Vacuum Pad

ZP3E Series

Ø32, Ø40, Ø50, Ø63, Ø80, Ø100, Ø125

Flat Type With Groove Bellows Type With Groove

RoHS

Stability of suction position, improved ease of removal

Number of mounting screws reduced (4 pcs. \rightarrow 1 pc.)

Pad and metal parts can be disposed of separately.

Improved uneven workpiece surface suction.



ZP3

ZP3E

ZP2 ZP2V

ZP ZPT ZPR

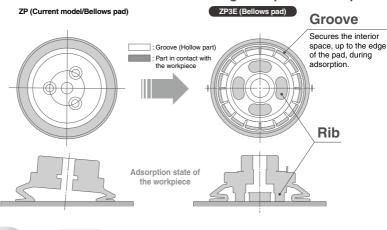
Vacuum Pad Flat Type with Groove/Bellows Type with Groove ZP3E Series

Stability of suction position

Groove and rib formed to adsorb with entire surface



■ Ribs reduce the inclinations during transport of workpiece.



Improved ease of removal

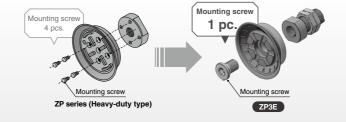
With groove

Dents and bumps on the adsorption surface prevent the workpiece from sticking to it. This facilitates easy removal.

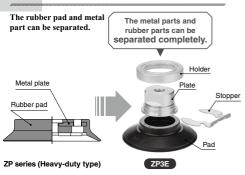
Shot-blasted

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

The number of mounting screws reduced



Can be disposed of separately.



Mark-free

Standard pad

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

Clear trace of the pad

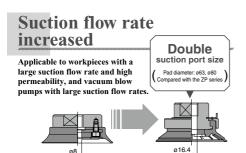
No trace of the pad!

Mark-free

NBR pad

by up to

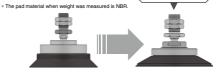
290 g



	ZP (Curre	nt model)	ZP3E		
Pad diameter	Suction port	Area [mm²]	Suction port	Area [mm²]	
ø32	_	_			
ø40	ø6	28.3	ø 8.4	55.4	
ø50	90	20.5			
ø63	ø8	50.2			
ø80	90	50.2	ø16.4	211	
ø100	ø10	78.52	910.4	211	
ø125	910	70.52			

Ball joint type pad weight reduced Weight reduced

Weight reduced by changing the internal structure and materials

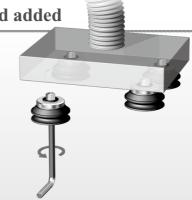


	ZP2/Flat type	ZP3E/Flat type with groove
Pad diameter	Weight [g]	Weight [g]
ø32	_	56
ø40	91	57
ø50	110	75
ø63	230	150
ø80	270	160
ø100	430	190
ø125	560	270

Direct mounting with male thread added

- Direct
 - Reduced in height
 - Easy mounting with tightening with a hexagonal wrench





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ZP3 ZP3: ZP2

ZP2V ZP

Vacuum Pad Flat Type with Groove/Bellows Type with Groove **ZP3E** Series

Pad Unit Variations



Form		Pad diameter						Material	Page	
	-OIIII	ø32	ø40	ø50	ø63	ø80	ø100	ø125	Material	raye
ZP3E-□UM-□	Flat type with groove For adsorption of general workpieces. To be used when adsorption surface of the workpiece is flat and not deformed.	-							NBR Silicone rubber	404
ZP3E-□BM-□	Bellows type with groove To be used when adsorption surface of the workpiece is slanted.								Urethane rubber FKM Mark-free NBR	404

Vacuum Pad Flat Type with Groove/Bellows Type with Groove 932, 940, 950, 663, 980, 9100, 9125

	/1
1. Features and Precautions for Vacuu 2. Vacuum Pad Selection	m Adsorption
■ Flat Type Pad/Bellows Type Pad w Pad Unit: Flat Type with GroovePad Unit: Bellows Type with Groove	P.404
With Set Screw: Flat Type with Groove With Male Thread Adapter: Flat Type w With Female Thread Adapter: Flat Type w With Set Screw: Bellows Type with Gro With Male Thread Adapter: Bellows Type With Female Thread Adapter: Bellows Type With Male Thread Adapter: Bel	P.408 rith Groove P.410 rith Groove P.412 ove P.414 with Groove P.416
With Male Thread Adapter: Flat Type w With Female Thread Adapter: Flat Type w With Female Thread Adapter: Bellows Type With Female Thread Adapter: Bellows Type	vith Groove ······ P.420 vith Groove ····· P.422 with Groove ···· P.424
Vertical Vacuum Inlet/With Bu With Buffer: Flat Type with Groove With Buffer: Bellows Type with Groove	P.428

Lateral Vacuum Inlet/With Buffer P.432
With Buffer: Flat Type with Groove P.432
With Buffer: Bellows Type with GrooveP.434
Vertical Vacuum Inlet/With Ball Joint Adapter P.436 With Ball Joint Adapter: Flat Type with Groove P.436 With Ball Joint Male Thread Adapter: Flat Type with Groove P.443 With Ball Joint Female Thread Adapter: Flat Type with Groove P.441 With Ball Joint Adapter: Bellows Type with Groove P.443 With Ball Joint Male Thread Adapter: Bellows Type with Groove P.445 With Ball Joint Female Thread Adapter: Bellows Type with Groove P.445
Lateral Vacuum Inlet/With Ball Joint Adapter · · · P.449
With Ball Joint Male Thread Adapter: Flat Type with Groove P.449
With Ball Joint Female Thread Adapter: Flat Type with Groove P.452
With Ball Joint Male Thread Adapter: Bellows Type with Groove ····· P.454
With Ball Joint Female Thread Adapter: Bellows Type with Groove · · · · P.456
Vertical Vacuum Inlet/With Ball Joint Buffer p.458
With Ball Joint Buffer: Flat Type with Groove P.458
With Ball Joint Buffer: Bellows Type with Groove P.461
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With Ball Joint Buffer: Flat Type with Groove P.463
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Construction
Component Part No. P.471
How to Replace the PadP.479
Component Parts: DimensionsP.480
Ball Joint Assembly/Unit Part No. P.487

With Adapter Variations **Standard Ball Joint** Type Type Vacuum inlet direction Vacuum inlet direction Mounting Buffer Mounting Buffer Page Page Mounting thread size thread size attachment Mounting attachment Vertical Vertical M₁₀ M6 Male thread/Direct mounting 408 Male thread/Direct mounting 436 M16 M12 ZP3E-T□□□-□ ZP3E-TF□□□-□ Vertical Vertical Male thread/Plate connection M14 Without Male thread/Plate connection M14 Without 408 436 buffer buffer M16 M16 ZP3E-T□□□-□ ZP3E-TF□□□-□ Vertical Vertical M8 M10 M8 408 Female thread mounting Female thread mounting 436 M12 M12 M18 ZP3E-T□□□-□ ZP3E-TF□□□-□ Lateral Lateral Male thread mounting Male thread mounting M14 M14 420 449 M16 M16 ZP3E-Y□□□-□ Without ZP3E-YF Without buffer buffer Lateral Lateral M8 M8 Female thread mounting Female thread mounting 420 449 M12 M12 ZP3E-Y□□□-□ ZP3E-YF Vertical Vertical Male thread mounting Male thread mounting 428 458 With With buffer buffer ZP3E-T□□□JB□ ZP3E-TF□□□JB□ M18 M18 Stroke Stroke M22 M22 · 10 mm · 10 mm Lateral Lateral · 30 mm · 30 mm Male thread mounting · 50 mm Male thread mounting · 50 mm 432 463

ZP3E

ZP3E ZP2

ZP2V ZP

ZPT ZPR XT661

ZP3E-YF□□□JB□

ZP3E-Y□□□JB□

Vacuum Equipment Model Selection

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Features and Precautions for Vacuum Adsorption

Vacuum adsorption system as a method to hold a workpiece has the following features.

- · Compared with the mechanical gripper and other similar products, it has a simpler construction and fewer moving parts.
- Workpieces with any shape are possible if they have an adsorption surface.
- · No need for accurate positioning
- · Compatible with soft and easily-deformed workpieces

However, special care is required in the following conditions.

- Be careful and do not drop the workpiece caused by the transfer conditions (acceleration, vibration, or impact).
- The piping may be clogged by liquid or particles suctioned near the workpiece.
- It is necessary to place the pad in the appropriate position to transfer heavy objects.
- The vacuum pad (rubber) may deteriorate 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 is recommended with actual equipment before selecting the product model.

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

Vacuum Pad Selection

Before selecting the product model, read "How to Order", "Vacuum Equipment Precautions", and "Safety Instructions."

The operating range and performance data and values shown in this catalog are the guidelines for selecting a model. In actual operation, there is a possibility that a general specification is not applicable due to unexpected factors or conditions.

Before using the product, determine whether or not the values shown in this catalog are applicable to expected usage, and accept all danger and responsibility caused thereby. SMC cannot take any responsibility for any items which are not shown in this catalog.

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 the model based on product weight, there is a possibility that the workpiece cannot be adsorbed or it is dropped depending on the operating conditions (workpiece balance, transfer acceleration, pressure or friction force applied to the workpiece during transfer etc.).
- 2) Find the theoretical lifting force from the identified adsorption area (pad area x number of pads) and vacuum pressure, and then find the lifting force considering actual lifting and safety factor of transfer condition.
 - * 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 weight of the workpiece.
- 4) Determine the pad form and materials, and the necessity of buffer based on the operating environment, and the workpiece shape and materials.
- 5) This product is not designed to hold a vacuum.
- 6) Perform a suction test with actual equipment to determine whether or not the product can be used.

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

Points for Selecting Vacuum Pads

A. Shear Force and Moment Applied to Vacuum Pad

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



ZP3

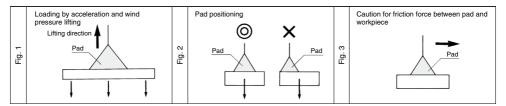
ZP3E

ZP2 ZP2V

ZΡ

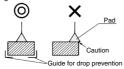
Lifting Force, Moment, Horizontal Force

- (Refer to Fig. 1) To lift a workpiece vertically, make sure to take into consideration the acceleration rate, wind pressure, impact, etc., in addition to the mass of the workpiece.
- (Refer to Fig. 2) Because the pads are susceptible to moments, mount the pad so as not to allow the workpiece to create a moment.
- (Refer to Fig. 3) When a workpiece that is suspended horizontally is moved laterally, the workpiece 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.

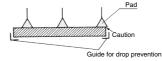


Balance of Pad and Workpiece

 Make sure that the pad's adsorption area is not larger than the surface of the workpiece to prevent vacuum leakage and unstable picking.



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 quide for preventing the workpieces from dropping) as necessary.

- * Mount the guide for drop prevention so that no load is applied to the workpiece (it does not push the workpiece up). If a load is applied, it is applied to the pad when the guide for drop prevention is removed. This may drop the workpiece.
- 3) Consider that the load may increase at a certain place due to the suction balance.

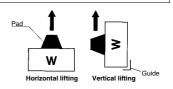
Formula examples with beams (Reference) Load/Shape conditions ۸_Č В A A в△ Λ Δ Λ D С С RA RR RA RR RA RB RC Formula RA-Ph/I RA=RB=P/2 RA=RC=5Pb/16 (Reactive force: R RB=Pa/L W=P RB=11P/8 Total load: W) W-P

Mounting Position

The basic mounting method is a horizontal lift.

Do not perform a suction when tilted, vertical suction, or holding suction (the pad receives the load of the workpiece). If the unit must be installed in such a manner, be certain to guarantee guide and absolute safety.

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



ØSMC

B. Theoretical Lifting Force

- The theoretical lifting force is determined by vacuum pressure and 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 in the actual operation.
- 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 pad, generation of cracks, sticking of
 the pad and workpiece, and sticking of the pad (bellows pad) will occur easily, possibly shortening the life of the pad.
 - Doubling the vacuum pressure makes the theoretical lifting force double, while to doubling the pad diameter makes the
 theoretical lifting force quadruple.
 - When the vacuum pressure (set pressure) is high, it makes not only response time longer, but also the necessary energy to generate a vacuum larger.

