35PTSFK20-B01	47.5	109.5	94.1

Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

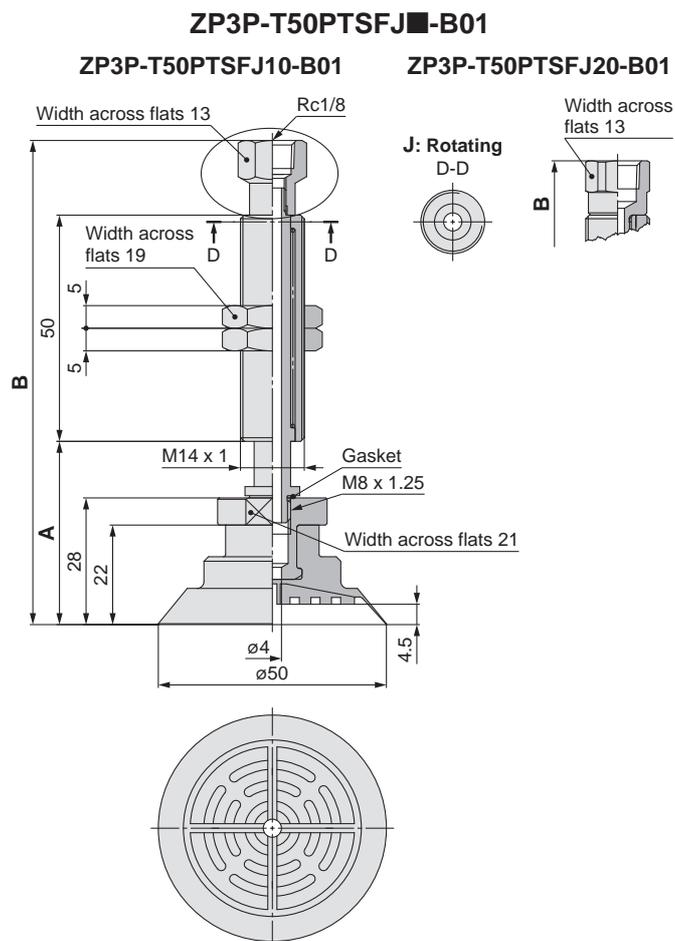
Ball Spine Buffer

Construction

Mounting Bracket Assembly

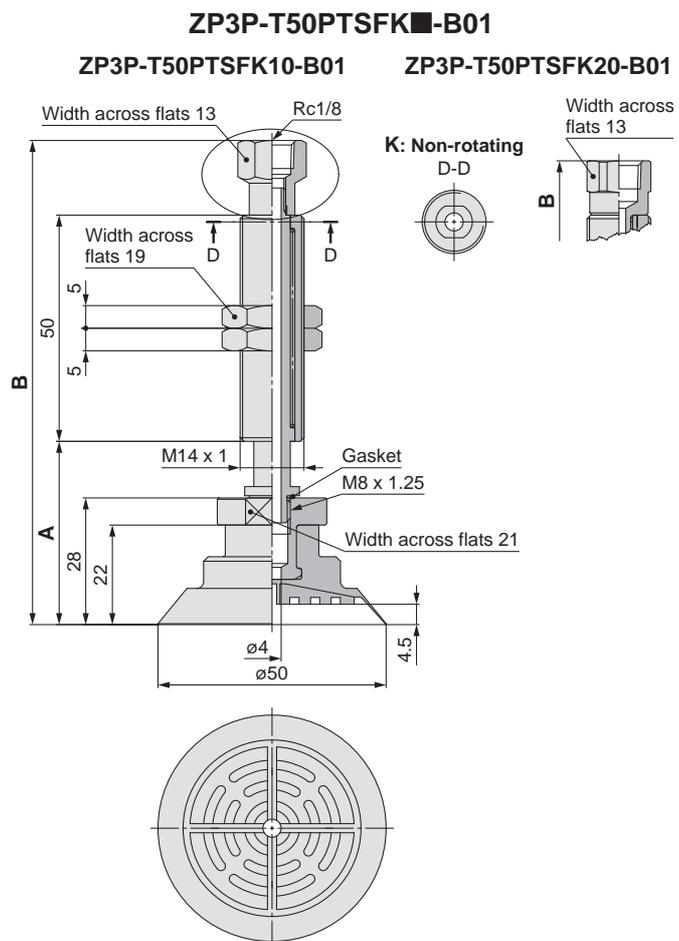
Precautions

Dimensions: With Buffer



Dimensions

Part no.	A	B	Weight [g]
ZP3P-T50PTSFJ10-B01	40.5	107	101.3
ZP3P-T50PTSFJ20-B01	50.5	112.5	102.3



Dimensions

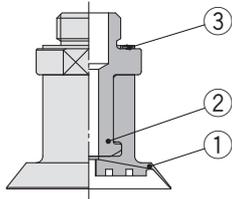
Part no.	A	B	Weight [g]
ZP3P-T50PTSFK10-B01	40.5	107	100.7
ZP3P-T50PTSFK20-B01	50.5	112.5	101.8

Vacuum Pad *ZP3P* Series Construction

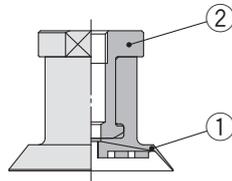
Model Selection

Pad with Adapter

Male thread



Female thread



Component Parts

No.	Description	Material (Surface treatment)	Note
1	Vacuum pad	Silicone rubber Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"	
2	Adapter	Aluminum alloy (Clear anodized)	
3	Gasket	Stainless steel/NBR	Thread size: Other than M12 x 1.75
	Seal washer	Structural steel/NBR	Thread size: M12 x 1.75

For Special Applications

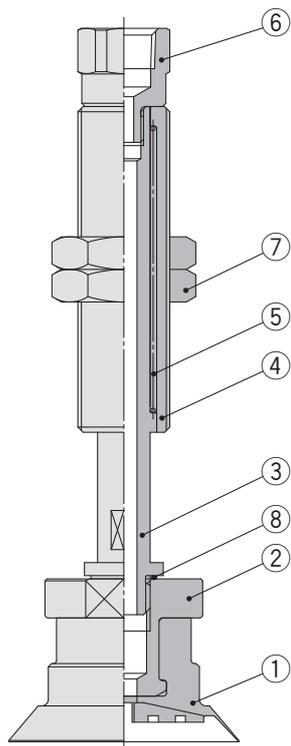
Mark-free

For Film Adsorption

Multistage

Flat

Pad with Buffer



Component Parts

No.	Description	Material (Surface treatment)
1	Vacuum pad	Silicone rubber Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"
2	Adapter	Aluminum alloy (Clear anodized)
3	Piston rod	Stainless steel
4	Buffer body	Brass (Electroless nickel plating)
5	Return spring	Stainless steel
6	Buffer adapter	Brass (Electroless nickel plating)
7	Nut	Brass (Nickel plating)
8	Gasket	Stainless steel/NBR

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

Construction

Mounting Bracket Assembly

Precautions

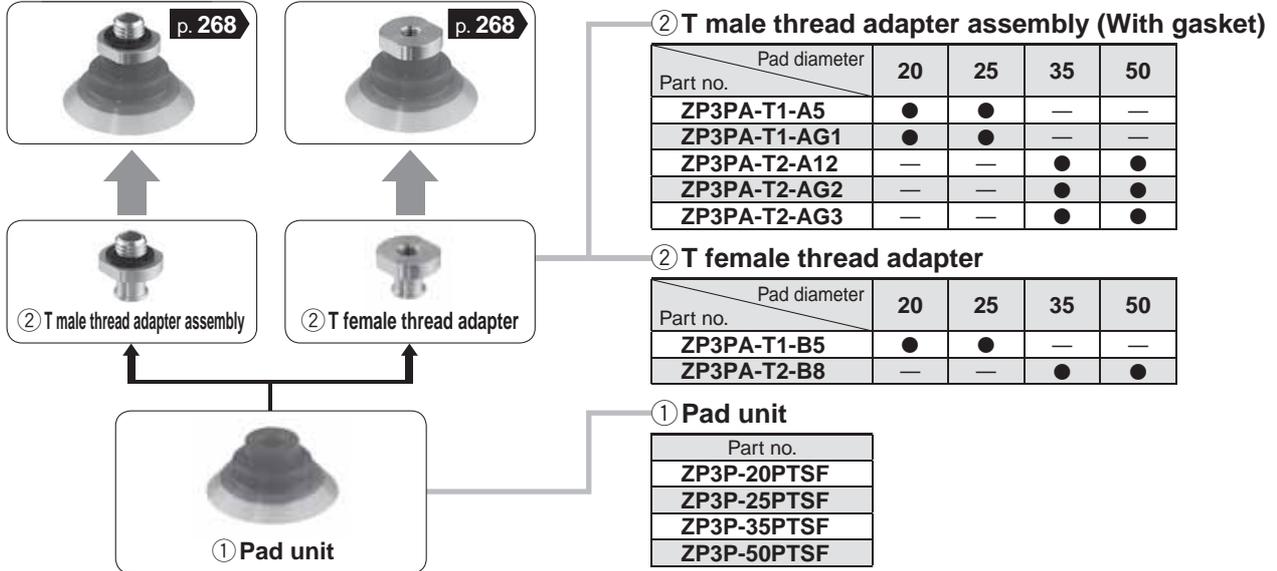
Vacuum Pad ZP3P Series

Parts Structure

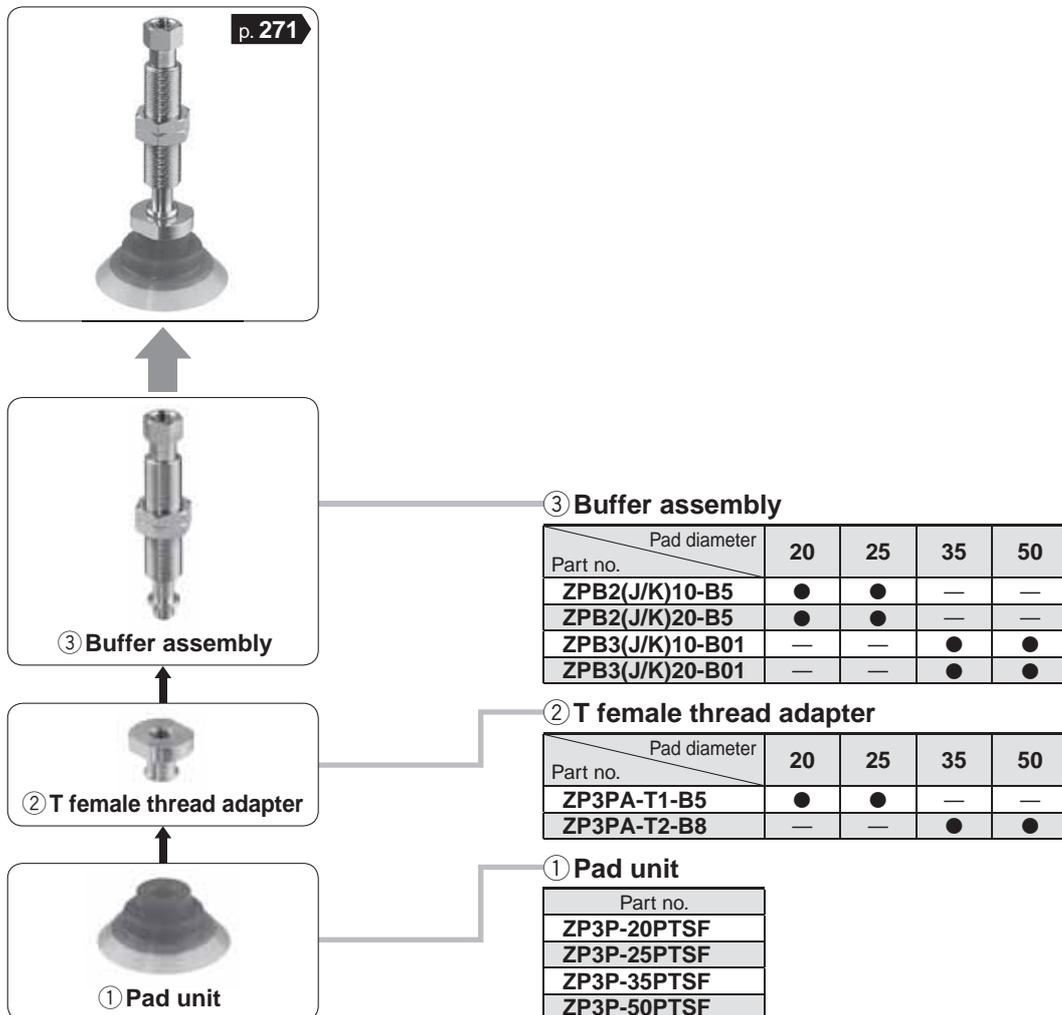
With T Type Adapter

ZP3P-T (20 to 50) PTSF-(A5/AG1/A12/AG2/AG3)

ZP3P-T (20 to 50) PTSF-(B5/B8)



With Buffer





Bellows Pad (4.5-Stage)

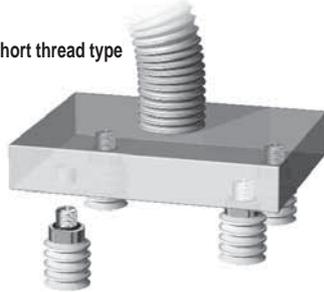
Symbol/Form

ZJ: Bellows type

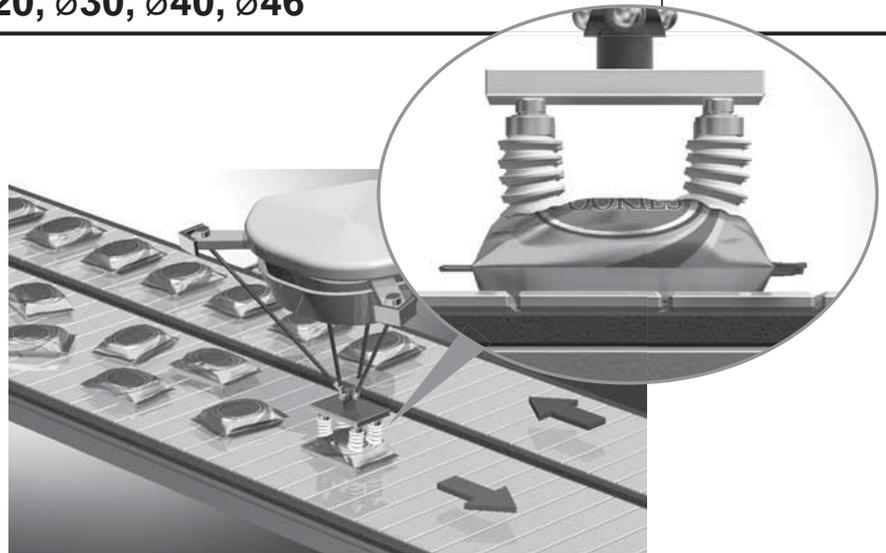
Pad diameter $\varnothing 15, \varnothing 20, \varnothing 30, \varnothing 40, \varnothing 46$

- For adsorbing workpieces moving at high speeds
- Follows various shapes of workpieces
- Pad material: Silicone rubber (Rubber hardness: A40, A50, A60)

• Short thread type



- Large opening size (short thread type): $\varnothing 5$ to $\varnothing 22$
For vacuum blower pumps with high suction flow rates



• One-touch fitting type



How to Order

Pad unit **ZP2 - B15 ZJ S**

* Pad unit's sales unit: 10 pcs.

Pad diameter

Symbol	Pad diameter
B15	$\varnothing 15^{*1}$
B20	$\varnothing 20^{*1}$
B30	$\varnothing 30^{*1}$
40	$\varnothing 40$
46	$\varnothing 46$

*1 Pad O.D.

Pad form

Symbol	Form
ZJ	Bellows type (4.5-stage)

Pad material

Symbol	Material	Applicable pad diameter					
		$\varnothing 15$	$\varnothing 20$	$\varnothing 30$	$\varnothing 40$	$\varnothing 46$	
N	NBR	—	—	—	●	●	
U	Urethane rubber	—	—	—	●	●	
F	FKM	—	—	—	●	●	
GN	Conductive NBR	—	—	—	●	●	
GS	Conductive silicone rubber (Black)	—	—	—	●	●	
S	Silicone rubber*1 (White)	Hardness A40/S*2	●	●	●	—	—
		Hardness A50/S	—	—	—	●	●
S6	Silicone rubber*1 High-hardness type (White)	Hardness A60/S	●	●	●	—	—

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

*2 Identification of rubber hardness: Painted with 1 pink dot

Mounting Bracket Part Nos.

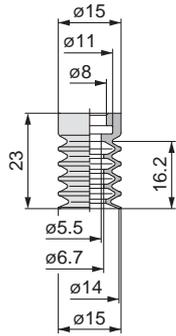
Adapter Assembly p. 281

Model Selection
For Special Applications
Mark-free
For Film Adsorption
Multistage
Flat
Nozzle
Sponge
For Disk Adsorption
For Panel Holding
Ball Spine Buffer
Construction
Mounting Bracket Assembly
Precautions

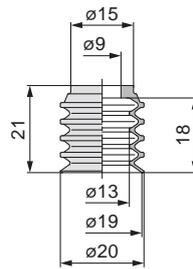
Bellows Pad (4.5-Stage) **ZP2 Series**

Dimensions: Pad Unit

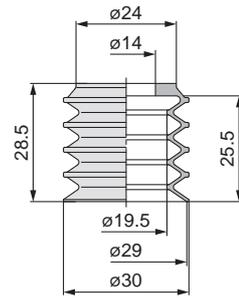
ZP2-B15ZJS □



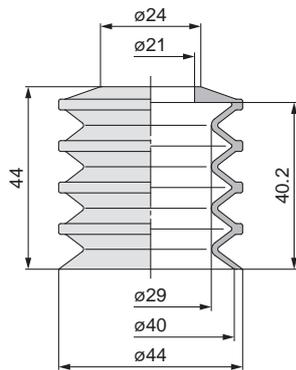
ZP2-B20ZJS □



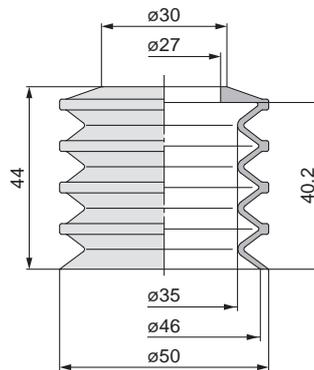
ZP2-B30ZJS □



ZP2-40ZJ □



ZP2-46ZJ □



Weight	[g]
ZP2-B15ZJS □	2.0
ZP2-B20ZJS □	2.0
ZP2-B30ZJS □	4.5
ZP2-40ZJN	16.0
ZP2-40ZJS □	15.0
ZP2-40ZJU	16.0
ZP2-40ZJF	25.0
ZP2-40ZJGN	16.0
ZP2-40ZJGS	16.0
ZP2-46ZJN	19.0
ZP2-46ZJS □	17.0
ZP2-46ZJU	19.0
ZP2-46ZJF	30.0
ZP2-46ZJGN	19.0
ZP2-46ZJGS	19.0

How to Order

Vertical vacuum inlet with adapter

ZP2 - T B15 ZJ S - A10 - 06



Pad diameter

Symbol	Pad diameter
B15	ø15*1
B20	ø20*1
B30	ø30*1
40	ø40
46	ø46

*1 Pad O.D.

Pad form

Symbol	Form
ZJ	Bellows type (4.5-stage)

Pad material

Symbol	Material	Applicable pad diameter				
		ø15	ø20	ø30	ø40	ø46
N	NBR	—	—	—	●	●
U	Urethane rubber	—	—	—	●	●
F	FKM	—	—	—	●	●
GN	Conductive NBR	—	—	—	●	●
GS	Conductive silicone rubber (Black)	—	—	—	●	●
S	Silicone rubber*1 (White)	Hardness A40/S*2	●	●	—	—
		Hardness A50/S	—	—	●	●
S6	Silicone rubber*1 High-hardness type (White)	Hardness A60/S	●	●	●	—

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

*2 Identification of rubber hardness: Painted with 1 pink dot

Vacuum inlet

Symbol	Vacuum inlet	Connection thread					
		A10	A16	A20	A30	AL12	AL14
Nil	Short thread	●	●	●	●	—	—
06	One-touch fitting(ø6)	—	—	—	—	●	●

Connection thread

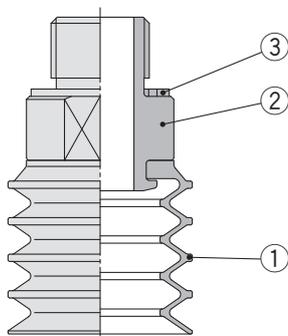
Type	Symbol	Size	ø15	ø20	ø30	ø40	ø46
Short thread	A10	M10 x 1	●	●	—	—	—
	A16	M16 x 1.5	—	—	●	—	—
	A20	M20 x 1.5	—	—	—	●	—
	A30	M30 x 1.5	—	—	—	—	●
One-touch fitting	AL12	M12 x 1	●	●	—	—	—
	AL14	M14 x 1	—	—	●	●	●

* The pad is shipped together but does not come assembled.

Bellows Pad (4.5-Stage) **ZP2 Series**

Component Parts

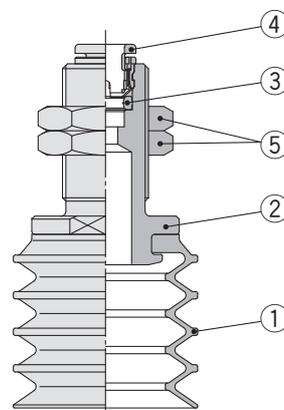
■ Short thread type (Pad with adapter)



Component Parts

No.	Description	Material (Surface treatment)
1	Pad	Refer to the pad material (page 276).
2	Adapter	Aluminum alloy (Anodized)
3	Seal washer	Structural steel/NBR

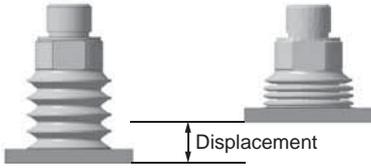
■ One-touch fitting type (Pad with adapter)



Component Parts

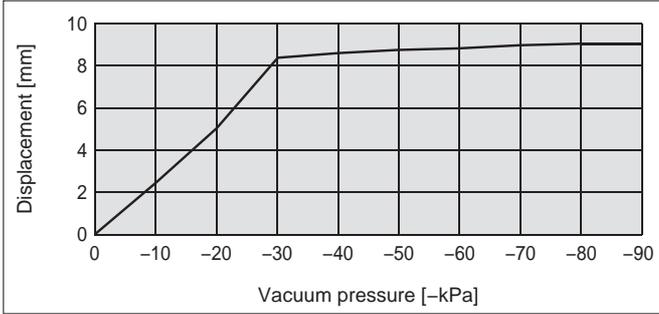
No.	Description	Material (Surface treatment)
1	Pad	Refer to the pad material (page 276).
2	Adapter	Aluminum alloy (Anodized)
3	Seal	NBR
4	Cassette	—
5	Nut	Structural steel (Trivalent chromated)

Pad Displacement to Vacuum Pressure (Pad material: Silicone rubber)

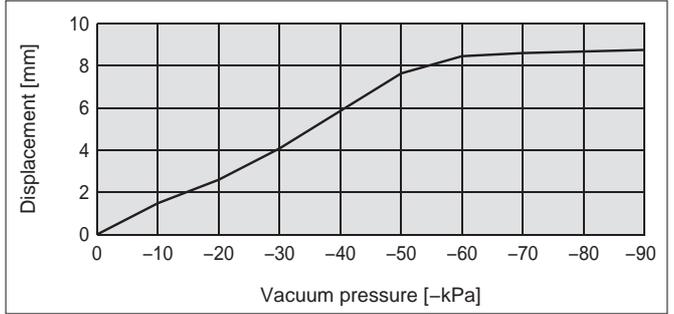


The data shown below are not guaranteed but actual measured (initial value). These values depend on the operating environment, workpiece weight and transfer method, so they cannot be guaranteed by SMC. Thorough research and confirmation are necessary before use.

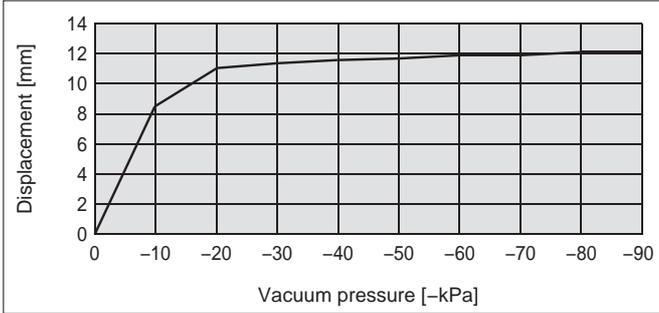
ZP2-B15ZJS



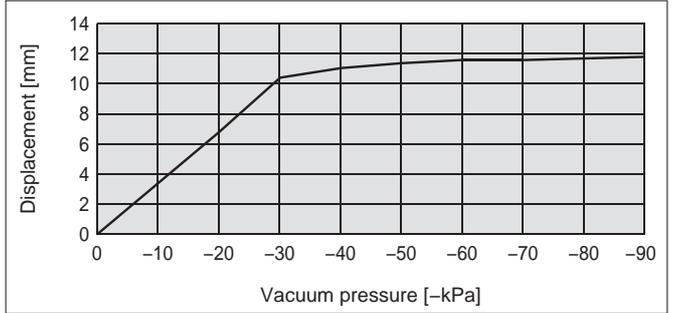
ZP2-B15ZJS6



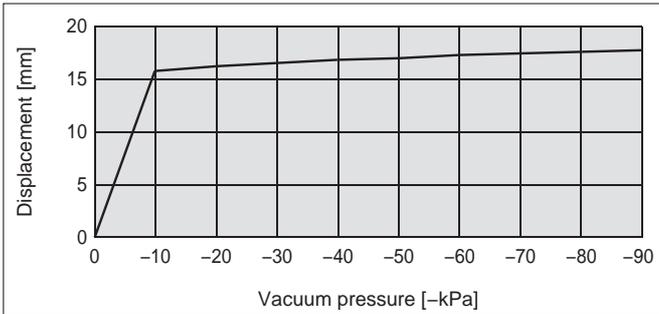
ZP2-B20ZJS



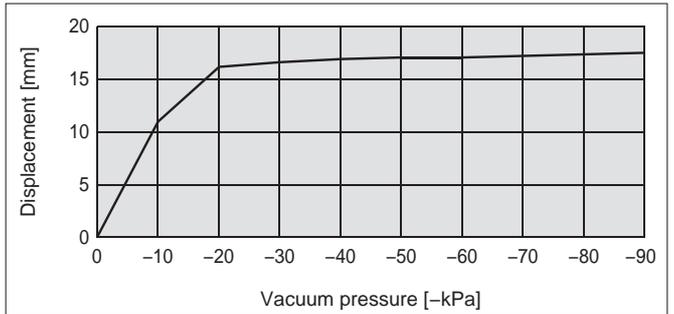
ZP2-B20ZJS6



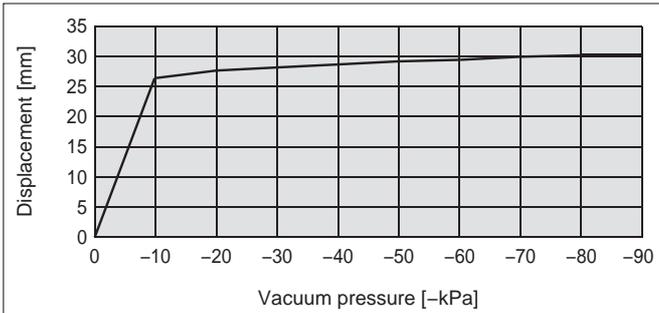
ZP2-B30ZJS



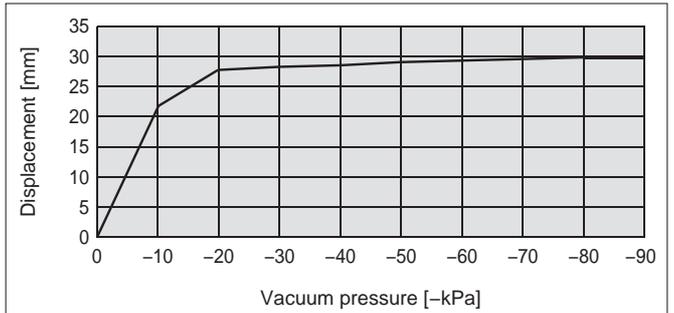
ZP2-B30ZJS6



ZP2-40ZJS



ZP2-46ZJS



Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

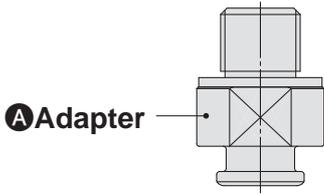
Construction

Mounting Bracket Assembly

Precautions

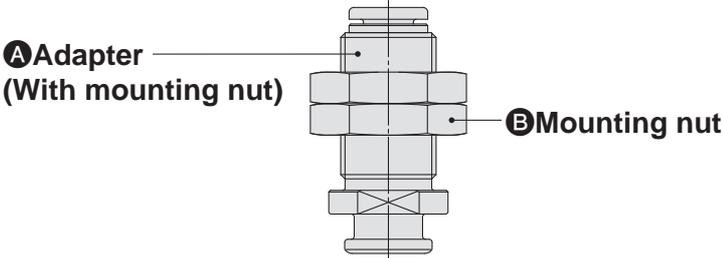
Bellows Pad (4.5-Stage) *ZP2* Series Mounting Bracket Assembly

Adapter Assembly

Product part no.	<p style="text-align: center;">ZP2 - T ① ZJ □ - ②</p> <p style="text-align: center;"> Pad diameter Bellows type Pad material Connection thread (Male thread) </p>
Component parts	 <p style="text-align: center;">A Adapter</p>

		Symbol	① Pad diameter symbol						
			B15	B20	B30	40	46		
A Adapter	② Connection thread Male thread (Short thread)	M10 x 1	A10	ZP2A-Z31-1P	ZP2A-Z31-2P	—			
		M16 x 1.5	A16	—		ZP2A-Z31-3P	—		
		M20 x 1.5	A20	—			ZP2A-Z31-4P	—	
		M30 x 1.5	A30	—				ZP2A-Z31-5P	

Adapter Assembly

Product part no.	<p style="text-align: center;">ZP2 - T ① ZJ □ - ② ③</p> <p style="text-align: center;"> Pad diameter Bellows type Pad material Vacuum inlet (One-touch fitting) Connection thread (Male thread) </p>
Component parts	 <p style="text-align: center;">A Adapter (With mounting nut) B Mounting nut</p>

		Symbol			Symbol	① Pad diameter symbol					
						B15	B20	B30	40	46	
A Adapter	② Connection thread Male thread	M12 x 1	AL12	③ Vacuum inlet One-touch fitting	ø6	06	ZP2A-Z32-1	ZP2A-Z32-2	—		
		M14 x 1	AL14				—		ZP2A-Z32-3	ZP2A-Z32-4	ZP2A-Z32-5
B Mounting nut (Single unit)				M12 x 1		ZPNA-M12C		—			
				M14 x 1		—		ZPNA-M14A			



Bellows Pad (2.5/3.5-Stage)

Symbol/Form

J: Bellows type

Pad diameter $\phi 6, \phi 9, \phi 10, \phi 14, \phi 15, \phi 16, \phi 25, \phi 30$

■ For use where there is no space for a buffer (spring type)

■ For workpieces with inclined adsorption surfaces

* The pad and lock ring are shipped together.

Mounting Bracket Part Nos.

Adapter Assembly p. 283 to 285



How to Order

Pad unit **ZP2-06JN-X19**

* Pad unit's sales unit: 10 pcs.

Pad diameter		
Symbol	Pad diameter	Blast type
06	$\phi 6$	—
09	$\phi 9$	—
B10	$\phi 10$	●
14	$\phi 14$	—
B15	$\phi 15$	●
16	$\phi 16$	—
B25	$\phi 25$	●
B30	$\phi 30$	●

* Blast type: Workpieces can be removed easily.

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"



With/Without lock ring

Nil	With lock ring
X19	Without lock ring*2

*2 $\phi 6, \phi 10,$ and $\phi 15$ are not available.

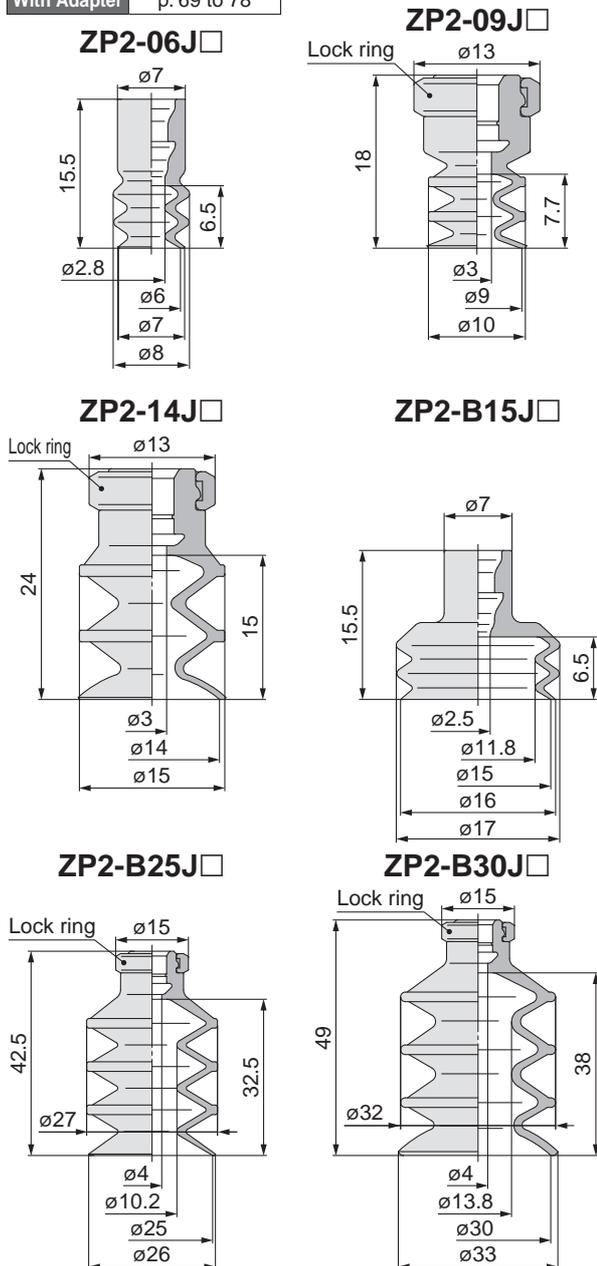
Pad form

Symbol	Form
J	Bellows type (2.5/3.5-stage)

Dimensions: Pad Unit

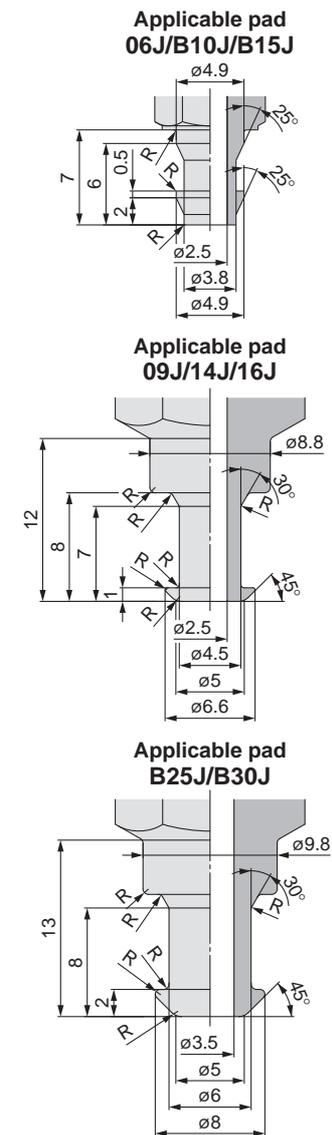
* The dimensions of the mounting bracket are the same as the ZP series. Refer to the mounting bracket dimensions on the following pages.

With Adapter p. 69 to 78



Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.



* The R part has to be smooth with no corners.

Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

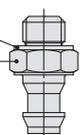
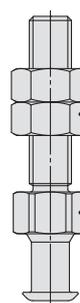
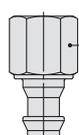
Construction

Mounting Bracket Assembly

Precautions

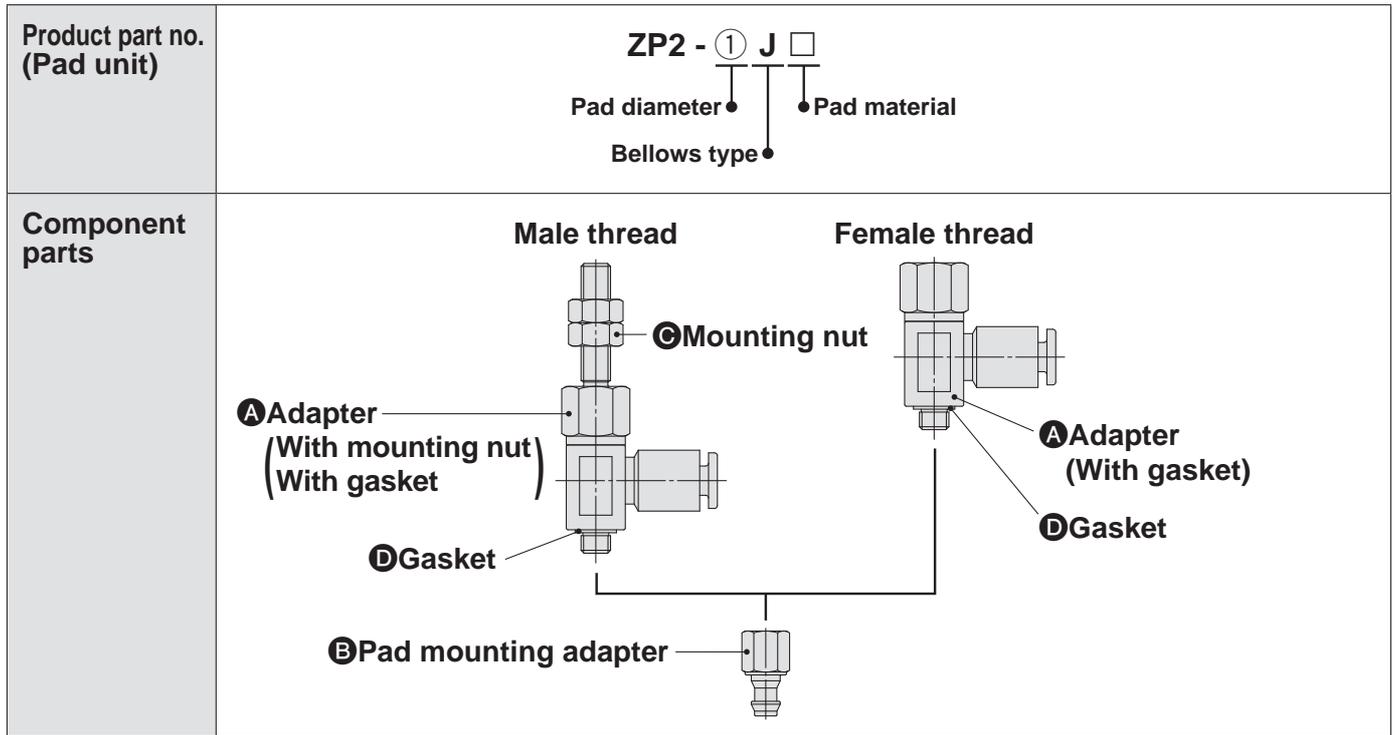
Bellows Pad (2.5/3.5-Stage) *ZP2 Series* Mounting Bracket Assembly

Adapter Assembly

Product part no. (Pad unit)	<p style="text-align: center;">ZP2 - ① J □</p> <p style="text-align: center;"> Pad diameter ● Pad material ● Bellows type ● </p>		
Component parts	<p>Ⓒ Gasket Male thread</p> <p>Ⓐ Adapter (With gasket)</p> 	<p>Male thread</p>  <p>Ⓑ Mounting nut</p> <p>Ⓐ Adapter (With mounting nut)</p>	<p>Female thread</p>  <p>Ⓐ Adapter</p>

		① Pad diameter symbol							
		06	B10	B15	09	14	16	B25	B30
Ⓐ Adapter	Vacuum inlet	Male thread	M5 x 0.8	ZPT1-A5		ZPT2-A5		—	
		M6 x 1	ZPT1-A6		ZPT2-A6		ZPT3-A6		
		M8 x 1	—		—		ZPT3-A8		
	Female thread	M4 x 0.7	ZPT1-B4		—		—		
		M5 x 0.8	ZPT1-B5		ZPT2-B5		ZPT3-B5		
		M6 x 1	—		ZPT2-B6		ZPT3-B6		
		M8 x 1.25	—		—		ZPT3-B8		
		Rc1/8	—		ZPT2-B01		ZPT3-B01		
		NPT1/8	—		ZPT2-N01		ZPT3-N01		
		NPTF1/8	—		ZPT2-T01		ZPT3-T01		
Ⓑ Mounting nut (Single unit)	M5 x 0.8	—		NTJ-015A		—			
	M6 x 1	—		ZPNA-M6		ZPNA-M6			
	M8 x 1	—		—		ZPNA-M8			
Ⓒ Gasket (Single unit)	For M5 x 0.8	M-5G2		—		—			
	For M6 x 1	M-6G		—		—			

Adapter Assembly: With One-touch Fitting



				① Pad diameter symbol						
				06	B10	B15	09	14	16	B25
A Adapter	Vacuum inlet	Connection thread	Male thread	M5 x 0.8	ZPRS-04-A5		ZPRS-04-A5			
				M6 x 1	ZPRS-04-A6		ZPRS-04-A6		ZPRL-04-A6	
				M8 x 1	—		—		ZPRL-04-A8	
			Female thread	M4 x 0.7	ZPRS-04-B4		—		—	
				M5 x 0.8	ZPRS-04-B5		ZPRS-04-B5		ZPRL-04-B5	
				M6 x 1	—		ZPRS-04-B6		ZPRL-04-B6	
		Male thread	M8 x 1.25	—		—		ZPRL-04-B8		
			Female thread	M5 x 0.8	ZPRS-06-A5		ZPRS-06-A5		—	
				M6 x 1	ZPRS-06-A6		ZPRS-06-A6		ZPRL-06-A6	
				M8 x 1	—		—		ZPRL-06-A8	
			Female thread	M4 x 0.7	ZPRS-06-B4		—		—	
				M5 x 0.8	ZPRS-06-B5		ZPRS-06-B5		ZPRL-06-B5	
	M6 x 1	—			ZPRS-06-B6		ZPRL-06-B6			
	Male thread	M8 x 1.25	—		—		ZPRL-06-B8			
		Female thread	M6 x 1	—		—		ZPRL-08-A6		
			M8 x 1	—		—		ZPRL-08-A8		
			M5 x 0.8	—		—		ZPRL-08-B5		
		M6 x 1	—		—		ZPRL-08-B6			
		M8 x 1.25	—		—		ZPRL-08-B8			
	B Pad mounting adapter			ZPT1-B5		ZPT2-B5		ZPT3-B8		
	C Mounting nut (Single unit)	M5 x 0.8		NTJ-015A		NTJ-015A		—		
		M6 x 1		ZPNA-M6		ZPNA-M6		ZPNA-M6		
		M8 x 1		—		—		ZPNA-M8		
	D Gasket (Single unit)			M-5G2		M-5G2		ZP-8G2		

Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

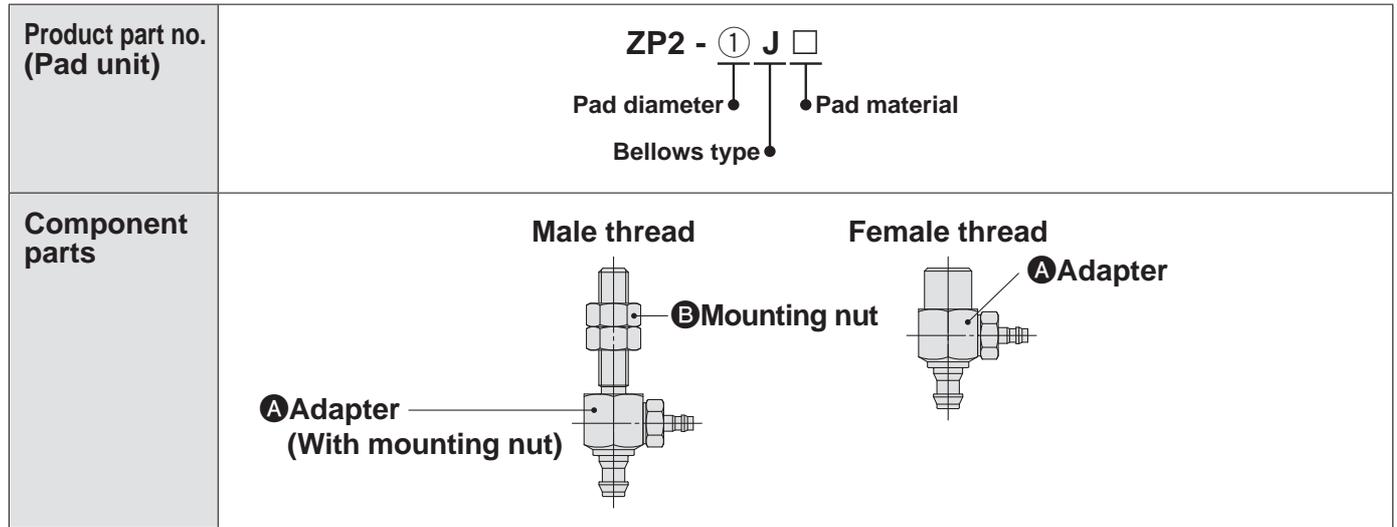
Construction

Mounting Bracket Assembly

Precautions

Bellows Pad (2.5/3.5-Stage) Mounting Bracket Assembly **ZP2 Series**

Adapter Assembly: With Barb Fitting



			① Pad diameter symbol							
			06	B10	B15	09	14	16	B25	B30
A Adapter	Vacuum inlet	For nylon tubing	ø4	Male thread	M5 x 0.8	ZPY1-N4-A5		ZPY2-N4-A5		
				Male thread	M6 x 1	ZPY1-N4-A6		ZPY2-N4-A6		ZPY3-N4-A6
				Female thread	M8 x 1	—		—		ZPY3-N4-A8
			Female thread	M4 x 0.7	ZPY1-N4-B4		—		—	
			Female thread	M5 x 0.8	ZPY1-N4-B5		ZPY2-N4-B5		ZPY3-N4-B5	
			Female thread	M6 x 1	—		ZPY2-N4-B6		ZPY3-N4-B6	
		ø6	Female thread	M8 x 1.25	—		—		ZPY3-N4-B8	
			Male thread	M5 x 0.8	ZPY1-N6-A5		ZPY2-N6-A5		—	
			Male thread	M6 x 1	ZPY1-N6-A6		ZPY2-N6-A6		ZPY3-N6-A6	
			Male thread	M8 x 1	—		—		ZPY3-N6-A8	
			Female thread	M4 x 0.7	ZPY1-N6-B4		—		—	
			Female thread	M5 x 0.8	ZPY1-N6-B5		ZPY2-N6-B5		ZPY3-N6-B5	
	For soft tubing	ø4	Female thread	M6 x 1	—		ZPY2-N6-B6		ZPY3-N6-B6	
			Female thread	M8 x 1.25	—		—		ZPY3-N6-B8	
			Male thread	M5 x 0.8	ZPY1-U4-A5		ZPY2-U4-A5		—	
			Male thread	M6 x 1	ZPY1-U4-A6		ZPY2-U4-A6		ZPY3-U4-A6	
			Male thread	M8 x 1	—		—		ZPY3-U4-A8	
			Female thread	M4 x 0.7	ZPY1-U4-B4		—		—	
		ø6	Female thread	M5 x 0.8	ZPY1-U4-B5		ZPY2-U4-B5		ZPY3-U4-B5	
			Female thread	M6 x 1	—		ZPY2-U4-B6		ZPY3-U4-B6	
			Female thread	M8 x 1.25	—		—		ZPY3-U4-B8	
			Male thread	M5 x 0.8	ZPY1-U6-A5		ZPY2-U6-A5		—	
			Male thread	M6 x 1	ZPY1-U6-A6		ZPY2-U6-A6		ZPY3-U6-A6	
			Male thread	M8 x 1	—		—		ZPY3-U6-A8	
Connection thread	ø4	Female thread	M4 x 0.7	ZPY1-U6-B4		—		—		
		Female thread	M5 x 0.8	ZPY1-U6-B5		ZPY2-U6-B5		ZPY3-U6-B5		
		Female thread	M6 x 1	—		ZPY2-U6-B6		ZPY3-U6-B6		
	ø6	Female thread	M8 x 1.25	—		—		ZPY3-U6-B8		
		Male thread	M5 x 0.8	NTJ-015A		NTJ-015A		—		
		Male thread	M6 x 1	ZPNA-M6		ZPNA-M6		ZPNA-M6		
Mounting nut (Single unit)			Male thread	M8 x 1	—		—	ZPNA-M8		



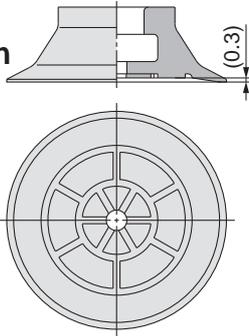
Flat Pad

Symbol/Form

Pad diameter $\varnothing 10, \varnothing 15, \varnothing 20, \varnothing 25, \varnothing 30$

MT: Thin flat type (With groove)

Adsorption surface with groove



How to Order

Pad unit **ZP2 - B10 MT N**



* Pad unit's sales unit: 10 pcs.

Pad diameter

Symbol	Pad diameter	Blast type
B10	$\varnothing 10$	●
B15	$\varnothing 15$	●
B20	$\varnothing 20$	●
B25	$\varnothing 25$	●
B30	$\varnothing 30$	●

* Blast type: Workpieces can be removed easily.

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form

Symbol	Form
MT	Thin flat type (With groove)

Mounting Bracket Part Nos.

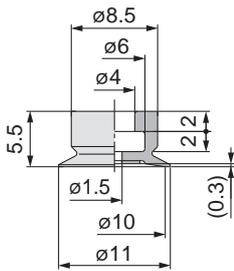
Adapter Assembly p. 288

For the adsorption of thin sheets or film Reduced deformation of flat surfaces during adsorption

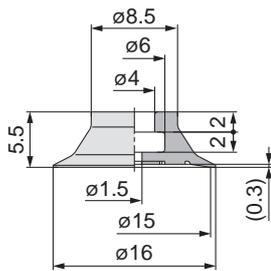
- * Not suitable for transferring workpieces which apply a load.
- * Wrinkling may be generated depending on the sheet thickness. Confirm the thickness before use.

Dimensions: Pad Unit

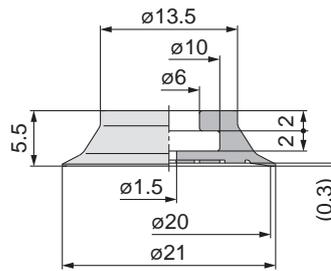
ZP2-B10MT □



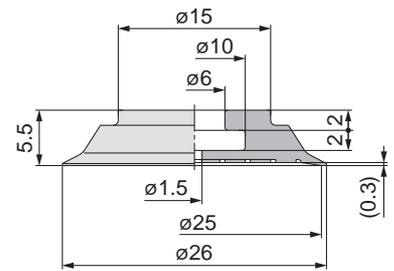
ZP2-B15MT □



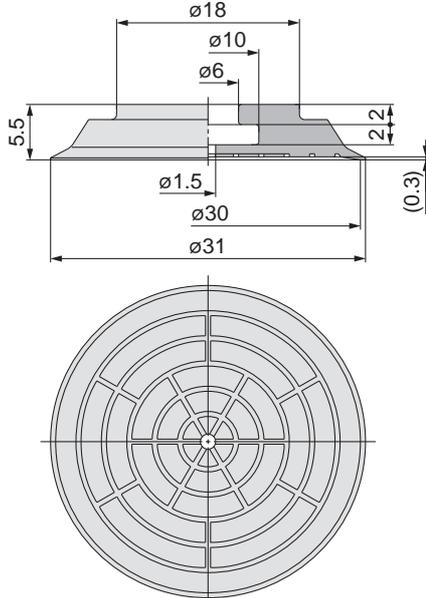
ZP2-B20MT □



ZP2-B25MT □



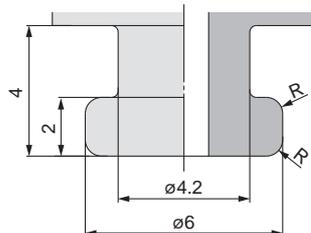
ZP2-B30MT □



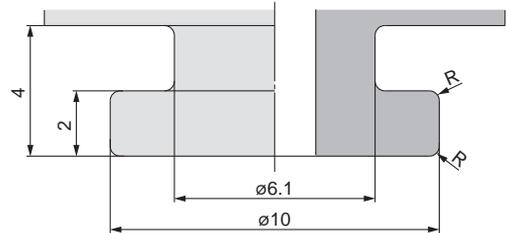
Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.

Applicable pad B10MT/B15MT



Applicable pad B20MT/B25MT/B30MT



* The R part has to be smooth with no corners.

Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

Construction

Mounting Bracket Assembly

Precautions

How to Order



With adapter **ZP2-T B10 MT N-H5**

Vacuum inlet direction

Symbol	Direction
T	Vertical

Pad diameter

Symbol	Pad diameter	Blast type
B10	ø10	●
B15	ø15	●
B20	ø20	●
B25	ø25	●
B30	ø30	●

* Blast type: Workpieces can be removed easily.

* Use a commercially available sealant for mounting.

Connection thread

Thread size (Symbol)	Pad diameter (Symbol)				
	B10	B15	B20	B25	B30
H5 (M5 x 0.8 Male thread)	●	●	●	●	●
B5 (M5 x 0.8 Female thread)	●	●	—	—	—

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

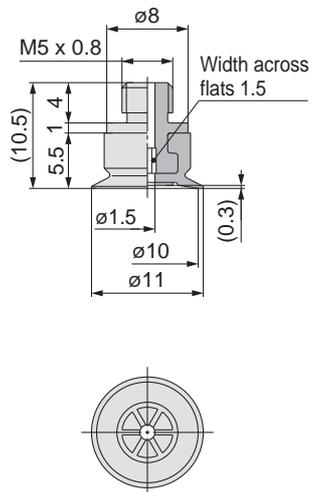
* The pad is shipped together but does not come assembled.

Pad form

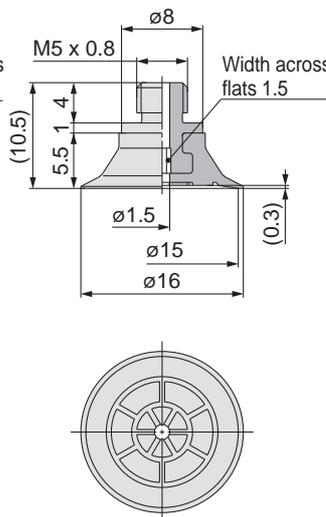
Symbol	Form
MT	Thin flat type (With groove)

Dimensions: With Adapter

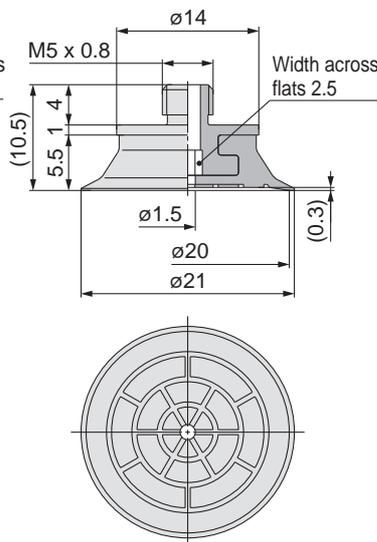
ZP2-TB10MT□-H5



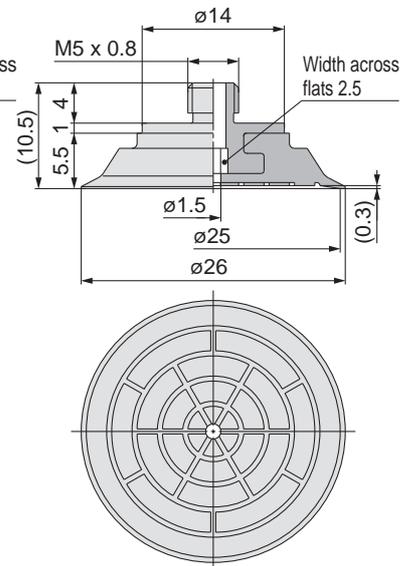
ZP2-TB15MT□-H5



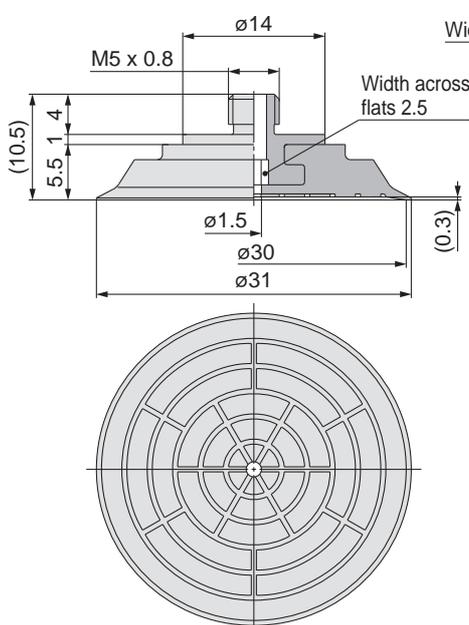
ZP2-TB20MT□-H5



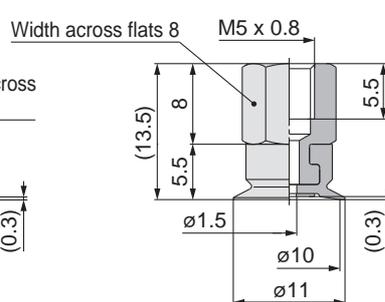
ZP2-TB25MT□-H5



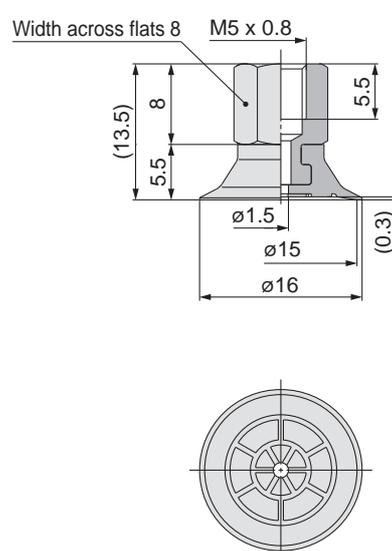
ZP2-TB30MT□-H5



ZP2-TB10MT□-B5



ZP2-TB15MT□-B5



Flat Pad ZP2 Series

Mounting Bracket Assembly

Adapter Assembly

Product part no.	<p>ZP2 - T ^① MT □ - ^②</p> <p>Pad diameter • • Connection thread (Male/Female thread)</p> <p>Thin flat type (With groove) • • Pad material</p>
Component parts	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Male thread</p> </div> <div style="text-align: center;"> <p>Female thread</p> </div> </div>

		Symbol	① Pad diameter symbol					
			B10	B15	B20	B25	B30	
A Adapter ② Connection thread	Male thread	M5 x 0.8	H5	ZP2A-M02		ZP2A-M03		
	Female thread	M5 x 0.8	B5	ZP2A-M04		—		

Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

Construction

Mounting Bracket Assembly

Precautions



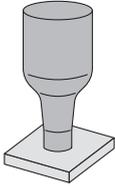
Nozzle Pad

Pad diameter $\varnothing 0.8, \varnothing 1.1$

Symbol/Form

AN: Nozzle type

■ For the adsorption of small components (such as IC chips)



How to Order

Pad unit **ZP2-08 AN N**

* Pad unit's sales unit: 10 pcs.

Symbol	Pad diameter
08	$\varnothing 0.8$
11	$\varnothing 1.1$

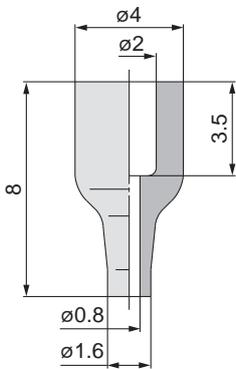
Symbol	Form
AN	Nozzle type

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

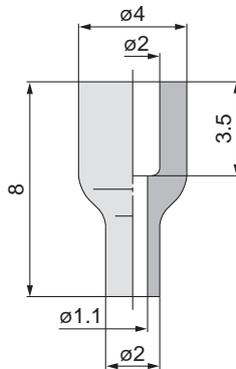
*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Dimensions: Pad Unit

ZP2-08AN□

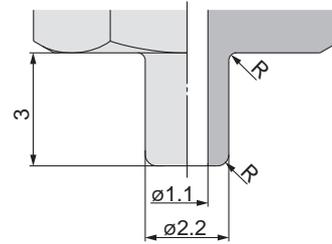


ZP2-11AN□



Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.



* The R part has to be smooth with no corners.

How to Order

With adapter **ZP2-T 08 AN N - A5**

Symbol	Direction
T	Vertical

Symbol	Pad diameter
08	$\varnothing 0.8$
11	$\varnothing 1.1$

Symbol	Form
AN	Nozzle type

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

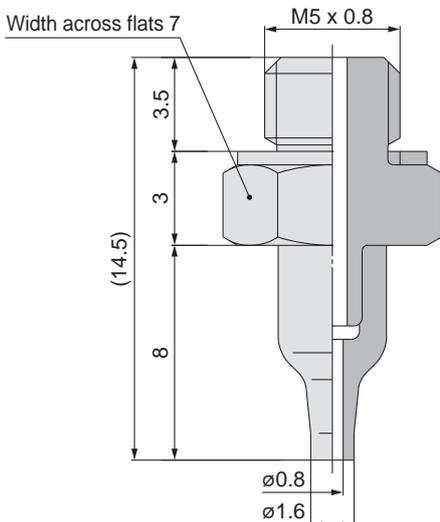
Symbol	Thread size
A5	M5 x 0.8

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

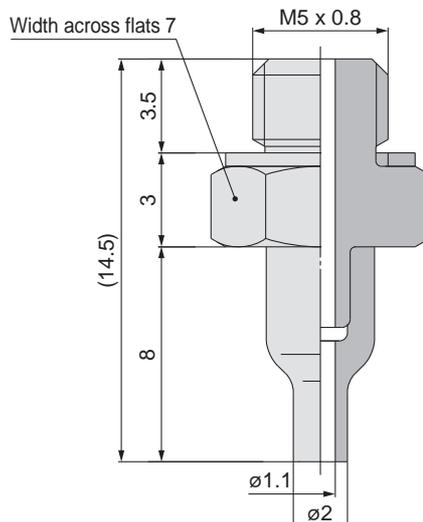
* The pad is shipped together but does not come assembled.

Dimensions: With Adapter

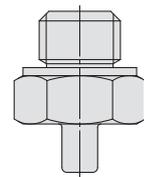
ZP2-T08AN□-A5



ZP2-T11AN□-A5



Adapter assembly unit



Part no. (With gasket):
ZP2A-Z21P
Gasket part no. (Single unit):
M-5G2



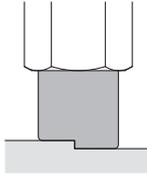
Sponge Pad

Symbol/Form

S: Sponge

Pad diameter \rightarrow $\varnothing 4, \varnothing 6, \varnothing 8, \varnothing 10, \varnothing 15$

■ For the adsorption of workpieces with bumps



Mounting Bracket Part Nos.

Adapter Assembly p. 293

How to Order

Pad unit **ZP2-06S GS**

* Pad unit's sales unit: 10 pcs.

Pad O.D.

Symbol	Pad diameter
04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$
10	$\varnothing 10$
15	$\varnothing 15$

Pad material

Symbol	Material
GS	Conductive silicone rubber
GC	Conductive CR

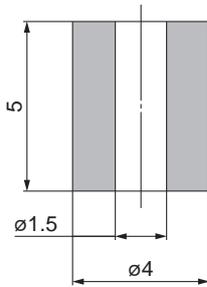
Pad form

Symbol	Form
S	Sponge

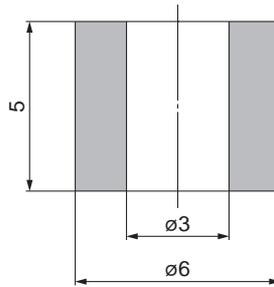


Dimensions: Pad Unit

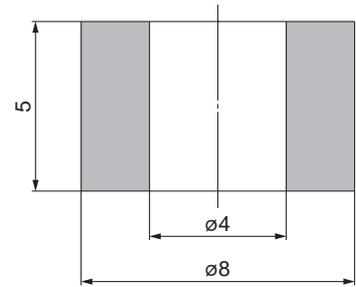
ZP2-04S□



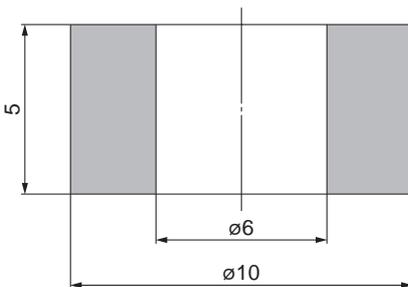
ZP2-06S□



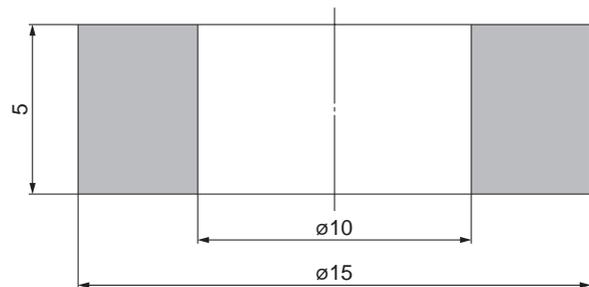
ZP2-08S□



ZP2-10S□



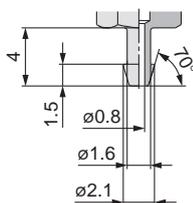
ZP2-15S□



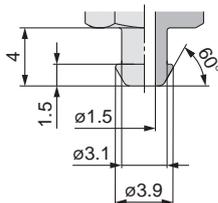
Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.

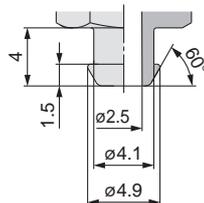
Applicable pad 04S



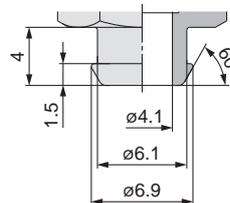
Applicable pad 06S



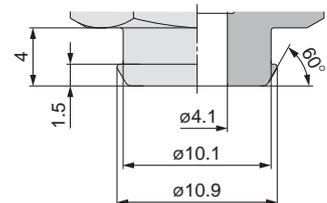
Applicable pad 08S



Applicable pad 10S



Applicable pad 15S



Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

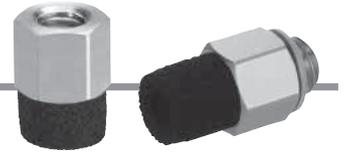
Ball Spine Buffer

Construction

Mounting Bracket Assembly

Precautions

How to Order



With adapter **ZP2 - T 04 S GS - A3**

Vacuum inlet direction

Symbol	Direction
T	Vertical

Pad O.D.

Symbol	Pad diameter
04	ø4
06	ø6
08	ø8
10	ø10
15	ø15

Pad form

Symbol	Form
S	Sponge

Connection thread

Symbol	Thread size	Applicable pad O.D. symbol				
		04	06	08	10	15
A3	M3 x 0.5 (Male thread)	●	—	—	—	—
A5	M5 x 0.8 (Male thread)	—	●	●	●	—
B3	M3 x 0.5 (Female thread)	●	—	—	—	—
B5	M5 x 0.8 (Female thread)	—	●	●	●	●

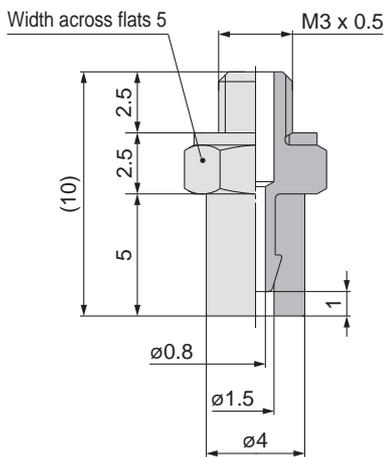
Pad material

Symbol	Material
GS	Conductive silicone rubber
GC	Conductive CR

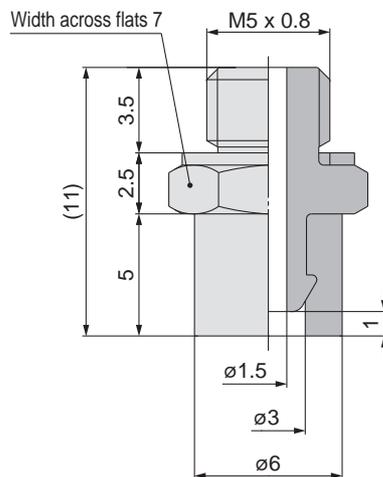
* The pad is shipped together but does not come assembled.

Dimensions: With Adapter

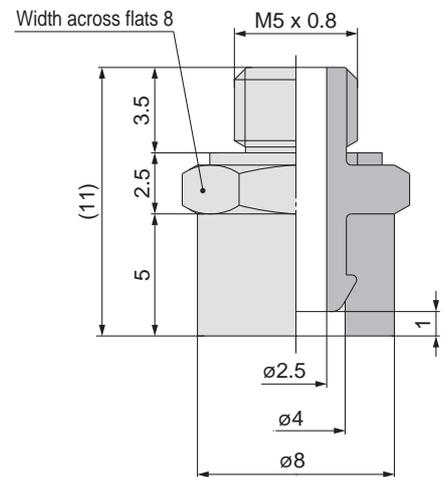
ZP2-T04S□-A3



ZP2-T06S□-A5

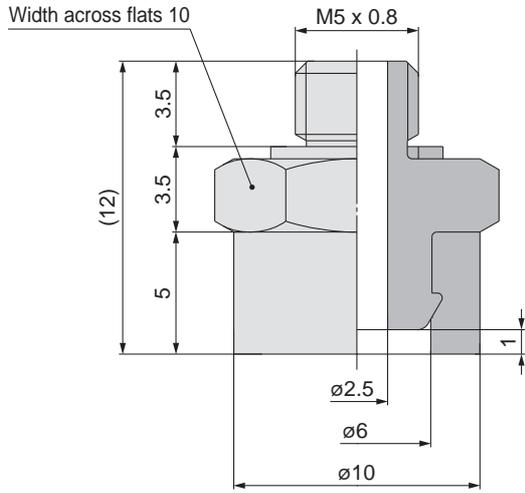


ZP2-T08S□-A5

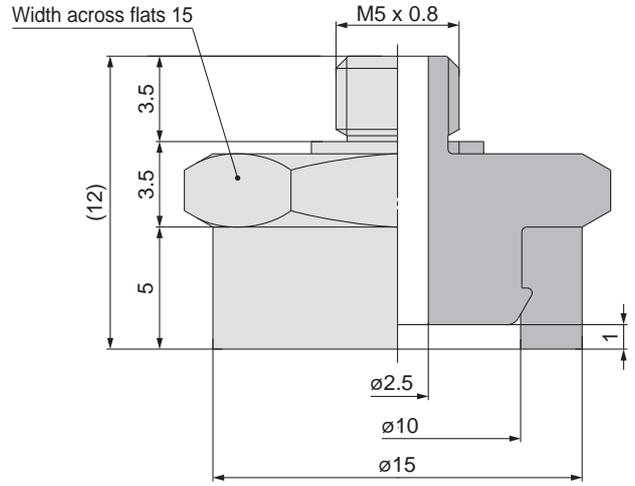


Dimensions: With Adapter

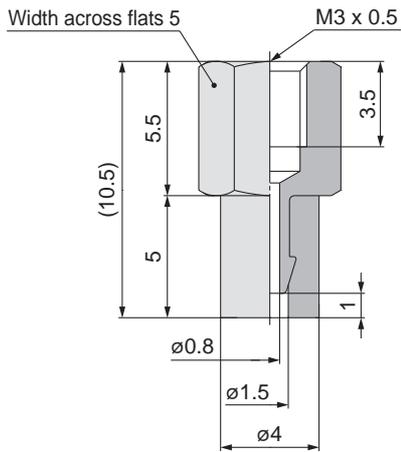
ZP2-T10S□-A5



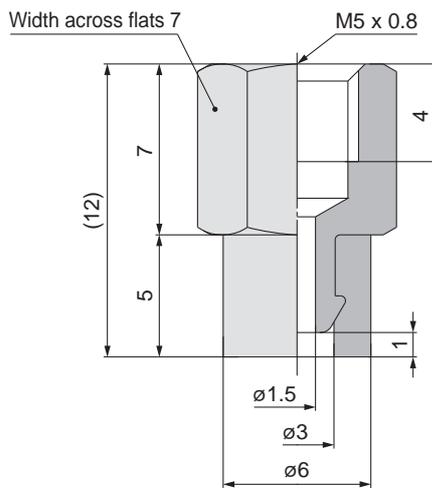
ZP2-T15S□-A5



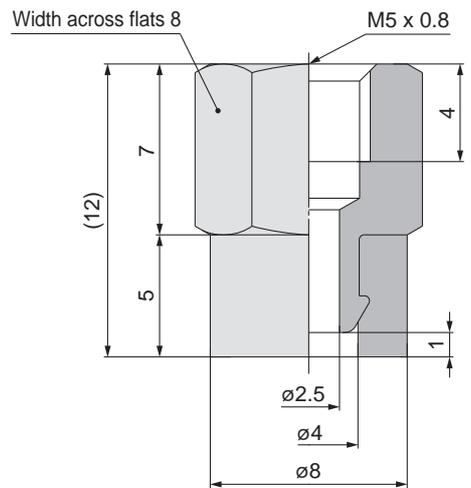
ZP2-T04S□-B3



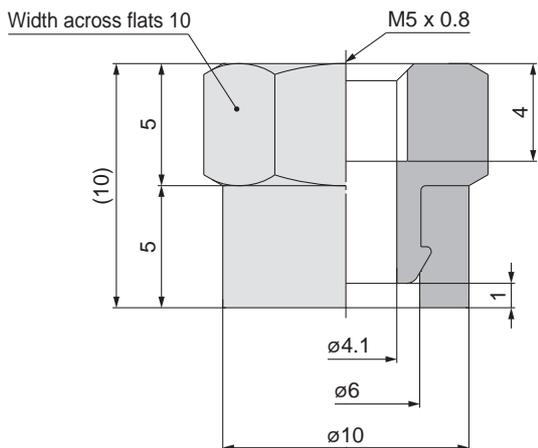
ZP2-T06S□-B5



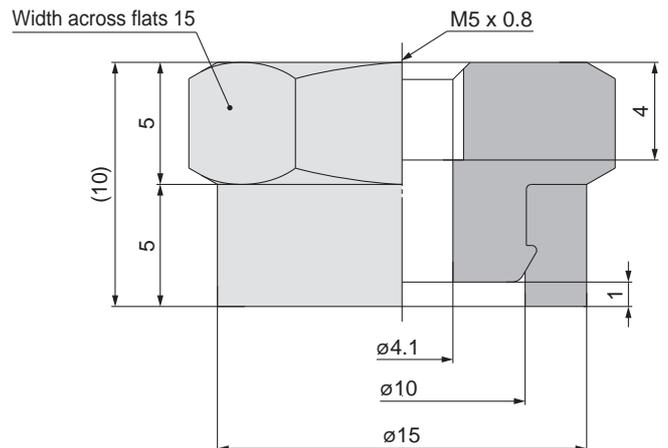
ZP2-T08S□-B5



ZP2-T10S□-B5



ZP2-T15S□-B5



Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

Construction

Mounting Bracket Assembly

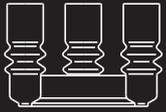
Precautions

Sponge Pad **ZP2 Series** Mounting Bracket Assembly

Adapter Assembly

Product part no.	<p>ZP2 - T ^① S □ - ^②</p> <p>Pad diameter Sponge Pad material Connection thread (Male/Female thread)</p>
Component parts	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>A Adapter (With gasket)</p> <p>B Gasket</p> </div> <div style="text-align: center;"> <p>Male thread</p> <p>A Adapter</p> </div> </div>

		Symbol	① Pad diameter symbol						
			04	06	08	10	15		
A Adapter	2 Connection thread	Male thread	M3 x 0.5	A3	ZP2A-S01P	—			
		Female thread	M5 x 0.8	A5	—	ZP2A-S02P	ZP2A-S03P	ZP2A-S04P	ZP2A-S05P
			M3 x 0.5	B3	ZP2A-S11	—			
			M5 x 0.8	B5	—	ZP2A-S12	ZP2A-S13	ZP2A-S14	ZP2A-S15
		B Gasket (Single unit)			M-3G2	M-5G2			



Vacuum Pad for Disk Adsorption

■ For adsorbing and transferring disks of digital household electric appliances (CD, DVD)

- For adsorbing circular components like CDs and DVDs
- The bellows mechanism in the pad helps to dampen the impact to workpieces.

How to Order

ZP2 - Z1 - 001 - **S**



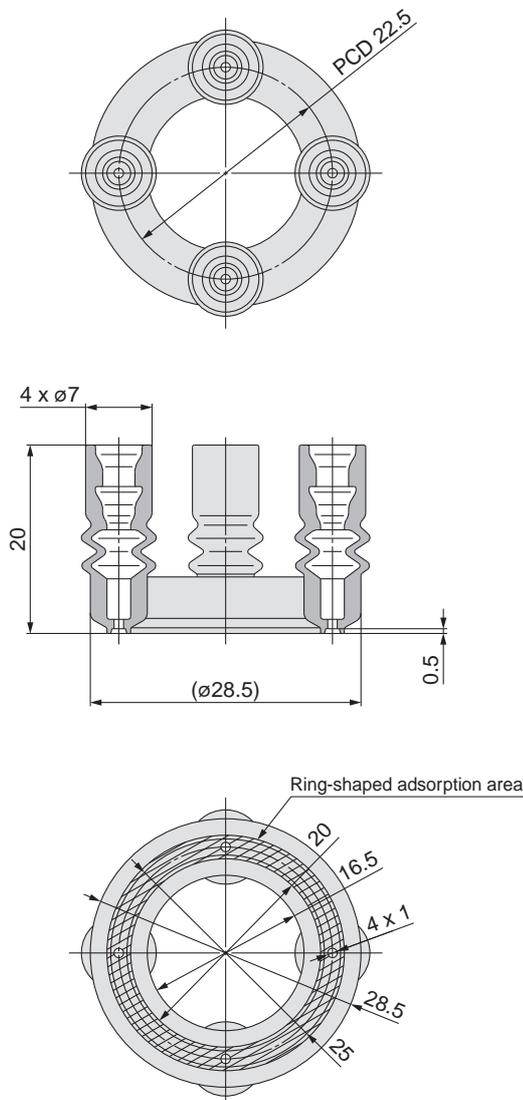
Pad material

Symbol	Material
S	Silicone rubber*1
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

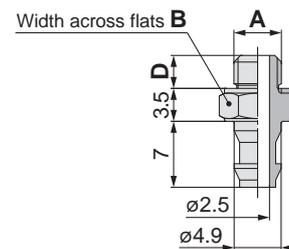
Dimensions

ZP2-Z1-001-□□



ZPT 1 -A 5/A 6 is a recommended adapter.
(Four adapters are necessary.)

Adapter assembly unit

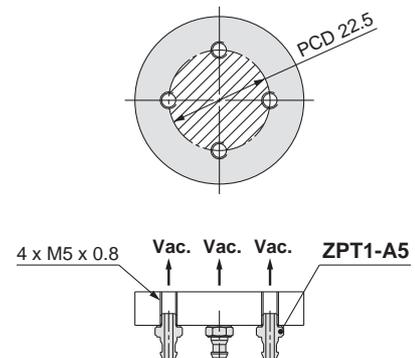


Part no. (With gasket): ZPT1-A5/A6

Dimensions

Model	A	B	D	Gasket part no. (Single unit)
ZPT1-A5	M5 x 0.8	7	3.5	M-5G2
ZPT1-A6	M6 x 1	8	4.5	M-6G

Example of attachment



Vacuum Pad for Panel Holding

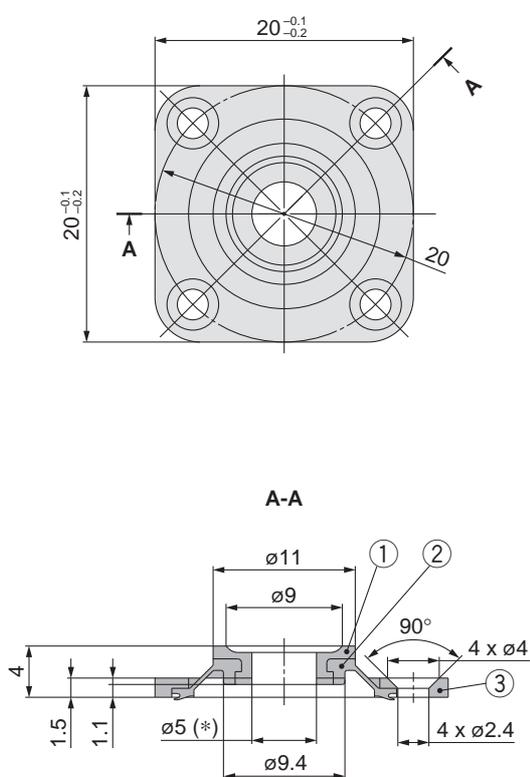


- For adsorbing and holding the stage of LCD panels, etc.
- The bellows mechanism allows for complete contact with curved work surfaces.



Dimensions

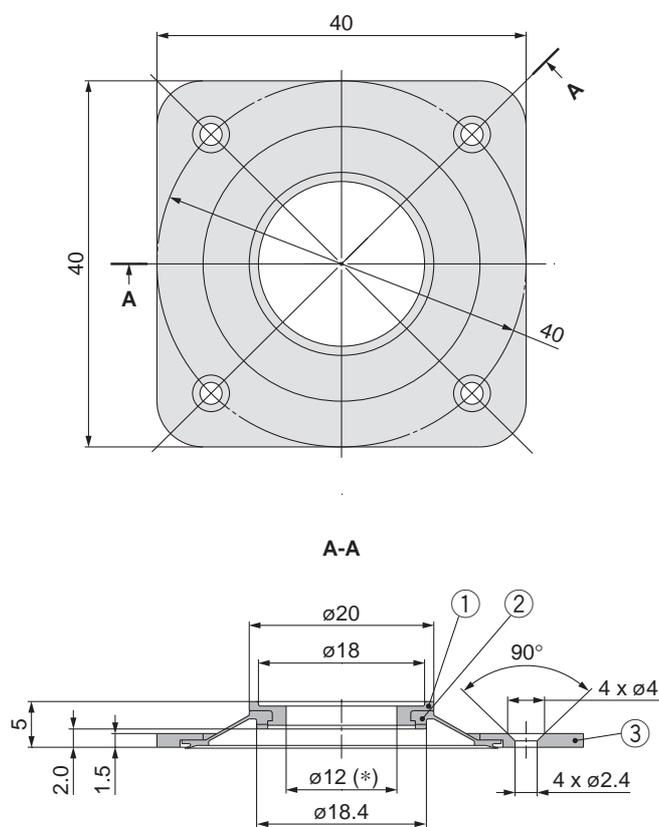
ZP2-Z002



Component Parts

No.	Part no.	Description	Material	Note
1	ZP2-Z2A	Pad	PTFE	—
2	ZP2-Z2B	Joint	FKM	—
3	ZP2-Z2C	Mounting plate	Aluminum alloy	Clear anodized

ZP2-Z003



Component Parts

No.	Part no.	Description	Material	Note
1	ZP2-Z3A	Pad	PTFE	—
2	ZP2-Z3B	Joint	FKM	—
3	ZP2-Z3C	Mounting plate	Aluminum alloy	Clear anodized

Take the following points into consideration when using this product.

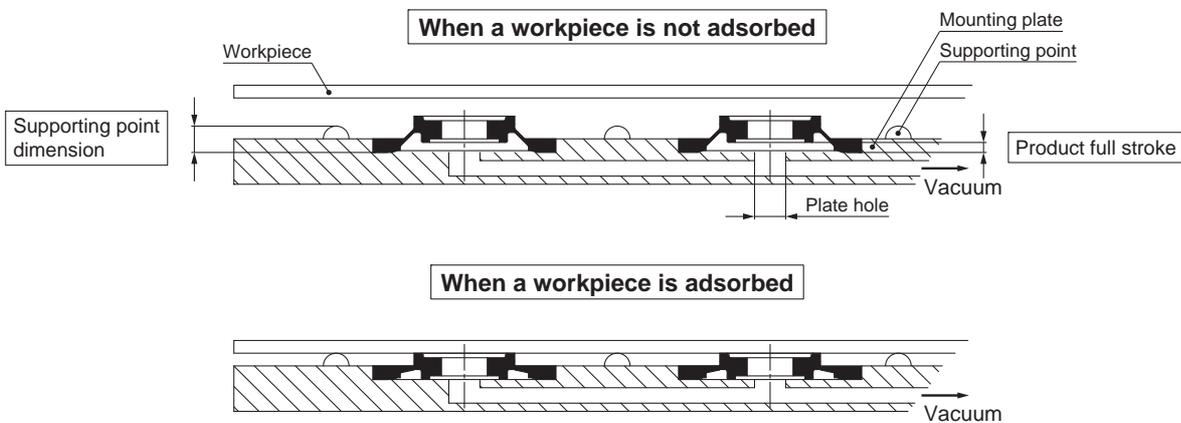
Customers are required to conduct the evaluation to judge whether or not the product is used.

- 1) This product should be used in the horizontal direction and to fix the workpiece.
- 2) The pad (resin) may have a more vacuum pressure leakage from the lip compared to general rubber pads. Therefore, maintain as large a flow rate as possible to minimize the pressure drop due to leakage.
- 3) Cannot be used for vacuum retention
- 4) Design the pad mounting parts while referring to the "Table 1: References for Designing Mounting Parts" shown below. Additionally, avoid applying the weight of the workpiece directly to the pad.
- 5) Be sure to clean the workpiece contact part of the pad before use and during periodic maintenance.

Table 1: References for Designing Mounting Parts

	Supporting point dimension	Plate hole	(Reference value) Product full stroke
ZP2-Z002	2.9 ± 0.1 mm	$\phi 5$ or less	1.1 mm
ZP2-Z003	3.0 ± 0.1 mm	$\phi 12$ or less	2.0 mm

* Use this product with its full stroke. Avoid using the product with a stroke less than the product stroke (at an intermediate position) or with a stroke exceeding the product stroke.



Model Selection

For Special Applications

Mark-free

For Film Adsorption

Multistage

Flat

Nozzle

Sponge

For Disk Adsorption

For Panel Holding

Ball Spine Buffer

Construction

Mounting Bracket Assembly

Precautions



Pad with Ball Spline Buffer

Symbol/Form

Pad diameter $\varnothing 2, \varnothing 4, \varnothing 6, \varnothing 8$

U: Flat type

■ The ball spline guide is used for buffers.

How to Order

ZP2-T02UNS6

Vacuum inlet direction

Symbol	Direction
T	Vertical

Pad diameter

Symbol	Pad diameter
02	$\varnothing 2$
04	$\varnothing 4$
06	$\varnothing 6$
08	$\varnothing 8$

Pad form

Symbol	Form
U	Flat type

Buffer stroke

Symbol	Stroke
6	6 mm

Buffer specification

Symbol	Specification
S	Ball spline

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

* The pad is shipped together but does not come assembled.

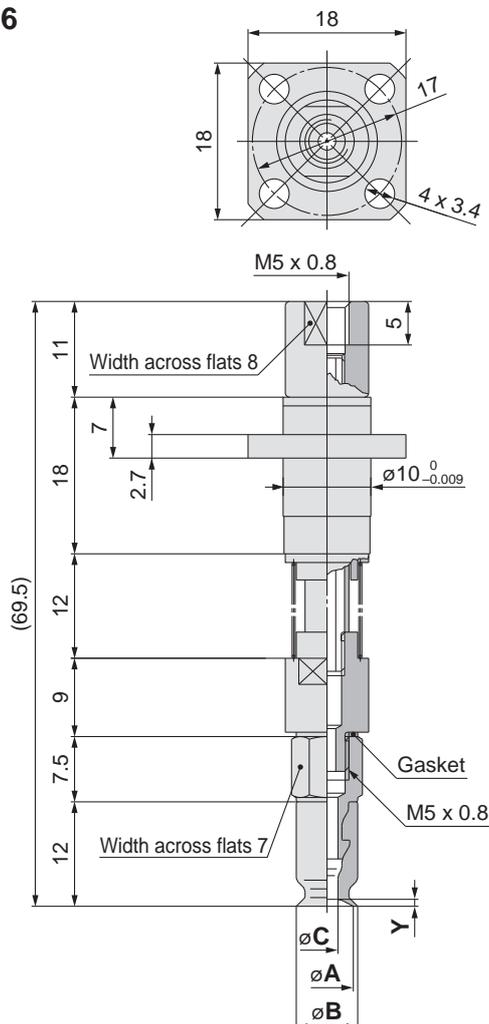


Buffer Specifications

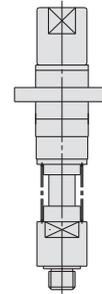
Specifications		Ball spline
Stroke [mm]		6
Spring reactive force [N]	At 0 stroke	0.8
	At full stroke	1.1

Dimensions

ZP2-T□U□S6



Buffer assembly unit



Part no. (With gasket): ZP2B-T3S6
Gasket part no. (Single unit): M-5G2

Dimensions

Model	A	B	C	Y
ZP2-T02U□S6	2	2.6	1.2	0.5
ZP2-T04U□S6	4	4.8	1.6	0.8
ZP2-T06U□S6	6	7	2.5	
ZP2-T08U□S6	8	9		1

Made to Order ZP/ZP2 Series

ø2 to ø340

Compact/Short-type, Thin Flat, Bellows, High Rigidity

Model Selection

Compact/Short-type

ø2 to ø15

Compact, Space saving

p. 304



Thin Flat

ø5 to ø20

For the adsorption of soft workpieces such as thin sheets or vinyl

p. 312



Bellows

ø2 to ø20

For use where there is no space for a buffer (spring type)

p. 314



High Rigidity

ø32 to ø340

For heavy or large workpieces

p. 317



Made to Order

ZP2V

XT661

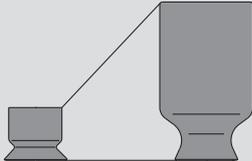
MHM

Pad Material: ZP/ZP2 Series

Material	NBR (Nitrile rubber)	Silicone rubber*1	Urethane rubber	FKM (Fluoro rubber)	CR (Chloroprene rubber)	EPR (Ethylene propylene rubber)	Conductive NBR (Nitrile rubber)	Conductive silicone rubber
Color of rubber	Black	White	Brown	Black				
Rubber hardness HS (±5°)	A50/S	Other than high rigidity: A40/S High rigidity: A50/S	A60/S		A50/S			
Identification (Dot or stamp)	—	—	—	· 1 green dot · F	· 1 red dot · C	· E	· 1 silver dot	· 2 silver dots

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Precautions

Variations	Symbol	Pad		Page
		Form	Diameter	
Compact Pad Flat type For the adsorption of general workpieces For the adsorption of workpieces with flat, non-deformed surfaces Flat type with ribs For workpieces which are likely to deform or for the reliable release of workpieces Bellows type For the adsorption of workpieces with inclined surfaces	 Single unit U	Flat type	ø3, ø4	304
	 Single unit C	Flat type with ribs	ø6, ø7, ø8	304
	 Single unit B	Bellows type	ø6, ø8	304
Short-type Pad Space saving in the height direction 	 Single unit With adapter MU	Flat type	ø2, ø3.5 ø4, ø5, ø6 ø8, ø10 ø15	305
	 Single unit With adapter EU		ø2, ø4, ø6 ø8, ø15	308
	 Single unit AU		ø2, ø3, ø4 ø6, ø8	311
Thin Flat Pad For the adsorption of soft workpieces such as thin sheets or vinyl Wrinkling or deformation during adsorption is reduced.	 Single unit UT	Thin flat type (Skirt)	ø5, ø6, ø11 ø14, ø18 ø20	312
Bellows Pad For use where there is no space for a buffer (spring type) For the adsorption of workpieces with inclined surfaces 	 Single unit With adapter MB	Bellows type	ø4, ø6, ø8 ø10, ø15 ø20	314
	 Single unit ZJ		ø2, ø4 ø5, ø6	316

Variations	Symbol	Pad		Page
		Form	Diameter	
Blast-type Pad Features blast treatment to create fine unevenness on the surface for improved adsorption Workpieces can be removed easily.	 Single unit U	Flat type	ø4	304
	 Single unit C	Flat type with ribs	ø6, ø8	304
	 Single unit B	Bellows type	ø6, ø8	304
	 Single unit With adapter MU	Flat type	ø2, ø3.5 ø4, ø5, ø6 ø8, ø10 ø15	305
	 Single unit With adapter EU	Flat type	ø2, ø4, ø6	308
	 Single unit AU	Flat type	ø8	311
	 Single unit With adapter MB	Bellows type	ø4, ø6, ø8 ø10, ø15 ø20	314

Model Selection

Made to Order

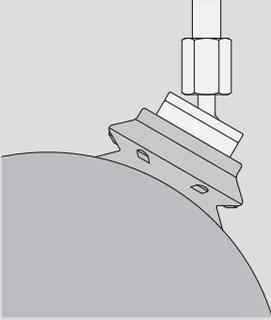
ZP2V

XT661

MHM

Precautions

Variations	Symbol	Pad		Page
		Form	Diameter	
<p>High Rigidity Pad</p> <p>High rigidity (Flat type with ribs) Ideal for heavy or large workpieces such as CRT tubes and automobile bodies</p> <p>High rigidity (Bellows type) · Ideal for workpieces with curved surfaces · Ideal for heavy or large workpieces</p>	H	High rigidity (Flat type with ribs)	ø40, ø50 ø63, ø80 ø100, ø125	 Single unit 333
				 With adapter: Vacuum inlet direction Vertical 334
				 With adapter: Vacuum inlet direction Lateral 337
				 With buffer: Vacuum inlet direction Vertical 339
				 With buffer: Vacuum inlet direction Lateral 341
	HB	High rigidity (Bellows type)		 Single unit 333
				 With adapter: Vacuum inlet direction Vertical 334
				 With adapter: Vacuum inlet direction Lateral 337
				 With buffer: Vacuum inlet direction Vertical 339
				 With buffer: Vacuum inlet direction Lateral 341

Variations	Symbol	Pad		Page	
		Form	Diameter		
<p>High Rigidity Ball Joint Pad For the adsorption of workpieces with inclined or curved surfaces</p> 	H	High rigidity (Flat type with ribs)	ø40 ø50 ø63 ø80 ø100 ø125	 With adapter: Vacuum inlet direction Vertical	321
				 With adapter: Vacuum inlet direction Lateral	322
				 With buffer: Vacuum inlet direction Vertical	323
				 With buffer: Vacuum inlet direction Lateral	325
	HB	High rigidity (Bellows type)	ø40 ø50 ø63 ø80 ø100 ø125	 With adapter: Vacuum inlet direction Vertical	327
				 With adapter: Vacuum inlet direction Lateral	328
				 With buffer: Vacuum inlet direction Vertical	329
				 With buffer: Vacuum inlet direction Lateral	331

Model Selection

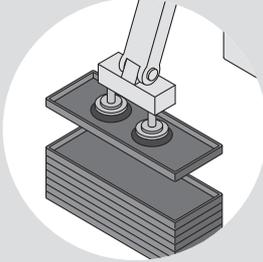
Made to Order

ZP2V

XT661

MHM

Precautions

Variations	Symbol	Pad		Page	
		Form	Diameter		
High Rigidity Pad For heavy or large workpieces 		H	High rigidity (Flat type with ribs)	ø32, ø300 ø340	317
		HT	High rigidity (Thin flat type with ribs)	ø150, ø250	317
		HB	High rigidity (Bellows type)	ø32, ø150	319
		HW	High rigidity (Oval type)	30 x 50	320



Compact Pad

Pad diameter $\varnothing 3, \varnothing 4, \varnothing 6, \varnothing 7, \varnothing 8$

Symbol/Form

U: Flat type
C: Flat type with ribs
B: Bellows type

Model Selection

- 5 types of $\varnothing 3$ to $\varnothing 8$ are added.
- Applicable for the ZP series adapter

Mounting Bracket Part Nos.

Adapter Assembly p. 313

How to Order



Pad unit **ZP2-03 U N**

* Pad unit's sales unit: 10 pcs.

Pad diameter		
Symbol	Pad diameter	Blast type
03	$\varnothing 3$	—
B04	$\varnothing 4$	●
B06	$\varnothing 6$	●
07	$\varnothing 7$	—
B08	$\varnothing 8$	●

* Blast type: Workpieces can be removed easily.

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form—Pad diameter

Pad form	Pad diameter (Symbol)				
	03	B04	B06	07	B08
U (Flat type)	●	●	—	—	—
C (Flat type with ribs)	—	—	—	●	●
B (Bellows type)	—	—	●	—	●

Made to Order

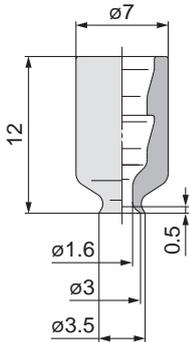
ZP2V

XT661

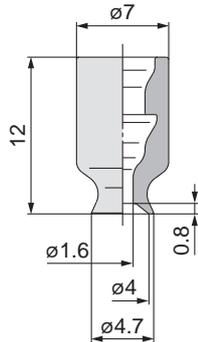
MHM

Dimensions: Pad Unit

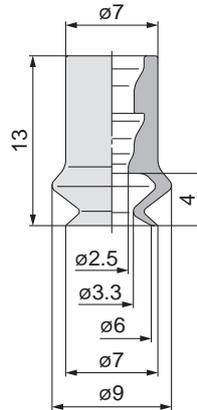
ZP2-03U□



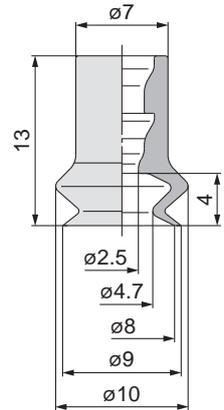
ZP2-B04U□



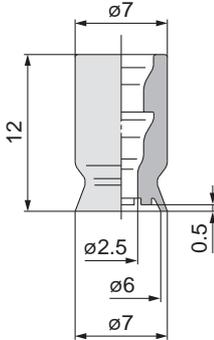
ZP2-B06B□



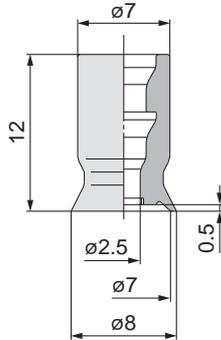
ZP2-B08B□



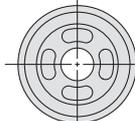
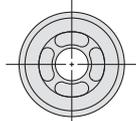
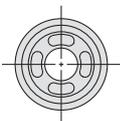
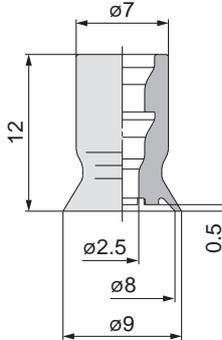
ZP2-B06C□



ZP2-07C□

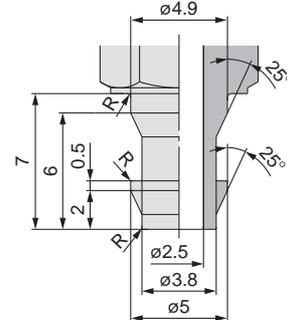


ZP2-B08C□



Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.



* The R part has to be smooth with no corners.

Precautions



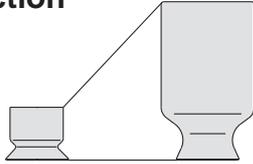
Short-type Pad

Symbol/Form

Pad diameter $\varnothing 2, \varnothing 3.5, \varnothing 4, \varnothing 5, \varnothing 6, \varnothing 8, \varnothing 10, \varnothing 15$

MU: Flat type

Space saving in the height direction



How to Order



Pad unit **ZP2 - B02 MU N**

* Pad unit's sales unit: 10 pcs.

Pad diameter

Symbol	Pad diameter	Blast type
B02	$\varnothing 2$	●
B035	$\varnothing 3.5$	●
B04	$\varnothing 4$	●
B05	$\varnothing 5$	●
B06	$\varnothing 6$	●
B08	$\varnothing 8$	●
B10	$\varnothing 10$	●
B15	$\varnothing 15$	●

* Blast type: Workpieces can be removed easily.