Example) Theoretical lifting force = Pressure x Area 2 times

Example) Theoretical litting force = Fressure x Area									
Pad diameter	Area [cm ²]	Vacuum pressure [-40 kPa]	Vacuum pressure [–80 kPa]						
ø6	0.28	Theoretical lifting force 1.1 N	Theoretical lifting force 2.2 N						
ø16	2.01	Theoretical lifting force 8.0 N	Theoretical lifting force 16.1 N						

4 times

Lifting Force and Vacuum Pad Diameter

- Set the vacuum pressure below the pressure that has been stabilized after adsorption.
 However, when a workpiece is permeable or has a rough surface, note that the vacuum pressure drops since the workpiece takes air in. In this case, 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 -

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

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 Pad W
Horizontal lifting

W Vertical lifting

This type of application should basically be avoided.

ZP3

ZP3E

ZP2

ZP2V

7P

XT661

Theoretical Lifting Force

The theoretical lifting force (not including the safety factor) is found from the pad diameter and vacuum pressure. The required lifting force is then found 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)

Theoretical Litting Force (Theoretical litting force = P x 5 x 0.1) [N]								
eter [mm]	ø 32	ø 40	ø 50	ø 63	ø 80	ø100	ø125	
rea [cm²]	8.04	12.56	19.63	31.16	50.24	78.50	122.66	
-85	68.3	107	167	265	427	667	1043	
-80	64.3	100	157	249	402	628	981	
-75	60.3	94.2	147	234	377	589	920	
-70	56.3	87.9	137	218	352	550	859	
-65	52.2	81.6	128	203	327	510	797	
-60	48.2	75.4	118	187	301	471	736	
-55	44.2	69.1	108	171	276	432	675	
-50	40.2	62.8	98.1	156	251	393	613	
-45	36.2	56.5	88.3	140	226	353	552	
-40	32.2	50.2	78.5	125	201	314	491	
	eter [mm] rea [cm²] -85 -80 -75 -70 -65 -60 -55 -50	eter [mm]	eter [mm]	eter [mm]	eter [mm]	eter [mm]	eter [mm] o32 o40 o50 o63 o80 o100 rea [cm²] 8.04 12.56 19.63 31.16 50.24 78.50 -85 68.3 107 167 265 427 667 -80 64.3 100 157 249 402 628 -75 60.3 94.2 147 234 377 589 -70 56.3 87.9 137 218 352 550 -65 52.2 81.6 128 203 327 510 -60 48.2 75.4 118 187 301 471 -55 44.2 69.1 108 171 276 432 -50 40.2 62.8 98.1 156 251 393 -45 36.2 56.5 88.3 140 226 353	

Vacuum Pad Type

Flat type with groove and bellows type with groove are available in the ZP3E series. Select the optimal form in accordance with the
workpiece and operating environment.

Pad Type

Pad form	Application			
Flat type with groove	For adsorption of general workpieces. To be used when adsorption surface of the workpiece is flat and not deformed.			
Bellows type	To be used when adsorption surface of			

* The bellows of the bellows type pad (including groove) may become stuck due to the operating conditions (flat board, high vacuum pressure, suction time (vacuum holding), etc.). If so, consider using a flat type pad. Select the pad type after evaluating them sufficiently at the customer's site.

■ Vacuum Pad Material

 It is necessary to determine vacuum pad materials carefully taking into account the workpiece shape, adaptability in the operating environment, effect after being adsorbed, electrical conductivity, etc.

Rubber Material and Properties

	General name	NBR (Nitrile rubber)	Silicone rubber	Urethane rubber	FKM (Fluoro rubber)
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
Pure (gum property (specific gravity)	1.00-1.20	0.95-0.98	1.00-1.30	1.80-1.82
mng	Impact resilience	0	0	0	Δ
	Abrasion resistance	0	\times to \triangle	0	0
pepuelq	Tear resistance	0	\times to \triangle	0	0
l le	Flex crack resistance	0	× to ○	0	0
of	Maximum operation temperature °C	120	200	60	250
ies	Minimum operation temperature °C	0	-30	0	0
Physical properties	Volume resistivity [Ωcm]	_	_	I	_
pro	Heat aging	0	0	Δ	0
g _	Weather resistance	0	0	0	0
is	Ozone resistance	Δ	0	0	0
立	Gas permeability resistance	0	\times to \triangle	\times to \triangle	× to △
926	Gasoline/Gas oil	0	\times to \triangle	0	0
star	Benzene/Toluene	× to △	×	\times to \triangle	0
Chemical resistance Oil resistance	Alcohol	0	0	Δ	△ to ◎
cal	Ether	× to △	\times to \triangle	×	× to △
ĕ≣	Ketone (MEK)	×	0	×	×
ਠ	Ethyl acetate	× to △	Δ	\times to \triangle	×
e 6	Water	0	0	Δ	0
anc	Organic acid	× to △	0	×	△ to ○
esis	Organic acid of high concentration	△ to ○	Δ	×	0
res	Organic acid of low concentration	0	0	Δ	0
Alkaline resistance Acid resistance	Strong alkali	0	0	×	0
₹^	Weak alkali	0	0	×	0

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

Color and Identification

General name	NBR (Nitrile rubber)	Silicone rubber	Urethane rubber	FKM (Fluoro rubber)	Mark-free NBR
Color of rubber	Black	White	Brown	Black	Black
Identification (Symbol)	_	_	_	F	_
Rubber hardness (±5°)	A55	A50	A50	A60	A60

^{*} Properties, chemical resistance, and other values are not guaranteed.

These values depend on the operating environment, so they cannot be guaranteed by SMC. Thorough research and confirmation are necessary before usage.

Pad type		Material of the	Д	Static *5			
		adsorption part (Part in contact with	Condition *2	(Initial value)	Operating temperature	friction	
		the workpiece)	Visual checking	Vapor method *3	range [°C]	ratio	
Mark-free Pad Series	Mark-free NBR pad		Mark-free NBR (Specially treated *4)	©	0	5 to 40	0.15 to 0.2
Standard	ZP series		NBR FKM Conductive NBR	×	×		
Stan	(Standard material)	Silicone rubber Urethane rubber	0	×	_	_	

Adsorption mark characteristics [©: Little or no influence O: Can be used depending on the conditions. X: Not suitable]
For NBR, FKM, and conductive rubber, black powder (rubber materials) may adhere to the the workpiece when it is adsorbed or when horizontal slippage occurs.

* The above table is for reference when selecting the pad.

Values and evaluation are reference data only. Preparatory testing under actual operating conditions is recommended.

*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 the workpiece to visually check for adsorption marks
- *4 Specially treated NBR is specially treated to modify and reduce the transfer of rubber constituents.
- *5 Static friction ratio ----- Static friction ratio when the workpiece (glass) is adsorbed by the pad. (NBR = 1 as a benchmark)

Cleaning method [Mark-free NBR pad]

- Always clean the product before operation and when carrying out regular maintenance.
- 1) Hold the 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%).
 - * This solution is a recommendation. If not available, use a solution with high purity which does not affect the material properties.
- 3) Wipe the adsorption surface (pad/resin attachment) and the part that comes into contact with the workpiece.
- 4) Dry them with clean air blow. (Or, wipe again with a dry non particle-generating cloth.)

Fine cracks may be generated on the mark-free NBR pad. However, it does not affect product operation.

Mark-free Pad Series [Mark-free NBR]

- Although the adsorption marks (transfer of rubber component to workpieces) of this product are minimized compared with current rubber pads, confirm if the adsorption marks have any effect when used in the actual system before use.
- 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.
- 2) Note that this product cannot be used to hold a vacuum.
- 3) Secure as high a flow rate as possible to suppress the pressure effect caused by leakage to a minimum.
- 4) Be sure to wash the portion of the pad that contacts the workpiece before use, or during periodic maintenance. If the pad is not washed correctly, deposits and solvents, etc. from the washing may remain as an adsorption mark.
- 5) When adsorbing workpieces with few impurities (high cleanliness), if "Mark-free NBR" is used, the edge of the pad may wear out early. Please consider using the ZP2 series "Stuck fluororesin pad" or "Resin attachment."

ZP3

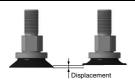
ZP3E ZP2

ZP2V

ΖP

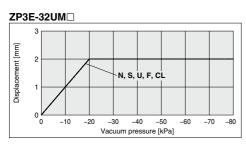
ZPT 7PR

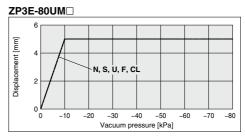
Pad Displacement to Vacuum Pressure (Flat Type with Groove)

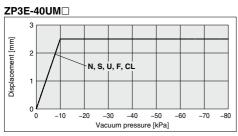


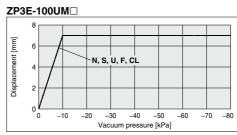
The data shown below are only for reference and are not guaranteed. These values depend on the operating environment, workpiece mass and transfer method. Therefore, thorough research and confirmation are necessary before use.

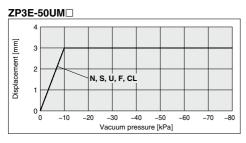
NBR (N): ——— Silicone rubber (S): · · · · · · Urethane rubber (U): - - - - FKM (F): - · · · · Mark-free NBR (CL): - · · ·

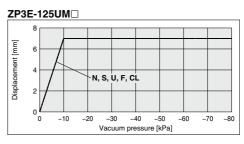


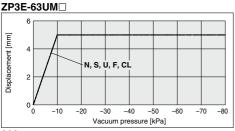






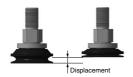






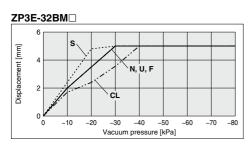
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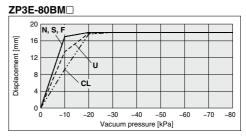
Pad Displacement to Vacuum Pressure (Bellows Type with Groove)

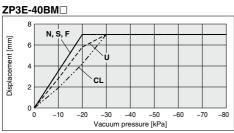


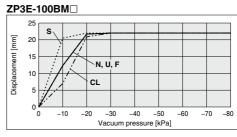
The data shown below are only for reference and are not guaranteed. These values depend on the operating environment, workpiece mass and transfer method. Therefore, thorough research and confirmation are necessary before use.

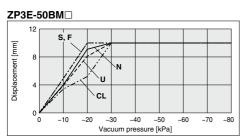
NBR (N): ——— Silicone rubber (S): · · · · · · Urethane rubber (U): - - - - FKM (F): - · · · · Mark-free NBR (CL): - · · · ·

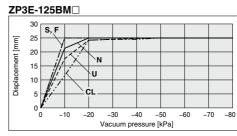


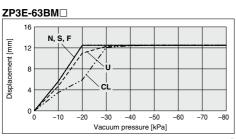












ZP3

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ZP2

ZP2V

ZΡ

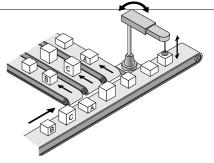
Buffer Attachment

• Choose buffer type when the workpieces are of varying heights, the workpieces are fragile, or you need to reduce the impact to the pad. If rotation needs to be limited, use non-rotating buffer.

в с

Unsteady Distance between Pad and Workpiece

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



Notes for Attachment

The buffer is manufactured for the purpose of protecting the pad from impact when the pad is applied to a workpiece. 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.

Use the buffer within the stroke.

● Pad Selection by Workpiece Type

• Carefully select a pad for the following workpieces.

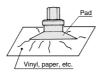
1. Porous Workpiece

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



3. Soft Workpiece

If a soft workpiece such as vinyl, paper, or thin sheet is picked up, the vacuum pressure could cause the workpiece to deform or wrinkle. In such a case, it will be necessary to use a small pad or a ribbed pad and reduce the vacuum pressure.

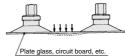


● Tube Piping Reference

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 as the long piping, piping bundles, piping material, etc., may become a load.