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

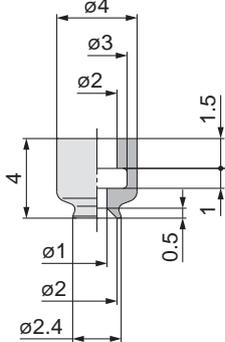
*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form

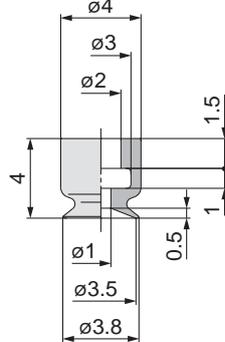
Symbol	Form
MU	Flat type

Dimensions: Pad Unit

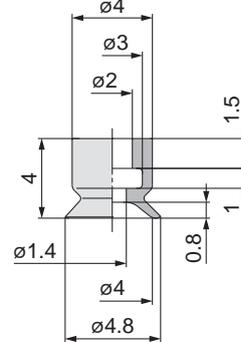
ZP2-B02MU□



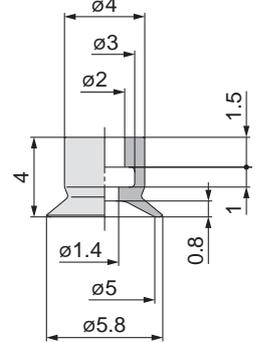
ZP2-B035MU□



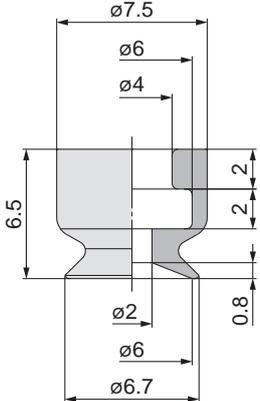
ZP2-B04MU□



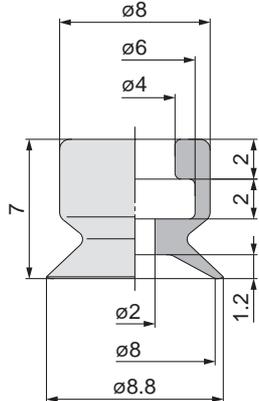
ZP2-B05MU□



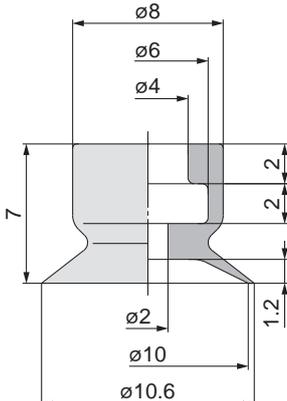
ZP2-B06MU□



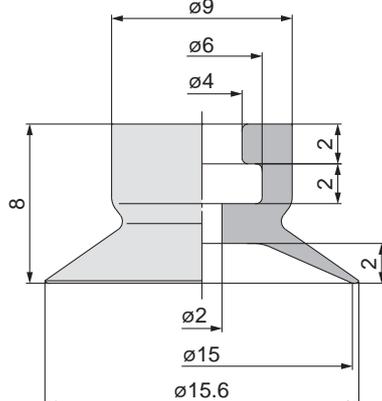
ZP2-B08MU□



ZP2-B10MU□



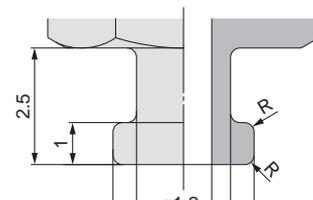
ZP2-B15MU□



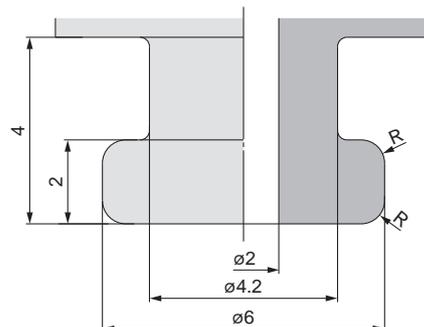
Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.

Applicable pad
B02MU/B035MU/B04MU/B05MU



Applicable pad
B06MU/B08MU/B10MU/B15MU



* The R part has to be smooth with no corners.
* Refer to page 306 for adapter applicable to the ZP2 series.



Model Selection

How to Order

With adapter **ZP2 - T B02 MU N - A3**

Vacuum inlet direction

Symbol	Direction
T	Vertical

Pad diameter

Symbol	Pad diameter	Blast type
B02	ø2	●
B035	ø3.5	●
B04	ø4	●
B05	ø5	●
B06	ø6	●
B08	ø8	●
B10	ø10	●
B15	ø15	●

* Blast type: Workpieces can be removed easily.

Pad form

Symbol	Form
MU	Flat type

Mounting

Thread size	Pad diameter (Symbol)	B02	B035	B04	B05	B06	B08	B10	B15
A3 (M3 x 0.5 Male thread)		●	●	●	●	—	—	—	—
H5 (M5 x 0.8 Male thread)		—	—	—	—	●	●	●	●
B5 (M5 x 0.8 Female thread)		—	—	—	—	●	●	●	●

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Replacement Part Nos.

Model	Pad unit part no.*1	Adapter part no. (With gasket)	Gasket part no. (Single unit)
ZP2-TB02MU□-A3	ZP2-B02MU□	ZP2A-M01P	M-3G2
ZP2-TB035MU□-A3	ZP2-B035MU□		
ZP2-TB04MU□-A3	ZP2-B04MU□		
ZP2-TB05MU□-A3	ZP2-B05MU□		
ZP2-TB06MU□-H5	ZP2-B06MU□	ZP2A-M02P	M-5G2
ZP2-TB08MU□-H5	ZP2-B08MU□		
ZP2-TB10MU□-H5	ZP2-B10MU□		
ZP2-TB15MU□-H5	ZP2-B15MU□	ZP2A-M04	—
ZP2-TB06MU□-B5	ZP2-B06MU□		
ZP2-TB08MU□-B5	ZP2-B08MU□		
ZP2-TB10MU□-B5	ZP2-B10MU□		
ZP2-TB15MU□-B5	ZP2-B15MU□		

*1 Pad unit's sales unit: 10 pcs.

* □ in the table indicates the pad material

* The pad is shipped together but does not come assembled.

Made to Order

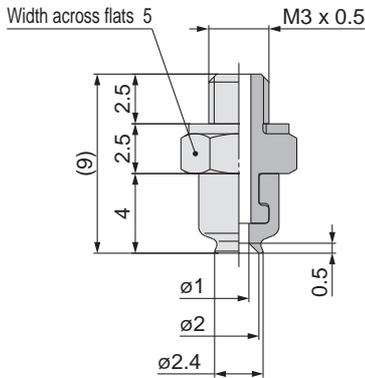
ZP2V

XT661

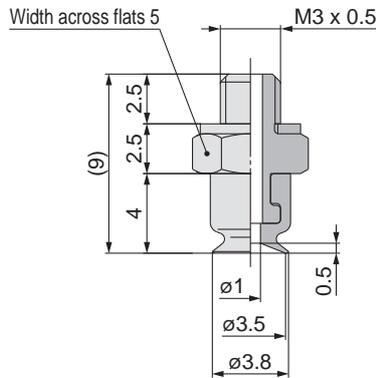
MHM

Dimensions: With Adapter

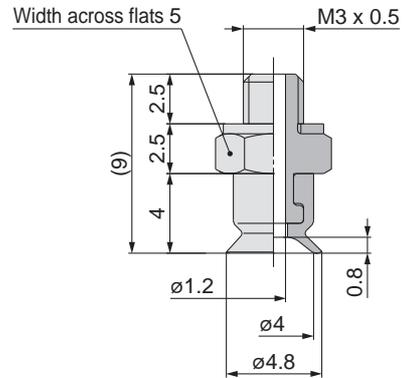
ZP2-TB02MU□-A3



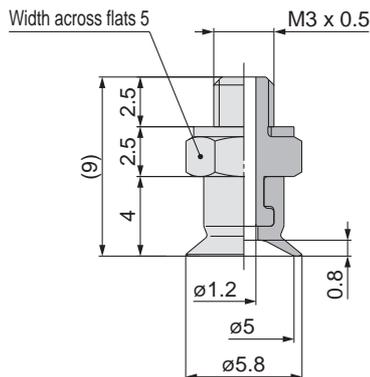
ZP2-TB035MU□-A3



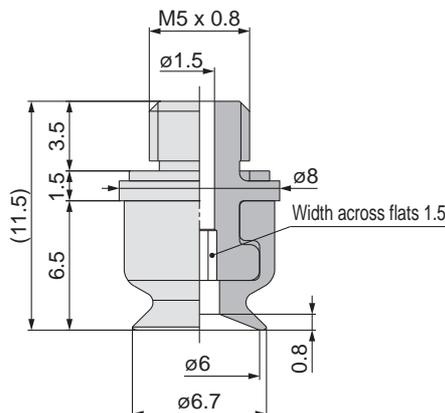
ZP2-TB04MU□-A3



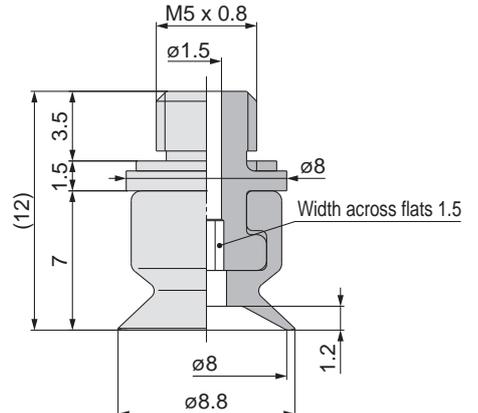
ZP2-TB05MU□-A3



ZP2-TB06MU□-H5



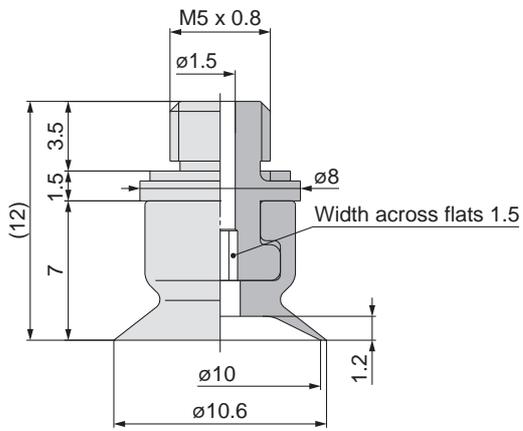
ZP2-TB08MU□-H5



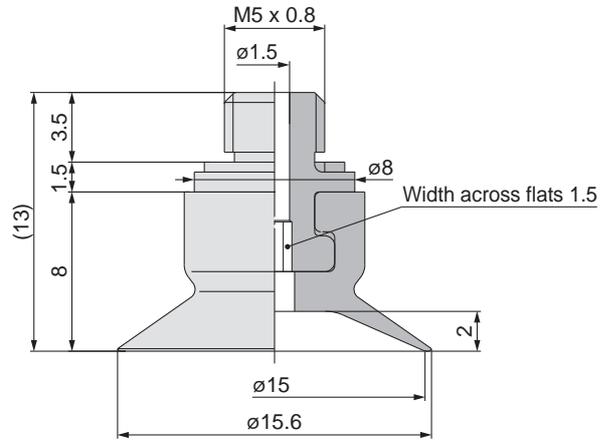
Precautions

Dimensions: With Adapter

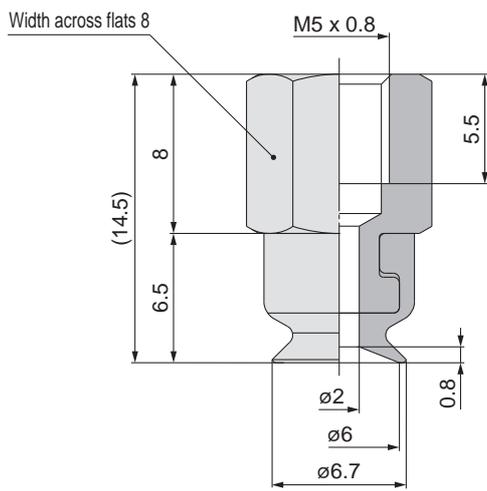
ZP2-TB10MU□-H5



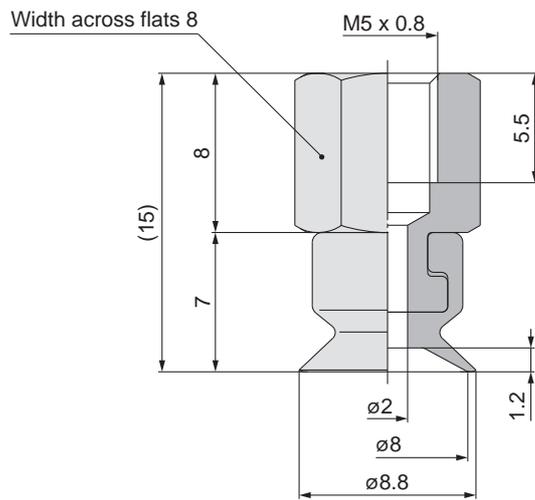
ZP2-TB15MU□-H5



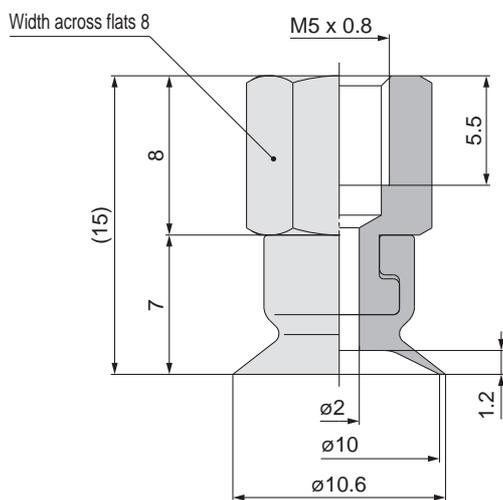
ZP2-TB06MU□-B5



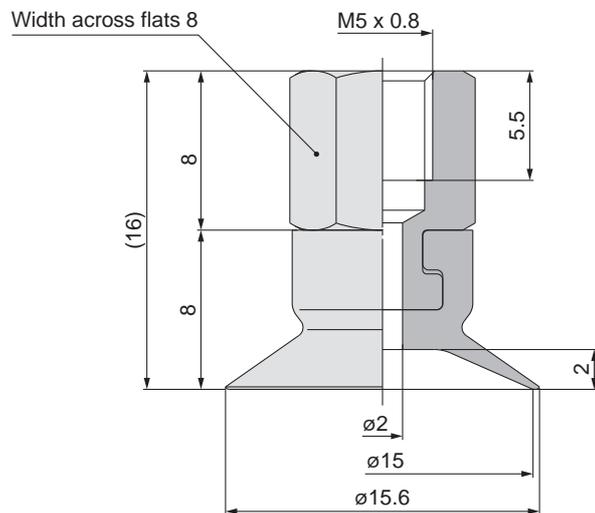
ZP2-TB08MU□-B5



ZP2-TB10MU□-B5



ZP2-TB15MU□-B5





Short-type Pad

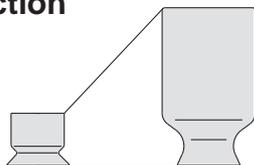
Symbol/Form

Pad diameter $\varnothing 2, \varnothing 4, \varnothing 6, \varnothing 8, \varnothing 15$

EU: Flat type

Model Selection

Space saving in the height direction



How to Order



Pad unit **ZP2 - B02 EU N**

* Pad unit's sales unit: 10 pcs.

Pad diameter

Symbol	Pad diameter	Blast type
B02	$\varnothing 2$	●
B04	$\varnothing 4$	●
B06	$\varnothing 6$	●
08	$\varnothing 8$	—
15	$\varnothing 15$	—

* Blast type: Workpieces can be removed easily.

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

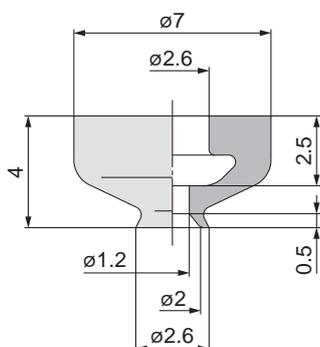
*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form

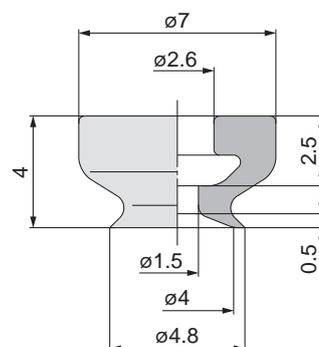
Symbol	Form
EU	Flat type

Dimensions: Pad Unit

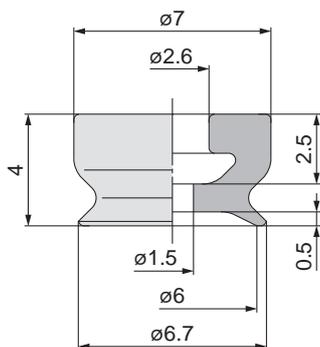
ZP2-B02EU□



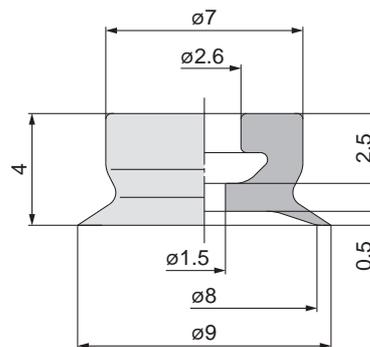
ZP2-B04EU□



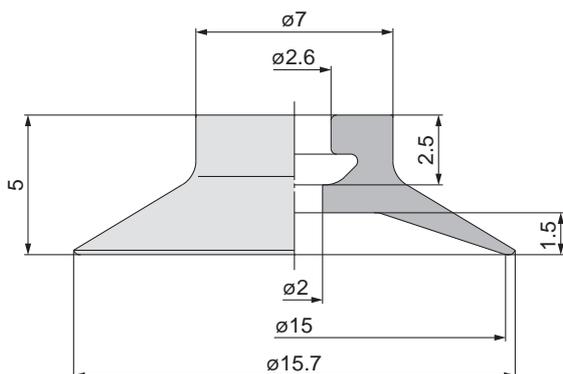
ZP2-B06EU□



ZP2-08EU□

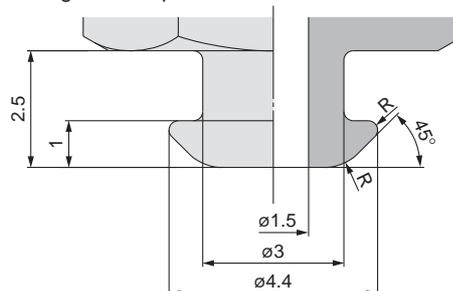


ZP2-15EU□



Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.



* The R part has to be smooth with no corners.
* Refer to page 309 for adapter applicable to the ZP2 series.

Made to Order

ZP2V

XT661

MHM

Precautions

How to Order



With adapter **ZP2 - T B02 EU N - A5**

Vacuum inlet direction

Symbol	Direction
T	Vertical

Pad diameter

Symbol	Pad diameter	Blast type
B02	ø2	●
B04	ø4	●
B06	ø6	●
08	ø8	—
15	ø15	—

* Blast type: Workpieces can be removed easily.

Pad form

Symbol	Form
EU	Flat type

Mounting

Symbol	Thread size	Adapter type
A5	M5 x 0.8	Hexagon O.D.
H5	M5 x 0.8	Hexagon socket head

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Replacement Part Nos.

Model	Pad unit part no.*1	Adapter part no. (With gasket)	Gasket part no. (Single unit)
ZP2-TB02EU□-A5	ZP2-B02EU□	ZP2A-Z01P	M-5G2
ZP2-TB04EU□-A5	ZP2-B04EU□		
ZP2-TB06EU□-A5	ZP2-B06EU□		
ZP2-T08EU□-A5	ZP2-08EU□		
ZP2-T15EU□-A5	ZP2-15EU□	ZP2A-Z02P	
ZP2-TB02EU□-H5	ZP2-B02EU□		
ZP2-TB04EU□-H5	ZP2-B04EU□		
ZP2-TB06EU□-H5	ZP2-B06EU□		
ZP2-T08EU□-H5	ZP2-08EU□		
ZP2-T15EU□-H5	ZP2-15EU□		

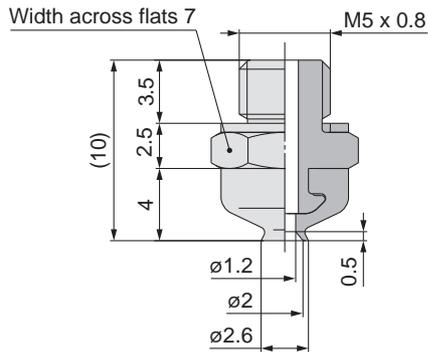
*1 Pad unit's sales unit: 10 pcs.

* □ in the table indicates the pad material

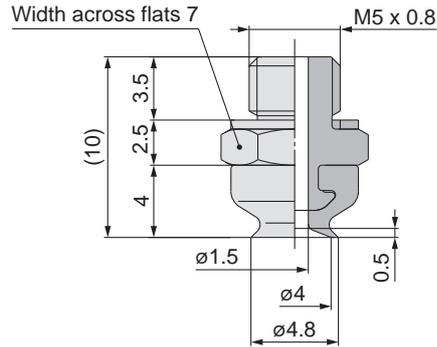
* The pad is shipped together but does not come assembled.

Dimensions: With Adapter

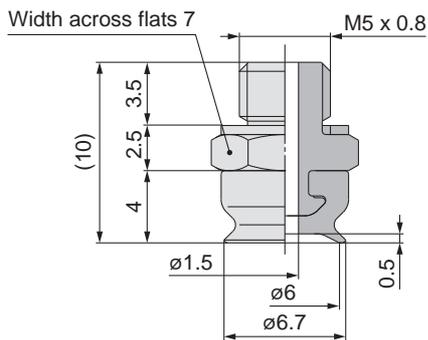
ZP2-TB02EU□-A5



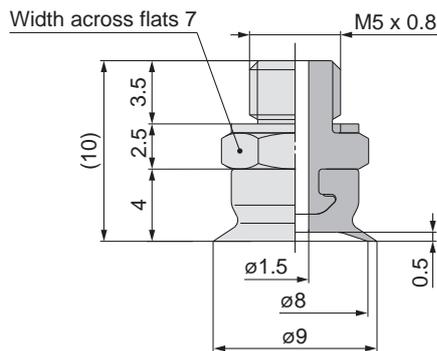
ZP2-TB04EU□-A5



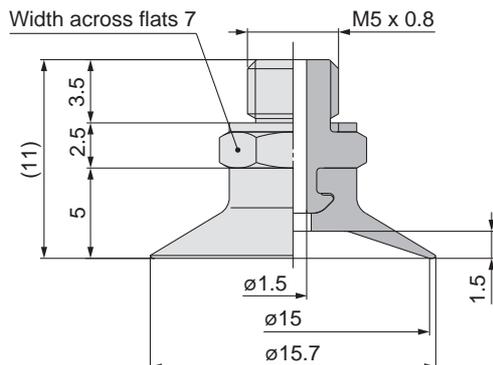
ZP2-TB06EU□-A5



ZP2-T08EU□-A5

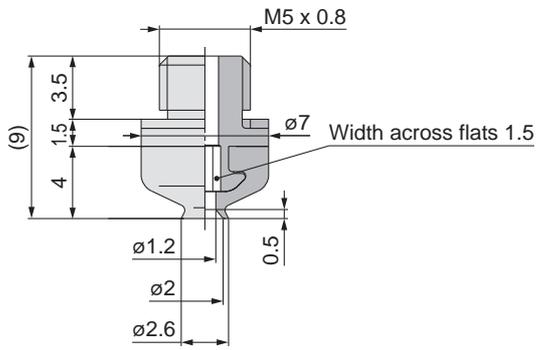


ZP2-T15EU□-A5

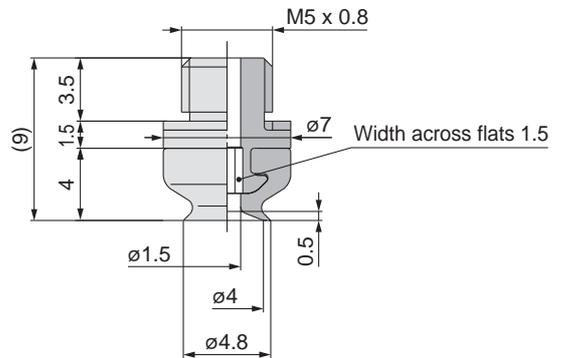


Dimensions: With Adapter

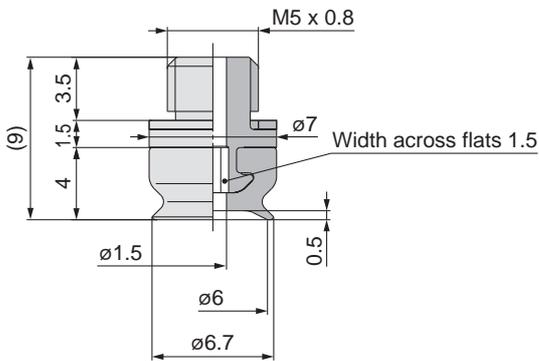
ZP2-TB02EU□-H5



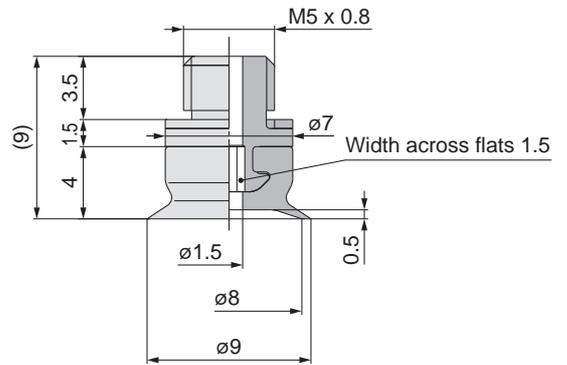
ZP2-TB04EU□-H5



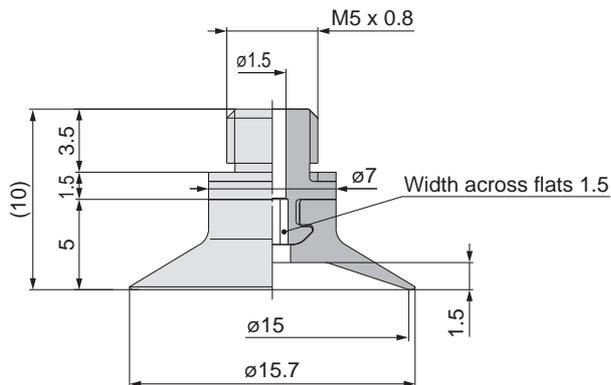
ZP2-TB06EU□-H5



ZP2-T08EU□-H5



ZP2-T15EU□-H5



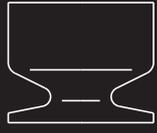
Made to Order

ZP2V

XT661

MHM

Precautions



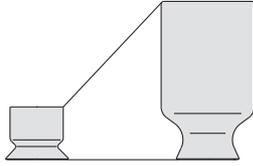
Short-type Pad

Symbol/Form

Pad diameter \rightarrow $\varnothing 2, \varnothing 3, \varnothing 4, \varnothing 6, \varnothing 8$

AU: Flat type

Space saving in the height direction



* The mounting adapter is available as a special order.

How to Order



Pad unit **ZP2-02AU N**

* Pad unit's sales unit: 10 pcs.

Pad diameter

Symbol	Pad diameter	Blast type
02	$\varnothing 2$	—
03	$\varnothing 3$	—
04	$\varnothing 4$	—
06	$\varnothing 6$	—
B08	$\varnothing 8$	●

* Blast type: Workpieces can be removed easily.

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

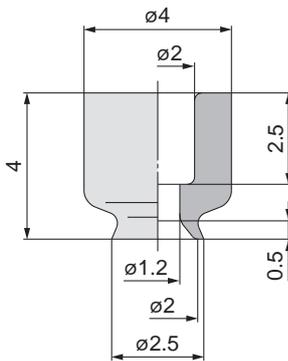
*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form

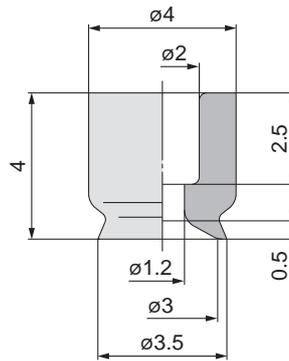
Symbol	Form
AU	Flat type

Dimensions: Pad Unit

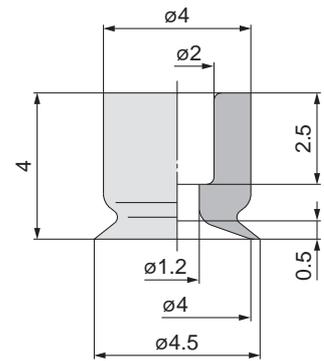
ZP2-02AU□



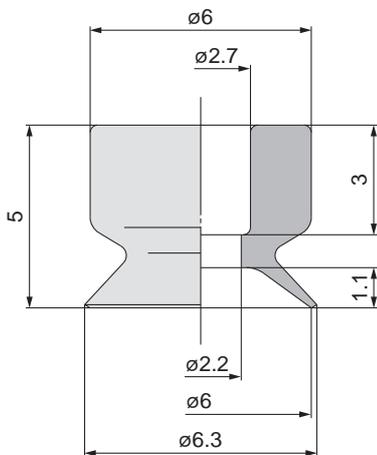
ZP2-03AU□



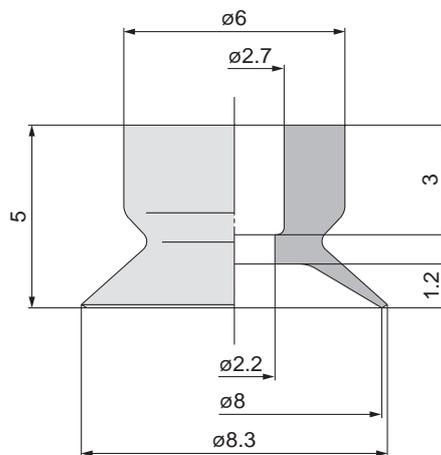
ZP2-04AU□

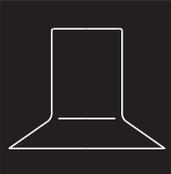


ZP2-06AU□



ZP2-B08AU□





Thin Flat Pad

Symbol/Form

UT: Thin flat type (Skirt)

Pad diameter $\phi 5, \phi 6, \phi 11, \phi 14, \phi 18, \phi 20$

■ For the adsorption of soft workpieces such as thin sheets or vinyl Wrinkling or deformation during adsorption is reduced.

■ Applicable for the ZP series adapter

Mounting Bracket Part Nos.

Adapter Assembly p. 313

How to Order

Pad unit **ZP2-11 UT N**

* Pad unit's sales unit: 10 pcs.

Pad diameter

Symbol	Pad diameter
05	$\phi 5$
06	$\phi 6$
11	$\phi 11$
14	$\phi 14$
18	$\phi 18$
20	$\phi 20$

Pad form

Symbol	Form
UT	Thin flat type (Skirt)

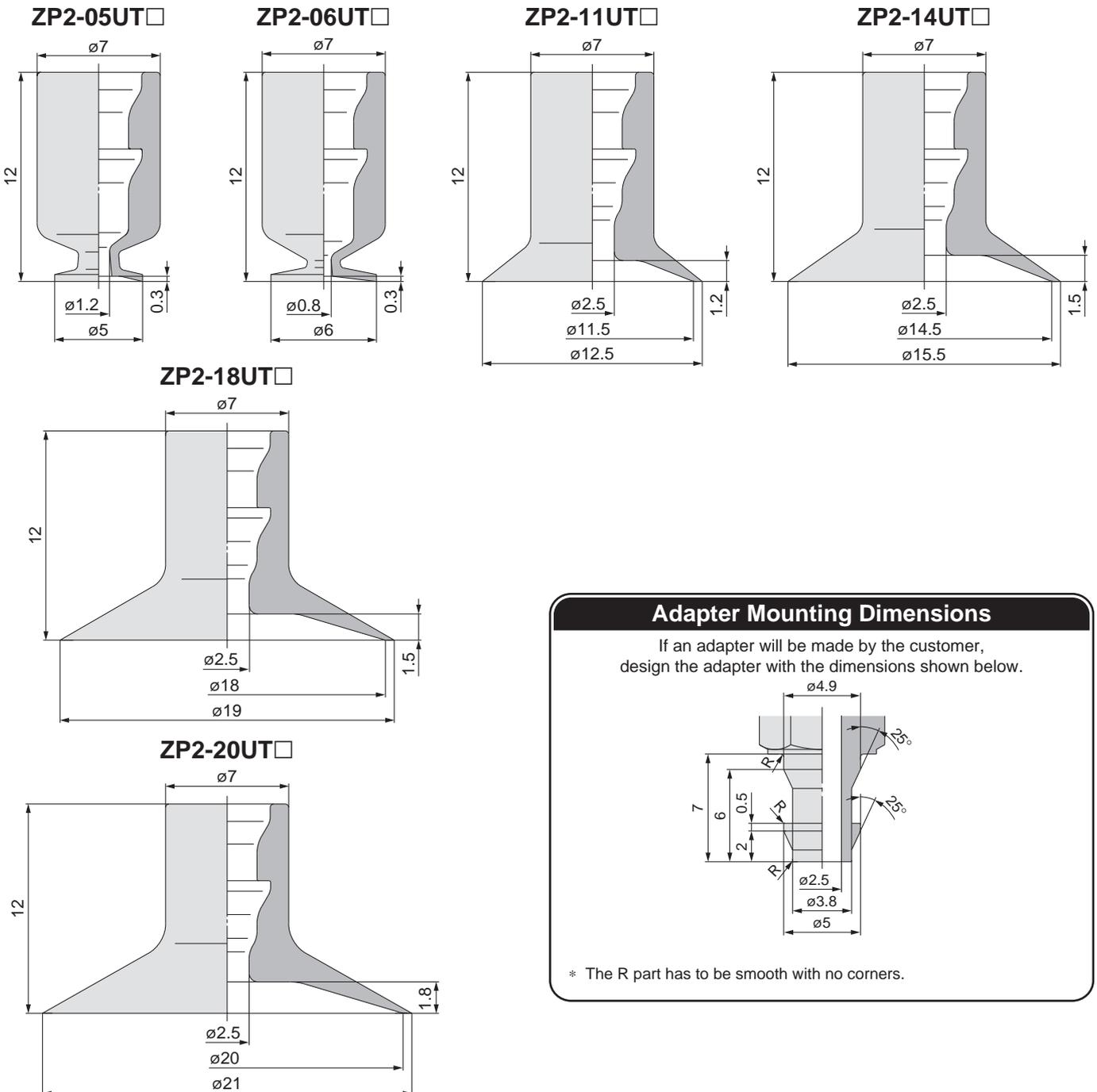
Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

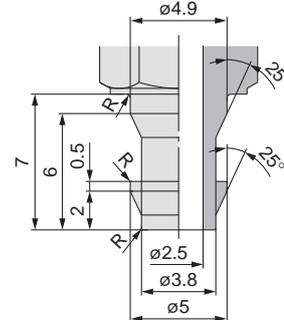


Dimensions: Pad Unit



Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.



* The R part has to be smooth with no corners.

Model Selection

Made to Order

ZP2V

XT661

MHM

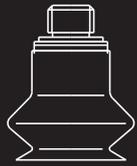
Precautions

Compact/Thin Flat Pad *ZP* Series Mounting Bracket Assembly

Adapter Assembly

Adapter part no. (With gasket)	ZPT1-A5/A6																				
	<table border="1"> <thead> <tr> <th colspan="2">Applicable pad part no.</th> </tr> </thead> <tbody> <tr> <td>ZP2-03U□</td> <td>ZP2-05UT□</td> </tr> <tr> <td>ZP2-B04U□</td> <td>ZP2-06UT□</td> </tr> <tr> <td>ZP2-B06C□</td> <td>ZP2-11UT□</td> </tr> <tr> <td>ZP2-07C□</td> <td>ZP2-14UT□</td> </tr> <tr> <td>ZP2-B08C□</td> <td>ZP2-18UT□</td> </tr> <tr> <td>ZP2-B06B□</td> <td>ZP2-20UT□</td> </tr> <tr> <td>ZP2-B08B□</td> <td></td> </tr> </tbody> </table>	Applicable pad part no.		ZP2-03U□	ZP2-05UT□	ZP2-B04U□	ZP2-06UT□	ZP2-B06C□	ZP2-11UT□	ZP2-07C□	ZP2-14UT□	ZP2-B08C□	ZP2-18UT□	ZP2-B06B□	ZP2-20UT□	ZP2-B08B□					
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ZP2-B08B□																					
<table border="1"> <thead> <tr> <th colspan="5">Dimensions</th> </tr> <tr> <th>Part no.</th> <th>A</th> <th>B</th> <th>D</th> <th>Gasket part no. (Single unit)</th> </tr> </thead> <tbody> <tr> <td>ZPT1-A5</td> <td>M5 x 0.8</td> <td>7</td> <td>3.5</td> <td>M-5G2</td> </tr> <tr> <td>ZPT1-A6</td> <td>M6 x 1</td> <td>8</td> <td>4.5</td> <td>M-6G</td> </tr> </tbody> </table>	Dimensions					Part no.	A	B	D	Gasket part no. (Single unit)	ZPT1-A5	M5 x 0.8	7	3.5	M-5G2	ZPT1-A6	M6 x 1	8	4.5	M-6G	
Dimensions																					
Part no.	A	B	D	Gasket part no. (Single unit)																	
ZPT1-A5	M5 x 0.8	7	3.5	M-5G2																	
ZPT1-A6	M6 x 1	8	4.5	M-6G																	

Adapter part no.	ZPT1-B4/B5																
	<table border="1"> <thead> <tr> <th colspan="2">Applicable pad part no.</th> </tr> </thead> <tbody> <tr> <td>ZP2-03U□</td> <td>ZP2-05UT□</td> </tr> <tr> <td>ZP2-B04U□</td> <td>ZP2-06UT□</td> </tr> <tr> <td>ZP2-B06C□</td> <td>ZP2-11UT□</td> </tr> <tr> <td>ZP2-07C□</td> <td>ZP2-14UT□</td> </tr> <tr> <td>ZP2-B08C□</td> <td>ZP2-18UT□</td> </tr> <tr> <td>ZP2-B06B□</td> <td>ZP2-20UT□</td> </tr> <tr> <td>ZP2-B08B□</td> <td></td> </tr> </tbody> </table>	Applicable pad part no.		ZP2-03U□	ZP2-05UT□	ZP2-B04U□	ZP2-06UT□	ZP2-B06C□	ZP2-11UT□	ZP2-07C□	ZP2-14UT□	ZP2-B08C□	ZP2-18UT□	ZP2-B06B□	ZP2-20UT□	ZP2-B08B□	
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<table border="1"> <thead> <tr> <th colspan="3">Dimensions</th> </tr> <tr> <th>Part no.</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>ZPT1-B4</td> <td>M4 x 0.7</td> <td>4</td> </tr> <tr> <td>ZPT1-B5</td> <td>M5 x 0.8</td> <td>5</td> </tr> </tbody> </table>	Dimensions			Part no.	A	B	ZPT1-B4	M4 x 0.7	4	ZPT1-B5	M5 x 0.8	5					
Dimensions																	
Part no.	A	B															
ZPT1-B4	M4 x 0.7	4															
ZPT1-B5	M5 x 0.8	5															



Bellows Pad

Symbol/Form

Pad diameter $\varnothing 4, \varnothing 6, \varnothing 8, \varnothing 10, \varnothing 15, \varnothing 20$

MB: Bellows type

Model Selection

- For use where there is no space for a buffer (spring type)
- For the adsorption of workpieces with inclined surfaces

How to Order



Pad unit **ZP2 - B04 MB N**

* Pad unit's sales unit: 10 pcs.

Symbol	Pad diameter	Blast type
B04	$\varnothing 4$	●
B06	$\varnothing 6$	●
B08	$\varnothing 8$	●
B10	$\varnothing 10$	●
B15	$\varnothing 15$	●
B20	$\varnothing 20$	●

Symbol	Form
MB	Bellows type

Pad material

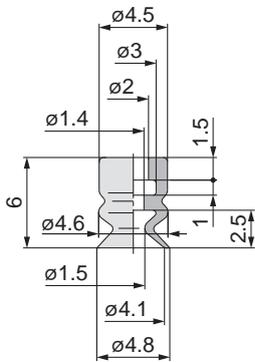
Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

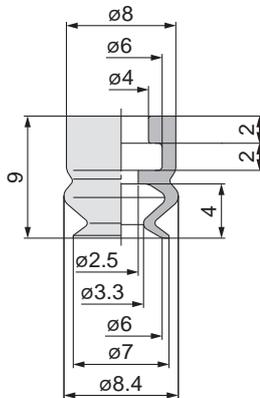
* Blast type: Workpieces can be removed easily.

Dimensions: Pad Unit

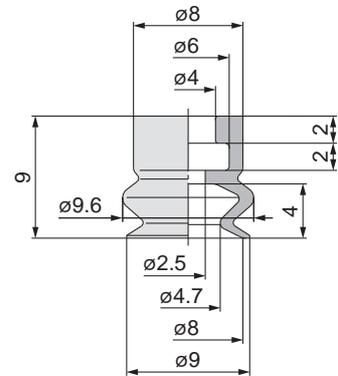
ZP2-B04MB □



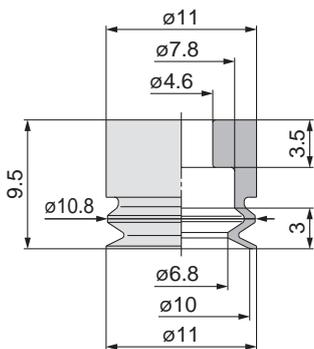
ZP2-B06MB □



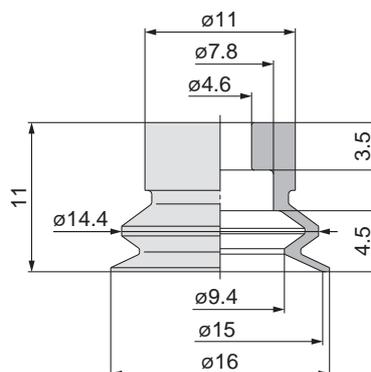
ZP2-B08MB □



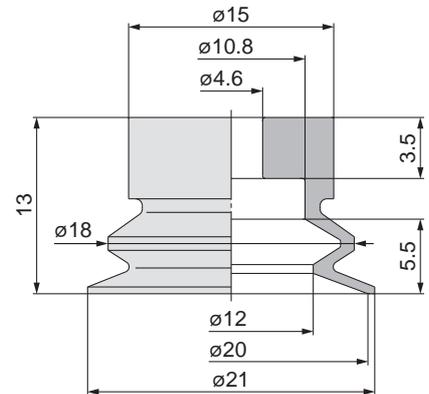
ZP2-B10MB □



ZP2-B15MB □



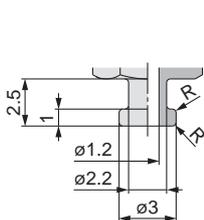
ZP2-B20MB □



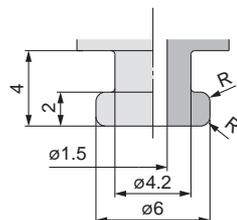
Adapter Mounting Dimensions

If an adapter will be made by the customer, design the adapter with the dimensions shown below.

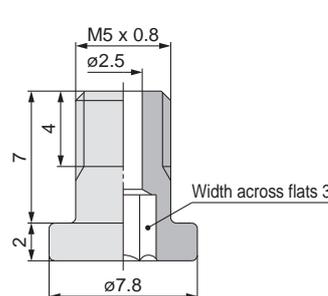
Applicable pad B04MB



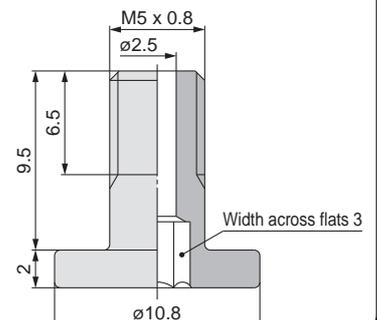
Applicable pad B06MB/B08MB



Applicable pad B10MB/B15MB



Applicable pad B20MB



* The R part has to be smooth with no corners.
* Refer to page 315 for adapter applicable to the ZP2 series.

Made to Order

ZP2V

XT661

MHM

Precautions

How to Order



With adapter **ZP2 - T B04 MB N - A3**

Vacuum inlet direction

Symbol	Direction
T	Vertical

Pad diameter

Symbol	Pad diameter	Blast type
B04	ø4	●
B06	ø6	●
B08	ø8	●
B10	ø10	●
B15	ø15	●
B20	ø20	●

* Blast type: Workpieces can be removed easily.

Mounting

Thread size (Symbol)	Pad diameter (Symbol)					
	B04	B06	B08	B10	B15	B20
A3 (M3 x 0.5 Male thread)	●	—	—	—	—	—
H5 (M5 x 0.8 Male thread)	—	●	●	●	●	●
B5 (M5 x 0.8 Female thread)	—	●	●	—	—	—

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form

Symbol	Form
MB	Bellows type

Replacement Part Nos.

Model	Pad unit part no.*1	Adapter part no.	Gasket part no. (Single unit)
ZP2-TB04MB□-A3	ZP2-B04MB□	ZP2A-M01P*2	M-3G2
ZP2-TB06MB□-H5	ZP2-B06MB□	ZP2A-M02P*2	M-5G2
ZP2-TB08MB□-H5	ZP2-B08MB□		
ZP2-TB10MB□-H5	ZP2-B10MB□	ZP2A-M05	—
ZP2-TB15MB□-H5	ZP2-B15MB□		
ZP2-TB20MB□-H5	ZP2-B20MB□	ZP2A-M06	—
ZP2-TB06MB□-B5	ZP2-B06MB□		
ZP2-TB08MB□-B5	ZP2-B08MB□	ZP2A-M04	—

*1 Pad unit's sales unit: 10 pcs.

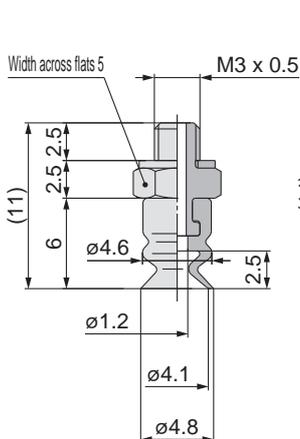
*2 With gasket

* □ in the table indicates the pad material

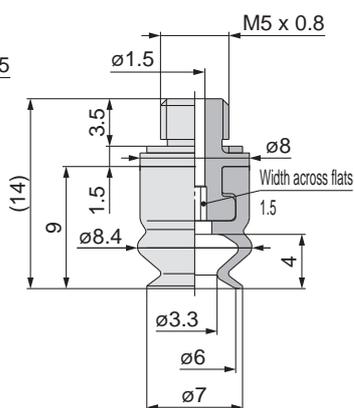
* The pad is shipped together but does not come assembled.

Dimensions: With Adapter

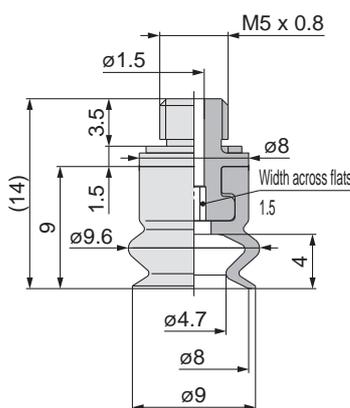
ZP2-TB04MB□□-A3



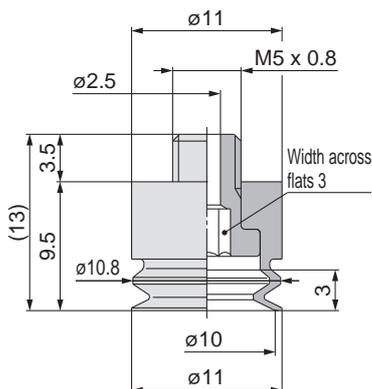
ZP2-TB06MB□-H5



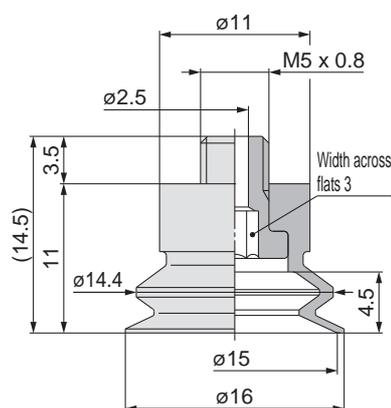
ZP2-TB08MB□-H5



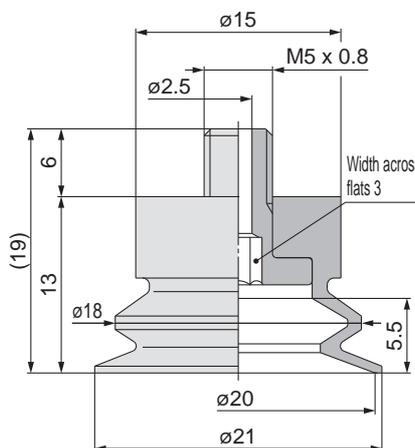
ZP2-TB10MB□-H5



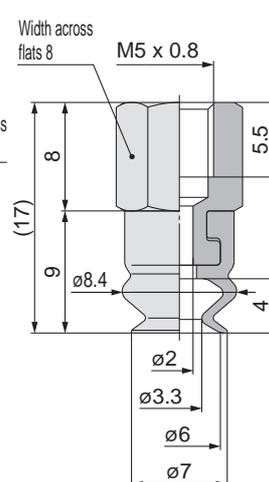
ZP2-TB15MB□-H5



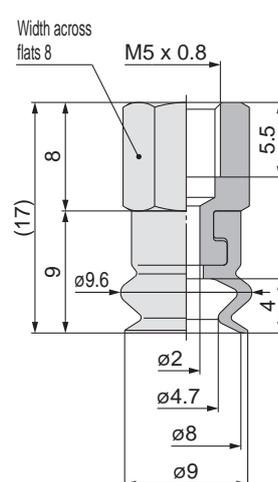
ZP2-TB20MB□-H5



ZP2-TB06MB□-B5



ZP2-TB08MB□-B5





Bellows Pad

Pad diameter \rightarrow $\varnothing 2, \varnothing 4, \varnothing 5, \varnothing 6$

Symbol/Form

ZJ: Bellows type

Model Selection

- For use where there is no space for a buffer (spring type)
- For the adsorption of workpieces with inclined surfaces

How to Order



Pad unit **ZP2-02 ZJ N**

* Pad unit's sales unit: 10 pcs.

Pad diameter

Symbol	Pad diameter
02	$\varnothing 2$
04	$\varnothing 4$
05	$\varnothing 5$
06	$\varnothing 6$

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
GN	Conductive NBR
GS	Conductive silicone rubber

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form

Symbol	Form
ZJ	Bellows type

* The mounting adapter is available as a special order.

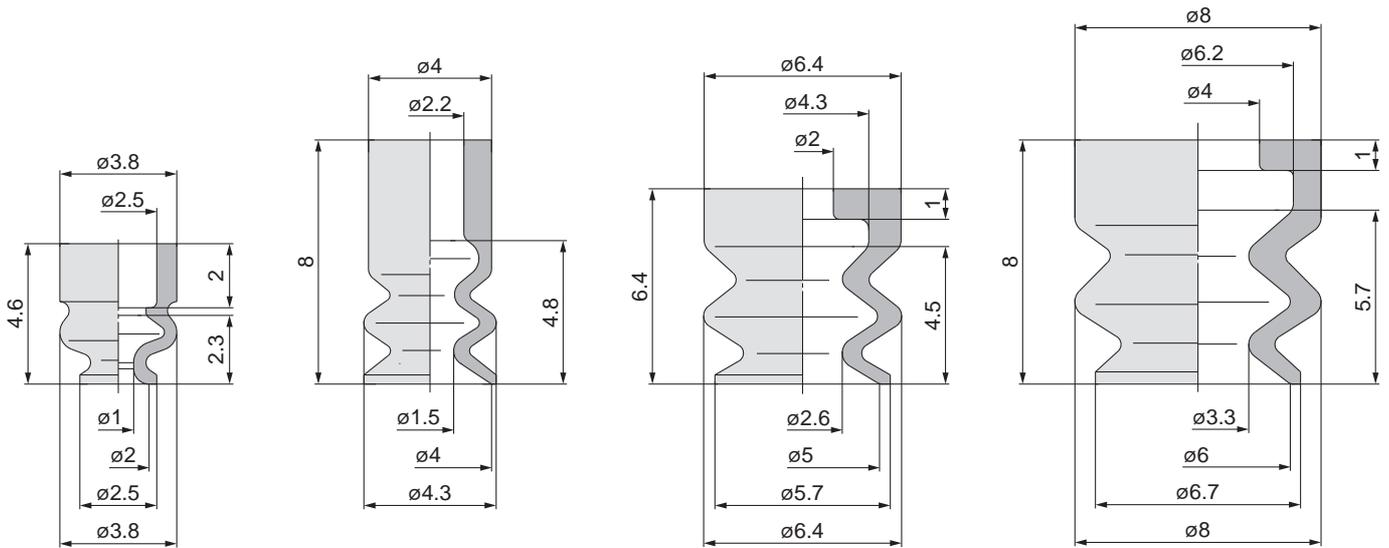
Dimensions: Pad Unit

ZP2-02ZJ \square [0.1 g]

ZP2-04ZJ \square [0.1 g]

ZP2-05ZJ \square [0.2 g]

ZP2-06ZJ \square [0.3 g]



Made to Order

ZP2V

XT661

MHM

Precautions



High Rigidity Pad

Pad diameter $\varnothing 32, \varnothing 150, \varnothing 250, \varnothing 300, \varnothing 340$

Symbol/Form

H: High rigidity
(Flat type with ribs)
HT: High rigidity
(Thin flat type with ribs)

■ Reinforced pad to prevent deformation when transferring heavy or large workpieces

How to Order



Pad unit **ZP2-32 H N**

Pad diameter

Symbol	Pad diameter
32	$\varnothing 32$
150	$\varnothing 150$
250	$\varnothing 250$
300	$\varnothing 300$
340	$\varnothing 340$

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
F	FKM
C	CR

*1 Silicone rubber is only applicable to the $\varnothing 32$ pad. Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

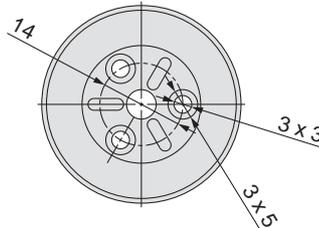
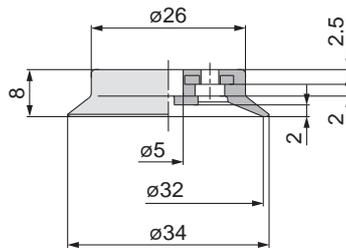
Pad form—Pad diameter

Pad form	Pad diameter (Symbol)				
	32	150	250	300	340
H (Flat type with ribs)	●	—	—	●	●
HT (Thin flat type with ribs)	—	●	●	—	—

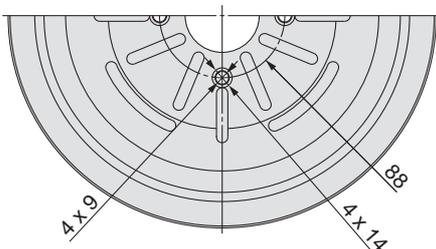
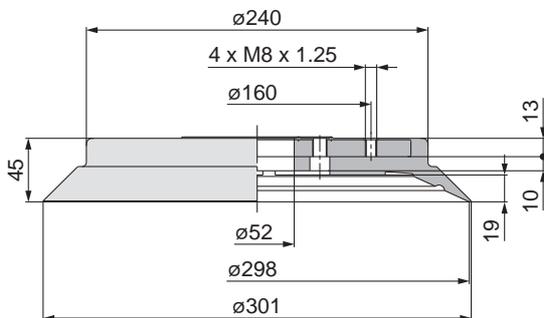
* The mounting adapter is available as a special order.

Dimensions: Pad Unit

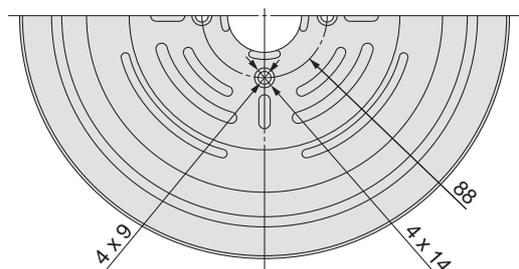
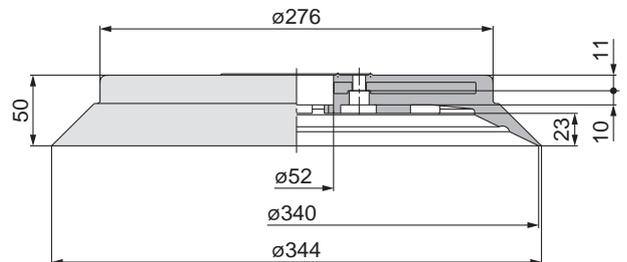
ZP2-32H□



ZP2-300H□

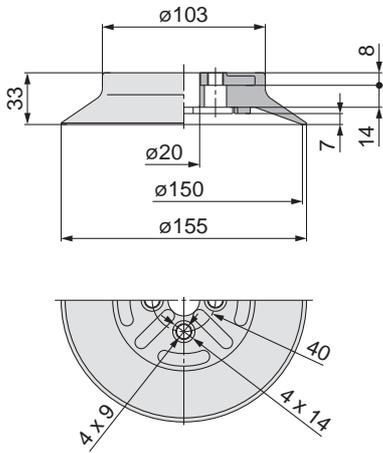


ZP2-340H□

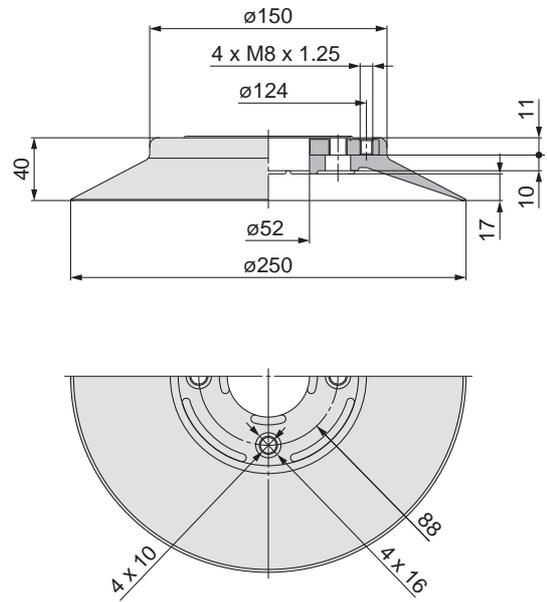


Dimensions

ZP2-150HT□



ZP2-250HT□



Made to Order

ZP2V

XT661

MHM

Precautions



High Rigidity Pad

Pad diameter $\varnothing 32, \varnothing 150$

Symbol/Form

HB: High rigidity (Bellows type)

■ For heavy or large workpieces

How to Order



Pad unit **ZP2-32 HB N**

Pad diameter

Symbol	Pad diameter
32	$\varnothing 32$
150	$\varnothing 150$

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
F	FKM
C	CR

*1 Silicone rubber is only applicable to the $\varnothing 32$ pad. Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

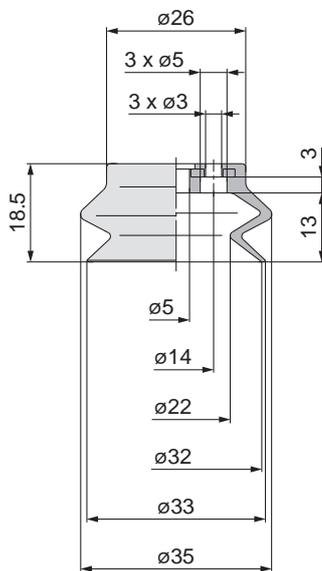
Pad form

Symbol	Form
HB	High rigidity (Bellows type)

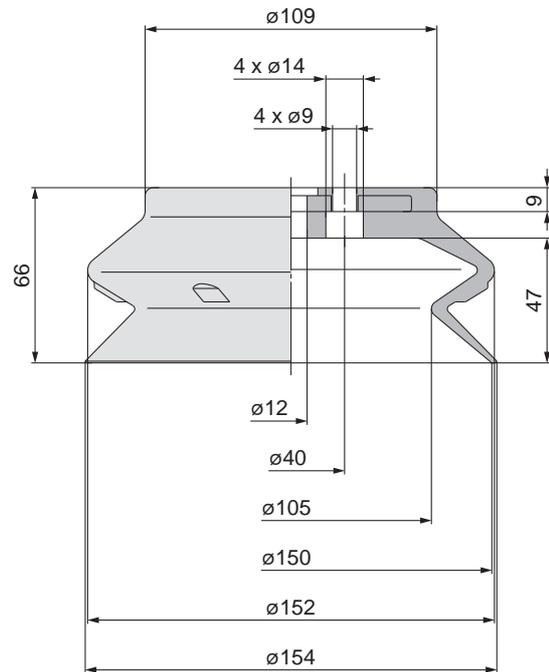
* The mounting adapter is available as a special order.

Dimensions: Pad Unit

ZP2-32HB □



ZP2-150HB □





High Rigidity Pad

Symbol/Form

Pad size **30 x 50**

HW: High rigidity (Oval type)

Model Selection

■ For heavy or large workpieces

How to Order



Pad unit **ZP2 - 3050 HW N**

Pad size

Symbol	Pad size
3050	30 x 50

Pad material

Symbol	Material
N	NBR
S	Silicone rubber*1
F	FKM
C	CR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form

Symbol	Form
HW	High rigidity (Oval type)

* For details on mounting brackets, refer to the special applications section of the pad on pages 255 to 263.

Made to Order

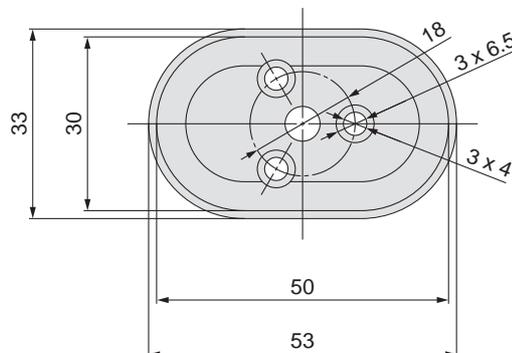
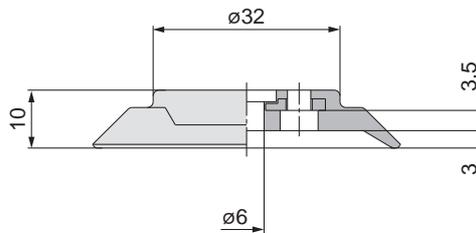
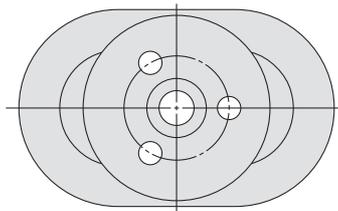
ZP2V

XT661

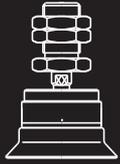
MHM

Dimensions: Pad Unit

ZP2-3050HW□



Precautions



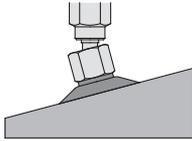
High Rigidity Ball Joint Pad

Symbol/Form

H: High rigidity
(Flat type with ribs)

Pad diameter $\varnothing 40, \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100, \varnothing 125$

■ For the adsorption of work-pieces with inclined surfaces



Replacement Part Nos.

Model	Pad unit part no.	Adapter assembly part no.	
ZP2-TF40H□	ZP40H□	ZP2A-TF1	With three M3 bolts
ZP2-TF50H□	ZP50H□	ZP2A-TF2	With four M4 bolts
ZP2-TF63H□	ZP63H□		
ZP2-TF80H□	ZP80H□	ZP2A-TF3	With four M5 bolts
ZP2-TF100H□	ZP100H□		
ZP2-TF125H□	ZP125H□		

* □ in the table indicates the pad material

How to Order

With adapter **ZP2 - T F 40 H N**

Vacuum inlet direction

Symbol	Direction
T	Vertical

Specification (mechanism)

Symbol	Specification
F	Ball joint

Pad diameter

Symbol	Pad diameter
40	$\varnothing 40$
50	$\varnothing 50$
63	$\varnothing 63$
80	$\varnothing 80$
100	$\varnothing 100$
125	$\varnothing 125$

Pad form

Symbol	Form
H	High rigidity (Flat type with ribs)

Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

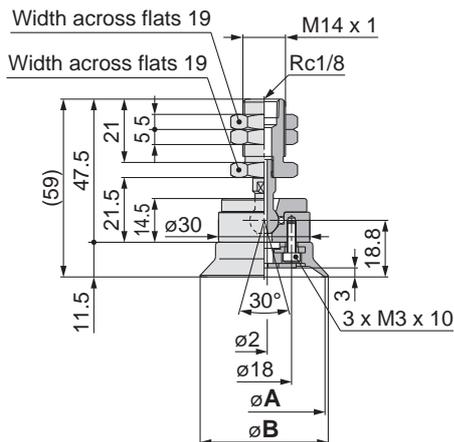
*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"



Vacuum inlet direction **Vertical**

Dimensions: With Adapter

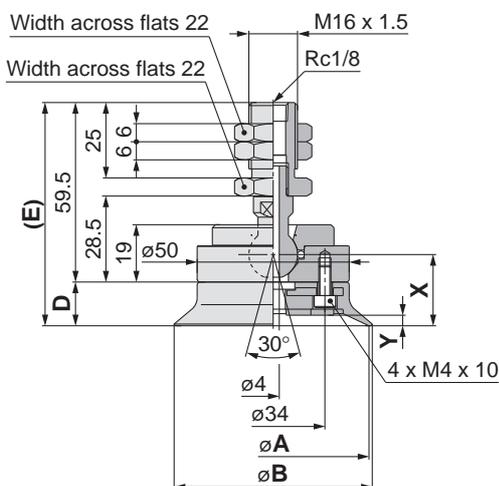
ZP2-TF⁴⁰/₅₀H□



Dimensions

Model	A	B
ZP2-TF40H□	40	42.1
ZP2-TF50H□	50	52.1

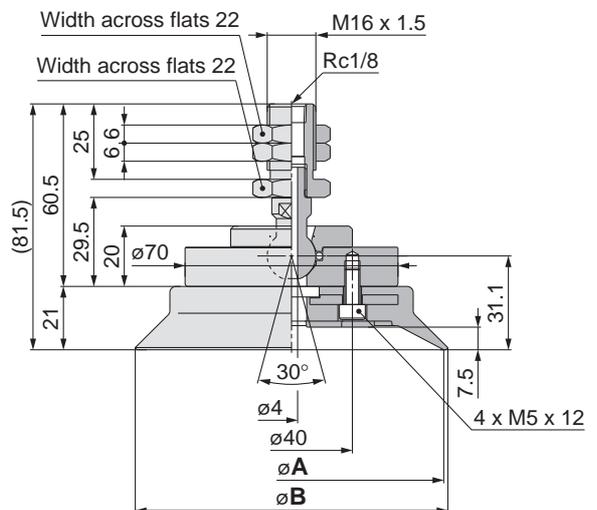
ZP2-TF⁶³/₈₀H□



Dimensions

Model	A	B	D	E	X	Y
ZP2-TF63H□	63	65.2	14.5	74	23.6	3.5
ZP2-TF80H□	80	82.1	16.5	76	25.6	4.5

ZP2-TF¹⁰⁰/₁₂₅H□



Dimensions

Model	A	B
ZP2-TF100H□	100	102.8
ZP2-TF125H□	125	127.7

How to Order



With adapter **ZP2-X F 40 H N**

Vacuum inlet direction

Symbol	Direction
X	Lateral

Specification (mechanism)

Symbol	Specification
F	Ball joint

Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§ 177.2600 for "Rubber articles intended for repeated use"

Pad form

Symbol	Form
H	High rigidity (Flat type with ribs)

Vacuum inlet direction **Lateral**

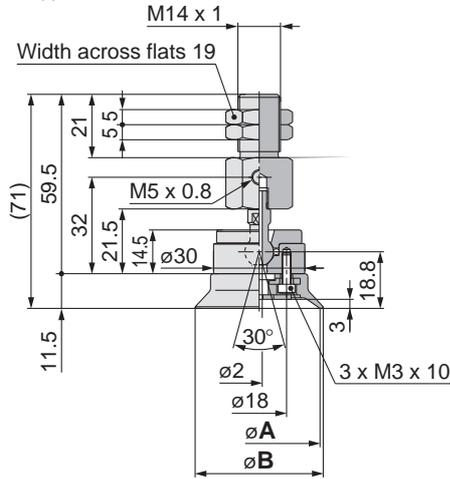
Replacement Part Nos.

Model	Pad unit part no.	Adapter assembly part no.	
ZP2-XF40H □	ZP40H□	ZP2A-XF1	With three M3 bolts
ZP2-XF50H □	ZP50H□		
ZP2-XF63H □	ZP63H□	ZP2A-XF2	With four M4 bolts
ZP2-XF80H □	ZP80H□		
ZP2-XF100H □	ZP100H□	ZP2A-XF3	With four M5 bolts
ZP2-XF125H □	ZP125H□		

* □ in the table indicates the pad material

Dimensions: With Adapter

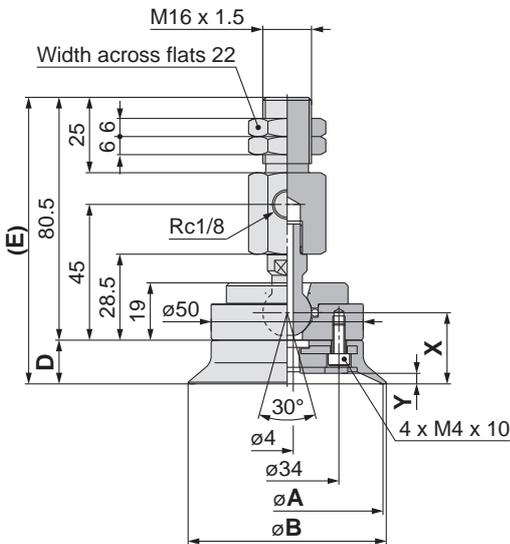
ZP2-XF⁴⁰/₅₀H□



Dimensions

Model	A	B
ZP2-XF40H □	40	42.1
ZP2-XF50H □	50	52.1

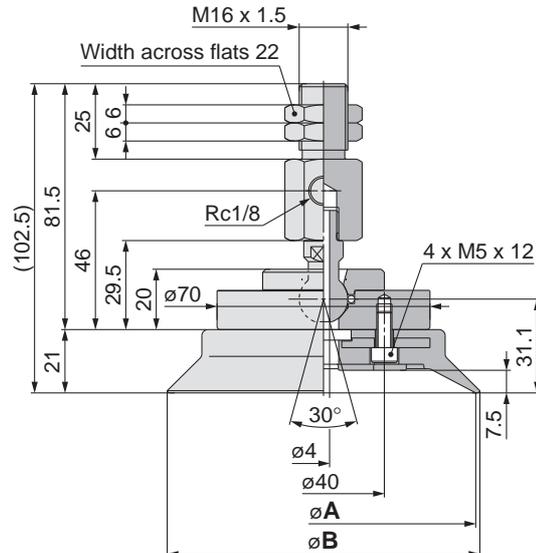
ZP2-XF⁶³/₈₀H□



Dimensions

Model	A	B	D	E	X	Y
ZP2-XF63H □	63	65.2	14.5	95	23.6	3.5
ZP2-XF80H □	80	82.1	16.5	97	25.6	4.5

ZP2-XF¹⁰⁰/₁₂₅H□



Dimensions

Model	A	B
ZP2-XF100H □	100	102.8
ZP2-XF125H □	125	127.7

High Rigidity Ball Joint Pad **ZP2 Series**

How to Order

With buffer ZP2 – T F 40 H N JB 25

• Vacuum inlet direction

Symbol	Direction
T	Vertical

• Specification (mechanism)

Symbol	Specification
F	Ball joint

• Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

• Pad form

Symbol	Form
H	High rigidity (Flat type with ribs)

• Buffer stroke (■)

Stroke	Pad diameter			
	ø40 ø50	ø63 ø80	ø100 ø125	
25	●	●	●	
50	●	●	●	
75	●	●	●	
100	—	●	●	

• Buffer specification

Symbol	Specification
JB	Rotating With bushing Material: Brass
JF	Rotating With bushing Material: Structural steel

• Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"



Vacuum inlet direction **Vertical**

Replacement Part Nos.

Model	Pad unit part no.	Buffer assembly part no.	
ZP2-TF40H□(JB/JF)25	ZP40H□	ZP2B-TF1(JB/JF)25	With three M3 bolts
ZP2-TF40H□(JB/JF)50		ZP2B-TF1(JB/JF)50	
ZP2-TF40H□(JB/JF)75		ZP2B-TF1(JB/JF)75	
ZP2-TF50H□(JB/JF)25	ZP50H□	ZP2B-TF1(JB/JF)25	
ZP2-TF50H□(JB/JF)50		ZP2B-TF1(JB/JF)50	
ZP2-TF50H□(JB/JF)75		ZP2B-TF1(JB/JF)75	
ZP2-TF63H□(JB/JF)25	ZP63H□	ZP2B-TF2(JB/JF)25	With four M4 bolts
ZP2-TF63H□(JB/JF)50		ZP2B-TF2(JB/JF)50	
ZP2-TF63H□(JB/JF)75		ZP2B-TF2(JB/JF)75	
ZP2-TF63H□(JB/JF)100		ZP2B-TF2(JB/JF)100	
ZP2-TF80H□(JB/JF)25	ZP80H□	ZP2B-TF2(JB/JF)25	
ZP2-TF80H□(JB/JF)50		ZP2B-TF2(JB/JF)50	
ZP2-TF80H□(JB/JF)75		ZP2B-TF2(JB/JF)75	
ZP2-TF80H□(JB/JF)100		ZP2B-TF2(JB/JF)100	
ZP2-TF100H□(JB/JF)25	ZP100H□	ZP2B-TF3(JB/JF)25	With four M5 bolts
ZP2-TF100H□(JB/JF)50		ZP2B-TF3(JB/JF)50	
ZP2-TF100H□(JB/JF)75		ZP2B-TF3(JB/JF)75	
ZP2-TF100H□(JB/JF)100		ZP2B-TF3(JB/JF)100	
ZP2-TF125H□(JB/JF)25	ZP125H□	ZP2B-TF3(JB/JF)25	
ZP2-TF125H□(JB/JF)50		ZP2B-TF3(JB/JF)50	
ZP2-TF125H□(JB/JF)75		ZP2B-TF3(JB/JF)75	
ZP2-TF125H□(JB/JF)100		ZP2B-TF3(JB/JF)100	

* □ in the table indicates the pad material

Buffer Specifications

Pad diameter		ø40, ø50	ø63, ø80, ø100, ø125
Stroke [mm]		25, 50, 75	25, 50, 75, 100
Spring reactive force [N]	At 0 stroke	6.9	10
	At full stroke	11.8	15
Buffer specifications	JB	Rotating With bushing Buffer body material: Brass	
		Nut tightening torque: 28 to 32 N-m Nut tightening torque: 45 to 50 N-m	
	JF	Rotating With bushing Buffer body material: Structural steel	
		Nut tightening torque: 48 to 52 N-m Nut tightening torque: 75 to 80 N-m	

How to Order

With buffer ZP2 - X F 40 H N JB 25

• Vacuum inlet direction

Symbol	Direction
X	Lateral

• Specification (mechanism)

Symbol	Specification
F	Ball joint

• Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

• Pad form

Symbol	Form
H	High rigidity (Flat type with ribs)

• Buffer stroke (■)

Stroke	Pad diameter			
	ø40 ø50	ø63 ø80	ø100 ø125	
25	●	●	●	
50	●	●	●	
75	●	●	●	
100	—	●	●	

• Buffer specification

Symbol	Specification
JB	Rotating With bushing Material: Brass
JF	Rotating With bushing Material: Structural steel

• Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"



Vacuum inlet direction **Lateral**

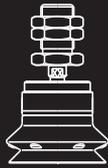
Replacement Part Nos.

Model	Pad unit part no.	Buffer assembly part no.
ZP2-XF40H□(JB/JF)25	ZP40H□	ZP2B-XF1(JB/JF)25
ZP2-XF40H□(JB/JF)50		ZP2B-XF1(JB/JF)50
ZP2-XF40H□(JB/JF)75		ZP2B-XF1(JB/JF)75
ZP2-XF50H□(JB/JF)25	ZP50H□	ZP2B-XF1(JB/JF)25
ZP2-XF50H□(JB/JF)50		ZP2B-XF1(JB/JF)50
ZP2-XF50H□(JB/JF)75		ZP2B-XF1(JB/JF)75
ZP2-XF63H□(JB/JF)25	ZP63H□	ZP2B-XF2(JB/JF)25
ZP2-XF63H□(JB/JF)50		ZP2B-XF2(JB/JF)50
ZP2-XF63H□(JB/JF)75		ZP2B-XF2(JB/JF)75
ZP2-XF63H□(JB/JF)100		ZP2B-XF2(JB/JF)100
ZP2-XF80H□(JB/JF)25	ZP80H□	ZP2B-XF2(JB/JF)25
ZP2-XF80H□(JB/JF)50		ZP2B-XF2(JB/JF)50
ZP2-XF80H□(JB/JF)75		ZP2B-XF2(JB/JF)75
ZP2-XF80H□(JB/JF)100		ZP2B-XF2(JB/JF)100
ZP2-XF100H□(JB/JF)25	ZP100H□	ZP2B-XF3(JB/JF)25
ZP2-XF100H□(JB/JF)50		ZP2B-XF3(JB/JF)50
ZP2-XF100H□(JB/JF)75		ZP2B-XF3(JB/JF)75
ZP2-XF100H□(JB/JF)100		ZP2B-XF3(JB/JF)100
ZP2-XF125H□(JB/JF)25	ZP125H□	ZP2B-XF3(JB/JF)25
ZP2-XF125H□(JB/JF)50		ZP2B-XF3(JB/JF)50
ZP2-XF125H□(JB/JF)75		ZP2B-XF3(JB/JF)75
ZP2-XF125H□(JB/JF)100		ZP2B-XF3(JB/JF)100

* □ in the table indicates the pad material

Buffer Specifications

Pad diameter		ø40, ø50	ø63, ø80, ø100, ø125
Stroke [mm]		25, 50, 75	25, 50, 75, 100
Spring reactive force [N]	At 0 stroke	6.9	10
	At full stroke	11.8	15
Buffer specifications	JB	Rotating With bushing Buffer body material: Brass Nut tightening torque: 28 to 32 N·m Nut tightening torque: 45 to 50 N·m	
	JF	Rotating With bushing Buffer body material: Structural steel Nut tightening torque: 48 to 52 N·m Nut tightening torque: 75 to 80 N·m	



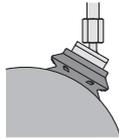
High Rigidity Ball Joint Pad

Symbol/Form

HB: High rigidity (Bellows type)

Pad diameter $\varnothing 40, \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100, \varnothing 125$

■ For the adsorption of workpieces with inclined or curved surfaces



Replacement Part Nos.

Model	Pad unit part no.	Adapter assembly part no.
ZP2-TF40HB□	ZP40HB□	ZP2A-TF1 With three M3 bolts
ZP2-TF50HB□	ZP50HB□	
ZP2-TF63HB□	ZP63HB□	ZP2A-TF2 With four M4 bolts
ZP2-TF80HB□	ZP80HB□	
ZP2-TF100HB□	ZP100HB□	ZP2A-TF3 With four M5 bolts
ZP2-TF125HB□	ZP125HB□	

* □ in the table indicates the pad material

How to Order

With adapter **ZP2 - T F 40 HB N**

Vacuum inlet direction

Symbol	Direction
T	Vertical

Specification (mechanism)

Symbol	Specification
F	Ball joint

Pad diameter

Symbol	Pad diameter
40	$\varnothing 40$
50	$\varnothing 50$
63	$\varnothing 63$
80	$\varnothing 80$
100	$\varnothing 100$
125	$\varnothing 125$

Pad form

Symbol	Form
HB	High rigidity (Bellows type)

Vacuum inlet direction **Vertical**

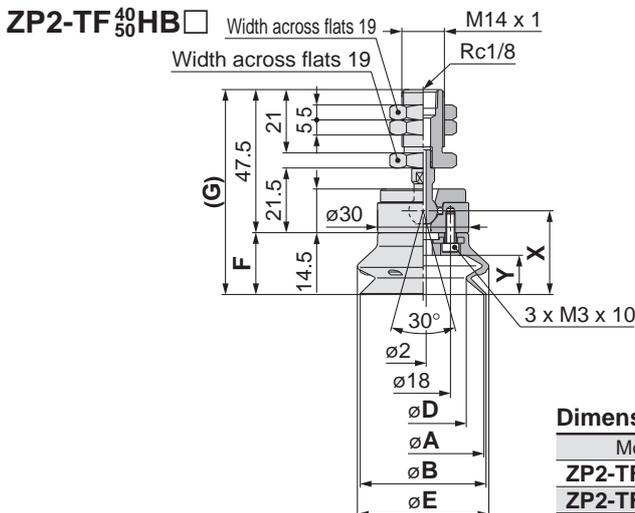
Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§ 177.2600 for "Rubber articles intended for repeated use"

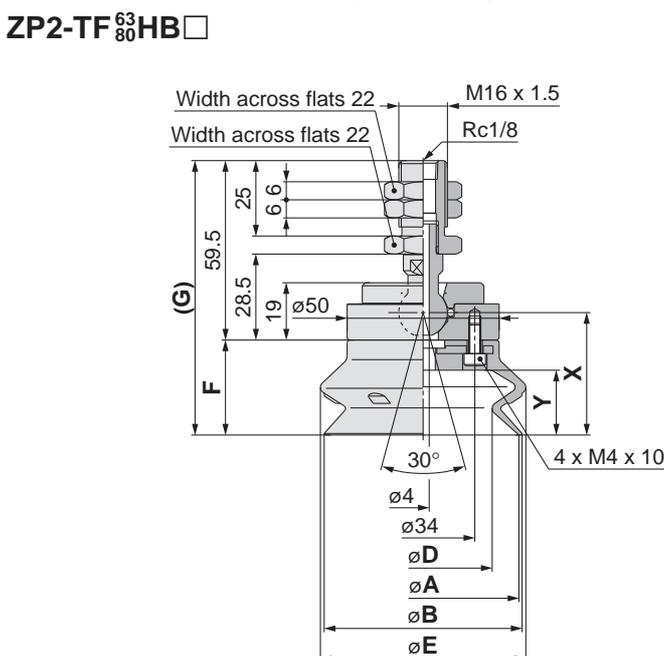


Dimensions: With Adapter



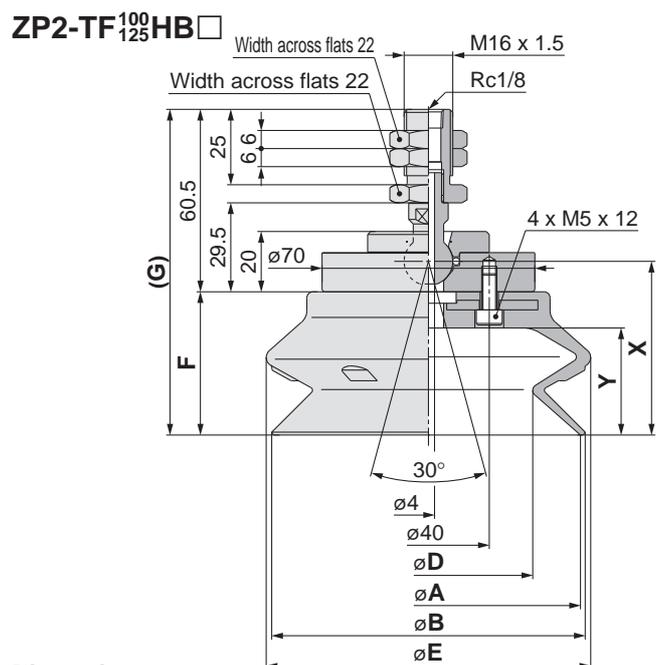
Dimensions

Model	A	B	D	E	F	G	X	Y
ZP2-TF40HB□	40	41.4	28.3	42.3	20.5	68	27.8	13
ZP2-TF50HB□	50	52	36.2	52.7	24	71.5	31.3	16.5



Dimensions

Model	A	B	D	E	F	G	X	Y
ZP2-TF63HB□	63	65.1	46	66.4	31.5	91	40.6	21.5
ZP2-TF80HB□	80	82.8	60.1	83.8	37	96.5	46.1	27.5



Dimensions

Model	A	B	D	E	F	G	X	Y
ZP2-TF100HB□	100	103	72.5	103.9	47.5	108	57.6	35.5
ZP2-TF125HB□	125	128.5	92.2	131.6	56	116.5	66.1	44

How to Order



With adapter **ZP2-X F 40 HB N**

Vacuum inlet direction

Symbol	Direction
X	Lateral

Specification (mechanism)

Symbol	Specification
F	Ball joint

Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§ 177.2600 for "Rubber articles intended for repeated use"

Pad form

Symbol	Form
HB	High rigidity (Bellows type)

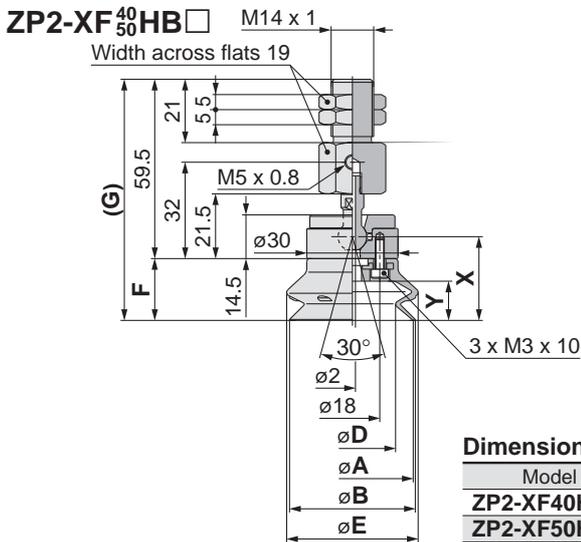
Vacuum inlet direction **Lateral**

Replacement Part Nos.

Model	Pad unit part no.	Adapter assembly part no.	
ZP2-XF40HB□	ZP40HB□	ZP2A-XF1	With three M3 bolts
ZP2-XF50HB□	ZP50HB□		
ZP2-XF63HB□	ZP63HB□	ZP2A-XF2	With four M4 bolts
ZP2-XF80HB□	ZP80HB□		
ZP2-XF100HB□	ZP100HB□	ZP2A-XF3	With four M5 bolts
ZP2-XF125HB□	ZP125HB□		

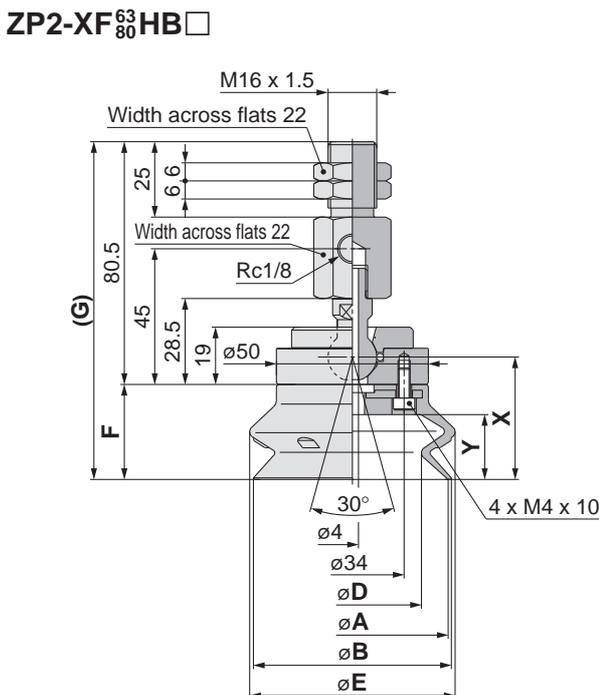
* □ in the table indicates the pad material

Dimensions: With Adapter



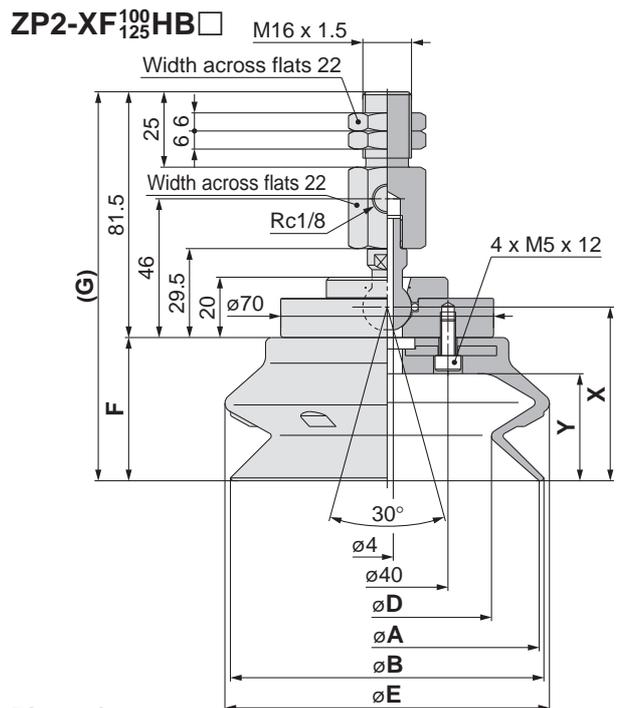
Dimensions

Model	A	B	D	E	F	G	X	Y
ZP2-XF40HB□	40	41.4	28.3	42.3	20.5	80	27.8	13
ZP2-XF50HB□	50	52	36.2	52.7	24	83.5	31.3	16.5



Dimensions

Model	A	B	D	E	F	G	X	Y
ZP2-XF63HB□	63	65.1	46	66.4	31.5	112	40.6	21.5
ZP2-XF80HB□	80	82.8	60.1	83.8	37	117.5	46.1	27.5



Dimensions

Model	A	B	D	E	F	G	X	Y
ZP2-XF100HB□	100	103	72.5	103.9	47.5	129	57.6	35.5
ZP2-XF125HB□	125	128.5	92.2	131.6	56	137.5	66.1	44

High Rigidity Ball Joint Pad **ZP2 Series**

How to Order

With buffer **ZP2 – T F 40 HB N JB 25**

• Vacuum inlet direction

Symbol	Direction
T	Vertical

• Specification (mechanism)

Symbol	Specification
F	Ball joint

• Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

• Pad form

Symbol	Form
HB	High rigidity (Bellows type)

• Buffer stroke (■)

Stroke	Pad diameter			
	ø40 ø50	ø63 ø80	ø100 ø125	
25	●	●	●	
50	●	●	●	
75	●	●	●	
100	—	●	●	

• Buffer specification

Symbol	Specification
JB	Rotating With bushing Material: Brass
JF	Rotating With bushing Material: Structural steel

• Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"



Vacuum inlet direction **Vertical**

Replacement Part Nos.

Model	Pad unit part no.	Buffer assembly part no.	
ZP2-TF40HB□(JB/JF)25	ZP40HB□	ZP2B-TF1(JB/JF)25	With three M3 bolts
ZP2-TF40HB□(JB/JF)50		ZP2B-TF1(JB/JF)50	
ZP2-TF40HB□(JB/JF)75		ZP2B-TF1(JB/JF)75	
ZP2-TF50HB□(JB/JF)25	ZP50HB□	ZP2B-TF1(JB/JF)50	With three M3 bolts
ZP2-TF50HB□(JB/JF)50		ZP2B-TF1(JB/JF)75	
ZP2-TF50HB□(JB/JF)75		ZP2B-TF1(JB/JF)100	
ZP2-TF63HB□(JB/JF)25	ZP63HB□	ZP2B-TF2(JB/JF)25	With four M4 bolts
ZP2-TF63HB□(JB/JF)50		ZP2B-TF2(JB/JF)50	
ZP2-TF63HB□(JB/JF)75		ZP2B-TF2(JB/JF)75	
ZP2-TF63HB□(JB/JF)100		ZP2B-TF2(JB/JF)100	
ZP2-TF80HB□(JB/JF)25	ZP80HB□	ZP2B-TF2(JB/JF)25	With four M4 bolts
ZP2-TF80HB□(JB/JF)50		ZP2B-TF2(JB/JF)50	
ZP2-TF80HB□(JB/JF)75		ZP2B-TF2(JB/JF)75	
ZP2-TF80HB□(JB/JF)100		ZP2B-TF2(JB/JF)100	
ZP2-TF100HB□(JB/JF)25	ZP100HB□	ZP2B-TF3(JB/JF)25	With four M5 bolts
ZP2-TF100HB□(JB/JF)50		ZP2B-TF3(JB/JF)50	
ZP2-TF100HB□(JB/JF)75		ZP2B-TF3(JB/JF)75	
ZP2-TF100HB□(JB/JF)100		ZP2B-TF3(JB/JF)100	
ZP2-TF125HB□(JB/JF)25	ZP125HB□	ZP2B-TF3(JB/JF)25	With four M5 bolts
ZP2-TF125HB□(JB/JF)50		ZP2B-TF3(JB/JF)50	
ZP2-TF125HB□(JB/JF)75		ZP2B-TF3(JB/JF)75	
ZP2-TF125HB□(JB/JF)100		ZP2B-TF3(JB/JF)100	

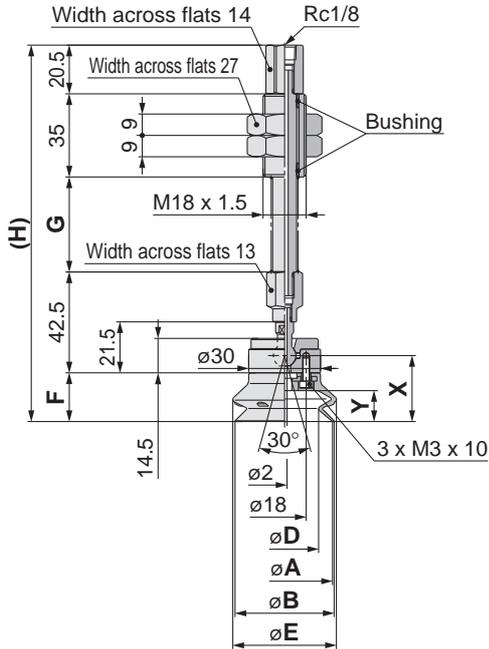
* □ in the table indicates the pad material

Buffer Specifications

Pad diameter		ø40, ø50	ø63, ø80, ø100, ø125
Stroke [mm]		25, 50, 75	25, 50, 75, 100
Spring reactive force [N]	At 0 stroke	6.9	10
	At full stroke	11.8	15
Buffer specifications	JB	Rotating With bushing Buffer body material: Brass	
		Nut tightening torque: 28 to 32 N·m	Nut tightening torque: 45 to 50 N·m
	JF	Rotating With bushing Buffer body material: Structural steel	
		Nut tightening torque: 48 to 52 N·m	Nut tightening torque: 75 to 80 N·m

Dimensions: With Buffer

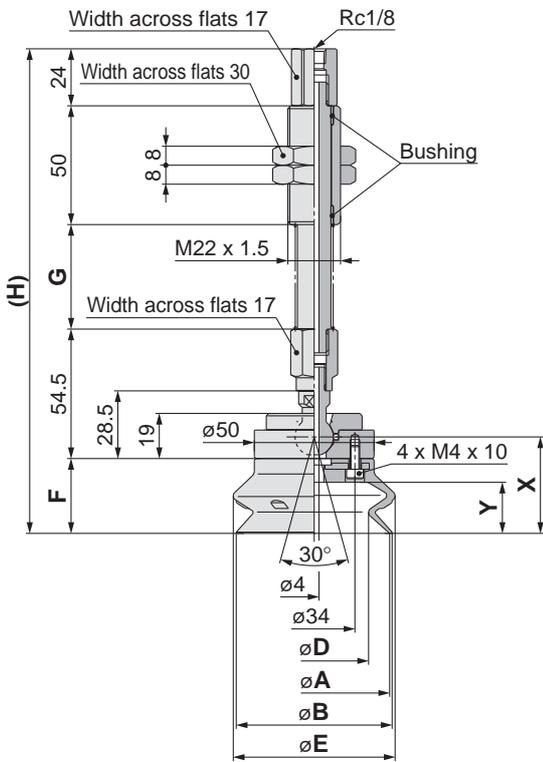
ZP2-TF⁴⁰₅₀HB □ JB/JF ■



Dimensions

Model	A	B	D	E	F	G	H	X	Y
ZP2-TF40HB □ (JB/JF)25						40	158.5		
ZP2-TF40HB □ (JB/JF)50	40	41.4	28.3	42.3	20.5	75	193.5	27.8	13
ZP2-TF40HB □ (JB/JF)75						111	229.5		
ZP2-TF50HB □ (JB/JF)25						40	162		
ZP2-TF50HB □ (JB/JF)50	50	52	36.2	52.7	24	75	197	31.3	16.5
ZP2-TF50HB □ (JB/JF)75						111	233		

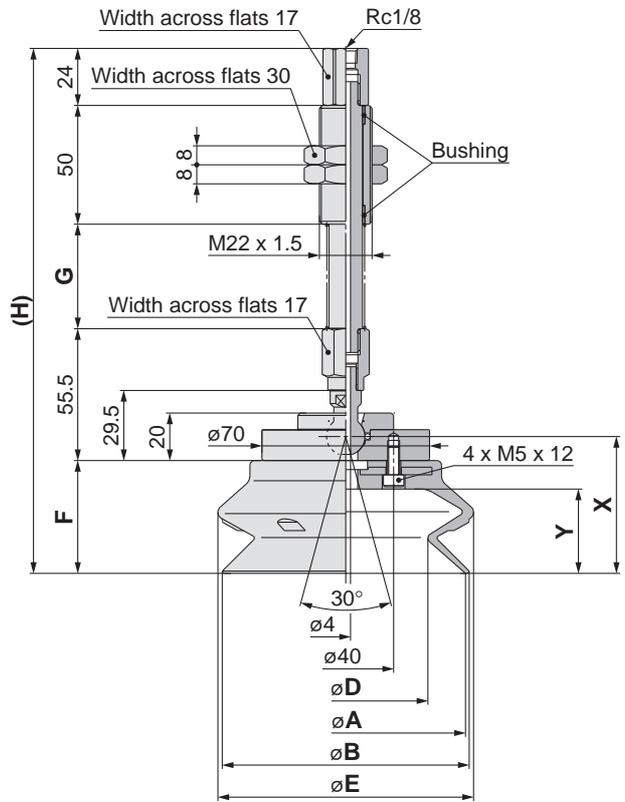
ZP2-TF⁶³₈₀HB □ JB/JF ■



Dimensions

Model	A	B	D	E	F	G	H	X	Y
ZP2-TF63HB □ (JB/JF)25						44	204		
ZP2-TF63HB □ (JB/JF)50	63	65.1	46	66.4	31.5	80	240	40.6	21.5
ZP2-TF63HB □ (JB/JF)75						120	280		
ZP2-TF63HB □ (JB/JF)100						155	315		
ZP2-TF80HB □ (JB/JF)25						44	209.5		
ZP2-TF80HB □ (JB/JF)50	80	82.8	60.1	83.8	37	80	245.5	46.1	27.5
ZP2-TF80HB □ (JB/JF)75						120	285.5		
ZP2-TF80HB □ (JB/JF)100						155	320.5		

ZP2-TF¹⁰⁰₁₂₅HB □ JB/JF ■



Dimensions

Model	A	B	D	E	F	G	H	X	Y
ZP2-TF100HB □ (JB/JF)25						44	221		
ZP2-TF100HB □ (JB/JF)50	100	103	72.5	103.9	47.5	80	257	57.6	35.5
ZP2-TF100HB □ (JB/JF)75						120	297		
ZP2-TF100HB □ (JB/JF)100						155	332		
ZP2-TF125HB □ (JB/JF)25						44	229.5		
ZP2-TF125HB □ (JB/JF)50	125	128.5	92.2	131.6	56	80	265.5	66.1	44
ZP2-TF125HB □ (JB/JF)75						120	305.5		
ZP2-TF125HB □ (JB/JF)100						155	340.5		

High Rigidity Ball Joint Pad **ZP2 Series**

How to Order

With buffer **ZP2 - X F 40 HB N JB 25**

• Vacuum inlet direction

Symbol	Direction
X	Lateral

• Specification (mechanism)

Symbol	Specification
F	Ball joint

• Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

• Pad form

Symbol	Form
HB	High rigidity (Bellows type)

• Buffer stroke (■)

Stroke	Pad diameter			
	ø40 ø50	ø63 ø80	ø100 ø125	
25	●	●	●	
50	●	●	●	
75	●	●	●	
100	—	●	●	

• Buffer specification

Symbol	Specification
JB	Rotating With bushing Material: Brass
JF	Rotating With bushing Material: Structural steel

• Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"



Vacuum inlet direction **Lateral**

Replacement Part Nos.