2. Flat Plate Workpiece

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

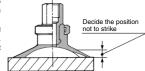


4. Impact to Pad

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. The pad should be pushed against the workpiece to the extent that its skirt portion deforms or that its

ribbed portion comes into slight contact with the workpiece. Especially, when using a smaller diameter pad, make sure to locate it

correctly.



5. Adsorption Mark

The main adsorption marks are as follows:

	Before suction		After suction		Countermeasure
Mark due to deformed (lined) workpiece	Suction conditions	Workpiece: Vin			Reduce the vacuum pressure. If lifting force is inadequate, increase the number of pads. Select a pad with a smaller center area.
	Suction conditions			Vacuum pressure: -40 kPa	
 Mark due to components contained in the rubber pad (material) moving to the workpiece. 					Use the following products. 1) Mark-free NBR pad 2) ZP2 series • Stuck fluororesin pad • Resin attachment
	Suction conditions	Workpiece: Gla: Vacuum pad: Zl		Vacuum pressure: -40 kPa	
A mark which remains on the rough surface of the workpiece due to wear-out of the rubber (pad material).	Suction conditions	Workniege: Be	ein plata	(Surface roughness 2.5 μ)	Use the following products. 1) ZP2 series • Stuck fluororesin pad • Resin attachment
	Suction conditions			Vacuum pressure: –80 kPa	

Vacuum Pad Durability

- Need to be careful of the vacuum pad (rubber) deterioration.
- When the vacuum pad is used continuously, the following problems may occur.
 - 1) Wear-out 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.)
- * It 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.

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3 Selection of Vacuum Ejector and Vacuum Switching Valve

Calculating Vacuum Ejector and Switching Valve Size with the Formula

Average suction flow rate for achieving adsorption response time

V : Piping capacity [L]

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

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

T2 = 3 x T1

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

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

QL: Leakage volume during workpiece adsorption [L/min (ANR)] Note 1)

Max. suction flow rate

Qmax = (2 to 3) x Q [L/min (ANR)]

<Selection Procedure>

Ejector

Select the ejector with the greater maximum suction flow rate from the Qmax indicated above.

Direct operation valve

Conductance
$$C = \frac{Qmax}{55.5} [dm^3/(s \cdot bar)]$$

* Select a valve (solenoid valve) having a conductance that is greater than that of the conductance **C** formula given above from the related equipment (page 793).

Note 1) QL: 0 when no leakage occurs during adsorbing a workpiece.

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

Note 2) Tube piping capacity can be found in "8. 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 pad becomes reduced 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 the proper size of the ejector and the vacuum switching valve by taking into consideration the amount of air that could leak through the workpiece.





Rough workpiece surface

Leakage Volume from Conductance of Workpiece

Leakage volume QL = 55.5 x CL

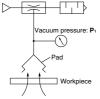
QL: Leakage volume [L/min (ANR)]

CL: Conductance between workpiece and pad, and workpiece opening area [dm3/(s-bar)]

● Leakage Volume from Suction Test

As described in the illustration below, pick up the workpiece with the ejector, using an ejector, pad and a vacuum gauge.

At this time, read 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.



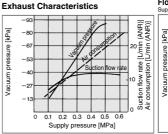
Exercise: Using a supply pressure of 0.45 MPa, when the ejector (ZH07) picks up a workpiece that leaks air, the vacuum gauge indicated a pressure of -53 kPa. Calculate the leakage volume from the workpiece.

<Selection Procedure>

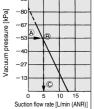
When obtaining the suction flow rate at a vacuum pressure of -53 kPa from the ZH07DS flow rate characteristics graph, the suction flow rate is 5 L/min (ANR). ((A) - (A) - (A))

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

ZH07BS, ZH07DS



Flow Rate Characteristics Supply pressure {0.45 MPa}



Leakage volume = Suction now rate 5 Limin (Ann

Adsorption Response Time

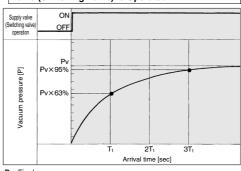
When a vacuum pad is used for the adsorption transfer of a workpiece, the approximate adsorption response time can be obtained (the length of time it takes for the pad's internal vacuum pressure to reach the pressure that is required for adsorption after the supply valve {vacuum switching valve} has 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 vacuum pressure and response time after the supply valve (switching valve) is operated as shown below.

Vacuum System Circuit Switching valve Switching valve Workpiece Workpiece

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

Calculating Adsorption Response Time with the Formula

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

Adsorption response time $T_1 = \frac{V \times 60}{2}$

Adsorption response time T2 = 3 x T1

Piping capacity

$$V = \frac{3.14}{4} D^2 x L x \frac{1}{1000} [L]$$

T1: Arrival time to 63% of final vacuum pressure Pv [sec]

T₂: Arrival time to 95% of final vacuum pressure Pv [sec]

Q1: Average suction flow rate [L/min (ANR)] Calculation of average suction flow rate

Eiector

Q₁ = (1/2 to 1/3) x Ejector max. suction flow rate [L/min (ANR)] Vacuum pump

 $Q_1 = (1/2 \text{ to } 1/3) \times 55.5 \times \text{Conductance of vacuum pump } [dm^3/(s\cdot bar)]$

D: Piping diameter [mm]

L : Length from ejector and switch valve to pad [m]

V : Piping capacity from ejector and switching valve to pad [L]

Q2: Max. flow from ejector and switching valve to pad by piping system $Q_2 = C \times 55.5 \text{ L/min (ANR)}$

Q: Smaller one between the Q1 and Q2 [L/min (ANR)]

C: Conductance of piping [dm3/(s-bar)]

For the conductance, the equivalent conductance can be found in "8. Data: Conductance by Tube I.D. (Selection Graph (3))."

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Adsorption Response Time from the Selection Graph

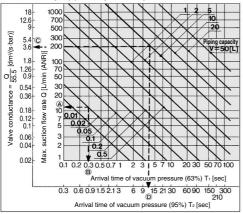
1. Tube Piping Capacity

Piping capacity from the ejector and switching valve at vacuum pump 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 T_1 and T_2 that elapsed before the prescribed vacuum pressure is reached can be obtained from the Selection Graph (1).

Selection Graph (1) Adsorption Response Time



^{*} 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 the vacuum ejector ZH07□S 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 T_1 that elapses until 63% of the maximum vacuum pressure is reached can be obtained. (Sequence in Selection Graph (1), $(A) \rightarrow (B)$, $T_1 \approx 0.3$ 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 dm²/(s-bar).

<Selection Procedure>

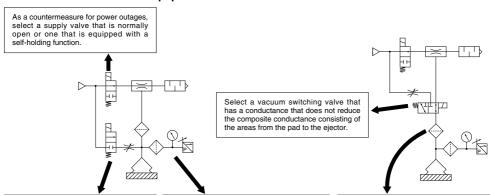
From the point at which the valve's conductance of 3.6 dm³/(s-bar) and the piping capacity of 5 L intersect, the discharge response time (Tz) that elapses until 95% of the final vacuum pressure is reached can be obtained. (Sequence in Selection Graph (1), \bigcirc — \bigcirc) Tz \approx 12 seconds.

6 Precautions on Vacuum Equipment Selection and SMC's Proposal

Safety Measures

• Make sure to provide a safe design for a vacuum pressure drop due to a disruption of power supply, or a lack of supply air. Drop prevention measures must be taken in particular when dropping a workpiece presents some degree of danger.

Precautions on Vacuum Equipment Selection

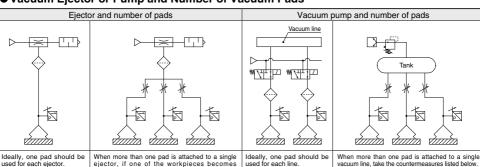


For the release valve, select a 2/3 port valve with a low vacuum specification. Also, use a needle valve to regulate the release flow rate

- · During the adsorption and transfer of a workpiece, verification of the vacuum switch is recommended.
- · In addition, visually verify the vacuum gauge 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 a dusty environment. If only the unit's filter is used, it will become clogged quickly.

Vacuum Ejector or Pump and Number of Vacuum Pads



When more than one pad is attached to a single ejector, if one of the workpieces becomes detached, the vacuum pressure will drop, causing other workpieces to become detached. Therefore, the countermeasures listed below must be taken.

- · Adjust the needle valve to minimize the préssure fluctuation between adsorption and non-adsorption operations.
- · Provide a vacuum switching valve to each individual pad to minimize the influences on other pads if an adsorption error occurs.

vacuum line, take the countermeasures listed below · 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 influences on other pads if an adsorption error occurs.

SMC

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ZP3E

ZP2 ZP2V

7P ZPT

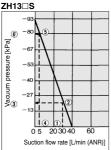
Vacuum Ejector Selection and Handling Precautions

Ejector Selection

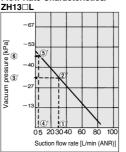
There are 2 types of ejector flow rate characteristics: the high vacuum type (S type) and the high flow type (L type).

During the selection, pay particular attention to the vacuum pressure when adsorbing workpieces that leak.

High Vacuum Type Flow Rate Characteristics/



High Flow Type Flow Rate Characteristics/

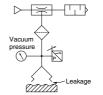


The vacuum pressure varies in accordance with the leakage volumes indicated in the above diagrams.

If the leakage volume is 30 L/min (ANR), the vacuum pressure of the S type is =20 kPa $\circlearrowleft \to 2) \to \circlearrowleft$, and for the L type it is =33 kPa $\circlearrowleft \to 2) \to \circlearrowleft$. If the leakage volume is 5 L/min (ANR), the vacuum pressure of the S type is =80 kPa $\circlearrowleft \to \circlearrowleft \to \circlearrowleft$, and for the L type it is =47 kPa $\circlearrowleft \to \circlearrowleft \to \circlearrowleft$. 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 (5 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

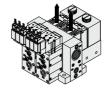


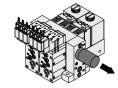
If a considerable amount of leakage occurs between the workpiece and the pad, resulting in incomplete adsorption, or to shorten the adsorption and transfer time, select an ejector nozzle with a larger diameter from the ZH, ZR, or ZL series.

Manifold Use

Individual exhaust

Centralized exhaust





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

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 exhaust at a certain supply pressure, the vacuum pressure will not be stable. It will not be any problem if the vacuum ejector is used under this condition. However, if the noise is disturbing or might affect the operation of the vacuum pressure switch, lower or raise supply pressure a little at a time, and use in 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, adsorption response time also improves. From the viewpoint of energy-saving, it is the 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 lower, it is recommended to use 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 a vacuum is generated after the adsorption pad descends to adsorb a workpiece. Also, there is a timing delay risk for the generating vacuum since the operational pattern for the verification switch, which is used for detecting the descending vacuum pad, is not even.

To solve this issue, we recommend that vacuum be generated in advance, before the vacuum pad begins to descend to the workpiece. Adopt this method after confirming that there will be no misalignment resulting from the workpiece's light mass.

B. Suction Verification

When lifting the 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., there is a risk that 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 Vacuum Pressure Switch

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

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

When setting vacuum pressure switch set values, you should set using a lower pressure, with which a workpiece can be adsorbed, only after considering the acceleration or vibration when a workpiece is transferred. The set value of the vacuum pressure switch shortens the time to lift a workpiece. Since the switch detects whether the workpiece is 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 a workpiece, verify at the vacuum pressure switch as much as possible (In addition, visually verify the vacuum gauge, especially when handling a heavy or a hazardous item.).

Approx. Ø1 adsorption nozzle

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

In such a case, it is necessary to use the digital pressure switch ZSE10 or ZSE30A with a fine smallest settable increment or a flow switch for flow rate detection.

Note) • 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 Best Pneumatics No. 8 for details.

Timing Chart Example **During suction** During vacuum release Cylinder UP Cylinder DOWN Cylinder switch Supply valve V port vacuum By lowering the nressure etting of the Atmospheric vacuum switch, the nressure takt time can be Vacuum pressure hortened switch set value Vacuum pressure at operation Vacuum re switch

Dust Handling of Vacuum Equipment

- When the vacuum equipment is used, not only the workpiece, but also dust in the surrounding environment is taken in the equipment. Preventing the intrusion of dust is required more than for any other 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 surrounding area of the workpiece clean so that dust will not be sucked in 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 depending on the amount of dirt.
- (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 a dusty environment, the unit's filter will become clogged quickly, so it is recommended that the ZFA, ZFB or ZFC series 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 conductances must be combined.)