Model	Pad unit part no.	Buffer assembly part no.	
ZP2-XF40HB□(JB/JF)25	ZP40HB□	ZP2B-XF1(JB/JF)25	With three M3 bolts
ZP2-XF40HB□(JB/JF)50		ZP2B-XF1(JB/JF)50	
ZP2-XF40HB□(JB/JF)75		ZP2B-XF1(JB/JF)75	
ZP2-XF50HB□(JB/JF)25	ZP50HB□	ZP2B-XF1(JB/JF)25	With three M3 bolts
ZP2-XF50HB□(JB/JF)50		ZP2B-XF1(JB/JF)50	
ZP2-XF50HB□(JB/JF)75		ZP2B-XF1(JB/JF)75	
ZP2-XF63HB□(JB/JF)25	ZP63HB□	ZP2B-XF2(JB/JF)25	With four M4 bolts
ZP2-XF63HB□(JB/JF)50		ZP2B-XF2(JB/JF)50	
ZP2-XF63HB□(JB/JF)75		ZP2B-XF2(JB/JF)75	
ZP2-XF63HB□(JB/JF)100		ZP2B-XF2(JB/JF)100	
ZP2-XF80HB□(JB/JF)25	ZP80HB□	ZP2B-XF2(JB/JF)25	With four M4 bolts
ZP2-XF80HB□(JB/JF)50		ZP2B-XF2(JB/JF)50	
ZP2-XF80HB□(JB/JF)75		ZP2B-XF2(JB/JF)75	
ZP2-XF80HB□(JB/JF)100		ZP2B-XF2(JB/JF)100	
ZP2-XF100HB□(JB/JF)25	ZP100HB□	ZP2B-XF3(JB/JF)25	With four M5 bolts
ZP2-XF100HB□(JB/JF)50		ZP2B-XF3(JB/JF)50	
ZP2-XF100HB□(JB/JF)75		ZP2B-XF3(JB/JF)75	
ZP2-XF100HB□(JB/JF)100		ZP2B-XF3(JB/JF)100	
ZP2-XF125HB□(JB/JF)25	ZP125HB□	ZP2B-XF3(JB/JF)25	With four M5 bolts
ZP2-XF125HB□(JB/JF)50		ZP2B-XF3(JB/JF)50	
ZP2-XF125HB□(JB/JF)75		ZP2B-XF3(JB/JF)75	
ZP2-XF125HB□(JB/JF)100		ZP2B-XF3(JB/JF)100	

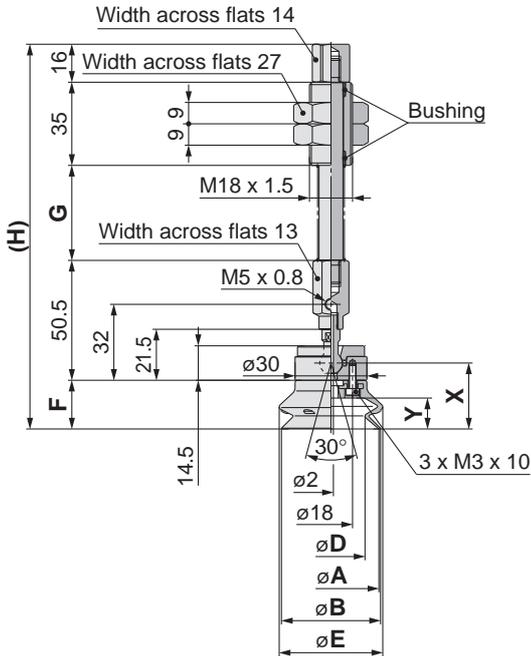
* □ in the table indicates the pad material

Buffer Specifications

Pad diameter		ø40, ø50	ø63, ø80, ø100, ø125
Stroke [mm]		25, 50, 75	25, 50, 75, 100
Spring reactive force [N]	At 0 stroke	6.9	10
	At full stroke	11.8	15
Buffer specifications	JB	Rotating With bushing Buffer body material: Brass	
		Nut tightening torque: 28 to 32 N·m	Nut tightening torque: 45 to 50 N·m
	JF	Rotating With bushing Buffer body material: Structural steel	
		Nut tightening torque: 48 to 52 N·m	Nut tightening torque: 75 to 80 N·m

Dimensions: With Buffer

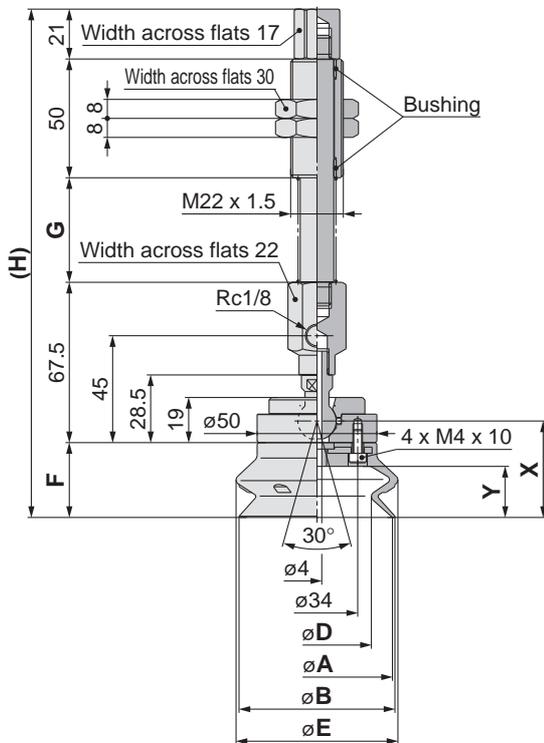
ZP2-XF⁴⁰₅₀HB □ JB/JF ■



Dimensions

Model	A	B	D	E	F	G	H	X	Y
ZP2-XF40HB□(JB/JF)25	40	41.4	28.3	42.3	20.5	40	162	27.8	13
ZP2-XF40HB□(JB/JF)50						75	197		
ZP2-XF40HB□(JB/JF)75	50	52	36.2	52.7	24	111	233	31.3	16.5
ZP2-XF50HB□(JB/JF)25						40	165.5		
ZP2-XF50HB□(JB/JF)50						75	200.5		
ZP2-XF50HB□(JB/JF)75						111	236.5		

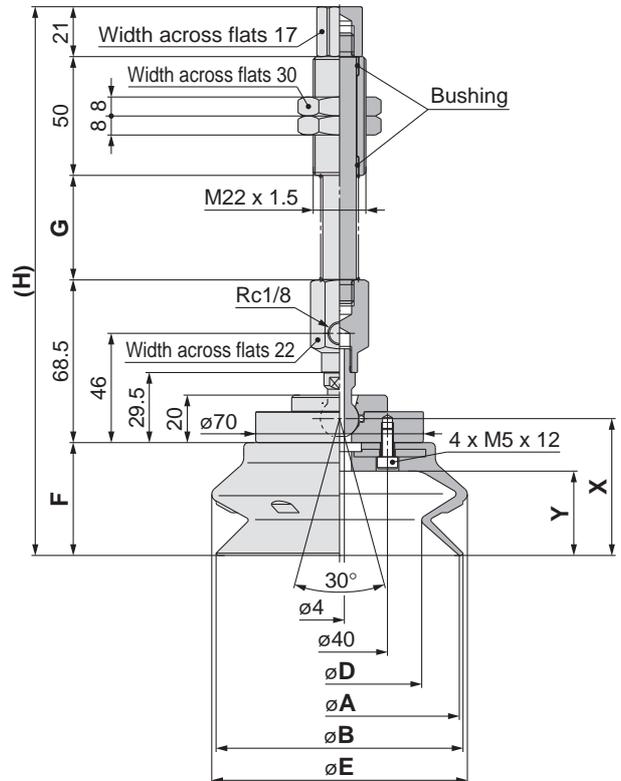
ZP2-XF⁶³₈₀HB □ JB/JF ■



Dimensions

Model	A	B	D	E	F	G	H	X	Y
ZP2-XF63HB□(JB/JF)25	63	65.1	46	66.4	31.5	44	214	40.6	21.5
ZP2-XF63HB□(JB/JF)50						80	250		
ZP2-XF63HB□(JB/JF)75						120	290		
ZP2-XF63HB□(JB/JF)100	80	82.8	60.1	83.8	37	155	325	46.1	27.5
ZP2-XF80HB□(JB/JF)25						44	219.5		
ZP2-XF80HB□(JB/JF)50						80	255.5		
ZP2-XF80HB□(JB/JF)75						120	295.5		
ZP2-XF80HB□(JB/JF)100						155	330.5		

ZP2-XF¹⁰⁰₁₂₅HB □ JB/JF ■



Dimensions

Model	A	B	D	E	F	G	H	X	Y
ZP2-XF100HB□(JB/JF)25	100	103	72.5	103.9	47.5	44	231	57.6	35.5
ZP2-XF100HB□(JB/JF)50						80	267		
ZP2-XF100HB□(JB/JF)75						120	307		
ZP2-XF100HB□(JB/JF)100	125	128.5	92.2	131.6	56	155	342	66.1	44
ZP2-XF125HB□(JB/JF)25						44	239.5		
ZP2-XF125HB□(JB/JF)50						80	275.5		
ZP2-XF125HB□(JB/JF)75						120	315.5		
ZP2-XF125HB□(JB/JF)100						155	350.5		

High Rigidity Pad

Symbol/Form

H: High rigidity
(Flat type with ribs)
HB: High rigidity
(Bellows type)

Pad diameter $\varnothing 40, \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100, \varnothing 125$

■ Reinforced pad prevents deformation when transferring heavy or large workpieces.

How to Order



Pad unit **ZP 40 H N**

Symbol	Pad diameter
40	$\varnothing 40$
50	$\varnothing 50$
63	$\varnothing 63$
80	$\varnothing 80$
100	$\varnothing 100$
125	$\varnothing 125$

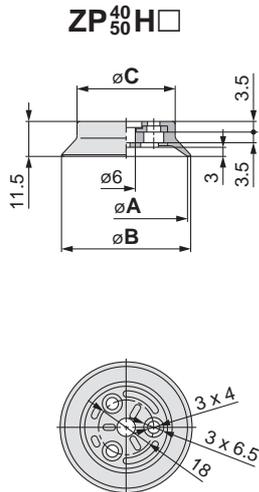
Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Pad form

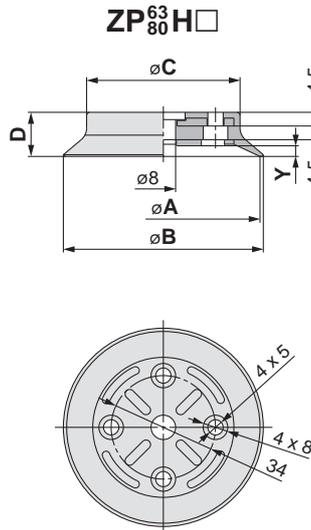
Symbol	Form
H	High rigidity (Flat type with ribs)
HB	High rigidity (Bellows type)

Dimensions: Pad Unit



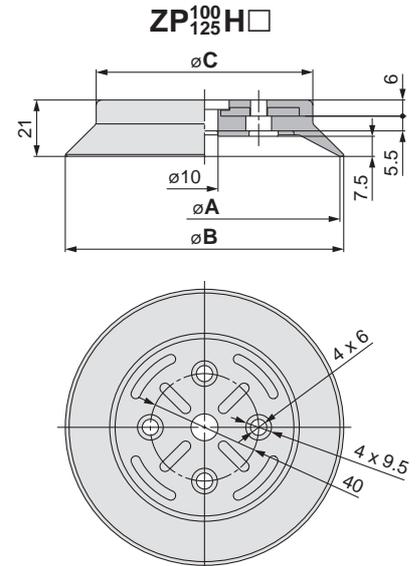
Dimensions

Model	A	B	C
ZP40H□	40	42.1	32
ZP50H□	50	52.1	42



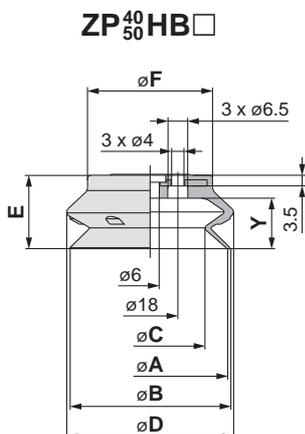
Dimensions

Model	A	B	C	D	Y
ZP63H□	63	65.2	50	14.5	3.5
ZP80H□	80	82.1	61	16.5	4.5



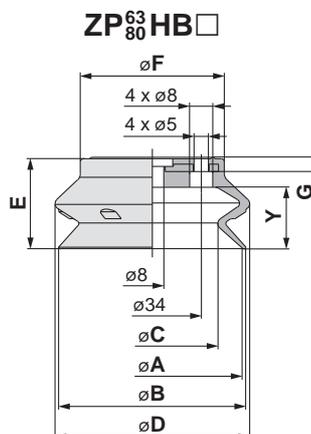
Dimensions

Model	A	B	C
ZP100H□	100	102.8	80
ZP125H□	125	127.7	104



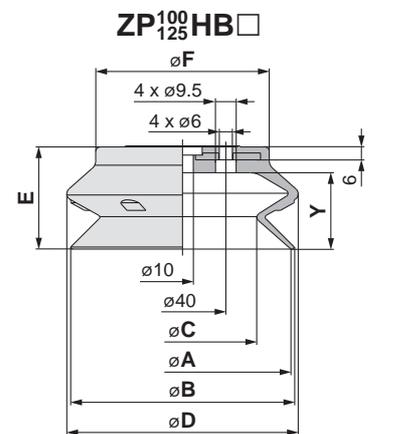
Dimensions

Model	A	B	C	D	E	F	Y
ZP40HB□	40	41.4	28.3	42.3	20.5	30	13
ZP50HB□	50	52	36.2	52.7	24	40.5	16.5



Dimensions

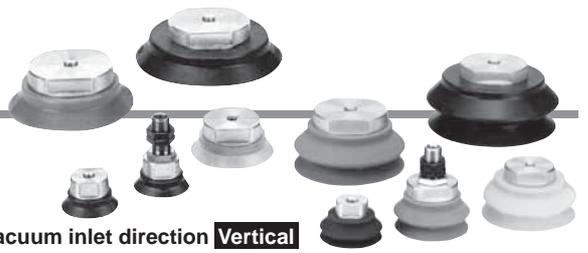
Model	A	B	C	D	E	F	G	Y
ZP63HB□	63	65.1	46	66.4	31.5	50	4.5	21.5
ZP80HB□	80	82.8	60.1	83.8	37	64	5	27.5



Dimensions

Model	A	B	C	D	E	F	Y
ZP100HB□	100	103	72.5	103.9	47.5	80	35.5
ZP125HB□	125	128.5	92.2	131.6	56	105	44

How to Order



With adapter **ZPT 40 H N - A14**

Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

Pad form (*)

Symbol	Form
H	High rigidity (Flat type with ribs)
HB	High rigidity (Bellows type)

Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

Mounting thread size (Vacuum inlet)

Mounting	Thread size	Symbol	Thread size	Pad diameter		
				ø40, ø50	ø63, ø80	ø100, ø125
Male thread	M14 x 1	A14	Rc1/8	●	—	—
		A14N	NPT1/8	●	—	—
		A14T	NPTF1/8	●	—	—
	M16 x 1.5	A16	Rc1/8	—	●	●
		A16N	NPT1/8	—	●	●
		A16T	NPTF1/8	—	●	●
Female thread	M8 x 1.25	B8	M8 x 1.25	●	●	—
		B10	M10 x 1.5	●	●	—
	M12 x 1.75	B12	M12 x 1.75	—	●	●
		B16	M16 x 1.5	—	●	●

Vacuum inlet direction **Vertical**

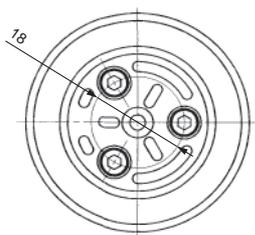
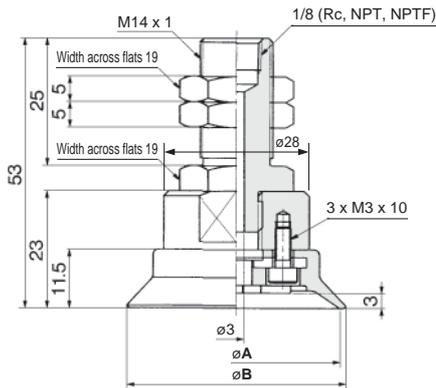
Replacement Part Nos.

Model	Pad unit part no.	Adapter assembly part no.	Model	Pad unit part no.	Adapter assembly part no.
ZPT40*□-A14		ZPA-T1-B01	ZPT40*□-B8	ZP40*□	ZPA-T1-B8
ZPT40*□-A14N	ZP40*□	ZPA-T1-N01	ZPT40*□-B10		ZPA-T1-B10
ZPT40*□-A14T		ZPA-T1-T01	ZPT50*□-B8	ZP50*□	ZPA-T1-B8
ZPT50*□-A14		ZPA-T1-N01	ZPT50*□-B10		ZPA-T1-B10
ZPT50*□-A14N	ZP50*□	ZPA-T1-T01	ZPT63*□-B8		ZPA-T2-B8
ZPT50*□-A14T		ZPA-T1-N01	ZPT63*□-B10	ZP63*□	ZPA-T2-B10
ZPT63*□-A16		ZPA-T2-B01	ZPT63*□-B12		ZPA-T2-B12
ZPT63*□-A16N	ZP63*□	ZPA-T2-N01	ZPT63*□-B16		ZPA-T2-B16
ZPT63*□-A16T		ZPA-T2-T01	ZPT80*□-B8		ZPA-T2-B8
ZPT80*□-A16		ZPA-T2-B01	ZPT80*□-B10	ZP80*□	ZPA-T2-B10
ZPT80*□-A16N	ZP80*□	ZPA-T2-N01	ZPT80*□-B12		ZPA-T2-B12
ZPT80*□-A16T		ZPA-T2-T01	ZPT80*□-B16		ZPA-T2-B16
ZPT100*□-A16		ZPA-T3-B01	ZPT100*□-B12	ZP100*□	ZPA-T3-B12
ZPT100*□-A16N	ZP100*□	ZPA-T3-N01	ZPT100*□-B16		ZPA-T3-B16
ZPT100*□-A16T		ZPA-T3-T01	ZPT125*□-B12	ZP125*□	ZPA-T3-B12
ZPT125*□-A16		ZPA-T3-B01	ZPT125*□-B16		ZPA-T3-B16
ZPT125*□-A16N	ZP125*□	ZPA-T3-N01			
ZPT125*□-A16T		ZPA-T3-T01			

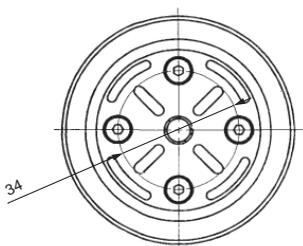
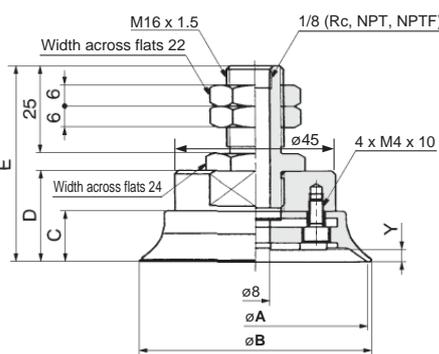
* in the table indicates the pad form
 □ in the table indicates the pad material

Dimensions: With Adapter

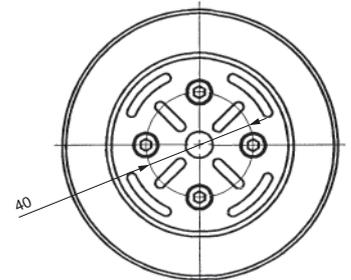
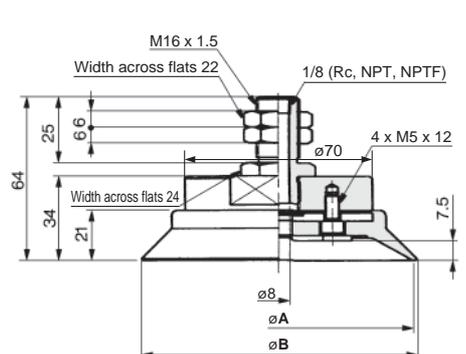
ZPT 40⁵⁰H□-A14 (Male thread)



ZPT 63⁸⁰H□-A16 (Male thread)



ZPT 100¹²⁵H□-A16 (Male thread)



Dimensions

Model	A	B
ZPT40H□-A14	40	42.1
ZPT50H□-A14	50	52.1

Dimensions

Model	A	B	C	D	E	Y
ZPT63H□-A16	63	65.2	14.5	26	56	3.5
ZPT80H□-A16	80	82.1	16.5	28	58	4.5

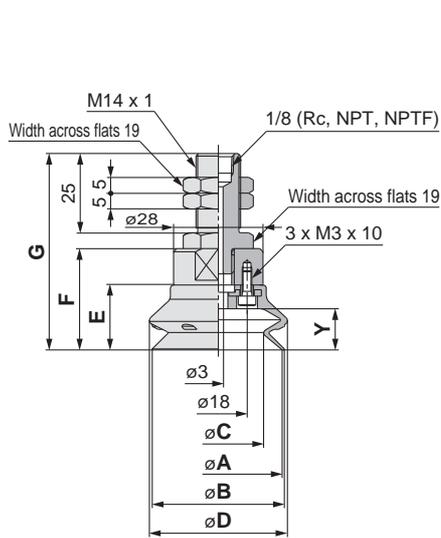
Dimensions

Model	A	B
ZPT100H□-A16	100	102.8
ZPT125H□-A16	125	127.7

High Rigidity Pad **ZP Series**

Dimensions: With Adapter

ZPT₄₀⁵⁰HB□-A14 (Male thread)

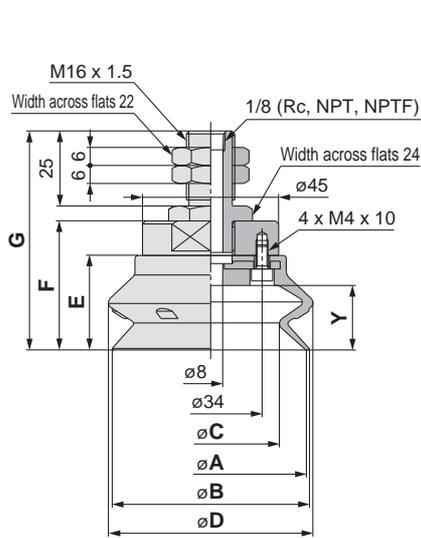


Dimensions

Model	A	B	C	D
ZPT40HB□-A14	40	41.4	28.3	42.3
ZPT50HB□-A14	50	52	36.2	52.7

Model	E	F	G	Y
ZPT40HB□-A14	20.5	32	62	13
ZPT50HB□-A14	24	35.5	65.5	16.5

ZPT₆₃⁸⁰HB□-A16 (Male thread)

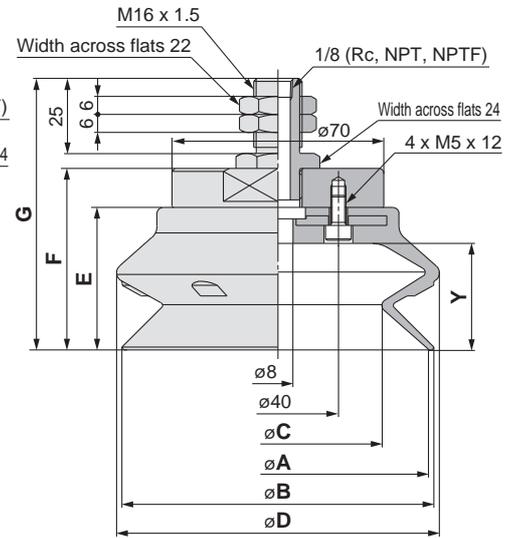


Dimensions

Model	A	B	C	D
ZPT63HB□-A16	63	65.1	46	66.4
ZPT80HB□-A16	80	82.8	60.1	83.8

Model	E	F	G	Y
ZPT63HB□-A16	31.5	43	73	21.5
ZPT80HB□-A16	37	48.5	78.5	27.5

ZPT₁₀₀¹²⁵HB□-A16 (Male thread)

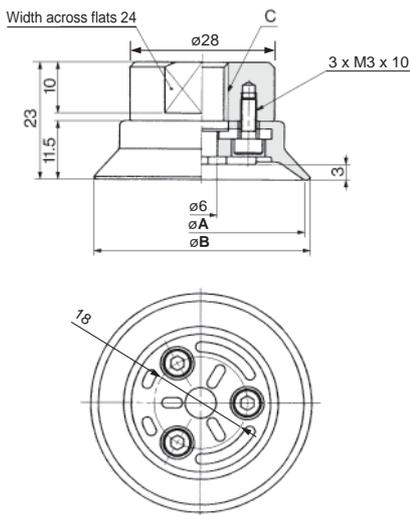


Dimensions

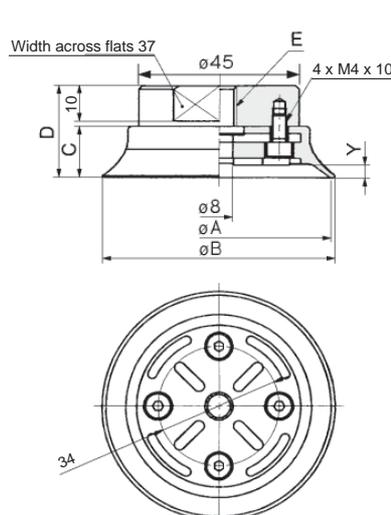
Model	A	B	C	D
ZPT100HB□-A16	100	103	72.5	103.9
ZPT125HB□-A16	125	128.5	92.2	131.6

Model	E	F	G	Y
ZPT100HB□-A16	47.5	60.5	90.5	35.5
ZPT125HB□-A16	56	69	99	44

ZPT₄₀⁵⁰H□-B□ (Female thread)



ZPT₆₃⁸⁰H□-B□ (Female thread)



Dimensions

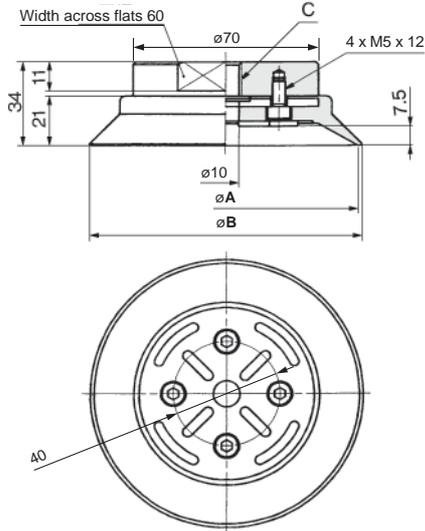
Model	A	B	C
ZPT40H□-B8	40	42.1	M8 x 1.25
ZPT40H□-B10			M10 x 1.5
ZPT50H□-B8	50	52.1	M8 x 1.25
ZPT50H□-B10			M10 x 1.5

Dimensions

Model	A	B	C	D	E	Y
ZPT63H□-B8	63	65.2	14.5	26	M8 x 1.25	3.5
ZPT63H□-B10					M10 x 1.5	
ZPT63H□-B12					M12 x 1.75	
ZPT63H□-B16	80	82.1	16.5	28	M16 x 1.5	4.5
ZPT80H□-B8					M8 x 1.25	
ZPT80H□-B10					M10 x 1.5	
ZPT80H□-B12					M12 x 1.75	
ZPT80H□-B16					M16 x 1.5	

Dimensions: With Adapter

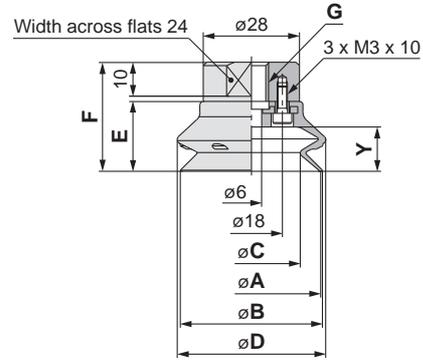
ZPT¹⁰⁰₁₂₅H□-B□ (Female thread)



Dimensions

Model	A	B	C
ZPT100H□-B12	100	102.8	M12 x 1.75
ZPT100H□-B16			M16 x 1.5
ZPT125H□-B12	125	127.7	M12 x 1.75
ZPT125H□-B16			M16 x 1.5

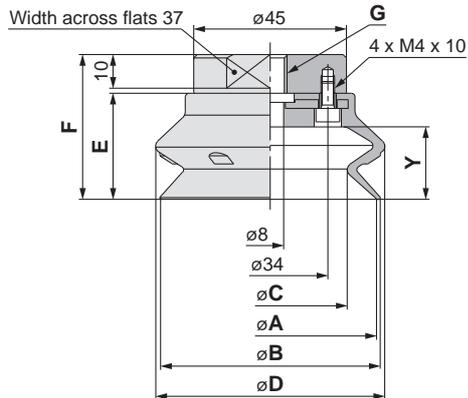
ZPT⁴⁰₅₀HB□-B□ (Female thread)



Dimensions

Model	A	B	C	D	E	F	G	Y
ZPT40HB□-B8	40	41.4	28.3	42.3	20.5	32	M8 x 1.25	13
ZPT40HB□-B10							M10 x 1.5	
ZPT50HB□-B8	50	52	36.2	52.7	24	35.5	M8 x 1.25	16.5
ZPT50HB□-B10							M10 x 1.5	

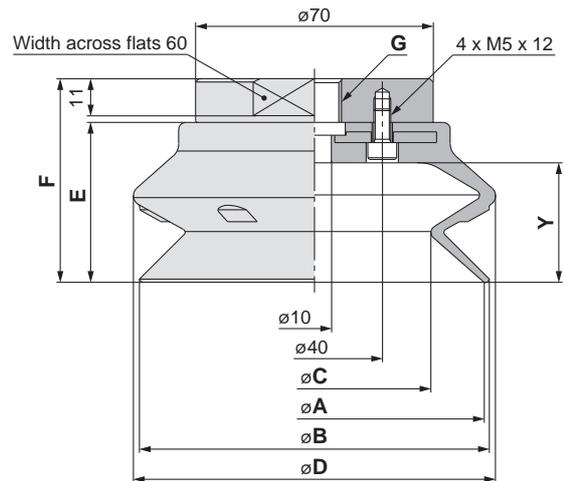
ZPT⁶³₈₀HB□-B□ (Female thread)



Dimensions

Model	A	B	C	D	E	F	G	Y
ZPT63HB□-B8	63	65.1	46	66.4	31.5	43	M8 x 1.25	21.5
ZPT63HB□-B10							M10 x 1.5	
ZPT63HB□-B12							M12 x 1.75	
ZPT63HB□-B16							M16 x 1.5	
ZPT80HB□-B8	80	82.8	60.1	83.8	37	48.5	M8 x 1.25	27.5
ZPT80HB□-B10							M10 x 1.5	
ZPT80HB□-B12							M12 x 1.75	
ZPT80HB□-B16							M16 x 1.5	

ZPT¹⁰⁰₁₂₅HB□-B□ (Female thread)



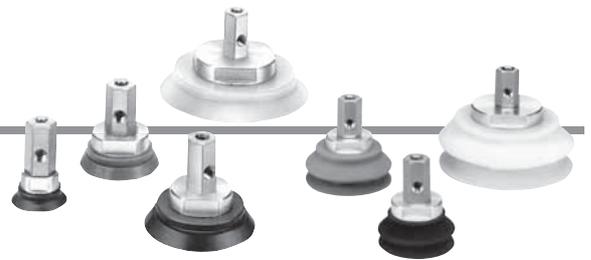
Dimensions

Model	A	B	C	D	E	F	G	Y
ZPT100HB□-B12	100	103	72.5	103.9	47.5	60.5	M12 x 1.75	35.5
ZPT100HB□-B16							M16 x 1.5	
ZPT125HB□-B12	125	128.5	92.2	131.6	56	69	M12 x 1.75	44
ZPT125HB□-B16							M16 x 1.5	

High Rigidity Pad **ZP Series**

How to Order

With adapter **ZPX 40 H N - B01 - B8**



Vacuum inlet direction **Lateral**

Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

Pad form (*)

Symbol	Form
H	High rigidity (Flat type with ribs)
HB	High rigidity (Bellows type)

Vacuum inlet thread size

Symbol	Thread size
B01	Rc1/8
N01	NPT1/8
T01	NPTF1/8

Mounting thread size

Symbol	Thread size	Pad diameter			
		ø40, ø50	ø63, ø80	ø100, ø125	
B8	M8 x 1.25	●	—	—	
B10	M10 x 1.5	●	●	●	
B12	M12 x 1.75	—	●	●	

Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21 CFR§177.2600 for "Rubber articles intended for repeated use"

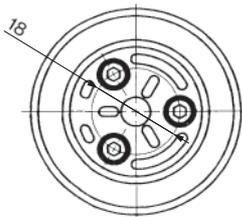
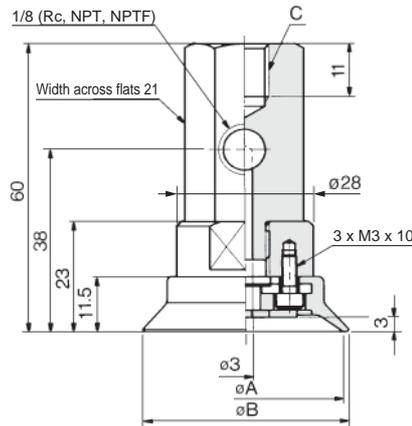
Replacement Part Nos.

Model	Pad unit part no.	Adapter assembly part no.	Model	Pad unit part no.	Adapter assembly part no.
ZPX40*□-B01-B8	ZP40*□	ZPA-X1-B01-B8	ZPX80*□-B01-B10	ZP80*□	ZPA-X2-B01-B10
ZPX40*□-N01-B8		ZPA-X1-N01-B8	ZPX80*□-N01-B10		ZPA-X2-N01-B10
ZPX40*□-T01-B8		ZPA-X1-T01-B8	ZPX80*□-T01-B10		ZPA-X2-T01-B10
ZPX40*□-B01-B10		ZPA-X1-B01-B10	ZPX80*□-B01-B12		ZPA-X2-B01-B12
ZPX40*□-N01-B10	ZP50*□	ZPA-X1-N01-B10	ZPX80*□-N01-B12	ZP100*□	ZPA-X2-N01-B12
ZPX40*□-T01-B10		ZPA-X1-T01-B10	ZPX80*□-T01-B12		ZPA-X2-T01-B12
ZPX50*□-B01-B8		ZPA-X1-B01-B8	ZPX100*□-B01-B10		ZPA-X3-B01-B10
ZPX50*□-N01-B8		ZPA-X1-N01-B8	ZPX100*□-N01-B10		ZPA-X3-N01-B10
ZPX50*□-T01-B8	ZPA-X1-T01-B8	ZPX100*□-T01-B10	ZPX100*□-B01-B12	ZP125*□	ZPA-X3-T01-B10
ZPX50*□-B01-B10	ZPA-X1-B01-B10	ZPX100*□-B01-B12	ZPA-X3-B01-B12		
ZPX50*□-N01-B10	ZPA-X1-N01-B10	ZPX100*□-N01-B12	ZPA-X3-N01-B12		
ZPX50*□-T01-B10	ZPA-X1-T01-B10	ZPX100*□-T01-B12	ZPA-X3-T01-B12		
ZPX63*□-B01-B10	ZP63*□	ZPA-X2-B01-B10	ZPX125*□-B01-B10	ZP125*□	ZPA-X3-B01-B10
ZPX63*□-N01-B10		ZPA-X2-N01-B10	ZPX125*□-N01-B10		ZPA-X3-N01-B10
ZPX63*□-T01-B10		ZPA-X2-T01-B10	ZPX125*□-T01-B10		ZPA-X3-T01-B10
ZPX63*□-B01-B12		ZPA-X2-B01-B12	ZPX125*□-B01-B12		ZPA-X3-B01-B12
ZPX63*□-N01-B12	ZPA-X2-N01-B12	ZPX125*□-N01-B12	ZPX125*□-T01-B12	ZP125*□	ZPA-X3-N01-B12
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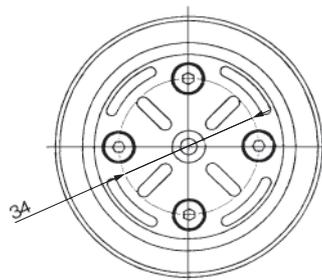
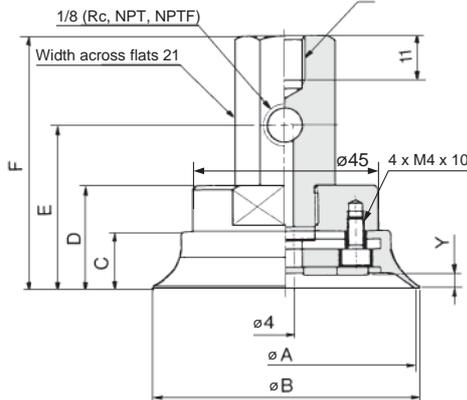
* * in the table indicates the pad form
* □ in the table indicates the pad material

Dimensions: With Adapter

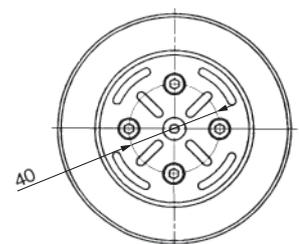
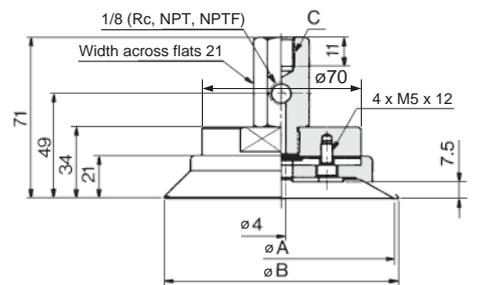
ZPX₅₀⁴⁰H□-□01-B₁₀^{B8}



ZPX₈₀⁶³H□-□01-B₁₂^{B10}



ZPX₁₂₅¹⁰⁰H□-□01-B₁₂^{B10}



Dimensions

Model	A	B	C
ZPX40H□-□01-B8	40	42.1	M8 x 1.25
ZPX40H□-□01-B10			M10 x 1.5
ZPX50H□-□01-B8	50	52.1	M8 x 1.25
ZPX50H□-□01-B10			M10 x 1.5

Dimensions

Model	A	B	C	D	E	F	Y	G
ZPX63H□-□01-B10	63	65.2	14.5	26	41	63	3.5	M10 x 1.5
ZPX63H□-□01-B12								M12 x 1.75
ZPX80H□-□01-B10	80	82.1	16.5	28	43	65	4.5	M10 x 1.5
ZPX80H□-□01-B12								M12 x 1.75

Dimensions

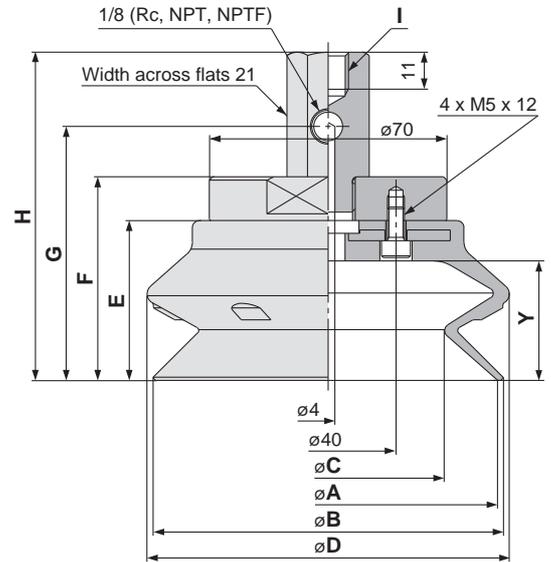
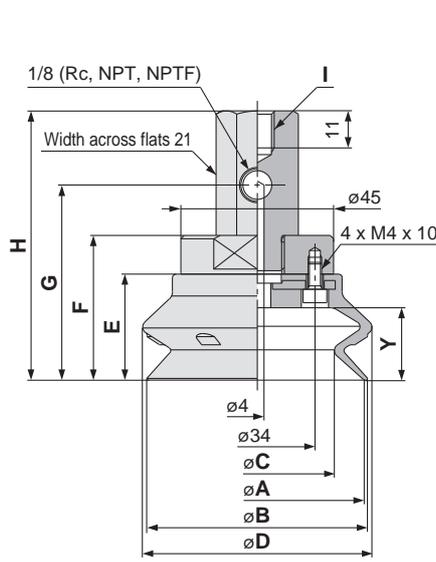
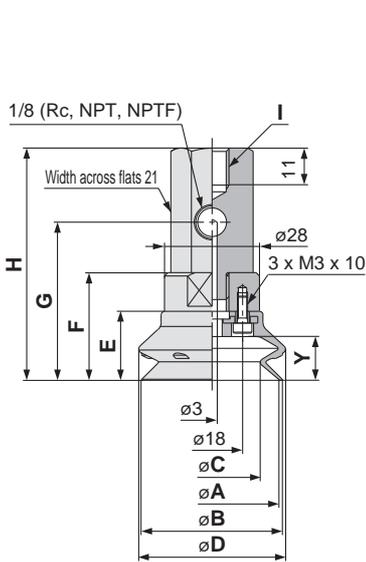
Model	A	B	C
ZPX100H□-□01-B10	100	102.8	M10 x 1.5
ZPX100H□-□01-B12			M12 x 1.75
ZPX125H□-□01-B10	125	127.7	M10 x 1.5
ZPX125H□-□01-B12			M12 x 1.75

Dimensions: With Adapter

ZPX₅₀⁴⁰HB□-□01-B_{B8}

ZPX₈₀⁶³HB□-□01-B_{B10}

ZPX₁₂₅¹⁰⁰HB□-□01-B_{B12}



Made to Order

ZP2V

XT661

MHM

Dimensions

Model	A	B	C	D	E	F
ZPX40HB□-□01-B8	40	41.4	28.3	42.3	20.5	32
ZPX40HB□-□01-B10						
ZPX50HB□-□01-B8	50	52	36.2	52.7	24	35.5
ZPX50HB□-□01-B10						

Model	G	H	I	Y
ZPX40HB□-□01-B8	47	69	M8 x 1.25	13
ZPX40HB□-□01-B10			M10 x 1.5	
ZPX50HB□-□01-B8	50.5	72.5	M8 x 1.25	16.5
ZPX50HB□-□01-B10			M10 x 1.5	

Dimensions

Model	A	B	C	D	E	F
ZPX63HB□-□01-B10	63	65.1	46	66.4	31.5	43
ZPX63HB□-□01-B12						
ZPX80HB□-□01-B10	80	82.8	60.1	83.8	37	48.5
ZPX80HB□-□01-B12						

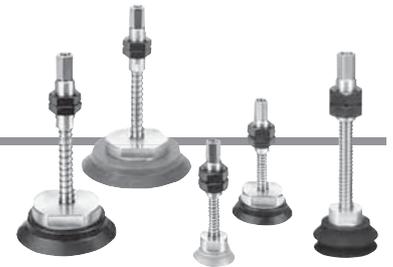
Model	G	H	I	Y
ZPX63HB□-□01-B10	58	80	M10 x 1.5	21.5
ZPX63HB□-□01-B12			M12 x 1.75	
ZPX80HB□-□01-B10	63.5	85.5	M10 x 1.5	27.5
ZPX80HB□-□01-B12			M12 x 1.75	

Dimensions

Model	A	B	C	D	E	F
ZPX100HB□-□01-B10	100	103	72.5	103.9	47.5	60.5
ZPX100HB□-□01-B12						
ZPX125HB□-□01-B10	125	128.5	92.2	131.6	56	69
ZPX125HB□-□01-B12						

Model	G	H	I	Y
ZPX100HB□-□01-B10	75.5	97.5	M10 x 1.5	35.5
ZPX100HB□-□01-B12			M12 x 1.75	
ZPX125HB□-□01-B10	84	106	M10 x 1.5	44
ZPX125HB□-□01-B12			M12 x 1.75	

How to Order



Vacuum inlet direction **Vertical**

With buffer **ZPT 40 H N J 25 - B01 - A18**

Pad diameter

Symbol	Pad diameter
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	ø125

Pad form (*)

Symbol	Form
H	High rigidity (Flat type with ribs)
HB	High rigidity (Bellows type)

Vacuum inlet thread size

Symbol	Thread size
B01	Rc1/8
N01	NPT1/8
T01	NPTF1/8

Mounting thread size

Symbol	Thread size
A18	M18 x 1.5 (ø40 to ø80)
A22	M22 x 1.5 (ø100, ø125)

Pad material (□)

Symbol	Material
N	NBR
S	Silicone rubber*1
U	Urethane rubber
F	FKM
E	EPR

Buffer body material (★)

Symbol	Material
J	Aluminum alloy
JB	Brass + With bushing
JF	Structural steel + With bushing

Buffer stroke (■)

Stroke	ø40	ø50	ø63	ø80	ø100	ø125
25	●	●	●	●	●	●
50	●	●	●	●	●	●
75	●	●	●	●	●	●
100	—	—	—	—	●	●

*1 Compliant with the FDA (USA Food and Drug Administration) regulation 21CFR§177.2600 for "Rubber articles intended for repeated use"

Buffer Specifications (Rotating)

Pad diameter		ø40 to ø80	ø100, ø125
Stroke [mm]		25, 50, 75	25, 50, 75, 100
Spring reactive force [N]	At 0 stroke	6.9	10
	At full stroke	11.8	15

Nut Tightening Torque [N·m]

Mounting thread size	Buffer body material		
	Aluminum alloy	Brass + With bushing	Structural steel + With bushing
M18 x 1.5	9.5 to 10.5	28 to 32	48 to 52
M22 x 1.5	9.5 to 10.5	45 to 50	75 to 80

Replacement Part Nos.

Model	Pad unit part no.	Buffer assembly part no.	
ZPT40*□★25-(B/N/T)01-A18	ZP40*□	ZPB-T1★25-(B/N/T)01	With three M3 bolts
ZPT40*□★50-(B/N/T)01-A18		ZPB-T1★50-(B/N/T)01	
ZPT40*□★75-(B/N/T)01-A18		ZPB-T1★75-(B/N/T)01	
ZPT50*□★25-(B/N/T)01-A18	ZP50*□	ZPB-T1★25-(B/N/T)01	With three M3 bolts
ZPT50*□★50-(B/N/T)01-A18		ZPB-T1★50-(B/N/T)01	
ZPT50*□★75-(B/N/T)01-A18		ZPB-T1★75-(B/N/T)01	
ZPT63*□★25-(B/N/T)01-A18	ZP63*□	ZPB-T2★25-(B/N/T)01	With four M4 bolts
ZPT63*□★50-(B/N/T)01-A18		ZPB-T2★50-(B/N/T)01	
ZPT63*□★75-(B/N/T)01-A18		ZPB-T2★75-(B/N/T)01	
ZPT80*□★25-(B/N/T)01-A18	ZP80*□	ZPB-T2★25-(B/N/T)01	With four M4 bolts
ZPT80*□★50-(B/N/T)01-A18		ZPB-T2★50-(B/N/T)01	
ZPT80*□★75-(B/N/T)01-A18		ZPB-T2★75-(B/N/T)01	
ZPT100*□★25-(B/N/T)01-A22	ZP100*□	ZPB-T3★25-(B/N/T)01	With four M5 bolts
ZPT100*□★50-(B/N/T)01-A22		ZPB-T3★50-(B/N/T)01	
ZPT100*□★75-(B/N/T)01-A22		ZPB-T3★75-(B/N/T)01	
ZPT100*□★100-(B/N/T)01-A22	ZP100*□	ZPB-T3★100-(B/N/T)01	With four M5 bolts
ZPT125*□★25-(B/N/T)01-A22		ZPB-T3★25-(B/N/T)01	
ZPT125*□★50-(B/N/T)01-A22		ZPB-T3★50-(B/N/T)01	
ZPT125*□★75-(B/N/T)01-A22	ZP125*□	ZPB-T3★75-(B/N/T)01	With four M5 bolts
ZPT125*□★100-(B/N/T)01-A22		ZPB-T3★100-(B/N/T)01	

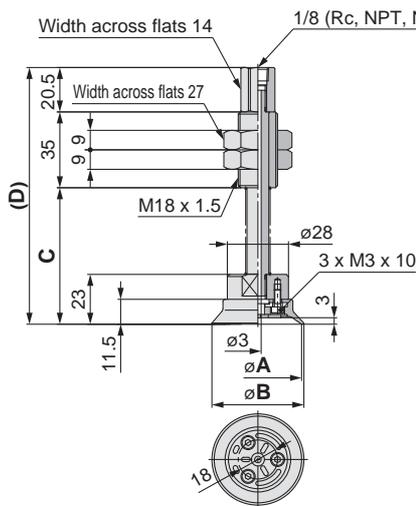
* * in the table indicates the pad form

□ in the table indicates the pad material

★ in the table indicates the buffer body material

Dimensions: With Buffer

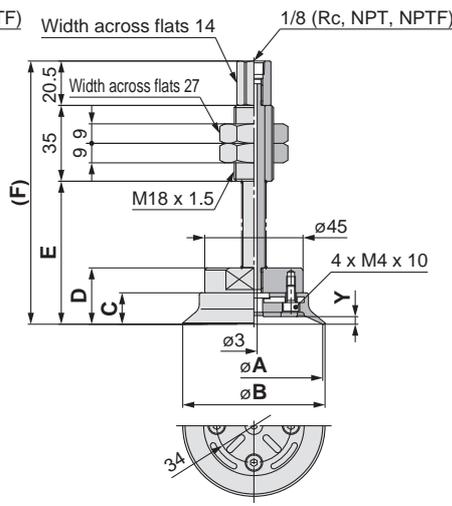
ZPT₅₀⁴⁰H□★■-□01-A18



Dimensions

Model	A	B	C	D
ZPT40H□★25-□01-A18		63	118.5	
ZPT40H□★50-□01-A18	40	42.1	98	153.5
ZPT40H□★75-□01-A18		134	189.5	
ZPT50H□★25-□01-A18		63	118.5	
ZPT50H□★50-□01-A18	50	52.1	98	153.5
ZPT50H□★75-□01-A18		134	189.5	

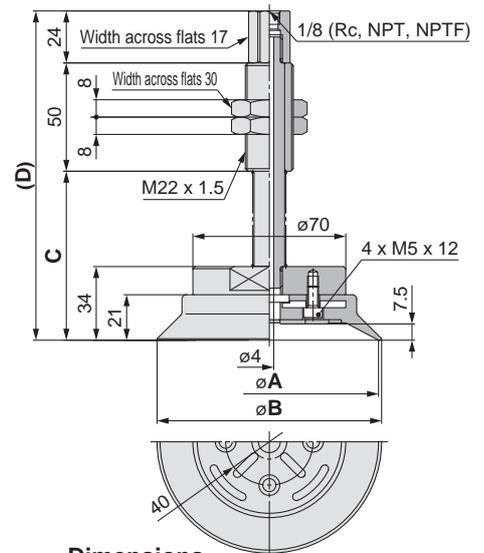
ZPT₈₀⁶³H□★■-□01-A18



Dimensions

Model	A	B	C	D	E	F	Y
ZPT63H□★25-□01-A18		66	121.5				
ZPT63H□★50-□01-A18	63	65.2	14.5	26	101	156.5	3.5
ZPT63H□★75-□01-A18		137	192.5				
ZPT80H□★25-□01-A18		68	123.5				
ZPT80H□★50-□01-A18	80	82.1	16.5	28	103	158.5	4.5
ZPT80H□★75-□01-A18		139	194.5				

ZPT₁₂₅¹⁰⁰H□★■-□01-A22

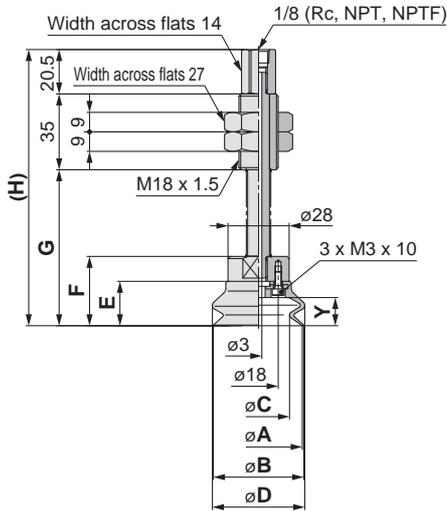


Dimensions

Model	A	B	C	D
ZPT100H□★25-□01-A22			78	152
ZPT100H□★50-□01-A22	100	102.8	114	188
ZPT100H□★75-□01-A22			154	228
ZPT100H□★100-□01-A22			189	263
ZPT125H□★25-□01-A22			78	152
ZPT125H□★50-□01-A22	125	127.7	114	188
ZPT125H□★75-□01-A22			154	228
ZPT125H□★100-□01-A22			189	263

Dimensions: With Buffer

ZPT₅₀⁴⁰HB \square \star \blacksquare \square **01-A18**

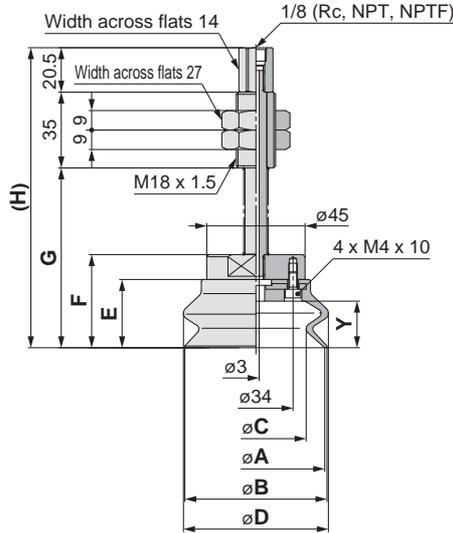


Dimensions

Model	A	B	C	D	E
ZPT40HB \square \star 25- \square 01-A18					
ZPT40HB \square \star 50- \square 01-A18	40	41.4	28.3	42.3	20.5
ZPT40HB \square \star 75- \square 01-A18					
ZPT50HB \square \star 25- \square 01-A18					
ZPT50HB \square \star 50- \square 01-A18	50	52	36.2	52.7	24
ZPT50HB \square \star 75- \square 01-A18					

Model	F	G	H	Y
ZPT40HB \square \star 25- \square 01-A18		72	127.5	
ZPT40HB \square \star 50- \square 01-A18	32	107	162.5	13
ZPT40HB \square \star 75- \square 01-A18		143	198.5	
ZPT50HB \square \star 25- \square 01-A18		75.5	131	
ZPT50HB \square \star 50- \square 01-A18	35.5	110.5	166	16.5
ZPT50HB \square \star 75- \square 01-A18		146.5	202	

ZPT₈₀⁶³HB \square \star \blacksquare \square **01-A18**

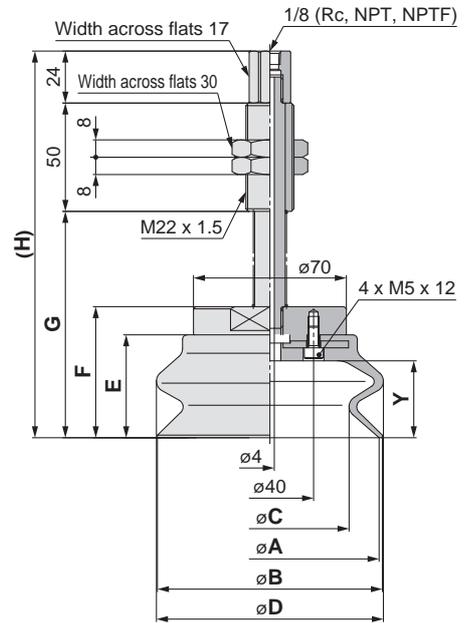


Dimensions

Model	A	B	C	D	E
ZPT63HB \square \star 25- \square 01-A18					
ZPT63HB \square \star 50- \square 01-A18	63	65.1	46	66.4	31.5
ZPT63HB \square \star 75- \square 01-A18					
ZPT80HB \square \star 25- \square 01-A18					
ZPT80HB \square \star 50- \square 01-A18	80	82.8	60.1	83.8	37
ZPT80HB \square \star 75- \square 01-A18					

Model	F	G	H	Y
ZPT63HB \square \star 25- \square 01-A18		83	138.5	
ZPT63HB \square \star 50- \square 01-A18	43	118	173.5	21.5
ZPT63HB \square \star 75- \square 01-A18		154	209.5	
ZPT80HB \square \star 25- \square 01-A18		88.5	144	
ZPT80HB \square \star 50- \square 01-A18	48.5	123.5	179	27.5
ZPT80HB \square \star 75- \square 01-A18		159.5	215	

ZPT₁₂₅¹⁰⁰HB \square \star \blacksquare \square **01-A22**



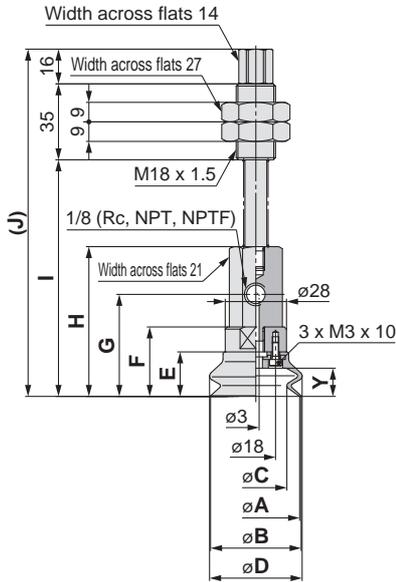
Dimensions

Model	A	B	C	D	E
ZPT100HB \square \star 25- \square 01-A22					
ZPT100HB \square \star 50- \square 01-A22	100	103	72.5	103.9	47.5
ZPT100HB \square \star 75- \square 01-A22					
ZPT100HB \square \star 100- \square 01-A22					
ZPT125HB \square \star 25- \square 01-A22					
ZPT125HB \square \star 50- \square 01-A22	125	128.5	92.2	131.6	56
ZPT125HB \square \star 75- \square 01-A22					
ZPT125HB \square \star 100- \square 01-A22					

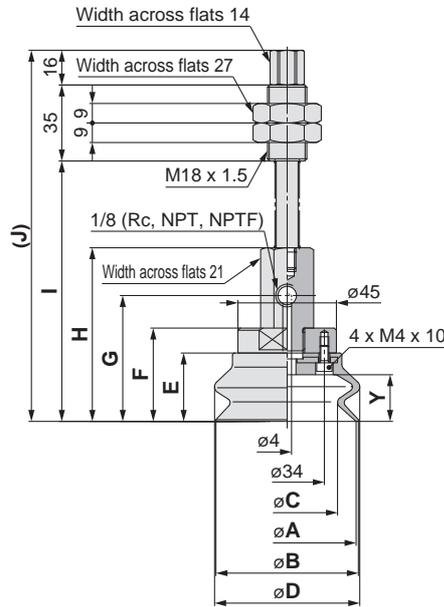
Model	F	G	H	Y
ZPT100HB \square \star 25- \square 01-A22		104.5	178.5	
ZPT100HB \square \star 50- \square 01-A22	60.5	140.5	214.5	35.5
ZPT100HB \square \star 75- \square 01-A22		180.5	254.5	
ZPT100HB \square \star 100- \square 01-A22		215.5	289.5	
ZPT125HB \square \star 25- \square 01-A22		113	187	
ZPT125HB \square \star 50- \square 01-A22	69	149	223	44
ZPT125HB \square \star 75- \square 01-A22		189	263	
ZPT125HB \square \star 100- \square 01-A22		224	298	

Dimensions: With Buffer

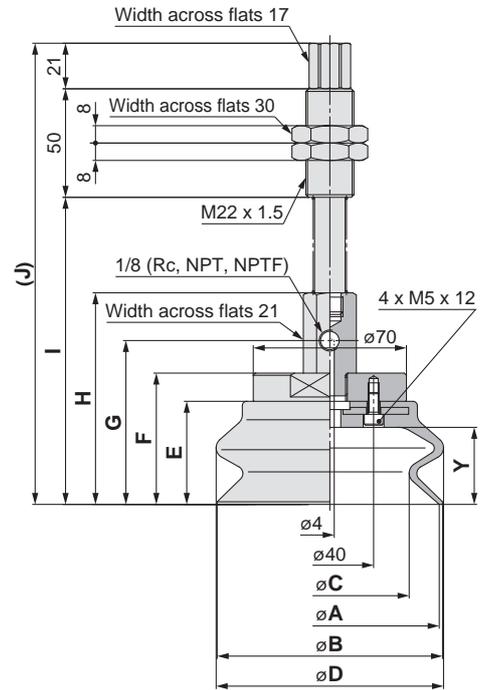
ZPX₅₀⁴⁰HB□★■-□01-A18



ZPX₈₀⁶³HB□★■-□01-A18



ZPX₁₂₅¹⁰⁰HB□★■-□01-A22



Dimensions

Model	A	B	C	D	E	F
ZPX40HB□★25-□01-A18						
ZPX40HB□★50-□01-A18	40	41.4	28.3	42.3	20.5	32
ZPX40HB□★75-□01-A18						
ZPX50HB□★25-□01-A18						
ZPX50HB□★50-□01-A18	50	52	36.2	52.7	24	35.5
ZPX50HB□★75-□01-A18						

Model	G	H	I	J	Y
ZPX40HB□★25-□01-A18			109	160	
ZPX40HB□★50-□01-A18	47	69	144	195	13
ZPX40HB□★75-□01-A18			180	231	
ZPX50HB□★25-□01-A18			112.5	163.5	
ZPX50HB□★50-□01-A18	50.5	72.5	147.5	198.5	16.5
ZPX50HB□★75-□01-A18			183.5	234.5	

Dimensions

Model	A	B	C	D	E	F
ZPX63HB□★25-□01-A18						
ZPX63HB□★50-□01-A18	63	65.1	46	66.4	31.5	43
ZPX63HB□★75-□01-A18						
ZPX80HB□★25-□01-A18						
ZPX80HB□★50-□01-A18	80	82.8	60.1	83.8	37	48.5
ZPX80HB□★75-□01-A18						

Model	G	H	I	J	Y
ZPX63HB□★25-□01-A18			120	171	
ZPX63HB□★50-□01-A18	58	80	155	206	21.5
ZPX63HB□★75-□01-A18			191	242	
ZPX80HB□★25-□01-A18			125.5	176.5	
ZPX80HB□★50-□01-A18	63.5	85.5	160.5	211.5	27.5
ZPX80HB□★75-□01-A18			196.5	247.5	

Dimensions

Model	A	B	C	D	E	F
ZPX100HB□★25-□01-A22						
ZPX100HB□★50-□01-A22	100	103	72.5	103.9	47.5	60.5
ZPX100HB□★75-□01-A22						
ZPX125HB□★25-□01-A22						
ZPX125HB□★50-□01-A22	125	128.5	92.2	131.6	56	69
ZPX125HB□★75-□01-A22						
ZPX125HB□★100-□01-A22						

Model	G	H	I	J	Y
ZPX100HB□★25-□01-A22			141.5	212.5	
ZPX100HB□★50-□01-A22	75.5	97.5	177.5	248.5	35.5
ZPX100HB□★75-□01-A22			217.5	288.5	
ZPX100HB□★100-□01-A22			252.5	323.5	
ZPX125HB□★25-□01-A22			150	221	
ZPX125HB□★50-□01-A22	84	106	186	257	44
ZPX125HB□★75-□01-A22			226	297	
ZPX125HB□★100-□01-A22			261	332	

Made to Order

ZP2V

XT661

MHM

Precautions



Made to Order Specific Product Precautions

Be sure to read this before handling the products.

Refer to page 375 for safety instructions. For vacuum equipment and vacuum pad precautions, refer to pages 376 to 379.

Mounting

1. Tighten the screw within the specified torque range when mounting the buffer.

Tightening with a torque outside of the specified range may cause malfunction.

ZP High Rigidity Series

Model	Connection thread	Buffer body material	Tightening torque [N·m]
ZP□(40 to 80)□J□-□-□	M18 x 1.5	Aluminum alloy	9.5 to 10.5
ZP□(40 to 80)□JB□-□-□		Brass	28 to 32
ZP□(40 to 80)□JF□-□-□		Structural steel	48 to 52
ZP□(100/125)□J□-□-□	M22 x 1.5	Aluminum alloy	9.5 to 10.5
ZP□(100/125)□JB□-□-□		Brass	45 to 50
ZP□(100/125)□JF□-□-□		Structural steel	75 to 80

ZP2 High Rigidity Ball Joint Series

Model	Connection thread	Buffer body material	Tightening torque [N·m]
ZP2-□(40/50)□JB□	M18 x 1.5	Brass	28 to 32
ZP2-□(40/50)□JF□		Structural steel	48 to 52
ZP2-□(63 to 125)□JF□-□-□	M22 x 1.5	Brass	45 to 50
ZP2-□(63 to 125)□JF□-□-□		Structural steel	75 to 80

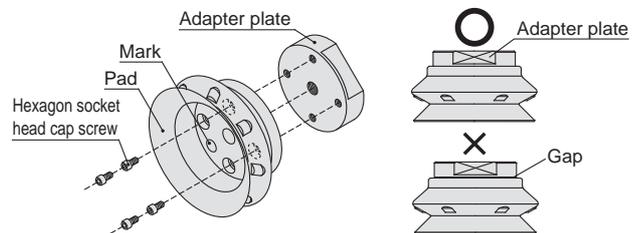
Pad Mounting

1. How to mount the ZP/ZP2 high rigidity pad

Remove bolts with a hex key wrench from the pad underside. Tighten the new pad with the bolts ensuring there is no gap between the adapter plate and the pad.

Tightening Torque for Replacement of High Rigidity Pads

Pad diameter	Connection thread	Tightening torque [N·m]
ø40, ø50	M3 x 8	0.7 to 0.9
ø63, ø80	M4 x 8	0.9 to 1.1
ø100, ø125	M5 x 10	2.3 to 2.7

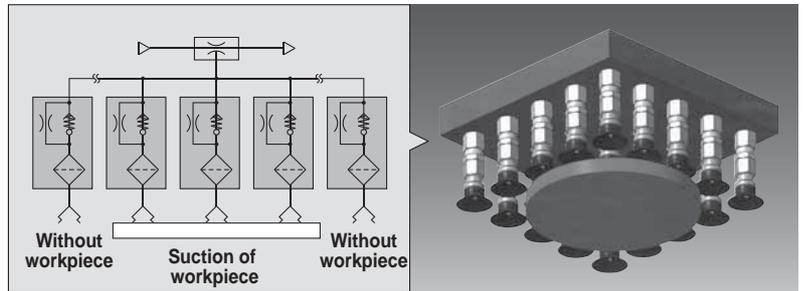


Vacuum Saving Valve ZP2V Series

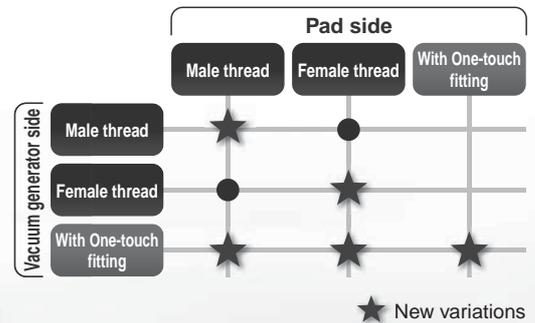
Model Selection

● Can restrict the reduction of vacuum pressure even when there is no workpiece

When multiple vacuum pads are operated by one vacuum generator, and some of them are not holding the workpiece, the reduction of vacuum pressure is restricted and the workpiece can remain held by the rest of pads.



With One-touch fitting type available!



Made to Order

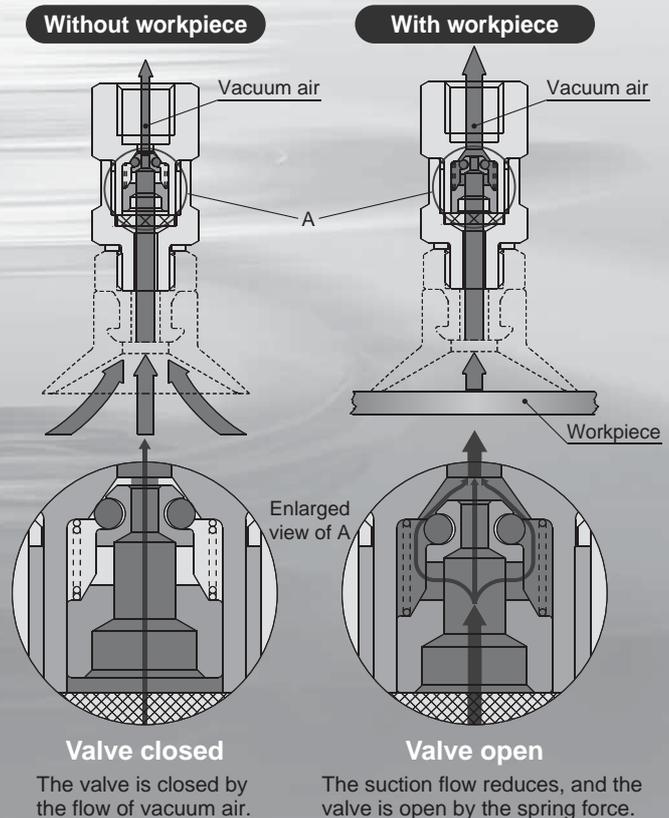
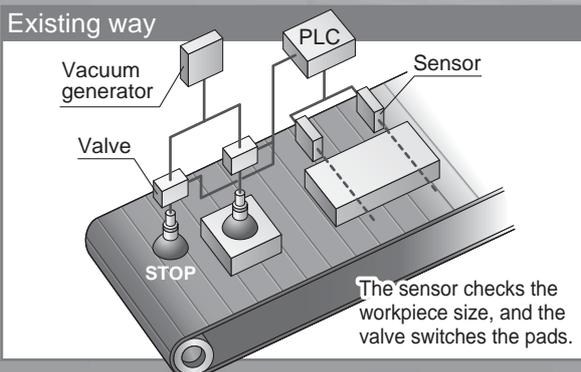
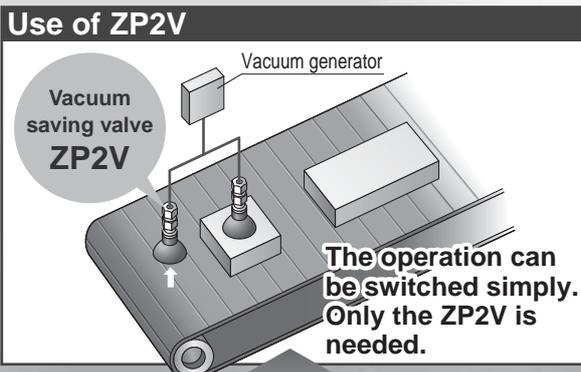
ZP2V

XT661

MHM

● A switching operation is not required when changing workpieces.

When the workpieces have different shapes, the control circuit can be simplified.



Precautions

ZP2V Series Model Selection

Calculate the number of vacuum saving valves that can be used with one vacuum generator.

Selection Conditions

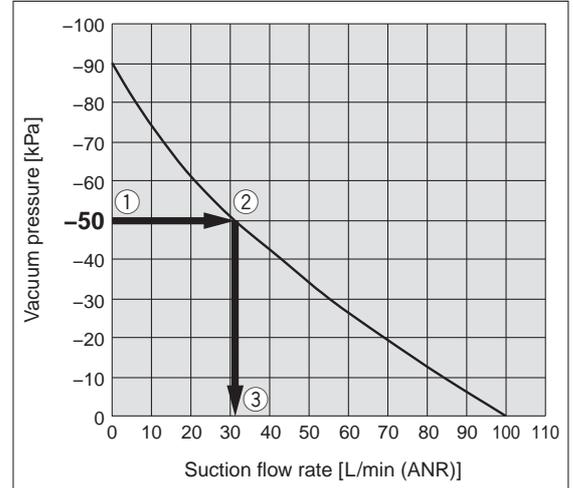
Workpiece: No leakage and several sizes
Required vacuum pressure: -50 kPa or more of vacuum pressure per vacuum pad
Part number of vacuum saving valve used: ZP2V-A8-05
(Connection thread size for pad side: M8, Fixed orifice size: ø0.5)

1 Check the flow rate characteristics of the vacuum generator used.

From the flow rate characteristics of the vacuum generator (Chart 1), calculate the suction flow rate of the vacuum generator (Q1) from the required vacuum pressure.

Vacuum pressure - 50 kPa (① → ② → ③) =
 Suction flow rate (Q1) ≈ 31 L/min (ANR).

Chart 1. Flow Rate Characteristics of Vacuum Generator



2 Calculate the number of vacuum saving valves (N).

Find the minimum operating flow rate (Q2) and the suction flow rate of the vacuum generator (Q1) in the specifications on page 346, and calculate the number of vacuum saving valves (N) that can be used with one vacuum generator.

$$\text{Number of vacuum saving valves (N)} = \frac{\text{Suction flow rate of the vacuum generator (Q1)}}{\text{Minimum operating flow rate (Q2)}}$$

Example) Vacuum saving valve used: ZP2V-A8-05

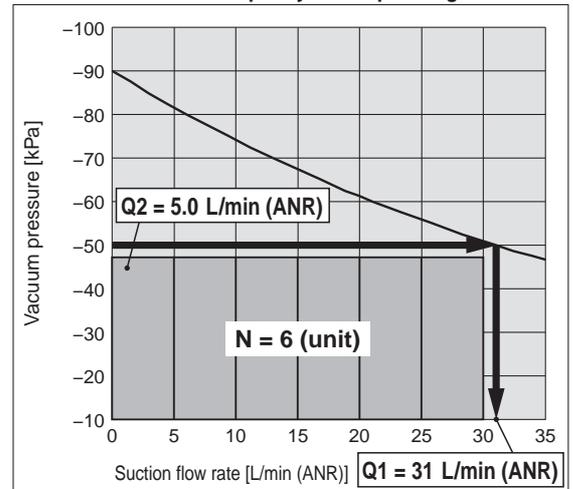
From Table 1, Q2 can be calculated as 5.0 L/min (ANR).

$$N = \frac{31 \{L/min(ANR)\}}{5 \{L/min(ANR)\}} \approx 6 \text{ (unit)}$$

Table 1. Relationship between Minimum Operating Flow Rate and Fixed Orifice Size

Connection thread size for pad side	M8
Fixed orifice size [mm]	0.5
Minimum operating flow rate [L/min (ANR)] Q2	5.0

Chart 2. Selection Example by Min. Operating Flow Rate



The above selection example is based on a general method under the given selection conditions, and may not always be applicable. For vacuum piping, select equipment and piping so that the "Minimum operating flow rate" in the specifications on page 346 is satisfied. A final decision on operating conditions should be made based on test results performed at the responsibility of the customer.

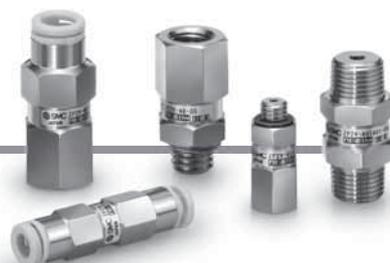
Vacuum Saving Valve

ZP2V Series

Model Selection

How to Order

ZP2V - **A5** - **03**



Connection size (Pad side/Vacuum generator side) •

Male thread/Female thread

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side Female thread
	Male thread	Female thread	0.3	0.5	0.7	1.0	
A5	M5 x 0.8		○	○	○	—	<p>Male thread Pad side</p>
A8	M8 x 1.25		—	○	○	○	
A01	R1/8	Rc1/8	—	○	○	○	
AG1	G1/8		—	○	○	○	
AN1	NPT1/8		—	○	○	○	

• Fixed orifice size

Symbol	Fixed orifice size [mm]
03	0.3
05	0.5
07	0.7
10	1.0

Female thread/Male thread

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side Male thread
	Female thread	Male thread	0.3	0.5	0.7	1.0	
B5	M5 x 0.8		○	○	○	—	<p>Female thread Pad side</p>
B6	M6 x 1		○	○	○	—	
B01	Rc1/8	R1/8	—	○	○	○	
BG1	G1/8		—	○	○	○	
BN1	NPT1/8		—	○	○	○	

Male thread/One-touch fitting

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side One-touch fitting
	Male thread	One-touch fitting	0.3	0.5	0.7	1.0	
A5W4	M5 x 0.8	ø4	○	○	○	—	<p>Male thread Pad side</p>
A01W6	R1/8	ø6	—	○	○	○	
AG1W6	G1/8	ø6	—	○	○	○	

Male thread/Male thread

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side Male thread
	Male thread	Male thread	0.3	0.5	0.7	1.0	
A5A5	M5 x 0.8		○	○	○	—	<p>Male thread Pad side</p>
A01A01	R1/8		—	○	○	○	
AG1AG1	G1/8		—	○	○	○	

Female thread/One-touch fitting

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side One-touch fitting
	Female thread	One-touch fitting	0.3	0.5	0.7	1.0	
B5W4	M5 x 0.8	ø4	○	○	○	—	<p>Female thread Pad side</p>
B01W6	Rc1/8	ø6	—	○	○	○	
BG1W6	G1/8	ø6	—	○	○	○	

Female thread/Female thread

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side Female thread
	Female thread	Female thread	0.3	0.5	0.7	1.0	
B5B5	M5 x 0.8		○	○	○	—	<p>Female thread Pad side</p>
B01B01	Rc1/8		—	○	○	○	
BG1BG1	G1/8		—	○	○	○	

One-touch fitting/One-touch fitting

Symbol	Pad side	Vacuum generator side	Applicable fixed orifice size				Vacuum generator side One-touch fitting
	One-touch fitting	One-touch fitting	0.3	0.5	0.7	1.0	
W4	ø4		○	○	○	—	<p>One-touch fitting Pad side</p>
W6	ø6		—	○	○	○	

Specifications

Connection size for pad side		M5, M6, ø4			M8, R1/8, Rc1/8, G1/8, NPT1/8, ø6		
Fixed orifice size [mm]		0.3	0.5	0.7	0.5	0.7	1.0
Effective area	When the valve is operating [mm ²]	0.07	0.19	0.38	0.19	0.38	0.78
	When the valve is not operating [mm ²]	1.64	1.76	1.95	1.76	2.64	3.04
Fluid		Air					
Max. operating pressure range [MPa]		0 to 0.7					
Max. operating vacuum pressure range [kPa]		0 to -100					
Ambient and fluid temperatures [°C]		5 to 60 (No freezing)					
Element nominal filtration rating [µm]		40					
Min. operating flow rate [L/min (ANR)]		3	5	8	5	8	16

Made to Order

ZP2V

XT661

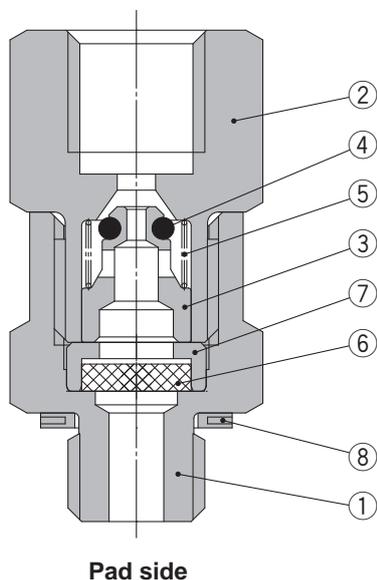
MHM

Precautions

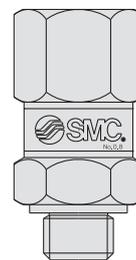
Working Principle

	Initial condition	When a workpiece is adsorbed		When a workpiece is released
		Without workpiece	With workpiece	
Air flow				
Valve operating condition	 Since there is no air flow, the valve remains open by the spring force.	 Valve closed When the workpiece is separated from the vacuum pad, the valve is closed by the air flow, and the suction air can only flow through the fixed orifice. At this time, an amount of air corresponding to the fixed orifice size is sucked.	 Valve open When the workpiece is adsorbed by the vacuum pad, the suction flow reduces, and the valve is open by the spring force, which opens the path between the valve and the body for suction.	 Valve open When the workpiece is released, the valve is open by the vacuum release air, and the path between the valve and the body will open.

Construction



Vacuum generator side

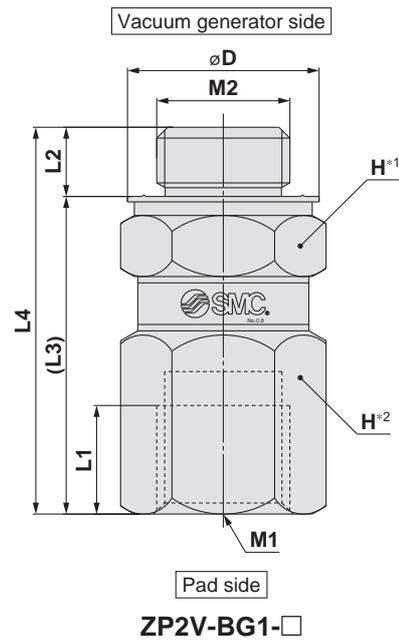
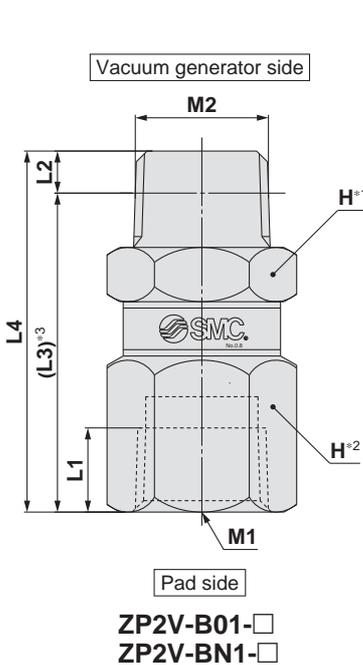
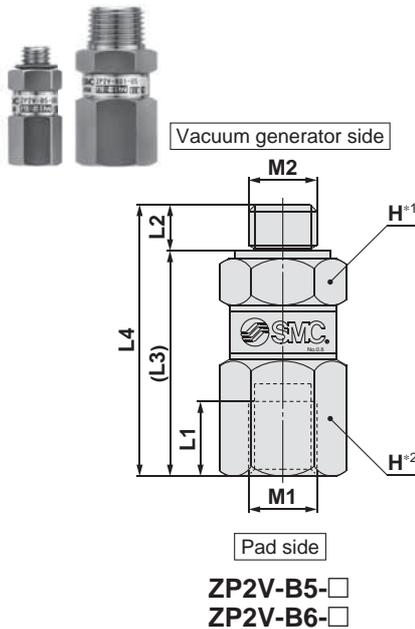
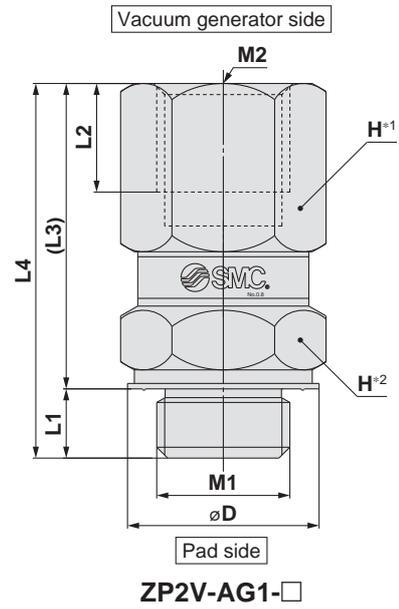
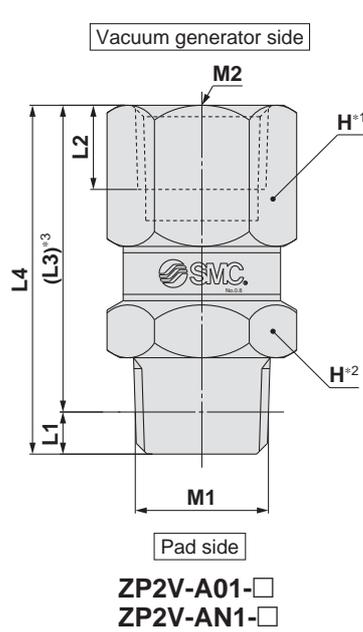
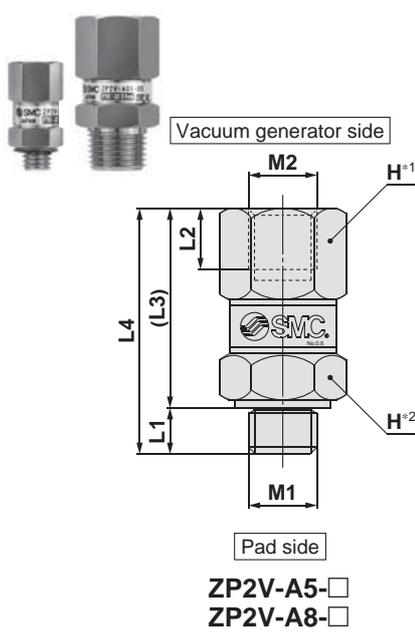


* For the mounting direction of the product, refer to page 352.

Component Parts

No.	Description	Material	Surface treatment
1	Body A	Brass	Electroless nickel plating
2	Body B	Brass	Electroless nickel plating
3	Valve	Aluminum	—
4	O-ring	HNBR	—
5	Spring	Stainless steel	—
6	Element	CAC403 equivalent	—
7	Ring	Aluminum	—
8	Gasket	NBR + Stainless steel	—

Dimensions



*1 The place at the vacuum generator side where the tool is used

*2 The place at the pad side where the tool is used

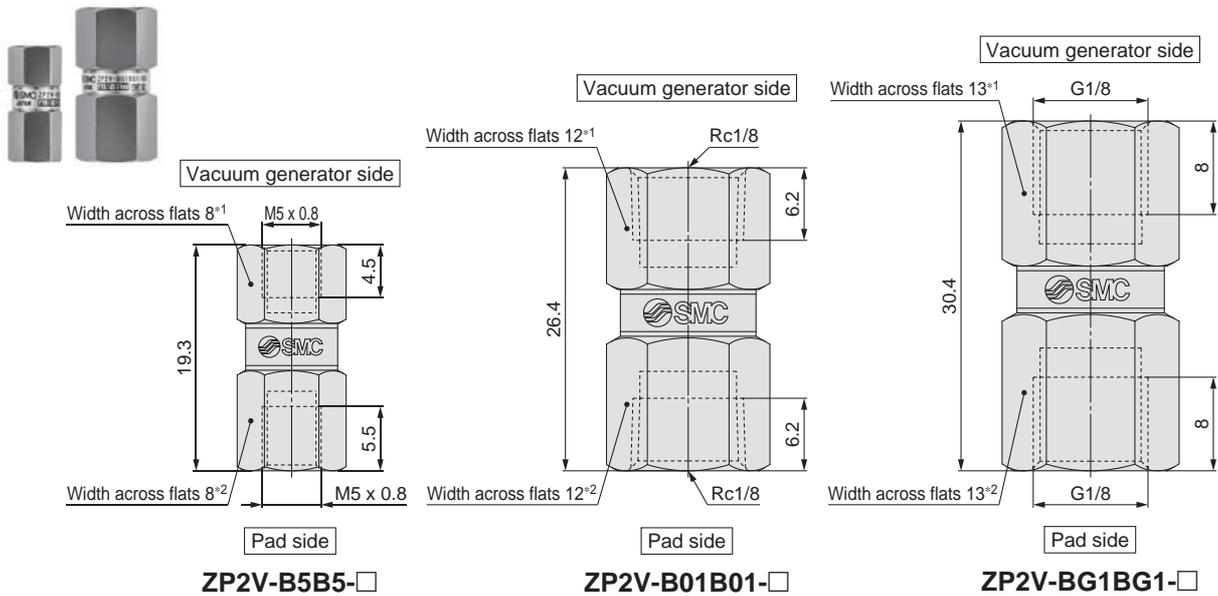
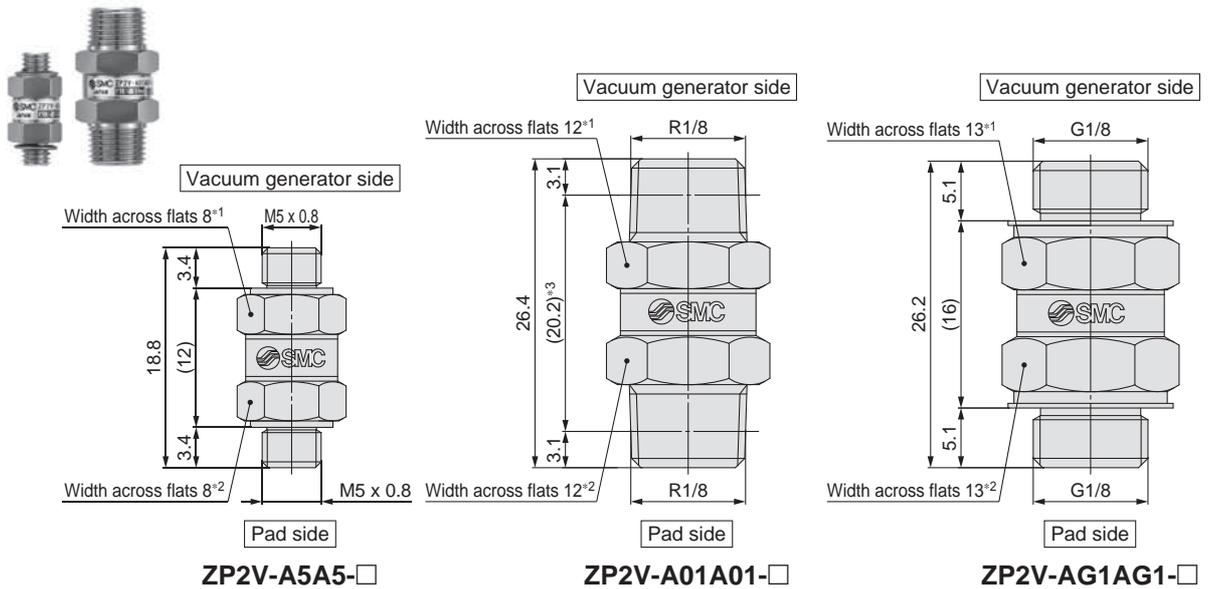
*3 The reference dimension after the R or NPT thread is screwed

Model	M1	M2	L1	L2	L3	L4	H (Width across flats)	øD	W [g]	Tightening torque [N·m] ^{*1}
ZP2V-A5-□	M5 x 0.8	M5 x 0.8	3.4	4.5	14.7	18.1	8	—	6	1.0 to 1.5
ZP2V-A8-□	M8 x 1.25	M8 x 1.25	5.9	8	20.1	26	12	—	18	5.5 to 6.0
ZP2V-A01-□	R1/8	Rc1/8	3.1	6.2	22.6	25.7	12	—	18	7.0 to 9.0
ZP2V-AG1-□	G1/8	G1/8	5.1	8	22.5	27.6	13	14	23	5.5 to 6.0
ZP2V-AN1-□	NPT1/8	NPT1/8	3.2	6.9	23.3	26.5	12	—	19	7.0 to 9.0
ZP2V-B5-□	M5 x 0.8	M5 x 0.8	5.5	3.4	16.6	20	8	—	7	1.0 to 1.5
ZP2V-B6-□	M6 x 1	M6 x 1	5	4.5	16.2	21.5	8	—	7	2.0 to 2.5
ZP2V-B01-□	Rc1/8	R1/8	6.2	3.1	23.5	27.1	12	—	19	7.0 to 9.0
ZP2V-BG1-□	G1/8	G1/8	8	5.1	23.4	29.0	13	14	24	5.5 to 6.0
ZP2V-BN1-□	NPT1/8	NPT1/8	6.9	3.2	24.2	27.9	12	—	19	7.0 to 9.0

*1 When mounting and/or removing the product, use a wrench or torque wrench in the place shown in the figures.
When mounting the product, tighten to the torque specified in the table.

Vacuum Saving Valve **ZP2V Series**

Dimensions

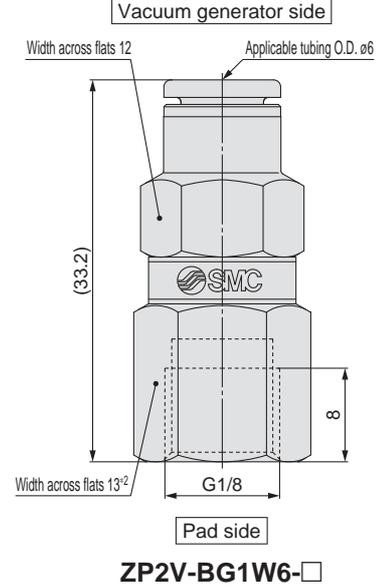
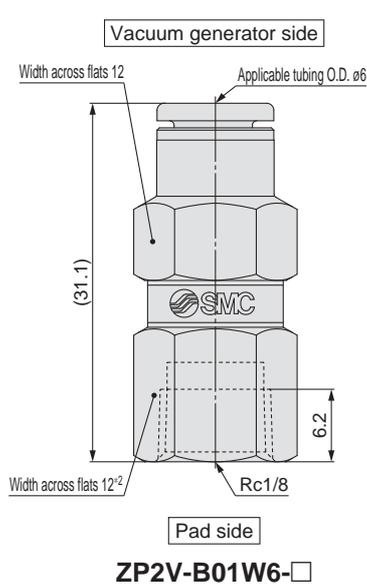
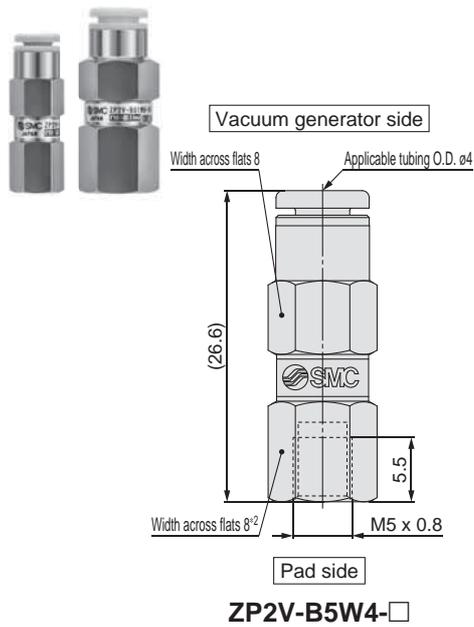
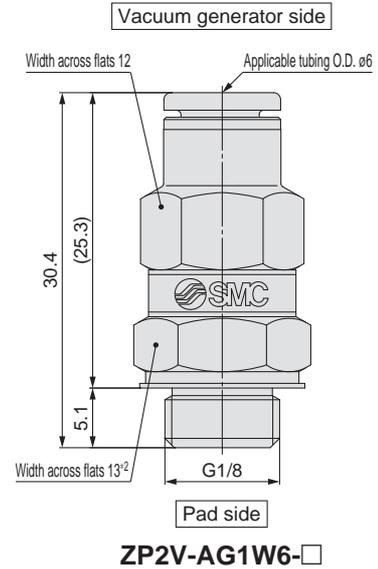
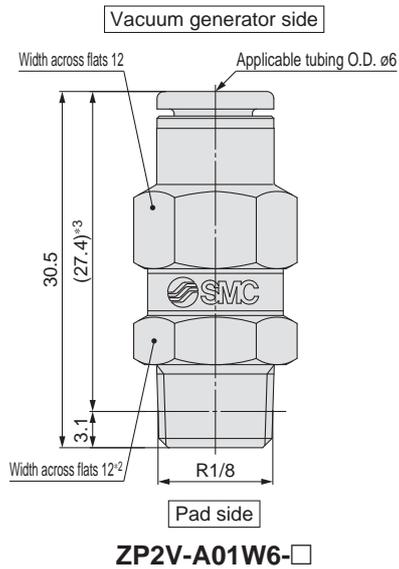
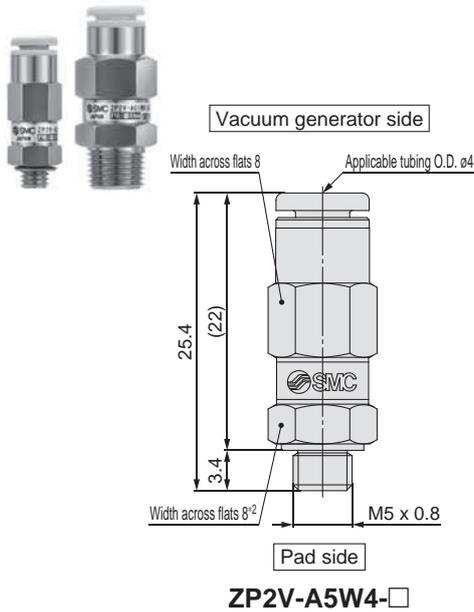


- *1 The place at the vacuum generator side where the tool is used
- *2 The place at the pad side where the tool is used
- *3 The reference dimension after the R thread is screwed

Model	Connection thread size		W [g]	Tightening torque [N·m] *1
	Pad side	Vacuum generator side		
ZP2V-A5A5-□	M5 x 0.8	M5 x 0.8	6	1.0 to 1.5
ZP2V-A01A01-□	R1/8	R1/8	19	7.0 to 9.0
ZP2V-AG1AG1-□	G1/8	G1/8	22	5.5 to 6.0
ZP2V-B5B5-□	M5 x 0.8	M5 x 0.8	7	1.0 to 1.5
ZP2V-B01B01-□	Rc1/8	Rc1/8	17	7.0 to 9.0
ZP2V-BG1BG1-□	G1/8	G1/8	24	5.5 to 6.0

*1 When mounting and/or removing the product, use a wrench or torque wrench in the place shown in the figures.
 When mounting the product, tighten to the torque specified in the table.

Dimensions



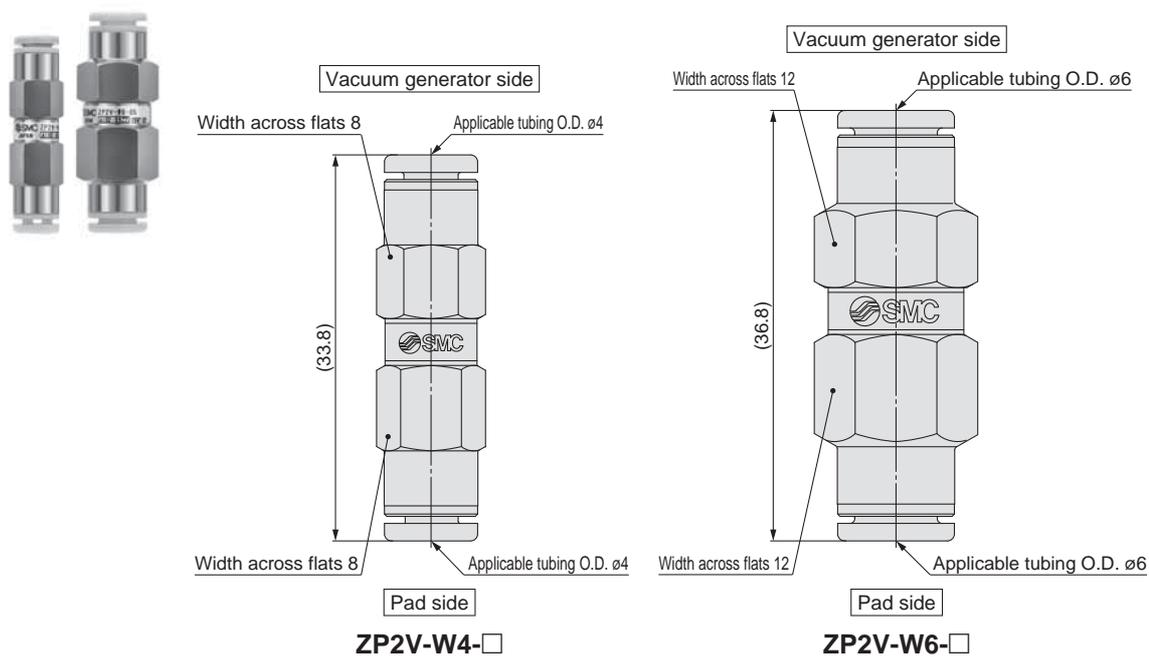
- *1 The place at the vacuum generator side where the tool is used
- *2 The place at the pad side where the tool is used
- *3 The reference dimension after the R thread is screwed

Model	Connection thread size		W [g]	Tightening torque [N·m] *1
	Pad side	Vacuum generator side		
ZP2V-A5W4-□	M5 x 0.8	ø4	6	1.0 to 1.5
ZP2V-A01W6-□	R1/8	ø6	18	7.0 to 9.0
ZP2V-AG1W6-□	G1/8	ø6	20	5.5 to 6.0
ZP2V-B5W4-□	M5 x 0.8	ø4	7	1.0 to 1.5
ZP2V-B01W6-□	Rc1/8	ø6	17	7.0 to 9.0
ZP2V-BG1W6-□	G1/8	ø6	21	5.5 to 6.0

*1 When mounting and/or removing the product, use a wrench or torque wrench in the place shown in the figures.
When mounting the product, tighten to the torque specified in the table.