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

C: Conductance [dm³/(s-bar)]

Qmax: Max. suction flow rate [L/min (ANR)]



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ZP2

ZP2V

ZΡ

7 Vacuum Equipment Selection Example

Transfer of Semiconductor Chips

Selection conditions:

(1) Workpiece: Semiconductor chips

Dimensions: 8 mm x 8 mm x 1 mm, Mass: 1 g

(2) Vacuum piping length: 1 m

(3) Adsorption response time: 300 msec 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 385, check the lifting force.

$$\begin{aligned} \mathbf{W} &= \mathbf{P} \times \mathbf{S} \times 0.1 \times 1/t & \qquad & \qquad & \qquad & \\ \mathbf{0.0098} &= \mathbf{P} \times 0.13 \times 0.1 \times 1/4 & \qquad & \qquad & \\ \mathbf{P} &= 3.0 \text{ kPa} & \qquad & \qquad & \\ \mathbf{W} &= 1 \text{ g} = 0.0098 \text{ N} \\ \mathbf{S} &= \pi/4 \times (0.4)^2 = 0.13 \text{ cm}^2 \\ \mathbf{t} &= 4 \text{ (Horizontal lifting)} \end{aligned}$$

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

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

Pad type: Flat type with groove Pad material: Silicone rubber

(4) According to the results above, select a 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 L

(2) Assuming that leakage (QL) during adsorption is 0, find the average suction flow rate to meet the adsorption response time using the formula on page 392.

```
Q = (V \times 60) / T_1 + Q_L = (0.0031 \times 60) / 0.3 + 0 = 0.62 L
```

From the formula on page 392, the maximum suction flow rate \mathbf{Q}_{max} is

```
Q<sub>max</sub> = (2 to 3) x Q = (2 to 3) x 0.62
= 1.24 to 1.86 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 the vacuum ejector ZX series is used, representative model ZX105□ can be selected.

(Based on the operating conditions, specify the complete part number for the vacuum ejector 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 vacuum ejector ZX105□ is 5 L/min (ANR).

From the formula on page 393, the average suction flow rate Q1 is as follows:

```
Q_1 = (1/2 \text{ to } 1/3) \text{ x Ejector max. suction flow rate}
= (1/2 \text{ to } 1/3) \text{ x } 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 the Selection Graph (3). From the formula on page 393, the maximum flow rate is as follows:

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

(3) Since Q2 is smaller than Q1, Q = Q1.

Thus, from the formula on page 393, the adsorption response time is as follows:

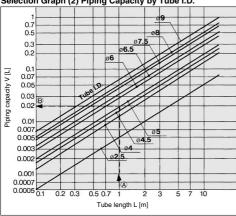
$$T = (V \times 60)/Q = (0.0031 \times 60)/1.7 = 0.109$$
 seconds

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

8 Data

Selection Graph

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



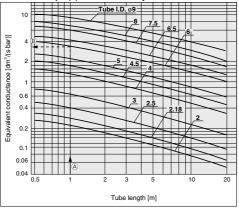
How to read the graph

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

<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 I.D. ø5, the 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: Tube size Ø8/Ø6 and 1 meter length

<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 I.D. ø6, the equivalent conductance approximately 3.6 dm²/(s-bar) can be obtained on the vertical axis.

Equivalent conductance ≈ 3.6 dm³/(s·bar)

ZP3

ZP3E ZP2

ZP2V

ZPT ZPT ZPR

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 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 measure
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, based on the phenomenon in which the pressure is reduced when the air around the nozzle is sucked.
Air suction filter	Vacuum filter provided in the vacuum passage for preventing the dust intrusion into the ejector, vacuum pump, or peripheral equipment

● Countermeasures for Vacuum Adsorption System Problems (Troubleshooting)

		, ,
Condition & Description of improvement	Contributing factor	Countermeasure
Initial adsorption problem (During trial operation)	Adsorption area is small. (Lifting force is lower than the workpiece mass.)	Recheck the relationship between workpiece mass and lifting force. • Use a vacuum pad with a large adsorption area. • Increase the quantity of vacuum pads.
	Vacuum pressure is low. (Leakage from adsorption surface) (Air permeable workpiece)	Eliminate (reduce) leakage from adsorption surface. • Reconsider the shape of a vacuum pad. Check the relationship between suction flow rate and arrival pressure of vacuum ejector. • Use a vacuum ejector with a high suction flow rate. • Increase adsorption area.
	Vacuum pressure is low. (Leakage from vacuum piping)	Repair leakage point.
	Internal volume of vacuum circuit is large.	Check the relationship between internal volume of the vacuum circuit and suction flow rate of the vacuum ejector. • Reduce internal volume of the vacuum circuit. • Use a vacuum ejector with a high suction flow rate.

Condition & Description of improvement	Contributing factor	Countermeasure
Initial adsorption problem	Pressure drop of vacuum piping is large.	Reconsider vacuum piping. • Use a shorter or larger tube (with appropriate diameter).
(During trial operation)	Inadequate supply pressure of vacuum ejector	Measure supply pressure in vacuum generation state. • Use standard supply pressure. • Reconsider compressed air circuit (line).
	Clogging of nozzle or diffuser (Infiltration of foreign matter during piping)	Remove foreign matter.
	Supply valve (switching valve) is not being activated.	Measure supply voltage at the solenoid valve with a tester. • Reconsider electric circuits, wiring and connectors. • Use in the rated voltage range.
	Workpiece deforms during adsorption.	Since a workpiece is thin, it deforms and leakage occurs. • Use a pad for adsorption of thin objects.
Late vacuum achieving time (Shortening of response time)	Internal volume of vacuum circuit is large.	Check the relationship between internal volume of the vacuum circuit and suction flow rate of the vacuum ejector. Reduce internal volume of the vacuum circuit. Use a vacuum ejector with a high suction flow rate.
,	Pressure drop of vacuum piping is large.	Reconsider vacuum piping. • Use a shorter or larger tube (with appropriate diameter).
	Using the product as close to the highest vacuum power in the specifications.	Set vacuum pressure to minimum necessary value by optimizing the pad diameter etc. 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 is lengthened. One should consider an increase in the diameter of the ejector nozzle or an increase the size of the vacuum pad utilized in order to lower the required vacuum pressure, maximum the vacuum flow, and speed up the adsorption process.
	Setting of vacuum pressure switch is too high.	Set to suitable setting pressure.
Fluctuation in vacuum pressure	Fluctuation in supply pressure	Reconsider compressed air circuit (line). (Addition of a tank etc.)
	Vacuum pressure may fluctuate under certain conditions due to ejector characteristics.	Lower or raise supply pressure a little at a time, and use in a supply pressure range where vacuum pressure does not fluctuate.
Occurrence of abnormal noise (intermittent noise) from exhaust of vacuum ejector	Intermittent noise may occur under certain conditions due to ejector characteristics.	Lower or raise supply pressure a little at a time, and use in 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.)
Adsorption problem over time	Clogging of suction filter	Replace filters. Improve installation environment.
(Adsorption is normal during trial operation.)	Clogging of sound absorbing material	Replace sound absorbing materials. Add a filter to supply (compressed) air circuit. Install an additional suction filter.
	Clogging of nozzle or diffuser	Remove foreign matter. Add a filter to supply (compressed) air circuit. Install an additional suction filter.
	Vacuum pad (rubber) deterioration, cracking, etc.	Replace vacuum pads. Check the compatibility of vacuum pad material and workpiece.
Workpiece is not released.	Inadequate release flow rate	Open release flow adjustment needle.
Teleaseu.	Vacuum pressure is high. Excessive force (adhesiveness of the rubber + vacuum pressure) is applied to the pad (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 a conductive pad.
	Adhesiveness of the rubber increases due to the operating environment or wearing of the pad. • Adhesiveness of the rubber material is high. • Adhesiveness increases due to wearing of the vacuum pad (rubber).	Replace pads. Reconsider the pad material and check the compatibility of pad material and workpiece. Reconsider the pad form. (Changes to rib, groove, blast options) Reconsider the pad diameter and quantity of pads.

ZP3E ZP2 ZP2V

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ATOUT

● Non-conformance Examples

Phenomenon	Possible causes	Countermeasure
No problem occurs during the test, but adsorption becomes unstable after starting operation.	Setting of the vacuum switch is not appropriate. Supply pressure is unstable. Vacuum pressure does not reach the set pressure. There is leakage between the workpiece and the vacuum pad.	1) 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. 2) 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 shape, diameter, and material of the vacuum pad. Reconsider the vacuum pad.
Adsorption becomes unstable after replacing the pad.	Initial setting conditions (vacuum pressure, vacuum switch setting, height of the pad) have changed. Settings have changed because the pad was worn out or had permanent setting due to the operating environment. When the pad was replaced, leakage was generated from the screw connection part, or the engagement between the pad and the adapter.	Reconsider the operating conditions including vacuum pressure, the set pressure of the vacuum switch, and the height of the pad. Reconsider the engagement.
Identical pads are used to adsorb identical workpieces, but some of the pads cannot adsorb the workpieces.	There is leakage between the workpiece and the vacuum pad. The supply circuit for the cylinder, the solenoid valve and the ejector is 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.	Reconsider the pad diameter, shape, material, vacuum ejector (suction flow rate), etc. Reconsider the pneumatic circuit. Reconsider the engagement.
Generation of sticking of bellows of the bellows pad and/or recovery delays. (It may occur at an early stage.)	When the vacuum pad (bellows type) reaches the end of its life, weakening of bent parts, wearing, or sticking of rubber parts occurs.	The operating conditions will determine the product life. Inspect it sufficiently and determine the replacement time. • Replace pads. • Reconsider the diameter, form, and material of vacuum pads. • Reconsider the quantity of vacuum pads.
	Vacuum pressure is higher than necessary, so excessive force (adhesiveness of the rubber + vacuum pressure) is applied to the pad (rubber part).	Reduce the vacuum pressure. If inadequate lifting force causes a problem in transferring the workpieces due to the reduction of vacuum pressure, increase the number of pads.
	Load is applied to the bellows due to the following operations, leading to sticking of rubber parts or reduction of the pad recovery performance. • Pushing exceeding pad displacement (operating range), external load. • Workpiece holding/waiting Waiting 10 seconds or more while the workpiece is being held * Even when under 10 seconds, pads sticking or a 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.	Reduce the load applied to the pad. Review the equipment so that an external load exceeding the pad displacement (operating range) is not applied. Avoid workpiece holding and waiting. The operating conditions will determine the product life. Inspect it and determine the replacement time.
The product life is shortened after replacement of the product (pad, buffer, etc.).	The settings of the product changed. Ube had been pulled. Unbalanced load in clockwise direction increased. 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.	If the problem (cannot adsorb) does not occur when starting 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 workpiece to be transferred or the specifications. Select the product model again by reconsidering the pad shape, diameter, quantity, and suction balance.
Pad comes out from the adapter during operation. Cracks are generated on the pad.	Load is applied to the pad (rubber part) due to the following factors. • Inadequate lifting force • Incorrect suction balance • Loads due to transfer acceleration are not considered when selecting the product model.	The selected model may not be appropriate for the current workpince to be transferred or the specifications. Select the product model again by reconsidering the pad shape, diameter, quantity, and suction balance.

Phenomenon	Possible causes	Countermeasure
Cracks are generated on the rubber (NBR, conduc- tive NBR).	The product is operated in an ozone environment. An ionizer is used. This phenomenon occurs earlier if pushing or the high vacuum pressure is used.	Reconsider the operating environment. Reconsider the materials to be used.
Even when a mark-free pad is used, the pad end wears out quickly. (Suction marks are generated.)	If the pad adsorbs a highly clean work- piece, slippage is minimized, and a load (impact) is applied to the pad end.	Use the following products. • Stuck fluororesin pad • Clean attachment
Even when a mark-free pad is used, suction marks are generated.	Incorrect application (The mark was generated due to a deformation.) Contamination (insufficient cleaning) on the pad when installing the equipment, dust in the operating environment etc.	Check the mark generated on the workpiece. 1) Mark due to deformed (lined) workpiece Reconsider the pad diameter, form, material, vacuum ejector (suction flow rate), etc. 2) Mark due to worn rubber Reconsider the pad diameter, form, material, vacuum ejector (suction flow rate), etc. 3) Mark generated by moving components If the suction mark disappears or becomes smaller after wiping with cloth or waste cloth (without using solutions), clean the pad as it may have been contaminated. Refer to "Cleaning method (Mark-free NBR pad)" on page 12 of this catalog.

■When mounted with the nut, sometimes the buffer operation is not smooth, or the buffer does not slide.

[Possible causes]

- The tightening torque of the nut for mounting the buffer is too high.
- · Particles stuck to the sliding surface, or it is scratched.
- · Lateral load applied to the piston rod, causing eccentric wearing.

[Remedy]

Tighten the nut to the recommended tightening torque.

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

Recommended Tightening Torque

· icooiiiiiiciiac	a rigiteining rorque			
	Tightening torque			
Pad diameter	Product part no.	Mounting thread size	[N·m]	
ø 32 to ø 50	ZP3E-(T/Y)(32 to 50)(UM/BM)**JB■■	M18 x 1.5	28 to 32	
032 10 030	ZP3E-(T/Y)F(32 to 50)(UM/BM)**JB■■	C.I X BIIW	28 10 32	
00 : 405	ZP3E-(T/Y)(63 to 125)(UM/BM)**JB■■	M/BM)**JB■■ M22 x 1.5 45		
ø 63 to ø 125	ZP3E-(T/Y)F(63 to 125)(UM/BM)**JB■■	1 IVIZZ X 1.5	45 to 50	

● Time of Replacement of Vacuum Pad

The vacuum pad is disposable. Replace it on a regular basis.

Continued use of the vacuum pad will cause wear and tear on the adsorption surface, and the exterior dimensions will gradually get smaller and smaller. As the pad diameter gets smaller, lifting force will decrease, though adsorption is possible. It is extremely difficult to provide advice on the frequency of vacuum pad exchange. 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 pad on the workpiece, presence or absence of a buffer, etc.).

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

Thus, the customer should decide when the vacuum pad should be exchanged, based on its condition at time of initial use.

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

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ZP2V

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XT661

403



Flat Type Pad/Bellows Type Pad with Groove

Pad diameter

Ø32, Ø40, Ø50, Ø63, Ø80, Ø100, Ø125

Symbol/Form

UM: Flat type with groove

BM: Bellows type with groove

How to Order

Pad unit ZP3E - 32 UM N - P

ad diameter					
Symbol	Pad diameter				
32	ø32				
40	ø40				
50	ø50				
63	ø63				
80	ø80				
100	ø100				
125	ø125				

Pad form Symbol Form UM Flat type with groove BM Bellows type with groove

(★)
None
With plate

Pad material

Symbol	Material
N	NBR
S	Silicone rubber
U	Urethane rubber
F	FKM
CL	Mark-free NBR

Plate Unit Part No.

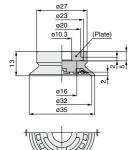
Form/Diameter	F	Flat type with groove (UM)				Bellows type with groove (B								
Model	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-P1	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EA-P2	_	_	•	_	_	_	_	_	_	•	_	_	—	_
ZP3EA-P3	_	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EA-P4	_	_	_	_	_	•	_	_	_	_	_	•	<u> </u>	_
ZP3EA-P5	_	_	_	_	_	_	•	_	_	_	_	_	•	_
ZP3EA-P6	_	_	_	_	_	_	_	_	_	_	_	_	_	•

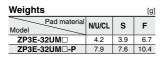
Dimensions: Pad Unit

Pad diameter ø32 to ø50 Pad form Flat type with groove

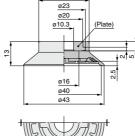


ZP3E-32UM□-★





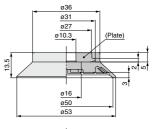
ZP3E-40UM□-★ ø27





Weights					
Pad material Model	N/U/CL	s	F		
ZP3E-40UM□	5.3	4.9	8.4		
ZP3E-40UM□-P	9.0	8.5	12.1		

ZP3E-50UM□-★





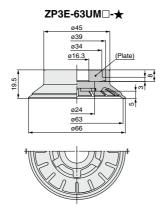
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-50UM□	9.4	8.7	14.9
ZP3E-50UM□-P	17.1	16.3	22.5

Pad Unit **ZP3E** Series

Pad diameter Ø63 to Ø125
Pad form Flat type with groove





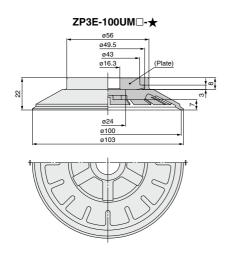


ZP3E-80UM□- ★
045 039 034 016.3 (Plate)

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-63UM□	18.2	16.7	28.8
ZP3E-63UM□-P	35.9	34.4	46.5

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-80UM□	26.4	24.3	41.9
ZP3E-80UM□-P	44.1	42.0	59.6

ZP3E-125UM□-★



97 96 95 916	5 8 .3. (Plate)
N N	w w
02 01: 01:	4 25

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-100UM□	44.7	40.9	70.7
ZP3E-100UM□-P	75.8	72.0	102

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-125UM□	79.3	72.7	126
ZP3E-125UM□-P	140	134	187

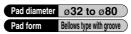
ZP3

ZP3E

ZP2 ZP2V ZP

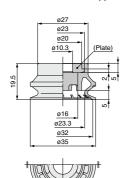
ZP3E Series

Dimensions: Pad Unit

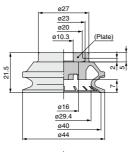




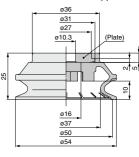
ZP3E-32BM□-★



ZP3	E-40	вмг	¬- ⋆









Weights		
Pad material	N/LI/CI	_
Mandal -	IN/U/CL	

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-32BM□	6.2	5.7	9.9
ZP3E-32BM□-P	9.9	9.4	13.6

Weights

- 3			
Pad material Model	N/U/CL	s	F
ZP3E-40BM□	10.2	9.4	16.2
ZP3E-40BM□-P	13.9	13.0	19.9

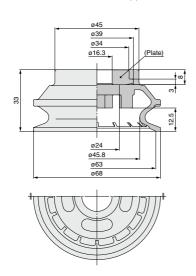
Weights

[a]

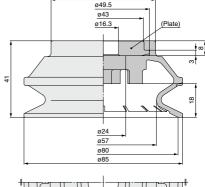
Pad material Model	N/U/CL	s	F
ZP3E-50BM□	17.9	16.4	28.4
ZP3E-50BM□-P	25.5	24.0	36.0

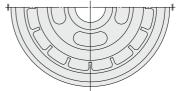
[g]

ZP3E-63BM□-★



ZP3E-80BM□- ★
a56





N/U/CL

60.2

91.3

55.2

86.3

[g]

95.3

126

Weights

ZP3E-80BM

ZP3E-80BM□-P

Pad material

Weights		
Pad material	NULIO	
Model	N/U/CL	S

34.8

52.5

31.9 55.1

49.6

72.8

ZP3E-63BM□

ZP3E-63BM□-P

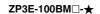
5/7a	CI/	/IC

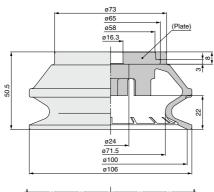
Pad Unit **ZP3E** Series

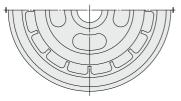
Pad diameter Ø100, Ø125

Dimensions: Pad Unit Pad form Bellows type with groove



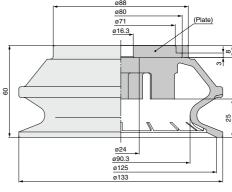


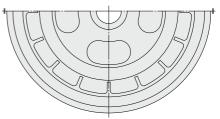




Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-100BM□	125	114	197
ZP3F-100BM□-P	186	175	258

ZP3E-125BM□-★





Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-125BM□	235	216	372
ZP3E-125BM□-P	329	310	466
ZF3E-123DIVILI-P	329	310	400

ZP3

ZP3E

ZP2V

ZP

ZPR XT661

How to Order



Vertical vacuum inlet With adapter

ZP3E-<u>T32UMN</u>-A10

Vacuum inlet direction

| Symbol | Direction |
| T | Vertical

Pad diameter

Symbol	Pad diameter		
32	ø32		
40	ø40		
50	ø50		
63	ø63		
80	ø80		
100	ø100		
125	ø125		

Pad form

Symbol	Form
UM	Flat type with groove
BM	Bellows type with groove

Mounting thread size

		Symbol	Mounting	ø 32	ø 63
			Thread size	to ø50	to ø125
ad	For direct	A10	M10 x 1	•	_
hre	For direct mounting For plate connection	A16	M16 x 1.5	_	•
ē	For plate	AL14*	M14 x 1	•	_
ž	connection	AL16*	M16 x 1.5	_	•
		B8	M8 x 1.25	•	_
F	emale	B10	M10 x 1.5	•	_
1	thread	B12	M12 x 1.75		•
		B18	M18 x 1.5	_	•

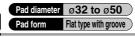
* Male thread AL14/AL16 connection types have a vacuum exhaust (female thread) port separate from the mounting screw.

Pad material

Symbol	Material	
N	NBR	
S	Silicone rubber	
U	Urethane rubber	
F	FKM	
CL	Mark-free NBR	

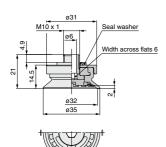
* Refer to pages 471 and 472 for replacement parts.

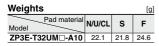
Dimensions/With Set Screw: Vacuum Inlet



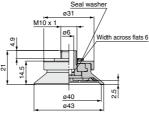


ZP3E-T32UM□-A10





ZP3E-T40UM□-A10





Weights			[9
Pad material Model	N/U/CL	s	F
ZP3E-T40UM□-A10	23.2	22.7	26.2

ZP3E-T50UM□-A10



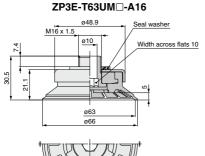


Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T50UM□-A10	33.8	33.0	39.2

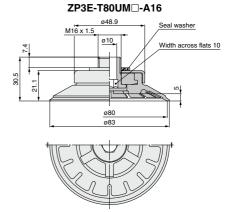
Dimensions/With Set Screw: Vacuum Inlet



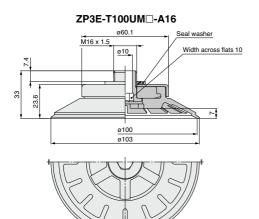




Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T63UM□-A16	35.9	34.4	46.5

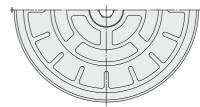


Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T80UM□-A16	44.1	42.0	59.6



Weights			[9]
Pad material Model	N/U/CL	s	F
ZP3E-T100UM□-A16	75.8	72.0	102

ZP3E-T125UM -A16 o77.8 Seal washer Width across flats 10 e125 e128

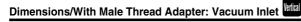


Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T125UM□-A16	140	134	187

ZP3

ZP3E
ZP2V
ZP2V
ZPT
ZPT
ZPT
ZPR

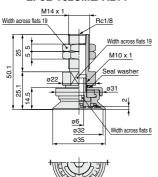
ZP3E Series



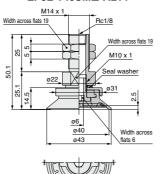


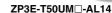


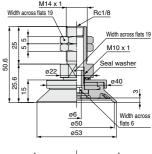




ZP3E-T40UM□-AL14









 Weights
 [g]

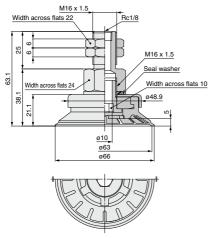
 Model
 NU/CL
 S
 F

 ZP3E-T32UM□-AL14
 49.1
 48.8
 51.6

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T40UM□-AL14	50.2	49.7	53.2

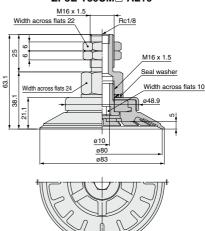
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T50UM□-AL14	60.8	60.0	66.2





Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T63UM□-AL16	199	198	210

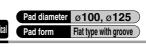
ZP3E-T80UM□-AL16



Weights			[g
Pad material Model	N/U/CL	s	F
ZP3E-T80UM□-AL16	208	206	223

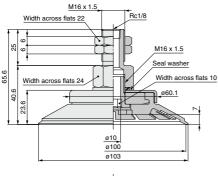
With Adapter: Vacuum Inlet **ZP3E** Series

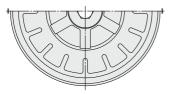
Dimensions/With Male Thread Adapter: Vacuum Inlet





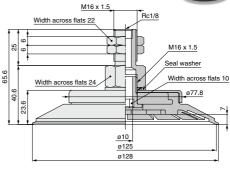
ZP3E-T100UM□-AL16

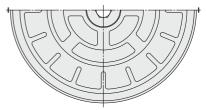




Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3F-T100UM□-AL16	254	250	280

ZP3E-T125UM□-AL16





Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T125UM□-AL16	347	341	394

ZP3

ZP3E

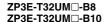
ZP2V

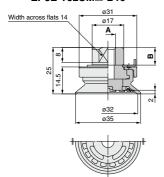
ΖP

Dimensions/With Female Thread Adapter: Vacuum Inlet

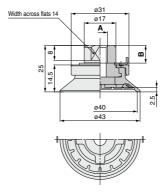




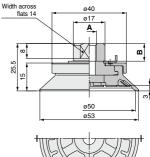




ZP3E-T40UM□-B8 ZP3E-T40UM□-B10



ZP3E-T50UM□-B8 ZP3E-T50UM□-B10





Dimensions

Model	Α	В
ZP3E-T32UM□-B8	M8 x 1.25	9.5
ZP3E-T32UM□-B10	M10 x 1.5	13

	Weight [g]/Pad material		
	N/U/CL	S	F
ZP3E-T32UM□-B8	20.6	20.3	23.1
ZP3F-T32UM□-B10	19.2	18.9	21 7

Dimensions

Model	Α	В
ZP3E-T40UM□-B8	M8 x 1.25	9.5
ZP3E-T40UM□-B10	M10 x 1.5	13

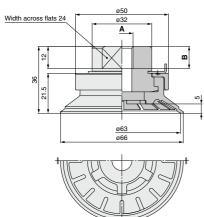
Model	Weight [g]/Pad material				
wodei	N/U/CL	S	F		
ZP3E-T40UM□-B8	21.7	21.2	24.8		
ZP3E-T40UM□-B10	20.3	19.8	23.4		

Dimensions

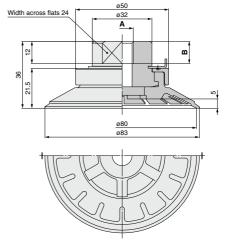
Model	Α	В	
ZP3E-T50UM□-B8	M8 x 1.25	9.5	
ZP3E-T50UM□-B10	M10 x 1.5	13	

Model	Weight [g]/Pad material				
wodei	N/U/CL	S	F		
ZP3E-T50UM□-B8	32.5	31.7	38.0		
ZP3E-T50UM□-B10	31.1	30.3	36.6		

ZP3E-T63UM□-B12 ZP3E-T63UM□-B18



ZP3E-T80UM□-B12 ZP3E-T80UM□-B18



Dimensions

Model A	Δ.	В	Weight [g]/Pad material		
		N/U/CL	S	F	
ZP3E-T63UM□-B12	M12 x 1.75	12	86.0	84.5	96.6
ZP3E-T63UM□-B18	M18 x 1.5	18	75.9	74.4	86.5

Dimensions

Model A		В	Weight [g]/Pad material		
Model A	N/U/CL		S	F	
ZP3E-T80UM□-B12	M12 x 1.75	12	94.2	92.1	110
ZP3E-T80UM□-B18	M18 x 1.5	18	84.1	82.0	99.6

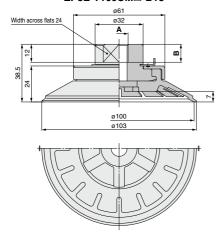
With Adapter: Vacuum Inlet **ZP3E** Series



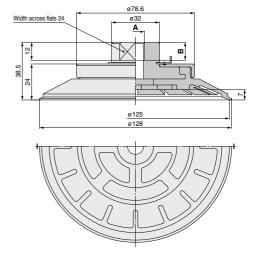








ZP3E-T125UM□-B12 ZP3E-T125UM□-B18



Dimensions

Model		В	Weight	[g]/Pad i	material
wodei	A	В	N/U/CL	S	F
ZP3E-T100UM□-B12	M12 x 1.75	12	132	128	158
ZP3E-T100UM□-B18	M18 x 1.5	18	122	118	148

Dimensions

Model	A	_	Weight	[g]/Pad r	naterial
Wodel	_ ^	P	N/U/CL	S	F
ZP3E-T125UM□-B12	M12 x 1.75	12	210	203	256
ZP3E-T125UM□-B18	M18 x 1.5	18	200	193	246

ZP3

ZP3E

ZP2V

ΖP

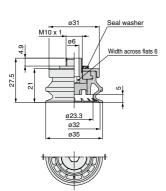


Dimensions/With Set Screw: Vacuum Inlet

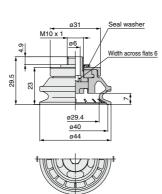




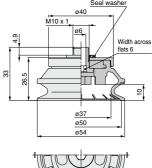
ZP3E-T32BM□-A10



ZP3E-T40BM□-A10



ZP3E-T50BM□-A10



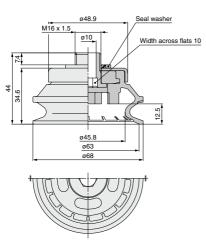


Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3F-T32BM□-A10	24.1	23.6	27.7

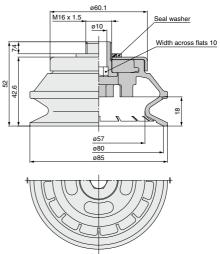
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T40BM□-A10	28.1	27.2	34.1

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T50BM□-A10	42.2	40.7	52.7

ZP3E-T63BM□-A16



ZP3E-T80BM□-A16



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T63BM□-A16	116	113	137

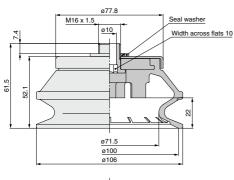
With Set Screw: Vacuum Inlet **ZP3E** Series

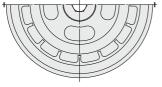






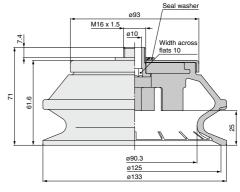
ZP3E-T100BM□-A16

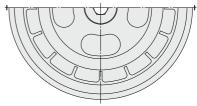




Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T100BM□-A16	293	282	365

ZP3E-T125BM□-A16





Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T125BM□-A16	466	447	603

ZP3

ZP3E

ZP2V

ΖP

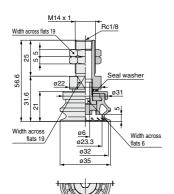




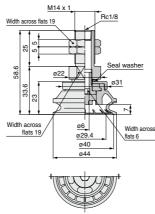




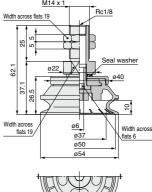
ZP3E-T32BM□-AL14



ZP3E-T40BM□-AL14



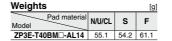
ZP3E-T50BM□-AL14



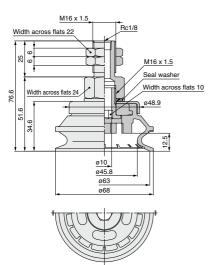


67.7 79.7

Weights [g] Pad material N/U/CL s F Model ZP3E-T32BM□-AL14 51.1 50.6 54.7



ZP3E-T63BM□-AL16

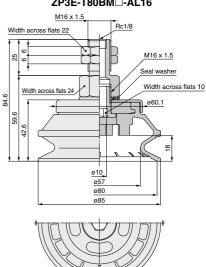


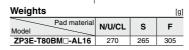
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-T63BM□-AL16	216	213	236

ZP3E-T80BM□-AL16

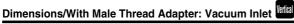
ZP3E-T50BM□-AL14 69.2

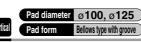
Model



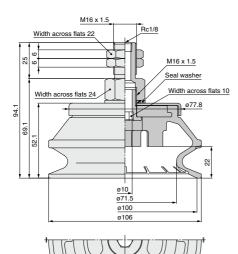


With Adapter: Vacuum Inlet **ZP3E** Series





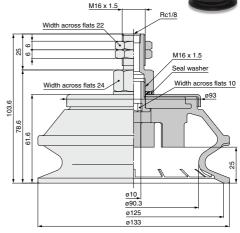
ZP3E-T100BM□-AL16

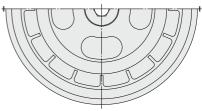




Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3F-T100BM□-AL16	393	382	465

ZP3E-T125BM□-AL16





Weights			[g:
Pad material Model	N/U/CL	s	F
ZP3E-T125BM□-AL16	565	546	702

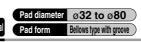
ZP3

ZP3E

ZP2V

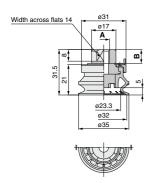
ZP

Dimensions/With Female Thread Adapter: Vacuum Inlet

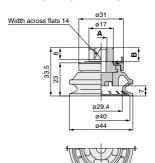




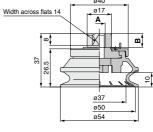




ZP3E-T40BM□-B8 ZP3E-T40BM□-B10









Dimensions

Model	Α	В
ZP3E-T32BM□-B8	M8 x 1.25	9.5
ZP3E-T32BM□-B10	M10 x 1.5	13

Model	Weight [g]/Pad material				
Wodel	N/U/CL	S	F		
ZP3E-T32BM□-B8	22.6	22.1	26.3		
ZP3E-T32BM□-B10	21.2	20.7	24.9		

Dimensions

Model	Α	В
ZP3E-T40BM□-B8	M8 x 1.25	9.5
ZP3E-T40BM□-B10	M10 x 1.5	13

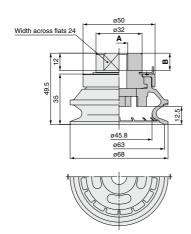
Model	Weight [g]/Pad material				
Wodel	N/U/CL	S	F		
ZP3E-T40BM□-B8		25.7			
ZP3E-T40BM□-B10	25.2	24.3	31.2		

Dimensions

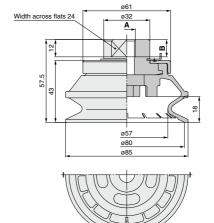
Model	Α	В
ZP3E-T50BM□-B8	M8 x 1.25	9.5
ZP3E-T50BM□-B10	M10 x 1.5	13

Model	Weight [g]/Pad material				
Wodel	N/U/CL	S	F		
ZP3E-T50BM□-B8	41.0	39.5	51.5		
ZP3E-T50BM□-B10	39.6	38.1	50.1		

ZP3E-T63BM□-B12 ZP3E-T63BM□-B18



ZP3E-T80BM□-B12 ZP3E-T80BM□-B18



Dimensions

Model	Λ.	В	Weight	[g]/Pad ı	material
iviodei	_ A	-	N/U/CL	S	F
ZP3E-T63BM□-B12	M12 x 1.75	12	103	100	123
ZP3F-T63BM□-B18	M18 x 1.5	18	92.5	89.6	113

Dimensions

Model	Α	В	Weight	[g]/Pad r	naterial
iviodei	A B		N/U/CL	S	F
ZP3E-T80BM□-B12	M12 x 1.75	12	148	143	183
ZP3E-T80BM□-B18	M18 x 1.5	18	138	133	173