Vacuum Saving Valve **ZP2V Series**

Dimensions



Model	Connection thread size		W
	Pad side	Vacuum generator side	[g]
ZP2V-W4-□	ø4	ø4	7
ZP2V-W6-□	ø6	ø6	19

[mm]



ZP2V Series

Specific Product Precautions

Be sure to read this before handling the products.

Refer to page 375 for safety instructions. For vacuum equipment and vacuum pad precautions, refer to pages 376 to 379.

1. The product is not equipped with a vacuum holding function and cannot be used for the purpose of holding vacuum.
2. Determine the number of products to be used, and keep the recommended pad diameter per product as shown in Table 1. Also, sufficiently check the operation with the actual equipment beforehand.

Table 1. Recommended Pad Diameter per Product

Connection thread symbol for pad side	A5	B5	W4	A8	A01	B01	AG1	BG1	AN1	BN1	W6
Thread size	M5	—	—	M8	R1/8	Rc1/8	G1/8		NPT1/8		
Recommended pad diameter [mm]	25 or less			32 to 50							

3. Do not disassemble the product. Once the product has been disassembled and reassembled, it will no longer be able to satisfy the original specifications.
4. When piping, do not get the pad side and vacuum generator side of the product mixed up. (Refer to Fig. 1.)

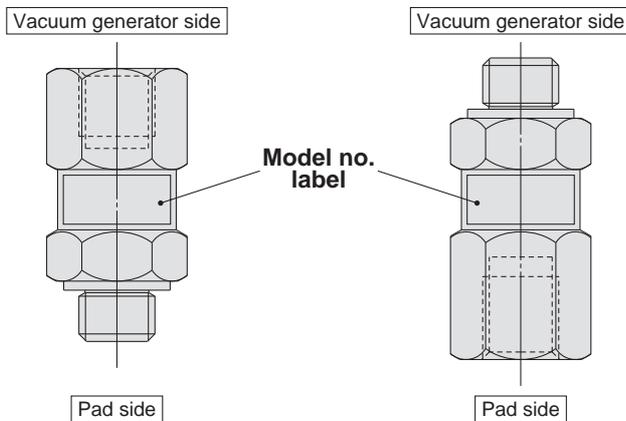


Fig. 1. Mounting direction

Enlarged view of model number label



Flow indication symbol on body

Flow Indication Symbol on Body

Indication symbol	Symbol

5. For mounting and/or removing the product, strictly follow the instructions below.

When mounting and/or removing the product, use the tool in the specified places shown on pages 348 to 350. Also, when mounting the product, tighten to the specified torque shown on pages 348 to 350. Applying excessive torque or using a tool in places other than those specified can cause damage or decreased performance.

6. The reduction of vacuum pressure while the workpiece is adsorbed and released depends on the flow rate characteristics of the vacuum generator. Check the flow rate characteristics of the vacuum generator before checking the operation with the actual equipment.

7. When the built-in element of the product gets clogged, replace the whole product.

8. When verifying the suction using a pressure sensor, etc., sufficiently check the operation with the actual equipment beforehand.

9. If there is leakage between the pad and a workpiece, for example, if the workpiece is permeable, fewer products can be used with one vacuum generator.

Take the leakage between the pad and workpiece into account and sufficiently check the operation with the actual equipment beforehand.

10. Any mounting direction is available for this product. (Vertical or lateral mounting is also available.)

11. For vacuum piping, select equipment and piping so that the "Minimum operating flow rate" in the specifications on page 346 is satisfied.

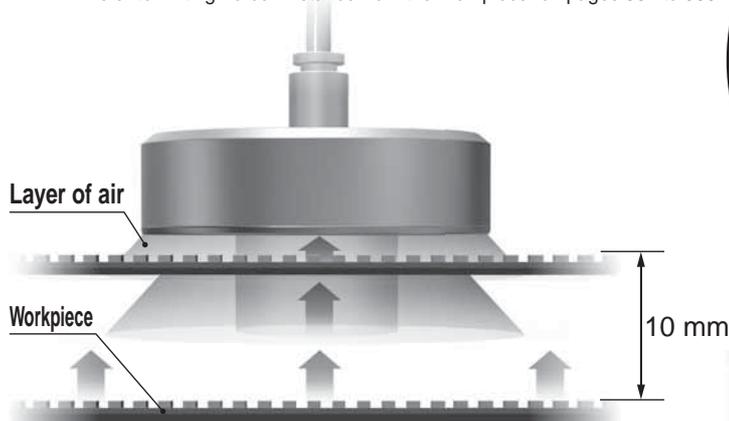
Make sure that there are no unnecessary restrictions, leaks, etc., along the course of the piping.

If the minimum operating flow rate listed in the specifications is not satisfied, operation will be unstable, which may lead to suction failure or cause damage to internal parts.

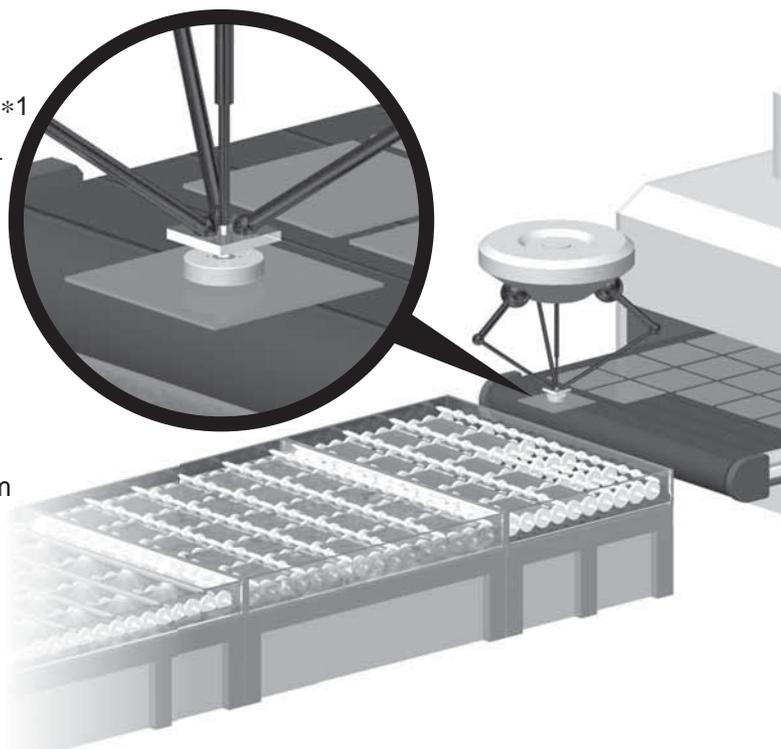
Non-contact Gripper *XT661 Series*

- Assists in non-contact workpiece transfer
- Max workpiece suction distance: **10 mm***1

*1 Refer to "Lifting Force—Distance from the Workpiece" on pages 364 to 366.



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



- Two types are available.

■ Cyclone Type

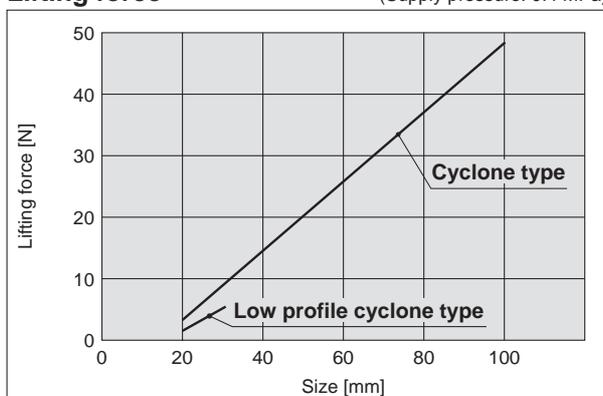
High lift

- High lifting force: Max. 44 N*1

*1 Outer body diameter: $\phi 100$

Lifting force

(Supply pressure: 0.4 MPa)



- Totalled 5 size: $\phi 20/\phi 40/\phi 60/\phi 80/\phi 100$

Low profile cyclone type

1.8 mm

Totalled 2 size: $\phi 20, \phi 25$



■ Bernoulli Type

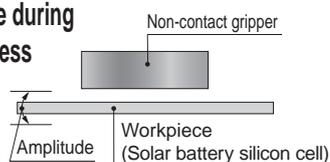
Vibration reducing

- Amplitude of the workpiece during gripping: ± 0.01 mm*1, 2 or less

*1 Solar battery silicon cell ($\square 125$ mm, $t = 250$ μ m)

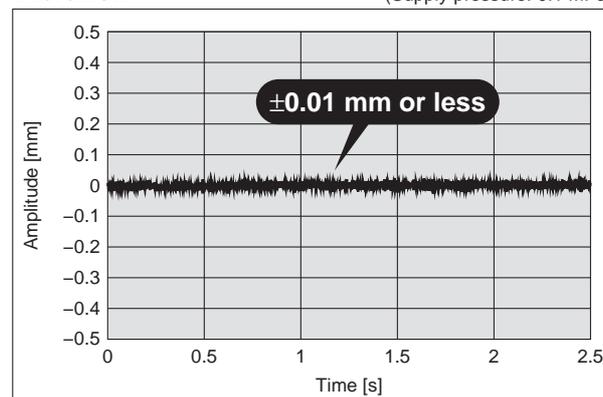
*2 In SMC conditions

(How to calculate: Page 356)



Vibration

(Supply pressure: 0.1 MPa)



- Totalled 6 size: $\phi 40/\phi 60/\phi 80/\phi 100/\square 120/\square 150$



Model Selection

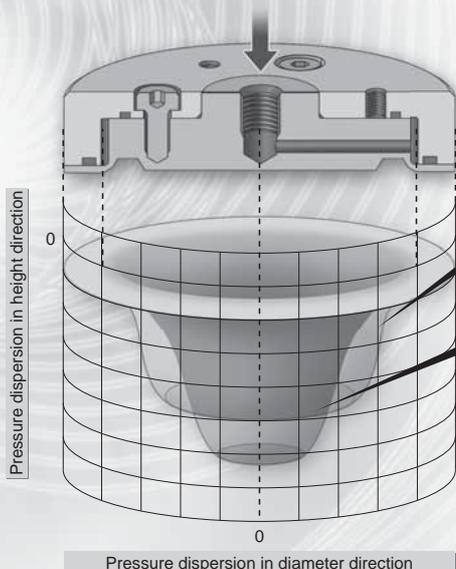
■ Cyclone Type

High lift

Low air consumption

Body material: Al

Original groove-channel design allows cyclone effect with **large suction area** and **even pressure dispersion!**



Non-contact gripper

Large vacuum area, even pressure dispersion

Existing SMC cyclone method

Small vacuum area, higher vacuum in the central part



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

Made to Order

ZP2V

XT661

MHM

Working Principle

Air is discharged in the whirling direction.

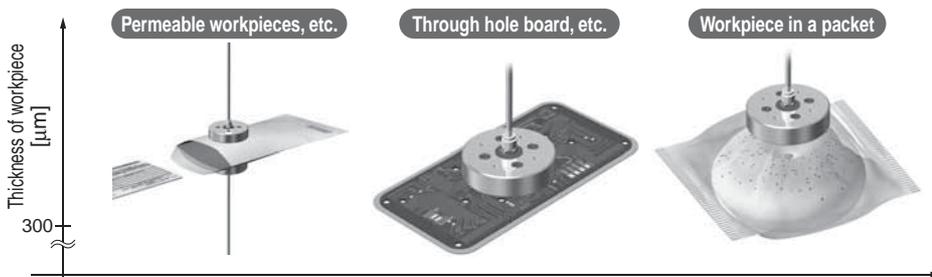


• Cyclone Type

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*¹ (-X207)

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

*1 Except ø20

Refer to page 361.

Urethane pad



With multi-port (-X211)

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

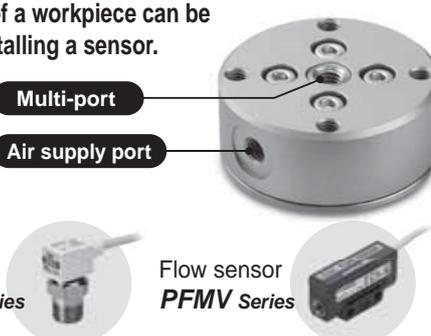
Multi-port

Air supply port

Recommended sensor

Pressure sensor
PSE540 Series

Flow sensor
PFMV Series



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

Precautions

Low Profile Cyclone Type (-X260)

Low profile

Made to order

Thickness: **1.8 mm**

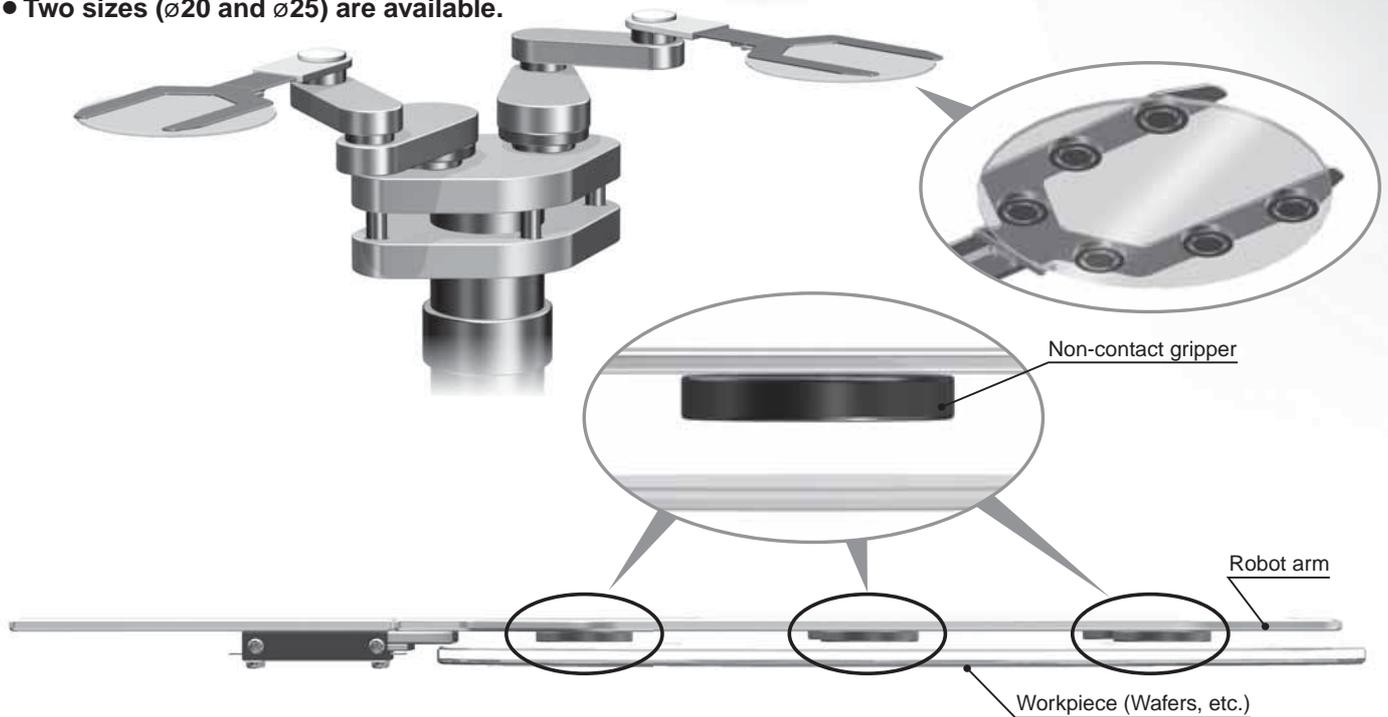
Weight: Approx. **1.3 g***1

*1 Outer body diameter: $\varnothing 20$

Outer body diameter [mm]	$\varnothing 20$	$\varnothing 25$
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 ($\varnothing 20$ and $\varnothing 25$) 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.)

Model Selection

■ **Bernoulli Type**

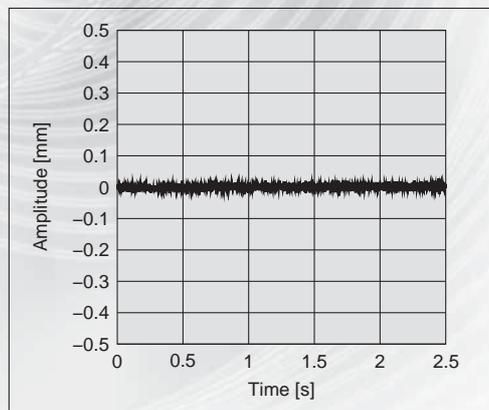
Vibration reducing type

Body material: Resin

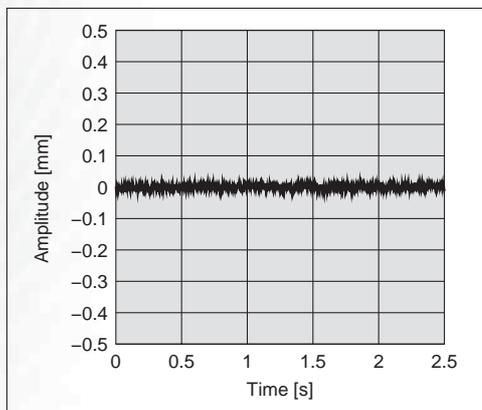
Original groove-channel design allows the Bernoulli effect with **suppressing the amplitude of the workpiece during gripping!**

- Reduced amplitude of the workpiece

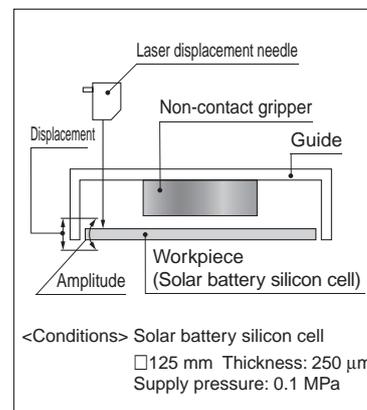
Size: □120



Size: ∅100



How to calculate



Made to Order

ZP2V

XT661

MHM

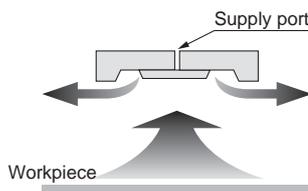


Outer body diameter [mm]	∅40	∅60	∅80	∅100	□120	□150
Air consumption [L/min (ANR)]	98	98	98	156	291	291
Lifting force [N]	2.2	4.1	5.1	7.8	17	14

Supply pressure: 0.4 MPa

Working Principle

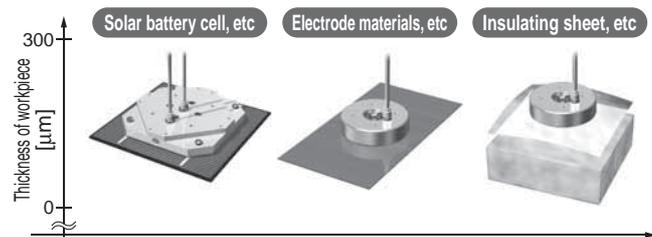
Air is discharged radially.



• **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*¹ *¹ Except ∅40

- Grease-free

- Can be disassembled and cleaned the inside

Precautions

Related Products

General
Air



Oil-free
Air



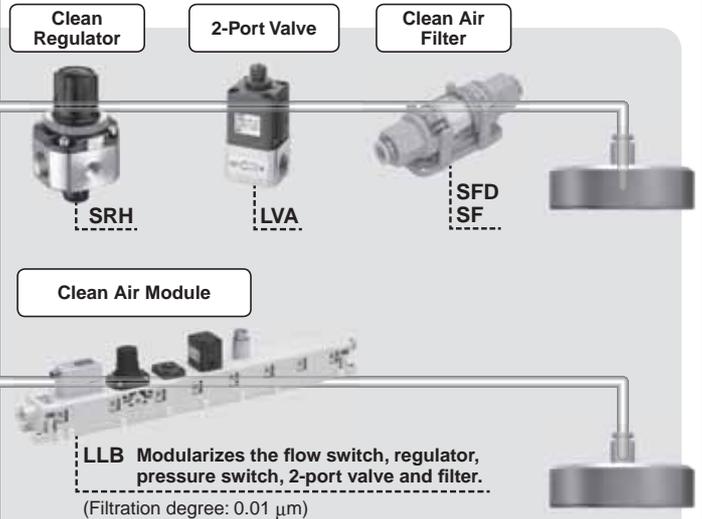
Clean
Air



Clean room production
Parts washed
Double packing/Shipping

For details, refer to the Pneumatic Clean Series catalog (CAT. E02-23) or the Web Catalog.

<https://www.smcworld.com>



XT661 Series 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 360).
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.

<How to read the graph>

Example: For the case of "Cyclone type ø60," 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 ø60" 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.)

$$F = f \times (1/t) \quad F: \text{Temporary lifting force [N]} \quad f: \text{Lifting force [N]} \quad t: \text{Safety factor} \dots 2 \text{ or more}$$

- 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 \geq workpiece mass**.

<Checking procedure>

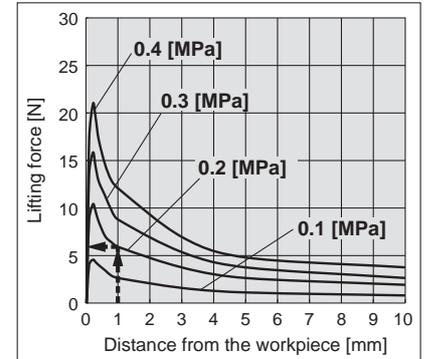
If **the temporary lifting force \geq workpiece mass**, the gripper can be used under these conditions.

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.

$$N = (9.8 \times W/1000)/(F) \dots \text{Rounding up to the nearest higher integer} \quad N: \text{Q'ty (pcs.)} \quad W: \text{Workpiece mass [g]} \quad F: \text{Temporary lifting force [N]} \quad 9.8: \text{Gravitational acceleration [m/s}^2\text{]}$$

[Cyclone type ø60]



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.

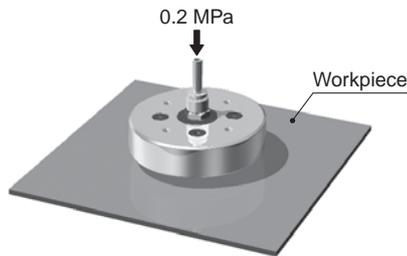
If the balance of the workpiece is poor during lifting, either increase the size of the non-contact gripper, or increase the number of grippers to be used.

- * 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: $F = f \times (1/t) = 0.8 \times (1/2) = 0.4 \text{ N}$
XT661-4A: $F = f \times (1/t) = 3.8 \times (1/2) = 1.9 \text{ N}$
XT661-6A: $F = f \times (1/t) = 5.9 \times (1/2) = 2.95 \text{ N}$
XT661-8A: $F = f \times (1/t) = 7.5 \times (1/2) = 3.75 \text{ N}$
XT661-10A: $F = f \times (1/t) = 14.4 \times (1/2) = 7.2 \text{ N}$**

- 3) Confirm the relationship “temporary lifting force \geq workpiece mass”.

Convert the workpiece mass [g] into a force [N].

300 g \rightarrow 300 x 9.8/1000 = 2.94 N

For a workpiece mass of 300 g (2.94 N)

**XT661-6A: Temporary lifting force 2.95 N \geq Workpiece mass 300 g (2.94 N)
XT661-8A: Temporary lifting force 3.75 N \geq Workpiece mass 300 g (2.94 N)
XT661-10A: Temporary lifting force 7.2 N \geq Workpiece mass 300 g (2.94 N)**

In this case, the relationship “temporary lifting force \geq workpiece mass” is obtained.

For this workpiece, select the **XT661-6A**.

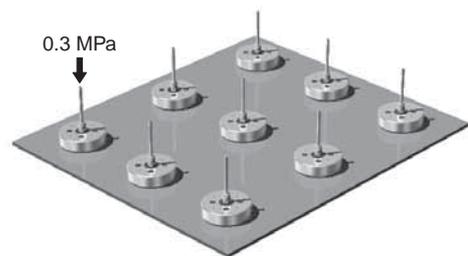
The number of grippers to be used is **one**.

(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: $F = f \times (1/t) = 22.4 \times (1/2) = 11.2 \text{ N}$

- 3) Confirm the relationship “temporary lifting force \geq workpiece mass”.

Convert the workpiece mass [g] into a force [N].

9700 g \rightarrow 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 “temporary lifting force \geq workpiece mass” is not obtained, so multiple grippers must be used. Obtain the number of grippers to be used from the following equation.

$N = (9.8 \times W/1000)/(F) = (9.8 \times 9700/1000)/(11.2) = 9$

... 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.

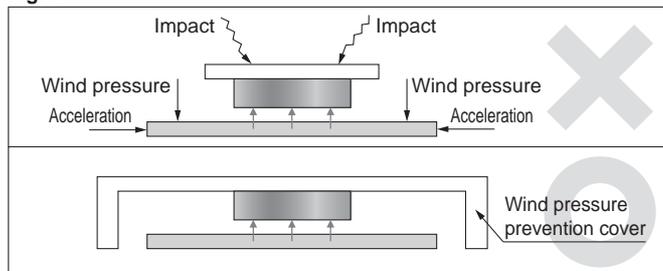
(* If a deflection occurs, the lifting force will decrease.)

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** \geq **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.

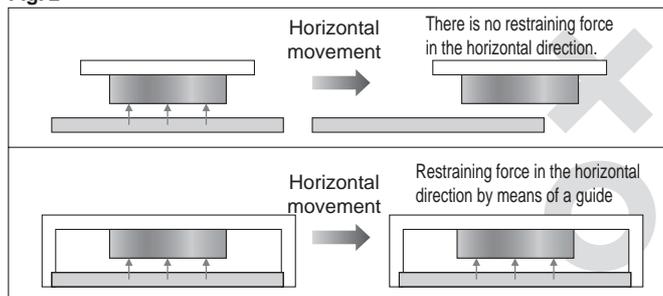
Fig. 1



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.)

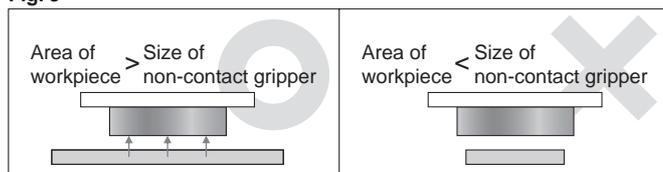
Fig. 2



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

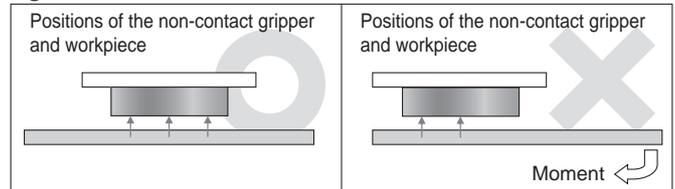
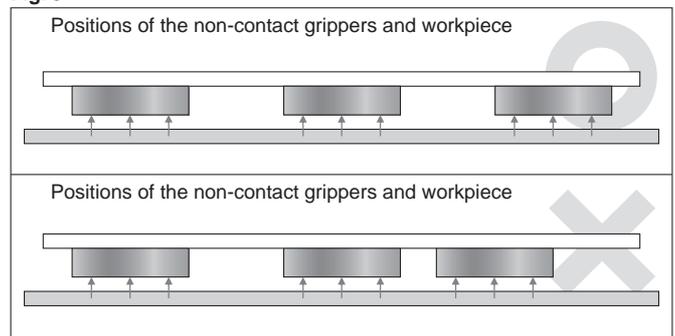


Fig. 5



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

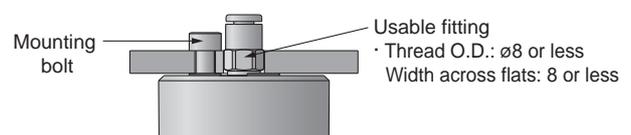
If the supply pressure is higher than the necessary value, the workpiece may be deformed or damaged due to the lifting force. There is also a possibility of the workpiece vibrating. To prevent this, do not set the supply pressure higher than necessary.

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 $\phi 8$ 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

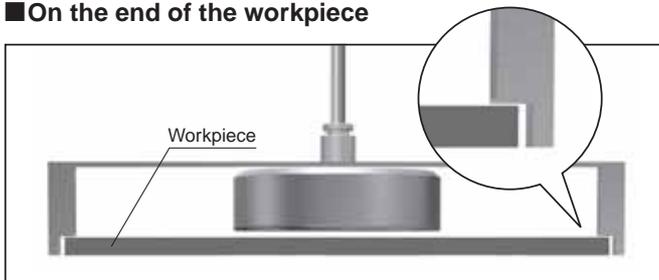
A non-contact gripper does not produce a restraining force that prevents horizontal movement of the workpiece. Install a guide at the end of the workpiece in order to hold the workpiece.

■ Preventing physical contact

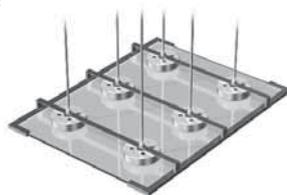
Depending on the operating conditions, the workpiece may touch the gripper. To prevent such contact, install a guide that maintains a certain distance between the gripper and the workpiece.

Installation examples

■ On the end of the workpiece

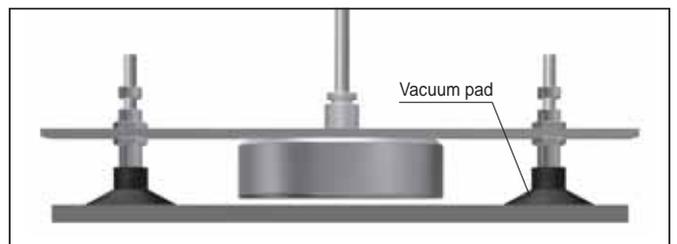


By installing a guide at the end of the workpiece, the contact area can be kept as small as possible.



When using multiple non-contact grippers

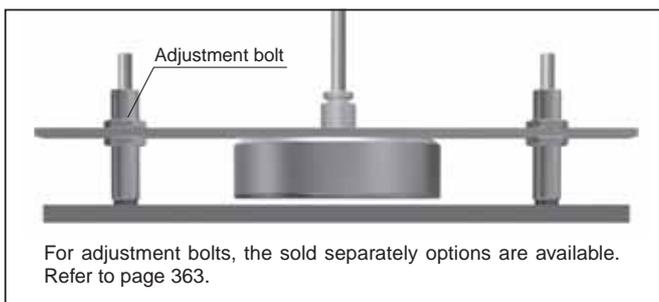
■ On the top of the workpiece (Use in combination with vacuum pads.)



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.



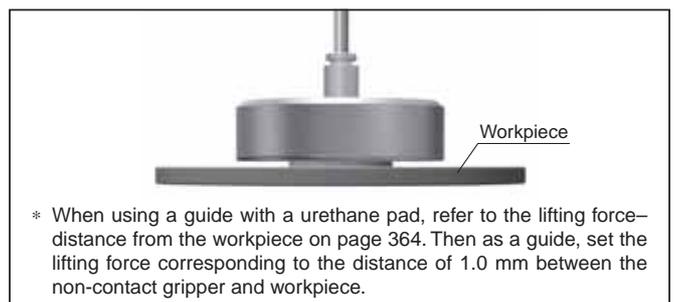
■ On the top of the workpiece (External stopper)



For adjustment bolts, the sold separately options are available. Refer to page 363.

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



* When using a guide with a urethane pad, refer to the lifting force-distance from the workpiece on page 364. 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 XT661 Series

Model Selection

How to Order

Cyclone type

XT661 - **2A** - **R**



Outer body diameter: \varnothing

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: \varnothing

2A	20 mm
3A	25 mm

Direction of whirling air

R	Clockwise
L	Counterclockwise

Bernoulli type

XT661 - **4C** - X321



Outer body diameter: \varnothing

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]	$\varnothing 20$	$\varnothing 40$	$\varnothing 60$	$\varnothing 80$	$\varnothing 100$
Piping port size	M5 x 0.8			Rc 1/8	
Fluid	Air ^{*1}				
Operating pressure	0.01 to 0.5 MPa				
Proof pressure	0.75 MPa				
Ambient and operating temperatures	-5 to 60°C (no freezing)				
Grease	Grease-free				
Body material	A2017				
Weight [g]	12.5	49	114	206	310

*1 Air purification rating: JIS B 8392-1 (ISO 8573-1) Quality Degree 4, 4, 2 or more

	2A	3A
Outer body diameter [mm]	$\varnothing 20$	$\varnothing 25$
Piping port size	$\varnothing 1.6$	
Fluid	Air ^{*1}	
Operating pressure	0.01 to 0.5 MPa	
Proof pressure	0.75 MPa	
Ambient and operating temperatures	-5 to 40°C (no freezing)	
Grease	Grease-free	
Body material	A2017	
Weight [g]	1.33	2.13

*1 Air purification rating: JIS B 8392-1 (ISO 8573-1) Quality Degree 4, 4, 2 or more

* Use adhesive to mount the gripper.

Made to Order

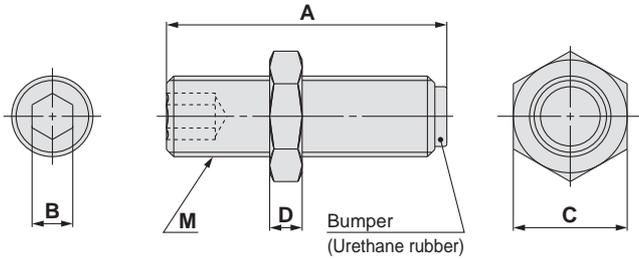
ZP2V

XT661

MHM

Precautions

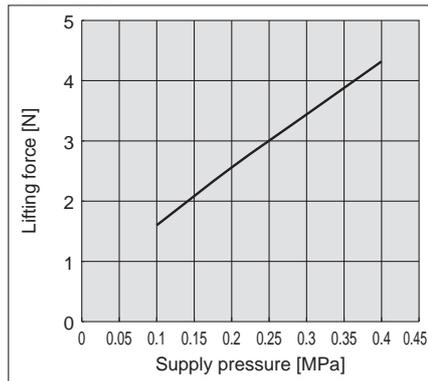
Sold Separately Options: External Stopper (Order Separately)



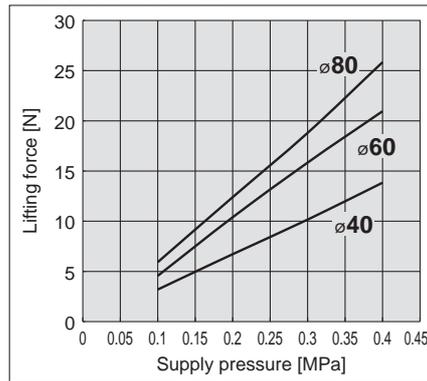
Model	Adjustment range [mm]	A	B	C	D	M
MXQ-A627	5	16.5	2.5	7	3	M5 x 0.8
MXQ-A627-X11	15	26.5				
MXQ-A827	5	16.5	3	8	3.5	M6 x 1
MXQ-A827-X11	15	26.5				
MXQ-A827-X12	25	36.5				
MXQ-A1227	5	20	4	12	4	M8 x 1
MXQ-A1227-X11	15	30				
MXQ-A1227-X12	25	40	5	14	4	M10 x 1
MXQ-A1627	5	24.5				
MXQ-A1627-X11	15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

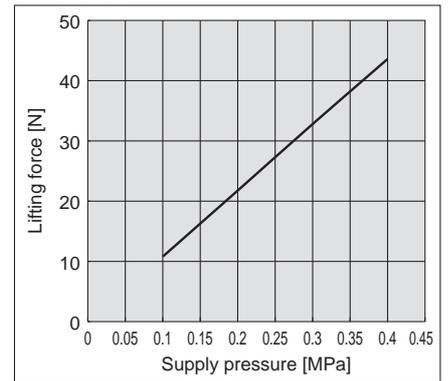
Size: $\varnothing 20$



Size: $\varnothing 40/\varnothing 60/\varnothing 80$

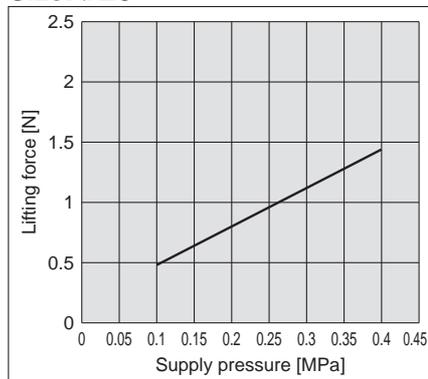


Size: $\varnothing 100$

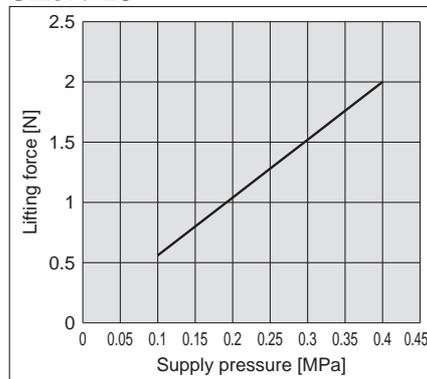


Lifting Force [Low Profile Cyclone Type]

Size: $\varnothing 20$



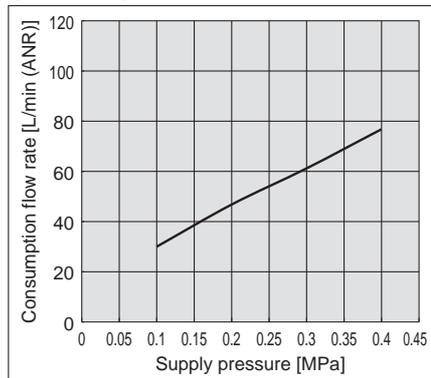
Size: $\varnothing 25$



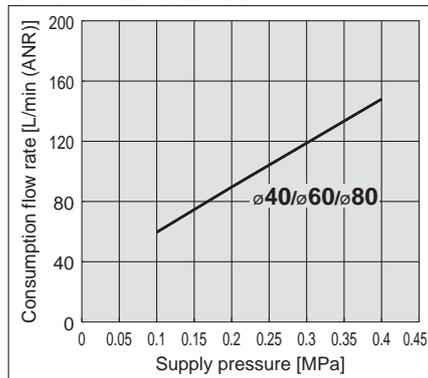
Model Selection

Air Consumption [Cyclone Type]

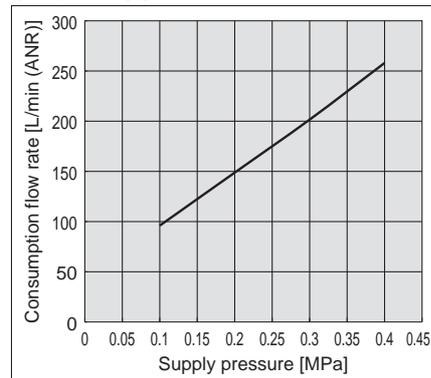
Size: $\phi 20$



Size: $\phi 40/\phi 60/\phi 80$

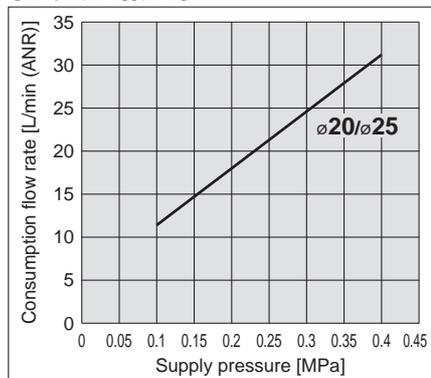


Size: $\phi 100$



Air Consumption [Low Profile Cyclone Type]

Size: $\phi 20/\phi 25$



Made to Order

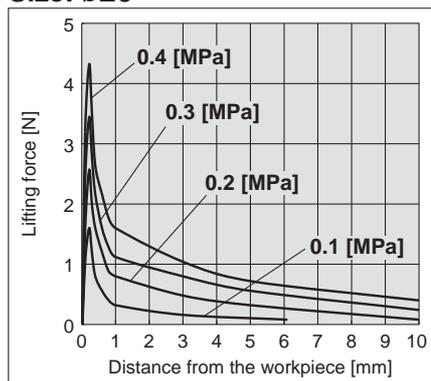
ZP2V

XT661

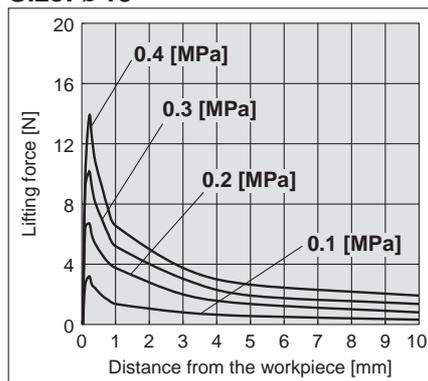
MHM

Lifting Force–Distance from the Workpiece [Cyclone Type]

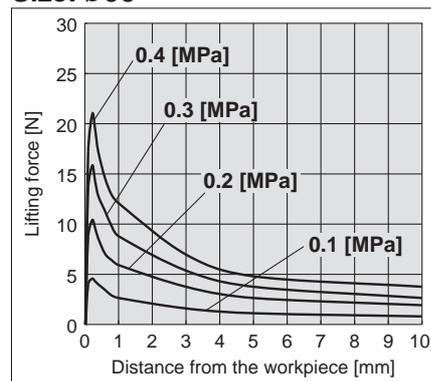
Size: $\phi 20$



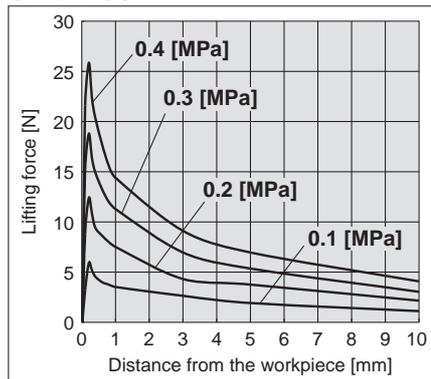
Size: $\phi 40$



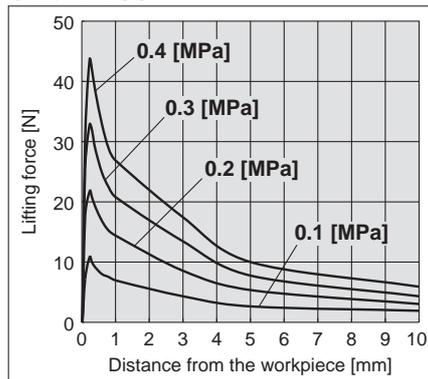
Size: $\phi 60$



Size: $\phi 80$



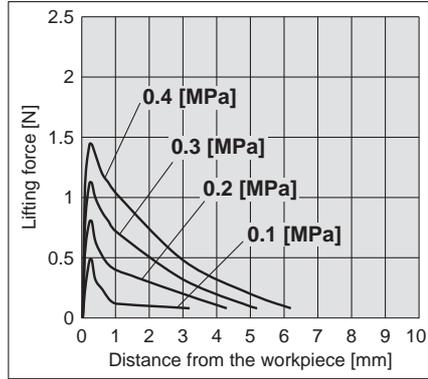
Size: $\phi 100$



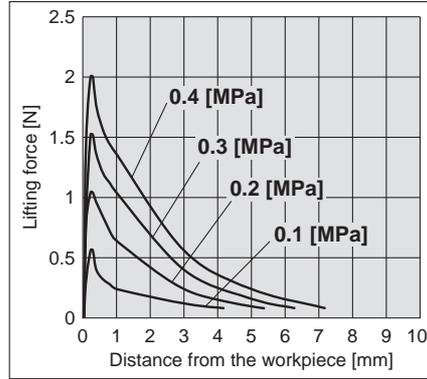
Precautions

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

Size: $\varnothing 20$

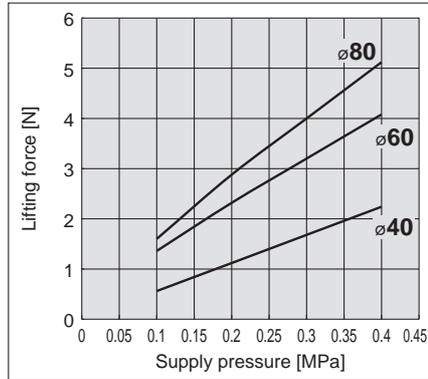


Size: $\varnothing 25$

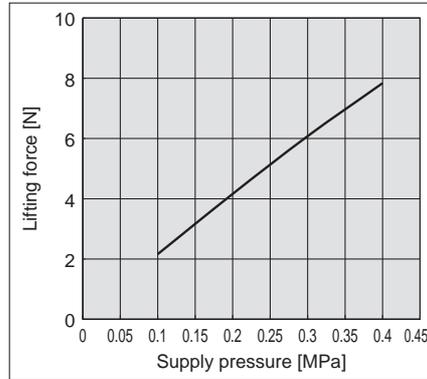


Lifting Force [Bernoulli Type]

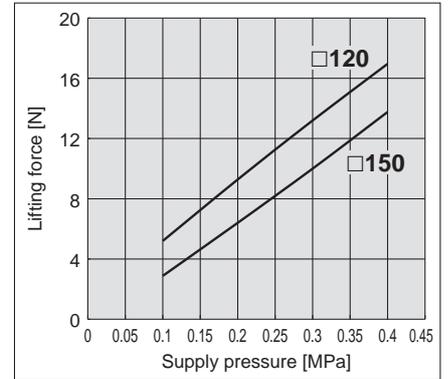
Size: $\varnothing 40/\varnothing 60/\varnothing 80$



Size: $\varnothing 100$

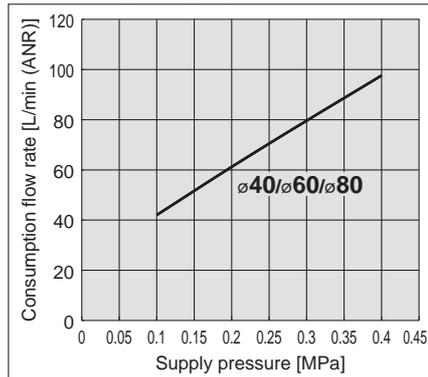


Size: $\square 120/\square 150$

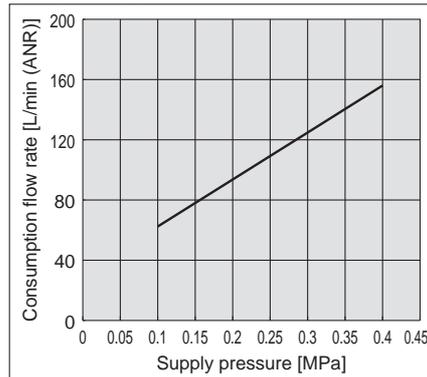


Air Consumption [Bernoulli Type]

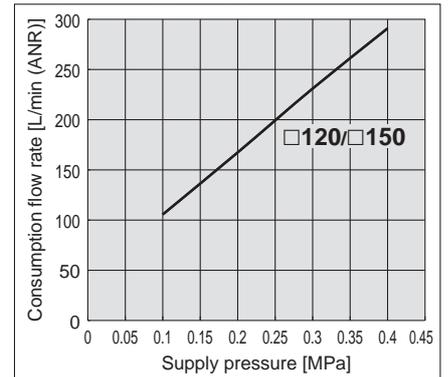
Size: $\varnothing 40/\varnothing 60/\varnothing 80$



Size: $\varnothing 100$

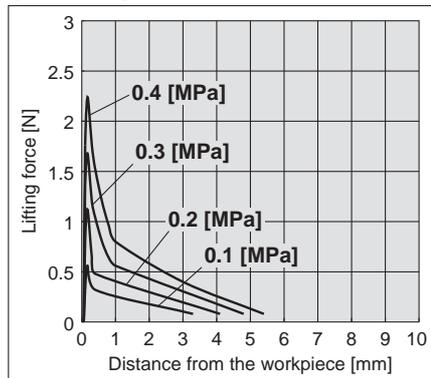


Size: $\square 120/\square 150$

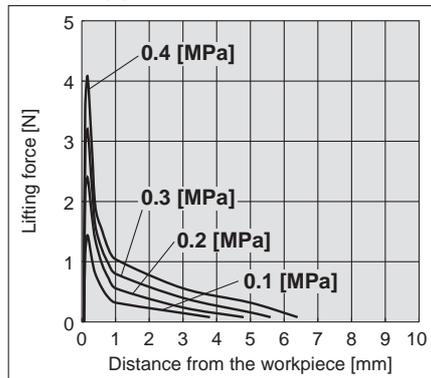


Lifting Force–Distance from the Workpiece [Bernoulli Type]

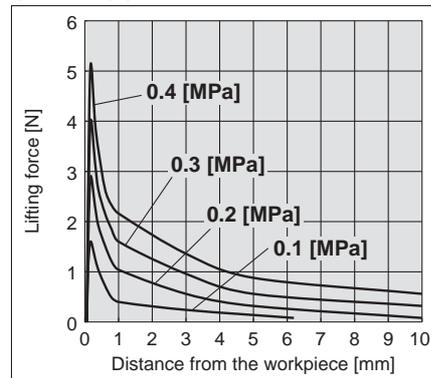
Size: $\varnothing 40$



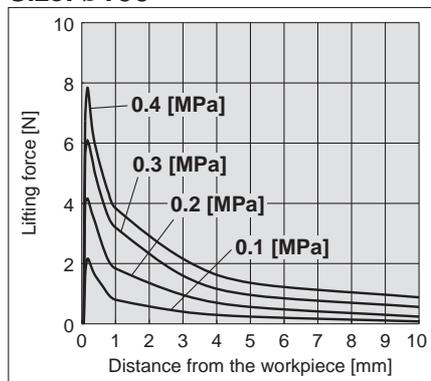
Size: $\varnothing 60$



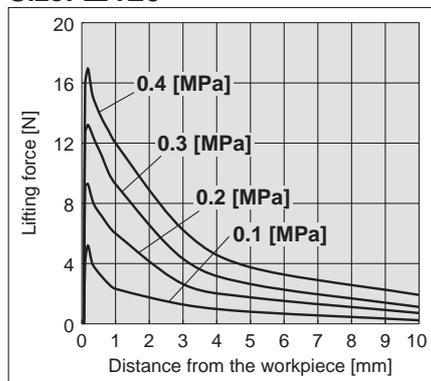
Size: $\varnothing 80$



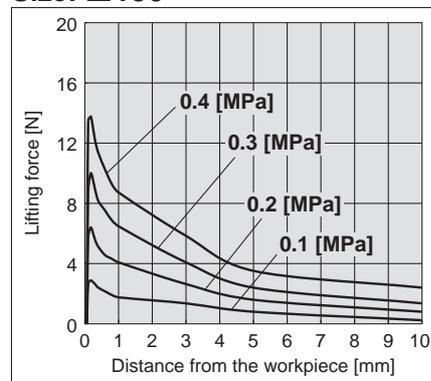
Size: $\varnothing 100$



Size: $\square 120$

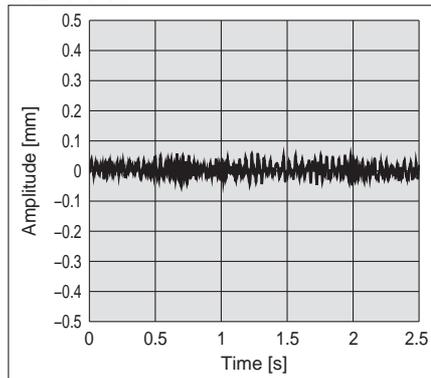


Size: $\square 150$

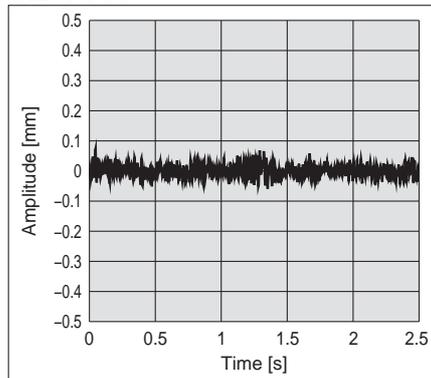


Vibration [Bernoulli Type] Supply pressure: 0.1 MPa

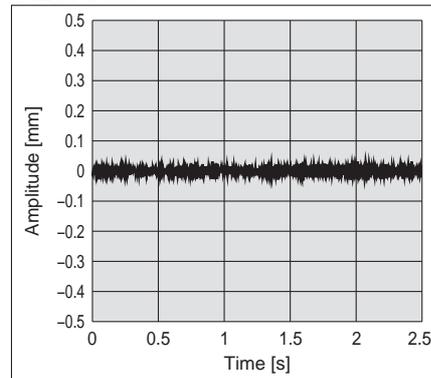
Size: $\varnothing 40$



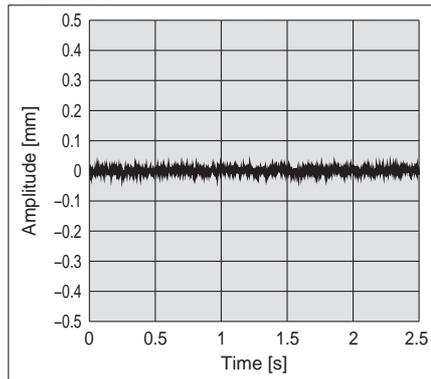
Size: $\varnothing 60$



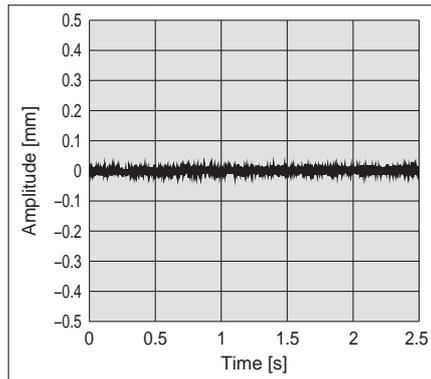
Size: $\varnothing 80$



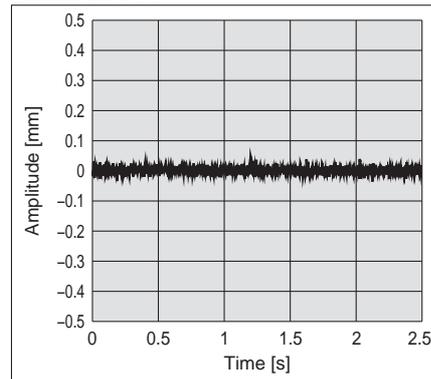
Size: $\varnothing 100$



Size: $\square 120$



Size: $\square 150$



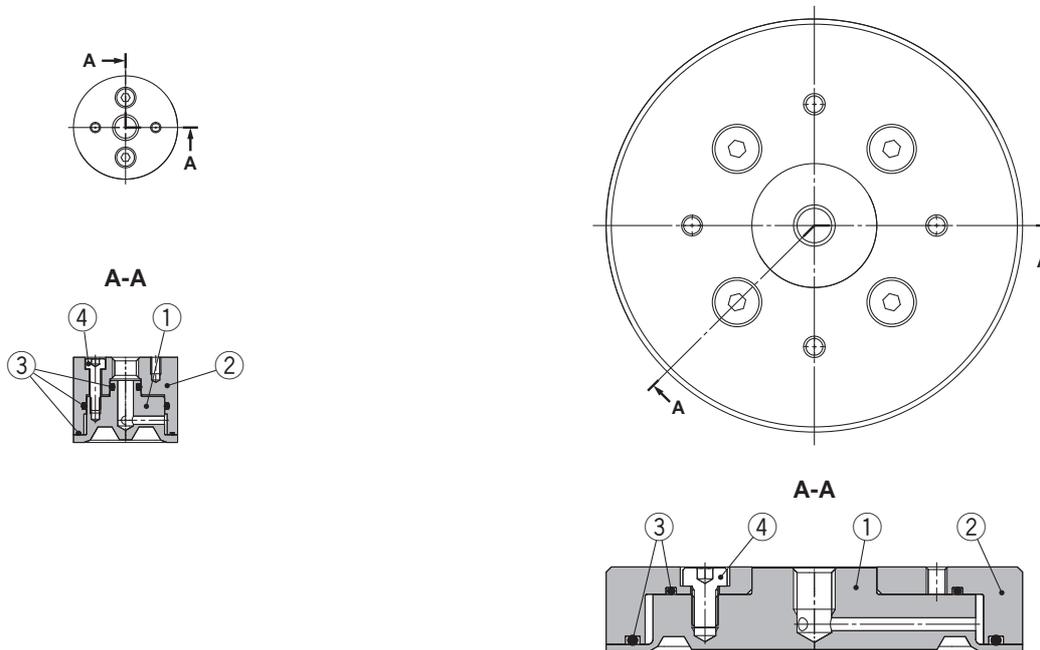
* $\square 150$ solar cell is used for this data only.

Non-contact Gripper **XT661 Series**

Construction [Cyclone Type]

Size: $\varnothing 20$

Size: $\varnothing 40, \varnothing 60, \varnothing 80, \varnothing 100$

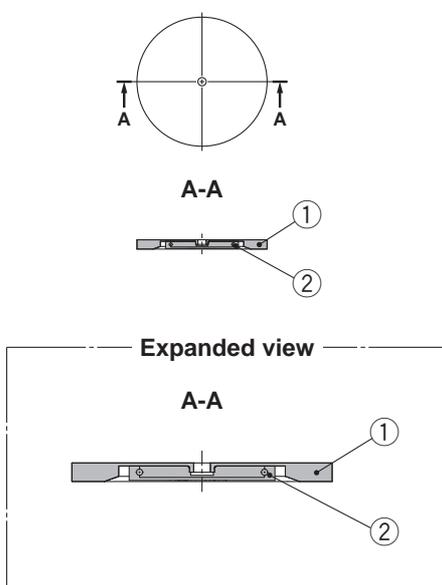


Component Parts

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: $\varnothing 20, \varnothing 25$



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)	

Model Selection

Construction [Bernoulli Type]

Size: $\varnothing 40$

Size: $\varnothing 60$

Size: $\varnothing 80, \varnothing 100$

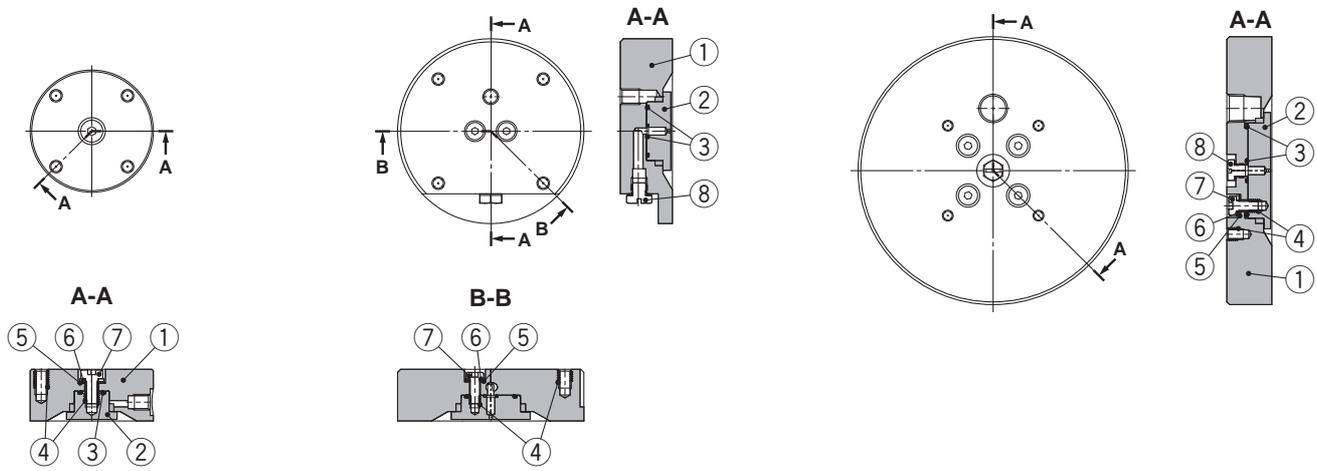
Made to Order

ZP2V

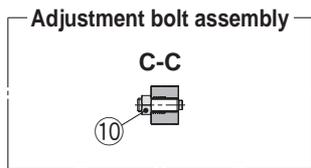
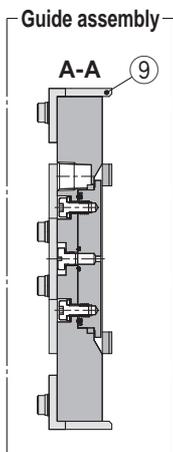
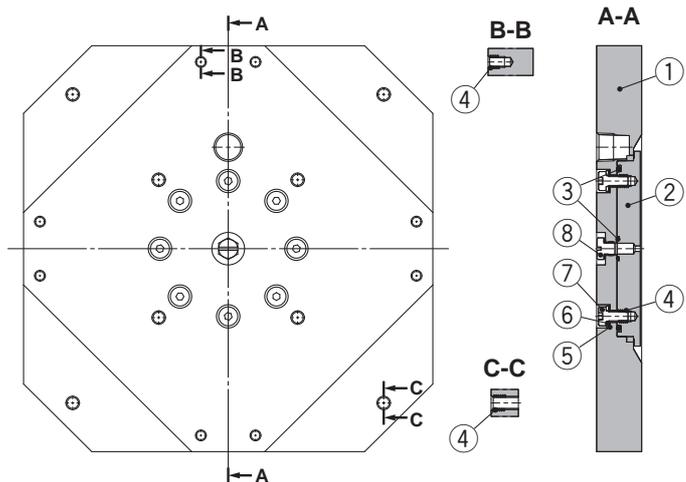
XT661

MHM

Precautions



Size: $\square 120, \square 150$



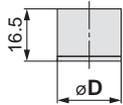
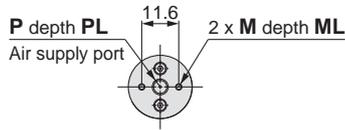
Component Parts

No.	Description	Material	Note
1	Body A	PBT resin	
2	Body B	PBT resin	
3	O-ring	NBR	
4	Helical insert	Stainless steel	
5	Flat washer	Chromium molybdenum steel (Zinc chromated)	XT661-4C to 10C XT661-120E, 150E
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)	

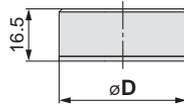
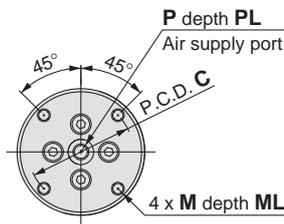
Non-contact Gripper **XT661 Series**

Dimensions [Cyclone Type]

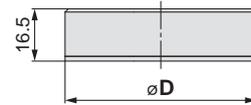
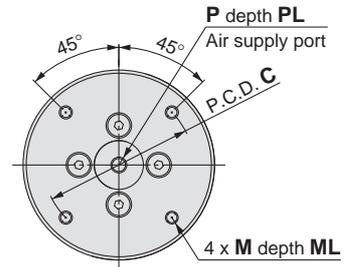
XT661-2A-(R, L)



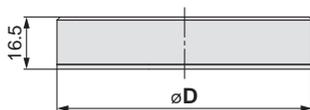
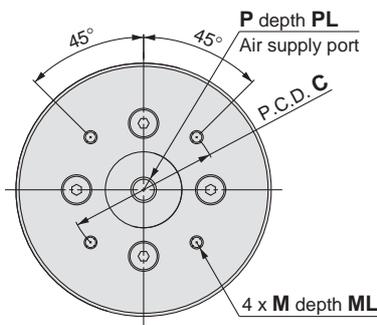
XT661-4A-(R, L)



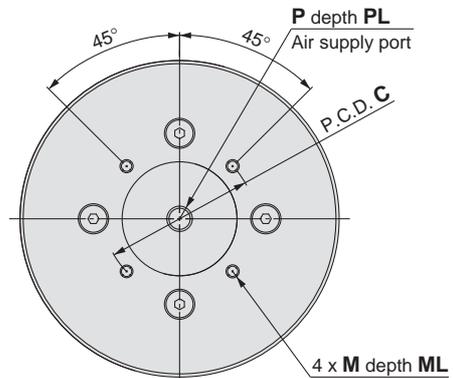
XT661-6A-(R, L)



XT661-8A-(R, L)



XT661-10A-(R, L)

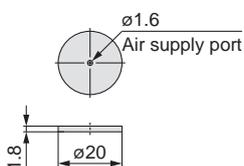


[mm]

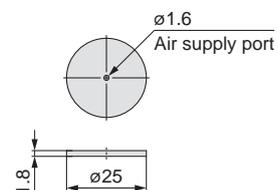
Part no.	P	PL	M	ML	C	D
XT661-2A-(R, L)	M5 x 0.8	5	M2 x 0.4	3.2	—	20
XT661-4A-(R, L)	M5 x 0.8	5	M4 x 0.7	5	32.8	40
XT661-6A-(R, L)	M5 x 0.8	5	M4 x 0.7	5	47	60
XT661-8A-(R, L)	Rc 1/8	—	M4 x 0.7	5	47	80
XT661-10A-(R, L)	Rc 1/8	—	M4 x 0.7	5	47	100

Dimensions [Low Profile Cyclone Type]

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

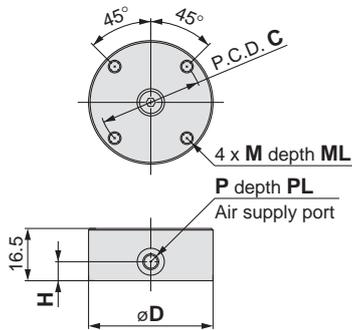


XT661-3A-(R, L)-X260

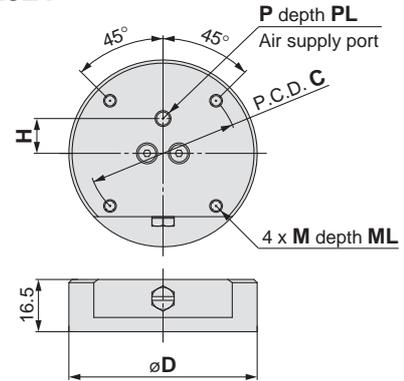


Dimensions [Bernoulli Type]

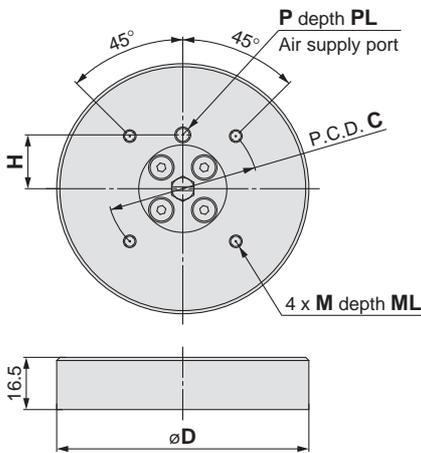
XT661-4C-X321



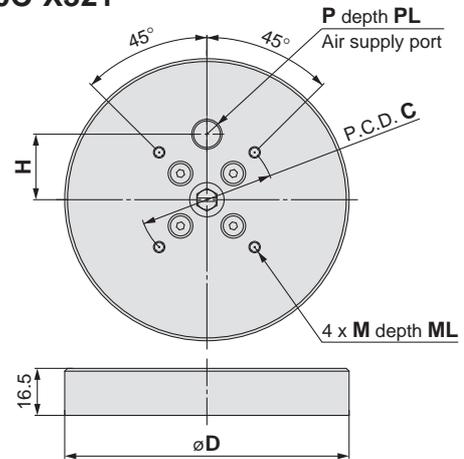
XT661-6C-X321



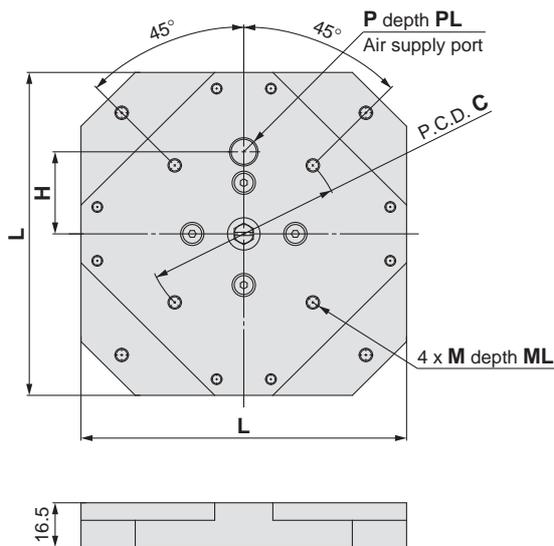
XT661-8C-X321



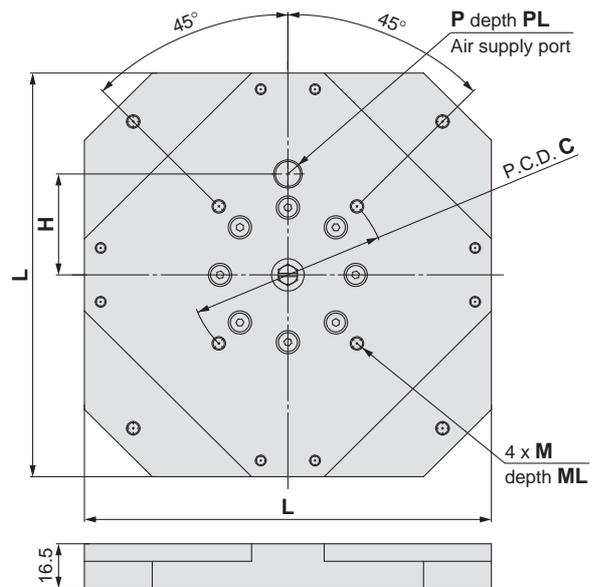
XT661-10C-X321



XT661-120E-X322



XT661-150E-X322



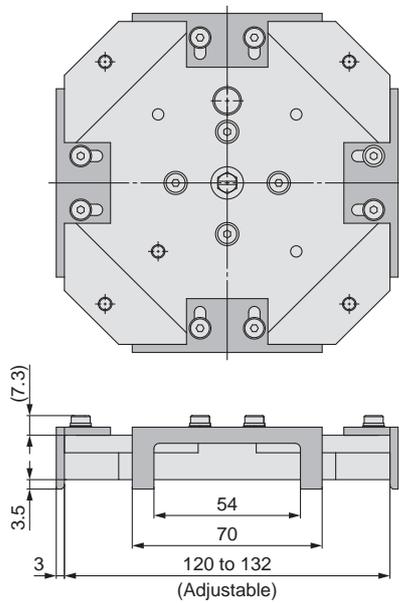
Part no.	P	PL	M	ML	C	H	D	L
XT661-4C-X321	M5 x 0.8	5	M4 x 0.7	8	32	6	39	—
XT661-6C-X321	M5 x 0.8	6	M4 x 0.7	6	47	11	59	—
XT661-8C-X321	M5 x 0.8	6	M4 x 0.7	6	47	17	79	—
XT661-10C-X321	Rc 1/8	—	M4 x 0.7	6	47	23	99	—
XT661-120E-X322	Rc 1/8	—	M5 x 0.8	7	72	30.5	—	120
XT661-150E-X322	Rc 1/8	—	M5 x 0.8	7	72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

Non-contact Gripper *XT661 Series*

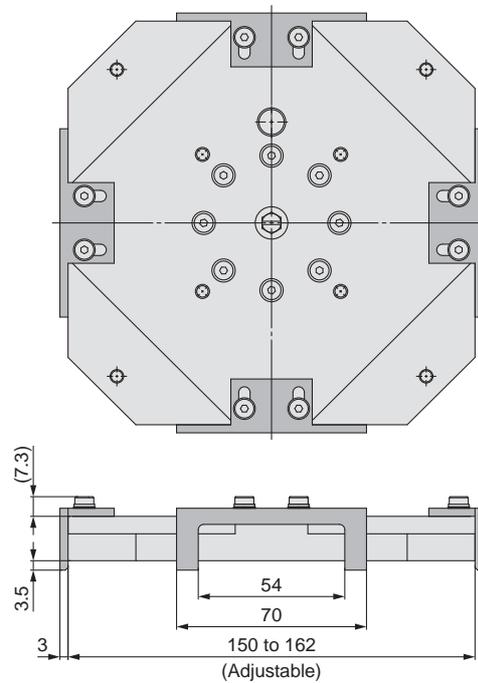
Dimensions [Bernoulli Type]

With guide assembly

Size: □120

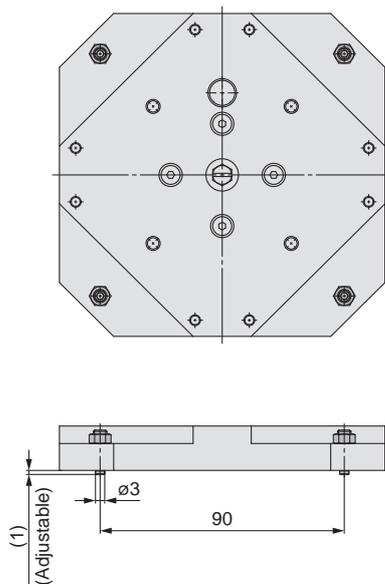


Size: □150

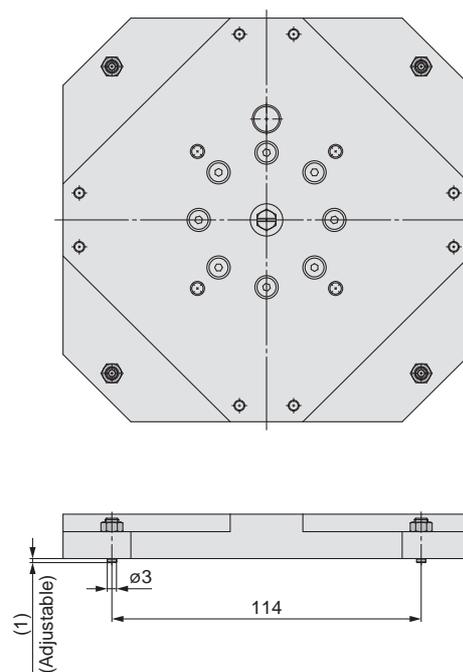


With adjustment bolt assembly

Size: □120



Size: □150



Magnet Gripper *MHM-X6400*

Adsorbs and Holds with a Magnet

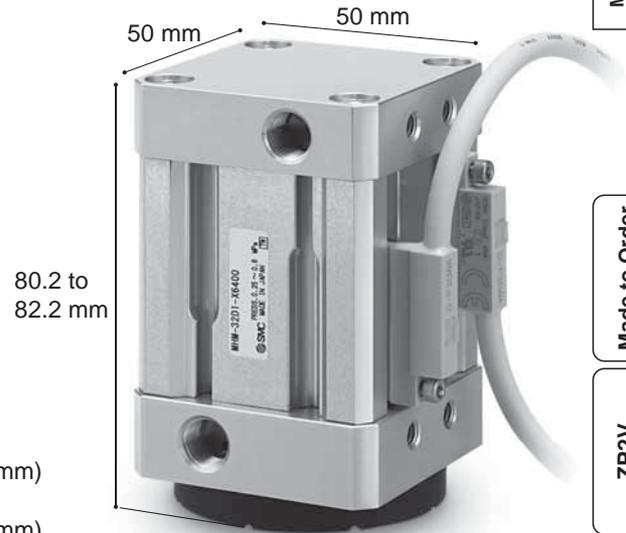
Steel plates can be transferred without a vacuum.

Can support workpieces with holes and uneven surfaces when a vacuum pad cannot be used

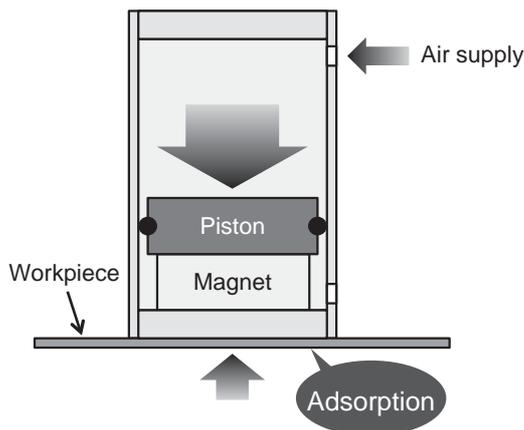
Holds workpieces even when the air is shut off

High holding force **80 N** (Workpiece plate thickness: 0.6 mm)
120 N (Workpiece plate thickness: 1.4 mm)

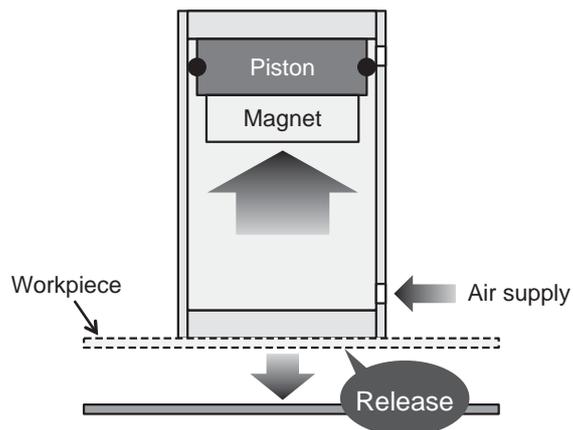
Residual holding force **0.3 N or less** (Reduces workpiece release time)



Workpiece adsorption/holding



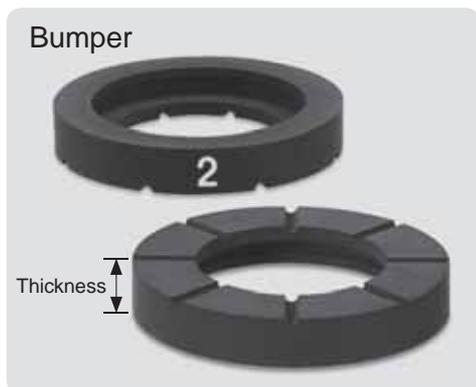
Workpiece release



Holding force can be adjusted with a bumper with 3 types of thicknesses.

Thickness	Holding force
6 mm	80 N
7 mm	50 N
8 mm	30 N

Prevents deformation of workpieces and accidental adsorption of a second piece. Fluororubber with excellent oil resistance is used. Has a contact surface structure which reduces sideslip. Bumper can be replaced without a tool.



Auto switches can be mounted on 4 surfaces.

Magnetic field-resistant auto switch:

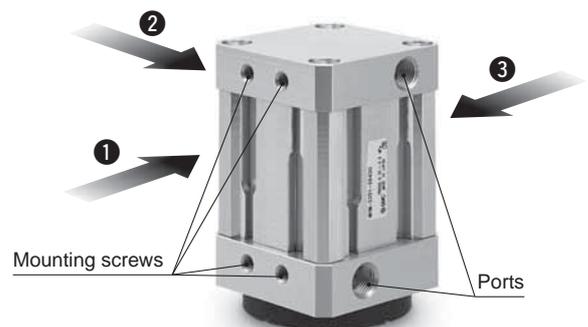
D-P3DWA

Small auto switch:

D-M9□V



Mountable on 3 surfaces.



Model Selection

Made to Order

ZP2V

XT661

MHM

Precautions

Magnet Gripper

MHM-X6400

How to Order

MHM-32D 1 - P3DWAL - X6400

Holding force

Symbol	Holding force
1	80 N
2	50 N
3	30 N

Number of auto switches

Nil	2
S	1

Auto switch

Nil	Without auto switch
P3DWA□	D-P3DWA□
M9□V	D-M9□V□

* For applicable auto switches, refer to the table below.



Applicable Auto Switches: Refer to the **Web Catalog** for further information on auto switches.
Magnetic Field-Resistant Auto Switches

Type	Auto switch model	Applicable magnetic field	Electrical entry	Indicator light	Wiring (Pin no. in use)	Load voltage	Lead wire length	Applicable load
Solid state auto switch	P3DWASC	AC magnetic field (Single-phase AC welding magnetic field)	Pre-wired connector	2-color	2-wire (3-4)	24 VDC	0.3 m 0.5 m 3 m 5 m	Relay, PLC
	P3DWASE				2-wire (1-4)			
	P3DWA		Grommet		2-wire			
	P3DWAL							
P3DWAZ								

Small Auto Switches

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length [m]				Pre-wired connector	Applicable load		
					DC	AC		0.5 (Nil)	1 (M)	3 (L)	5 (Z)		IC circuit	Relay, PLC	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	●	●	●	○	○	IC circuit	Relay, PLC	
				3-wire (PNP)				●	●	●	○	○			
				2-wire	12 V			●	●	●	○	○			
				3-wire (NPN)	5 V, 12 V			●	●	●	○	○			
				3-wire (PNP)				●	●	●	○	○			
	Diagnostic indication (2-color indicator)			2-wire	12 V			●	●	●	○	○	—		
				Water resistant (2-color indicator)	3-wire (NPN)			5 V, 12 V	○	○	●	○	○		IC circuit
					3-wire (PNP)				○	○	●	○	○		
					2-wire			12 V	○	○	●	○	○		—
					3-wire (NPN)			5 V, 12 V	○	○	●	○	○		IC circuit
3-wire (PNP)	○	○	●		○	○									
2-wire	12 V	○	○	●	○	○	—								

* Solid state auto switches marked with "○" are produced upon receipt of order.

* For details about auto switches with pre-wired connectors, refer to the **Web Catalog**.

* Auto switches are shipped together with the product but do not come assembled.

* Lead wire length symbols: 0.5 m Nil (Example) M9NWV
 1 m M (Example) M9NWVM
 3 m L (Example) M9NWVL
 5 m Z (Example) M9NWVZ

Specifications

Action	Double acting
Fluid	Air
Operating pressure	0.25 to 0.6 MPa
Ambient and fluid temperatures	-10 to 60°C (No freezing)
Holding force	MHM-32D1-X6400 80 N
(Workpiece thickness: 0.6 mm)	MHM-32D2-X6400 50 N
	MHM-32D3-X6400 30 N
Residual holding force	0.3 N or less
Lubrication	Non-lube
Weight	475 g

Bumper Order Nos.

Symbol	Holding force	Model
1	80 N	MHM-A3201-1-X6400
2	50 N	MHM-A3201-2-X6400
3	30 N	MHM-A3201-3-X6400



Symbol

Dimensions

Model Selection

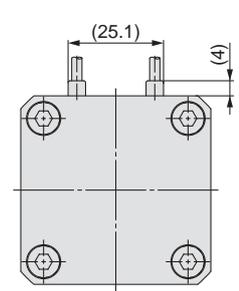
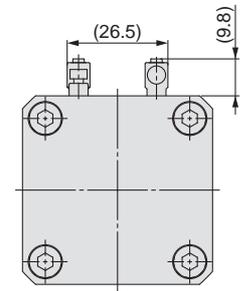
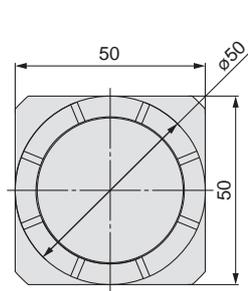
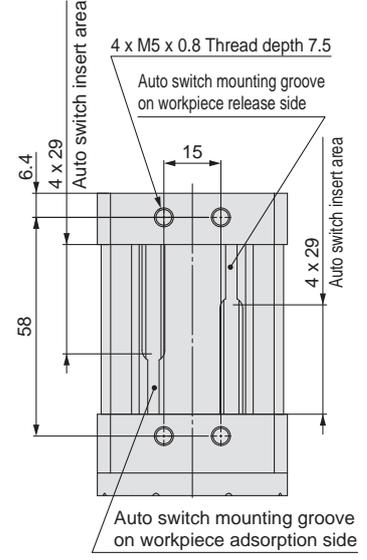
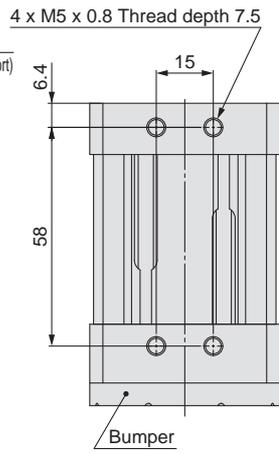
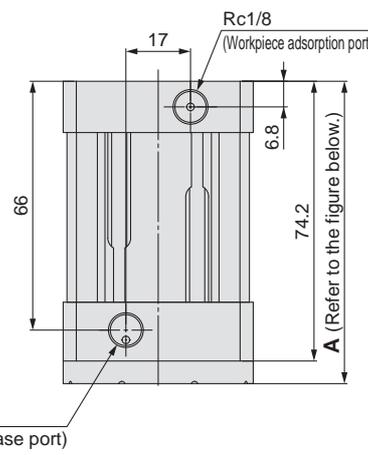
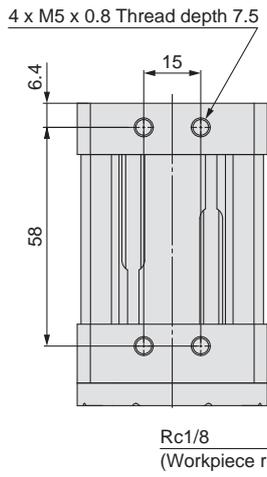
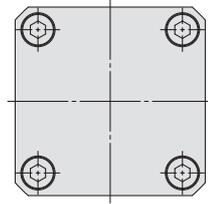
Made to Order

ZP2V

XT661

MHM

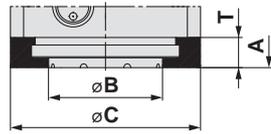
Precautions



D-P3DWA

D-M9□V

With auto switch



Symbol	Part number	A	øB	øC	T
1	MHM-32D1-X6400	80.2	39	50	(6)
2	MHM-32D2-X6400	81.2	30		(7)
3	MHM-32D3-X6400	82.2	30		(8)

Bumper dimensions

⚠ Caution

- Since a thin plate is used for the metal surface on the end, damage may occur when an impact load is applied due to contact with a workpiece. Be sure to attach a bumper before use, and check and adjust operation so that no impact load is applied to the metal surface.
- When operating an actuator with a small diameter and a short stroke at a high frequency, dew condensation (water droplets) may occur inside the piping depending on the conditions.
Simply connecting the moisture control tube (IDK series) to the actuator will prevent dew condensation from occurring. For details, refer to the IDK series in the **Web Catalog**.

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.

Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.



Vacuum Equipment Precautions 1

Be sure to read this before handling products.

Design/Selection

Warning

1. Confirm the specifications.

Products represented in this catalog are designed only for use in compressed air systems (including vacuum).

Do not operate at pressures, temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction. (Refer to the specifications.)

Please contact SMC when using a fluid other than compressed air (including vacuum).

We do not guarantee against any damage if the product is used outside of the specification range.

2. Safe designs should be developed, which account for the possibility of accidents resulting from a drop in vacuum pressure due to power failure, trouble with the air supply, etc.

If vacuum pressure drops and there is a loss of vacuum pad adsorption force, workpieces being carried may fall, causing human injury or damage to machinery. Sufficient safety measures should be implemented, such as drop prevention, to avoid any accidents.

3. Follow vacuum specifications for vacuum switching valves and vacuum release valves.

If non-vacuum equipment is installed in a vacuum piping, vacuum leakage will occur. Therefore, select only equipment for vacuum specifications.

4. Select an ejector which has a suitable suction flow rate.

<When there is vacuum leakage from the workpiece or the piping>
If the ejector's suction flow rate is too low, the adsorption will be poor.

<When piping is long or the diameter is large>
The adsorption response time will delay due to the increased volume of the piping.
Select an ejector with a suitable suction flow rate by referring to the technical data.

5. If the suction flow rate is too high, setting of vacuum switch will become difficult.

Setting the vacuum switch when adsorbing a small (few millimeter) workpiece will sometimes become difficult, if the selected ejector has a high suction flow rate and there is a small pressure difference when adsorbing and releasing the workpiece.

6. When two or more pads are piped to one ejector, if one pad releases its workpiece, the other pads will also release.

When one pad releases its workpiece, there is a drop in vacuum pressure which causes the other pad to release its workpiece as well.

7. When separating the pad from the workpiece, break the vacuum and confirm that the pressure is atmospheric pressure.

Do not separate them forcibly while vacuum pressure exists between them. This may cause cracking, tearing, or distortion of the pad, or cause the pad to come off the adapter.

8. Do not apply a lateral load (force), such as rotation or sliding force of the workpiece, to the adsorption surface of the pad during the adsorption of a workpiece.

This may cause deformation, cracking, tearing, or distortion of the pad, or cause the pad to come off the adapter.

9. Do not disassemble the product or make any modifications, including additional machining.

Doing so may cause human injury and/or an accident. When disassembling or assembling the product for the purpose of replacing parts, etc., be certain to follow the operation manual or catalogs.

10. Vacuum holding using check valves

SMC can issue no guarantees regarding the maintenance of workpiece adsorption when using check valves. Take separate safety measures to prevent workpieces from dropping in the case of an electrical power outage, etc. Please consult with SMC when using check valves as a means of preventing interference caused by the exhaust from nearby ejectors.

11. Air leakage from main valve

SMC does not guarantee zero air leaks from the main valve used for the vacuum ejector/vacuum pump system. If air leakage is a problem, please contact SMC.

12. Vacuum pads are not guaranteed for zero air leakage (vacuum holding).

Caution

1. Mounting the suction filter

Because the suction of vacuum equipment acts not only on workpieces but also on dust or water droplets in the surrounding atmosphere, steps must be taken to prevent their penetration into the equipment's interior. Even when using equipment equipped with filters, if there is a considerable amount of dust in the environment, use a separately ordered large-size filter as well.

If there is a possibility of water droplets being sucked in by the vacuum, use a drain separator for vacuum.

2. The maximum vacuum pressure of the vacuum ejector is affected by the atmospheric pressure of the operating environment.

As atmospheric pressure changes based on altitude, climate, etc., the actual maximum vacuum pressure may not reach the value listed in the specifications.

3. For information on related items, such as directional control equipment and actuators, refer to the caution sections in each respective catalog.

4. Do not use the product in an environment that exposes it to vibration. If the product is used in such an environment, we can offer a lock nut type product to prevent it from loosening. Please contact SMC for the part number.

5. Foreign matter may get inside the pad.

Although SMC gives full attention to prevent foreign matter from getting inside the product during pad molding, it is difficult to remove foreign matter from the molded product completely. Therefore, products with imperceptible, fine foreign matter are determined as acceptable and shipped to customers.



Vacuum Equipment Precautions 2

Be sure to read this before handling products.

Design/Selection

⚠ Caution

6. There is a possibility of crystallized white powder or exuded liquid forming on the rubber surface.

The crystallized powder is called bloom, and the exuded liquid is called bleed. Bloom and bleed do not affect product operation. This phenomenon is caused by rubber compounding agents, such as a vulcanizing agent, antioxidants, oxidation inhibitors, softeners, parting agents, etc., and differs depending on the rubber material. As this phenomenon is influenced by changes in the environment (temperature differences, light (fluorescent light), humidity, etc.), the occurrence time cannot be estimated.

Mounting

⚠ Warning

1. Operation manual

Install the products and operate them only after reading the operation manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.

2. Ensure sufficient space for maintenance activities.

When installing the products, allow access for maintenance and inspection.

3. Tighten threads with the proper tightening torque.

When installing the products, follow the listed torque specifications.

4. Be sure to secure the product in place when mounting the pad.

Not securing it firmly into place may cause problems.

5. Use caution when implementing rotating transfer with a pad or when using workpieces and pads with a deviation in the center of the suction position.

Screw looseness due to rotation and pad rotation may cause problems. Apply a screw lock agent as necessary.

6. Avoid operation in a rotational direction by using the ball joint pad mechanism.

Wear may cause problems.

7. A buffer is used to decrease the load applied to the pad (horizontal lifting).

A malfunction may occur when the buffer is used for inclined or vertical lifting.

8. After the stroke, make sure that the buffer returns to the initial state before starting the next process.

Malfunctions may occur.

9. When pushing a pad to a workpiece, make sure not to apply an impact or a large force.

This will lead to premature deformation, cracking, or wearing of the pad. When pushing a pad onto a workpiece, operate within the deformable range of the pad skirt.

10. Do not obstruct the exhaust port of the ejector.

If the exhaust port is obstructed when mounted, a vacuum will not be generated. Also, do not obstruct the exhaust port with the goal of removing the workpiece. It may cause damage to the equipment.

Piping

⚠ Caution

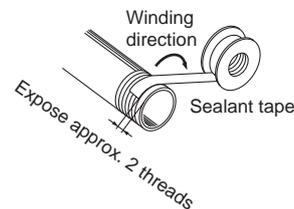
1. Refer to the Fittings and Tubing Precautions (Web Catalog) for handling One-touch fittings.

2. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil, and other debris from inside the pipe.

3. Winding of sealant tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not enter the piping. Also, if sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



4. Use piping with adequate conductance.

Select equipment and piping for the vacuum side which has adequate conductance so that the ejector's maximum suction flow rate can be accommodated by the piping.

Also, make sure that there are no unnecessary restrictions, leaks, etc., along the course of the piping. Furthermore, the air supply should be designed while taking into consideration the ejector's maximum air consumption and the air consumption of other pneumatic circuits.

5. Avoid disorganized piping.

Piping which is direct and of the shortest possible length should be used for both the vacuum and supply sides. Disorganized piping should be avoided. Unnecessary length increases the piping volume, and thus increases the response time.

6. Use piping with large conductance on the exhaust side of the ejector.

If the exhaust piping is restrictive, there will be a decline in the ejector's performance.

7. Be certain that there are no crushed areas in the piping due to damage or bending.

Vacuum Release Flow Adjusting Needle

⚠ Warning

1. The pressure and flow rate of the vacuum release air to be output varies depending on the supply pressure, needle opening, and difference between the vacuum ejector system and the vacuum pump system. Conduct appropriate adjustments with the adjusting needle mounted on the actual machine while checking the effects on the workpiece.

2. To adjust the flow rate, turn the adjusting needle to the right (clockwise) to decrease the flow rate, and turn it to the left (counterclockwise) to increase the flow rate.



Vacuum Equipment Precautions 3

Be sure to read this before handling products.

Air Supply

Warning

1. Type of fluids

Be sure to use compressed air for the fluid. Please consult with SMC when using the product in applications other than compressed air.

Additionally, use purified compressed air, from which the water contents, oil contents, and drains have been removed completely.

2. Control of supply air

Compressed air containing a large amount of water content, oil content, drain, etc., may cause the pneumatic equipment to malfunction. So, install an air filter, air dryer, or a mist separator. (A system with a quality grade of No. C, D, or higher in the air preparation equipment model selection guide of Best Pneumatics No. 6 is recommended.)

Additionally, when applying oil to compressed air that is used for directional control equipment or actuators, install piping separately so that air is supplied to the vacuum equipment before the oil is applied.

If oil flows into the vacuum ejector/vacuum pump system, the silencer, nozzle, or filter may be clogged, causing reduced performance.

3. Drain flushing

If drain in the air filter or mist separator is not removed, the drain flows from the outlet, causing the pneumatic equipment to malfunction.

If drain flushing is deemed difficult, it is recommended to use a product with an auto drain option. For details about compressed air quality, refer to the SMC Best Pneumatics No. 6 catalog.

4. Use clean air.

Do not use compressed air that contains chemicals, synthetic oils that include organic solvents, salt contents, corrosive gases, etc. This may cause the product to break or malfunction.

Operating Environment

Warning

1. Do not use in an atmosphere containing corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.
2. Do not use in a place subject to heavy vibration and/or shock.
3. Do not use in an environment where flammable gas or explosive gas exists. Usage may cause a fire or explosion. The products do not have an explosion-proof construction.
4. The product should not be exposed to prolonged sunlight. Use a protective cover.
5. Remove any sources of excessive heat.
6. In locations where there is contact with spatter from water, oil, solder, etc., take suitable protective measures.
7. In cases where the vacuum unit is surrounded by other equipment, etc., or the unit is energized for an extended time, take measures to exhaust excess heat so that the temperature remains within the specifications.

Operating Environment

Caution

1. Under certain conditions, the exhaust of the vacuum ejector may generate intermittent noises, and vacuum pressure may be uneven.

Using the ejector under these conditions will not result in decreased performance, but if the intermittent noise becomes a nuisance, or there is an adverse effect on the operation of the vacuum pressure switch, try lowering or raising the supply pressure of the vacuum ejector to find a supply pressure level at which the intermittent noise ceases.

Maintenance

Warning

1. Perform maintenance and inspection according to the procedures indicated in the operation manual.

If handled improperly, malfunction or damage of machinery and equipment may occur.

2. Maintenance work

If handled improperly, compressed air can be dangerous. Assembly, handling, repair, and element replacement of pneumatic systems should be performed by a knowledgeable and experienced person.

3. Drain flushing

Remove drainage regularly from the water separator, air filters, drain separator for vacuum, etc.

4. Removal of equipment, and supply/exhaust of compressed air

Before components are removed, first confirm that measures are in place to prevent workpieces from dropping, run-away equipment, etc. Then, cut off the supply pressure and electric power, and exhaust all compressed air from the system using the residual pressure release function.

When machinery is restarted after remounting or replacement, first confirm that measures are in place to prevent the lurching of actuators, etc. Then, confirm that the equipment is operating normally.

5. Perform maintenance of suction filters and silencers periodically.

The performance of an ejector will deteriorate due to clogged filters and silencers. High-flow filters should be used, especially in dusty locations.

6. Leakage or clogging of the air pressure circuit, wear, cracks, or deterioration of the pad, or buffer sliding failure (wear, galling, or other failure of the sliding parts) may lead to problems. Make sure to perform periodic maintenance and inspection.

7. When adsorbing a deformed or spherical workpiece, it is necessary to push the pad against it.

Even if the workpiece can be adsorbed in the initial operation, deformation, cracks, or wear of the pad may occur prematurely, causing problems. Make sure to perform periodic maintenance and inspection.



Vacuum Pads Precautions

Be sure to read this before handling products.

Design

Warning

1. In cases where the workpieces are heavy or dangerous objects, etc., take measures to address a possible loss of adsorption force (installation of a drop prevention guide, etc.).

In the case of transportation by vacuum adsorption using vacuum pads, the adsorption force is lost when there is a drop in vacuum pressure. Furthermore, since vacuum pressure can also deteriorate due to the wear and cracking of pads, vacuum leakage from piping, etc., be certain to perform maintenance on vacuum equipment.

Selection

Caution

1. The pad materials which can be used differ depending upon the operating environment.

An appropriate pad material should be selected. Furthermore, since vacuum pads are manufactured for use with industrial products, they should not come into direct contact with medicines, food products, etc.

2. Depending upon the weight and shape of the workpieces, the diameter, quantity, and shape of pads suitable for use will vary.

Use the pad lifting force table for reference. Also, the selectable pads will differ based upon conditions other than the above, such as the condition of the workpiece surface (presence or absence of oil or water), the workpiece material, and its gas permeability. Confirmation is necessary by actually performing vacuum adsorption on the subject workpieces.

3. Use a buffer for the adsorption of fragile workpieces.

The cushioning performed by the buffer is also necessary when there is variation in the height of workpieces. If further positioning of the pads and workpieces is required, a non-rotating buffer can be used.

4. The life of the buffer will be reduced if lateral force is applied to the buffer shaft.

Note that sometimes a load is applied to the buffer by a piping tube (pulling, pressing, etc. in a lateral direction).

5. Do not apply an impact or large force to a pad when adsorbing a workpiece.

This will cause the deformation, cracking, and wear of the pad to be accelerated. The stiffening ribs, etc., should touch lightly, while staying within the pad skirt's deformation range. Positioning should be performed accurately, especially in the case of small-diameter pads.

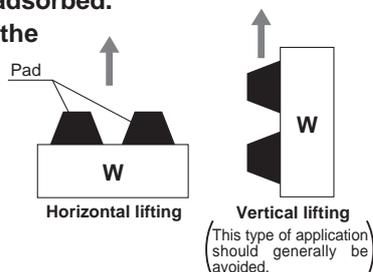
6. When transporting vertically, factors such as acceleration, wind pressure, and impact force must be considered in addition to the workpiece weight.

Use caution particularly when lifting items such as glass plates and circuit boards because a large force will be applied by wind pressure. When a workpiece which is oriented vertically is transported horizontally, large forces are applied by acceleration when movement is started and stopped. Furthermore, in cases where the pad and workpiece can slip easily, accelerations and decelerations of horizontal movement should be kept to a minimum.

7. When transporting flat shaped workpieces that have large surface areas using multiple pads, care must be taken in arranging the pads, so that the workpieces are evenly adsorbed.

8. Use caution since the workpiece could rotate during transfer.

Use of more than one pad for each workpiece is recommended.



Maintenance

Caution

1. Perform pad maintenance regularly.

Since pads are essentially rubber, deterioration is unavoidable. The rate of deterioration depends upon factors such as conditions of use, environment, and temperature. Regular maintenance should be performed. If any damage, splitting, cracking, or abrasion has occurred in a pad, replace it immediately. Also, take care not to damage the outside of the pad.

Storage

Caution

1. It is recommended to store vacuum pads in the environment shown in the table below.

Storing in an environment other than that recommended below may lead to changes in properties (deformation, discoloration, cracking, increased adhesiveness, etc.).

Table 1. Recommended Storage Environment for Vacuum Pads

Temperature	15 to 25 [°C]
Humidity	50[%] or less, No condensation
Other	Location that is shaded from direct sunlight or fluorescent light Location without the presence of ozone (For NBR and conductive NBR)

Vacuum Pads

Basic Pad **ZP** Series

Compact Type **ZP3** Series

Oval Pad **ZP/ZP2** Series

High Rigidity Pad **ZP3E** Series

Pads for Special Applications

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D-G

1st printing XU printing XU 13800SZ Printed in Japan.