With Adapter: Vacuum Inlet **ZP3E** Series

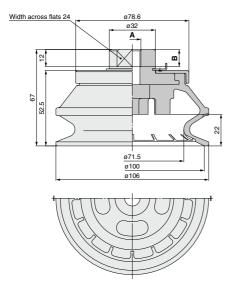






Dimensions/With Female Thread Adapter: Vacuum Inlet

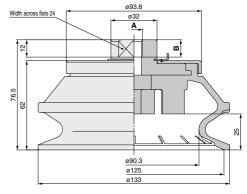
ZP3E-T100BM□-B12 ZP3E-T100BM□-B18

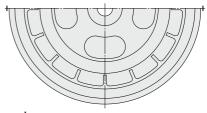


Dimensions

Model	A B		Weight [g	/Pad m	naterial	
Woder	^		N/U/CL	S	F	
ZP3E-T100BM□-B12	M12 x 1.75	12	255	244	327	
ZP3E-T100BM□-B18	M18 x 1.5	18	245	234	317	
			•			

ZP3E-T125BM□-B12 **ZP3E-T125BM**□-B18





Dimensions

Model	Weight [g]/Pa		Weight [g]/P	ь	A B Weight [g]/Pad ma		naterial
Wodel	_ ^	В	N/U/CL	S	F		
ZP3E-T125BM□-B12	M12 x 1.75	12	412	393	549		
ZP3E-T125BM□-B18	M18 x 1.5	18	402	383	539		

ZP3

ZP3E

ZP2 ZP2V

ZΡ





Lateral vacuum inlet With adapter **ZP3E-<u>Y32UM</u>N-AL14**

Vacuum inlet direction

Symbol Direction
Y Lateral

Pad diameter •					
Symbol	Pad diameter				
32	ø32				
40	ø40				
50	ø50				
63	ø63				
80	ø80				
100	ø100				
125	ø125				

	Pad form
Symbol	Form
UM	Flat type with groove
ВМ	Bellows type with groove

Mounting thread size

	Symbol	Mounting	ø 32	ø 63
	Symbol	Thread size	to ø50	to ø125
Male	AL14	M14 x 1	•	_
thread	AL16	M16 x 1.5	_	•
Female	B8	M8 x 1.25	•	_
thread	B12	M12 x 1.75		•

* Male thread AL14/AL16 connection types have a vacuum exhaust (female thread) port separate from the mounting screw.

Pad material

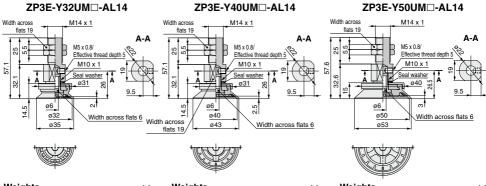
Symbol	Material
N	NBR
S	Silicone rubber
U	Urethane rubber
F	FKM
CL	Mark-free NBR

* Refer to page 473 for replacement parts.

Dimensions/With Male Thread Adapter: Vacuum Inlet







weights			[g
Pad material Model	N/U/CL	s	F
ZP3E-Y32UM□-AL14	58.4	58.1	60.9

Weights			[9
Pad material Model	N/U/CL	s	F
ZP3E-Y40UM□-AL14	59.5	59.0	62.5

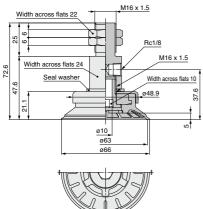
Weights			[g
Pad material Model	N/U/CL	s	F
ZP3E-Y50UM□-AL14	70.1	69.3	75.5
•			

Dimensions/With Male Thread Adapter: Vacuum Inlet



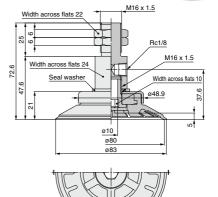






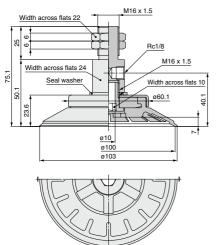
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y63UM□-AL16	216	215	227

ZP3E-Y80UM□-AL16



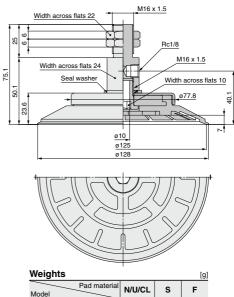
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y80UM□-AL16	224	222	240

ZP3E-Y100UM□-AL16



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y100UM□-AL16	271	267	297

ZP3E-Y125UM□-AL16



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y125UM□-AL16	364	357	411

ZP3

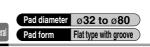
ZP3E

ZP2 ZP2V

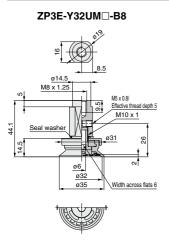
ZΡ

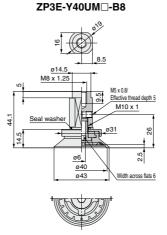
ZPT ZPR XT661

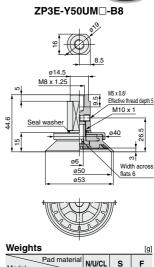
Dimensions/With Female Thread Adapter: Vacuum Inlet





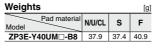


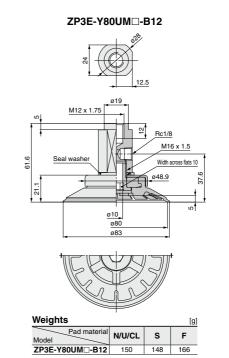




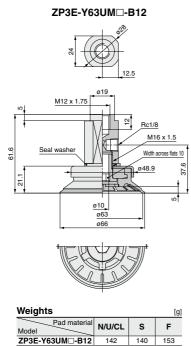
48.5 47.7 53.9

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y32UM□-B8	36.8	36.5	39.3

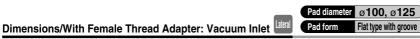




ZP3E-Y50UM□-B8



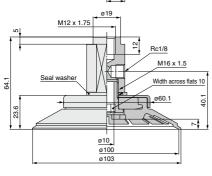
With Adapter: Vacuum Inlet 2P3E Series

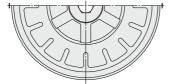




ZP3E-Y100UM□-B12



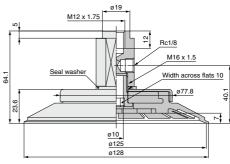


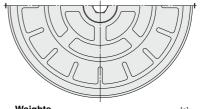


Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3F-Y100UM□-B12	271	267	297

ZP3E-Y125UM□-B12







Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y125UM□-B12	364	357	411

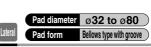
ZP3

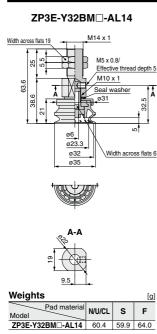
ZP3E

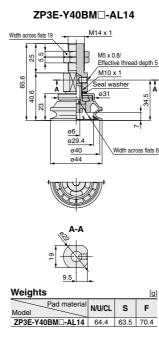
ZP2

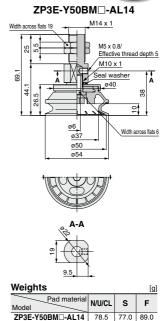
ZP2V ZΡ

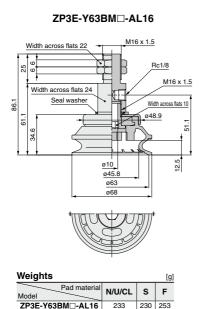
Dimensions/With Male Thread Adapter: Vacuum Inlet

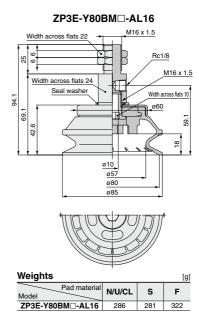












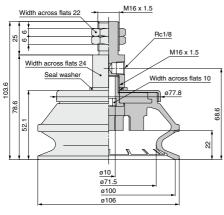
With Adapter: Vacuum Inlet 2P3E Series

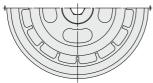




5 ove

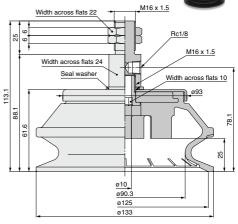
ZP3E-Y100BM□-AL16

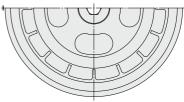




Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y100BM□-AL16	410	399	482

ZP3E-Y125BM□-AL16





Weights			
Pad material Model	N/U/CL	s	F
ZP3E-Y125BM□-AL16	582	563	719

ZP3

ZP3E

ZP2

ZP2V ZP

ZPT ZPR

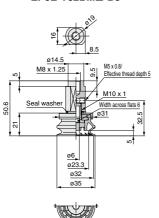
Dimensions/With Female Thread Adapter: Vacuum Inlet

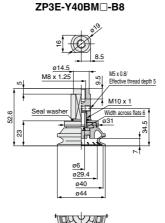


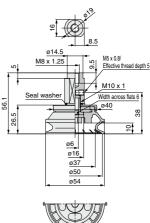
ZP3E-Y50BM□-B8



ZP3E-Y32BM□-B8



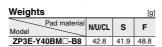




Weights			[g]
Pad material	N/U/CL	s	F

38.8

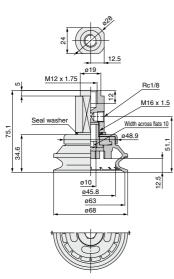
ZP3E-Y32BM□-B8





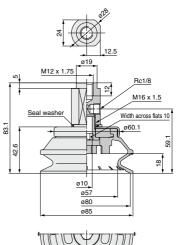
ZP3E-Y63BM□-B12

38.3 42.4



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y63BM□-B12	159	156	179

ZP3E-Y80BM□-B12



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y80BM□-B12	212	207	247

With Adapter: Vacuum Inlet 273E Series

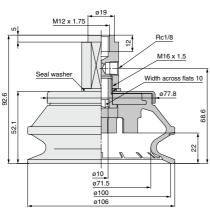
Dimensions/With Female Thread Adapter: Vacuum Inlet

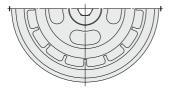




ZP3E-Y100BM□-B12



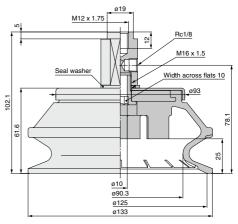


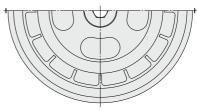


Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-Y100BM□-B12	335	324	407

ZP3E-Y125BM□-B12







Weights			
Pad material Model	N/U/CL	s	F
ZP3E-Y125BM□-B12	508	489	645

ZP3

ZP3E

ZP2V

ZP





Symbol Direction

•Stroke (■)

| Symbol | Stroke | 10 | 10 mm | | 30 | 30 mm | | 50 | 50 mm |

Buffer specification

JB Rotating, With bushing

• Pau	IOTIII
Symbol	Form
UM	Flat type with groove
BM	Bellows type with groove

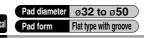
Pad material

/mbol	Material	
N	NBR	
S	Silicone rubber	
U	Urethane rubber	
F	FKM	
CL	Mark-free NBB	1

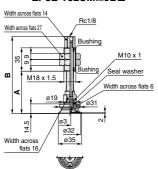
Specifications

Buffer specification Pad diameter		Mounting	Tightening torque Stroke Spring reactive for		tive force [N]	
bullet specification	rau ulametei	iviouriting	[N·m]	[mm]	At 0 stroke	At full stroke
				10	5	6.5
	ø32 to ø50	M18 x 1.5	28 to 32	30	5	8.5
Rotating				50	5	10.5
Hotaling				10	10	11.5
	ø63 to ø125	M22 x 1.5	48 to 52	30	10	13.5
				50	10	15.5

Dimensions/With Buffer: Vacuum Inlet



ZP3E-T32UM□JB■

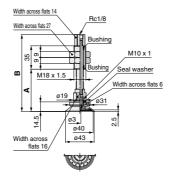


Dimensions

Model	Α	В
ZP3E-T32UM□JB10	63.6	115.6
ZP3E-T32UM□JB30	88.6	140.6
ZP3E-T32UM□JB50	108.6	160.6
	Weight [g]/Pad materia	

Model	Weight [g]/Pad material		
Wodel	N/U/CL	S	F
ZP3E-T32UM□JB10	194	194	197
ZP3E-T32UM□JB30	209	208	211
ZP3E-T32UM□JB50	220	220	223

ZP3E-T40UM□JB■

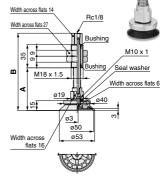


Dimensions

Model	Α	В
ZP3E-T40UM□JB10	63.6	115.6
ZP3E-T40UM□JB30	88.6	140.6
ZP3E-T40UM□JB50	108.6	160.6
	Majaht [a]/Dad matarial	

Model	Weight [g]/Pad material					
Model	N/U/CL	S	F			
ZP3E-T40UM□JB10	195	195	198			
ZP3E-T40UM□JB30	210	209	213			
ZP3E-T40UM□JB50	221	221	224			

ZP3E-T50UM□JB■



Dimensions

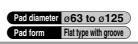
Model	Α	В
ZP3E-T50UM□JB10	64.1	116.1
ZP3E-T50UM□JB30	89.1	141.1
ZP3E-T50UM□JB50	109.1	161.1

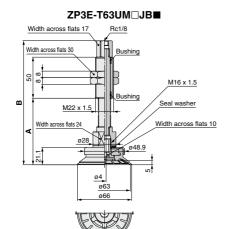
Model	Weight [g]/Pad materia					
wodei	N/U/CL	S	F			
ZP3E-T50UM□JB10	206	205	211			
ZP3E-T50UM□JB30	220	220	226			
ZP3E-T50UM□JB50	232	231	237			

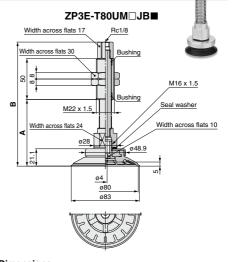
^{*} Refer to page 474 for replacement parts.

With Buffer: Vacuum Inlet ZP3E Series









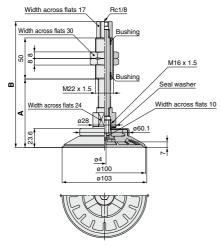
Dimensions

Model	A		Weight [g]/Pad material				
			N/U/CL	S	F		
ZP3E-T63UM□JB10	81.1	151.1	408	406	418		
ZP3E-T63UM□JB30	106.1	176.1	437	435	447		
ZP3E-T63UM□JB50	126.1	196.1	460	458	470		

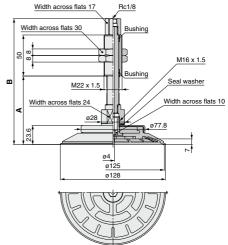
Dimensions

Model	Α	В	Weight	[g]/Pad r	material
Wodel	_ ^		N/U/CL	S	F
ZP3E-T80UM□JB10	81.1	151.1	416	414	431
ZP3E-T80UM□JB30	106.1	176.1	445	443	461
ZP3E-T80UM□JB50	126.1	196.1	468	466	483

ZP3E-T100UM□JB■



ZP3E-T125UM□JB■



Dimensions

Difficusions							
Model		Weight [g]/Pad materia					
Model		P	N/U/CL	S	F		
ZP3E-T100UM□JB10	83.6	153.6	462	459	488		
ZP3E-T100UM□JB30	108.6	178.6	492	488	518		
ZP3E-T100UM□JB50	128.6	198.6	514	511	540		

Dimensions

Model	Α		Weight	[g]/Pad r	material
Model			N/U/CL	S	F
ZP3E-T125UM□JB10	83.6	153.6	555	549	602
ZP3E-T125UM□JB30	108.6	178.6	585	578	631
7P3F-T125UM□.IB50	128 6	1986	608	601	654

ZP3

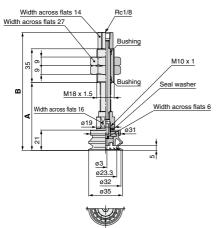
ZP3E

ZP2 ZP2V ZP

Dimensions/With Buffer: Vacuum Inlet



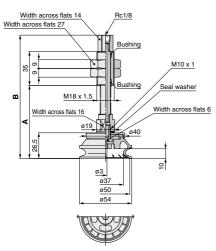
ZP3E-T32BM□JB■



Dimensions

Model	Α	. н	Weight	[g]/Pad r	material
Model	_ ^		N/U/CL	S	F
ZP3E-T32BM□JB10	70.1	122.1	204	204	207
ZP3E-T32BM□JB30	95.1	147.1	219	218	221
ZP3E-T32BM□JB50	115.1	167.1	230	230	233

ZP3E-T50BM□JB■



Dimensions

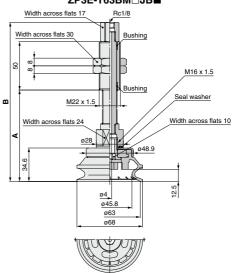
Model			A B Weig			naterial
Model	A		N/U/CL	S	F	
ZP3E-T50BM□JB10	75.6	127.6	223	222	229	
ZP3E-T50BM□JB30	100.6	152.6	238	237	243	
ZP3E-T50BM□JB50	120.6	172.6	249	249	255	

ZP3E-T40BM□JB■ Width across flats 14 Rc1/8 Width across flats 27 Bushing M10 x 1 33 Bushing Seal washer m M18 x 1.5 Width across flats 6 Width across flats 16 ø19 23 ø29.4 ø40

Dimensions

Model	Α	В	material		
Model	Α .		N/U/CL	S	F
ZP3E-T40BM□JB10	72.1	124.1	205	205	208
ZP3E-T40BM□JB30	97.1	149.1	220	219	223
ZP3E-T40BM□JB50	117.1	169.1	231	231	234
	117.1	100.1	201	201	

ZP3E-T63BM□JB■



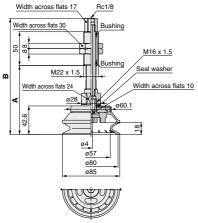
Dimensions

Model								В	Weight	[g]/Pad ı	naterial
Wodei	Α	-	N/U/CL	S	F						
ZP3E-T63BM□JB10	94.6	164.6	434	433	445						
ZP3E-T63BM□JB30	119.6	189.6	464	462	474						
ZP3E-T63BM□JB50	139.6	209.6	487	485	497						





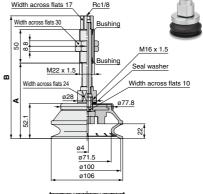
ZP3E-T80BM□JB■



Dimensions

		Weight	[g]/Pad ı	material
_ ^		N/U/CL	S	F
102.6	172.6	443	441	458
127.6	197.6	472	470	487
147.6	217.6	495	493	510
	127.6	102.6 172.6 127.6 197.6	A B N/U/CL 102.6 172.6 443 127.6 197.6 472	102.6 172.6 443 441 127.6 197.6 472 470

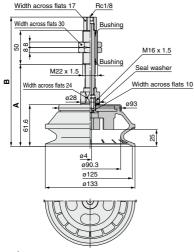
ZP3E-T100BM□JB■ across flats 17 Rc1/8



Dimensions

Model	_	В	Weight	[g]/Pad r	material
	A	P	N/U/CL	S	F
ZP3E-T100BM□JB10	112.1	182.1	481	477	507
ZP3E-T100BM□JB30	137.1	207.1	510	506	536
ZP3E-T100BM□JB50	157.1	227.1	533	529	559

ZP3E-T125BM□JB■



Dimensions

Model	Α	В	Weight	[g]/Pad ı	material
	Α	-	N/U/CL	S	F
ZP3E-T125BM□JB10	121.6	191.6	558	552	605
ZP3E-T125BM□JB30	146.6	216.6	588	581	634
ZP3E-T125BM□JB50	166.6	236.6	610	604	657

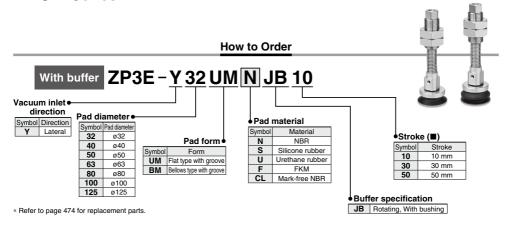
ZP3

ZP3E

ZP2

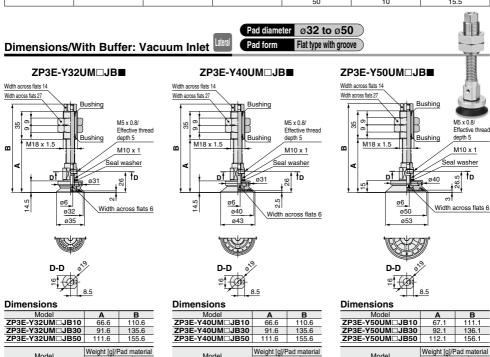
ZP2V

ZΡ



Specifications

Buffer specification	Pad diameter Mounting T		Tightening torque	Stroke	Spring reactive force [N]		
Bullet specification Fau diameter Wounting [N·m]		[mm]	At 0 stroke	At full stroke			
				10	5	6.5	
ø32 to ø50 M18 x 1.5	28 to 32	30	5	8.5			
Rotating				50	5	10.5	
notating			10	10	11.5		
	ø63 to ø125	M22 x 1.5	48 to 52	30	10	13.5	
				50	10	15.5	



Model

ZP3E-Y32UM□JB10

ZP3E-Y32UM□JB50

ZP3E-Y32UM□JB30 211

N/U/CL S

196

F

200

210 214

N/U/CL S

F

Model

ZP3E-Y50UM□JB10

ZP3E-Y50UM□JB30

ZP3E-Y50UM□JB50

F

N/U/CL S

214

229

Model

ZP3E-Y40UM□JB10

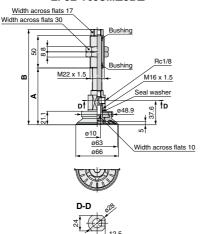
ZP3E-Y40UM□JB30 215

ZP3E-Y40UM□JB50 226

Dimensions/With Buffer: Vacuum Inlet



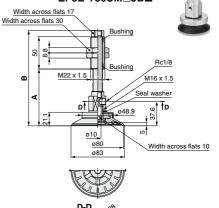
ZP3E-Y63UM□JB■



Dimensions

Model	_	В	Weight	[g]/Pad ı	material
	Α	•	N/U/CL	S	F
ZP3E-Y63UM□JB10	88.1	148.1	424	421	445
ZP3E-Y63UM□JB30	113.1	173.1	453	451	474
ZP3E-Y63UM□JB50	133.1	193.1	476	473	497

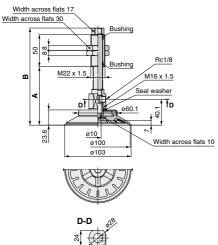
ZP3E-Y80UM□JB■



Dimensions

Model	Α	В	Weight	[g]/Pad r	material
	^		N/U/CL	S	F
ZP3E-Y80UM□JB10	88.1	148.1	478	473	513
ZP3E-Y80UM□JB30	113.1	173.1	507	502	542
ZP3E-Y80UM□JB50	133.1	193.1	530	525	565

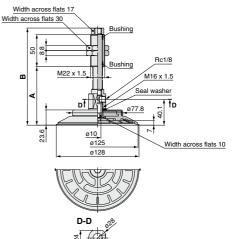
ZP3E-Y100UM□JB■



Dimensions

Differisions										
Model	_	В	Weight	[g]/Pad ı	material					
	A	•	N/U/CL	S	F					
ZP3E-Y100UM□JB10	90.6	150.6	601	590	673					
ZP3E-Y100UM□JB30	115.6	175.6	630	619	702					
ZP3E-Y100UM□JB50	135.6	195.6	653	642	725					

ZP3E-Y125UM□JB■



Dimensions

Model		Weight [g]/Pad material			
		-	N/U/CL	S	F
ZP3E-Y125UM□JB10	90.6	150.6	773	754	910
ZP3E-Y125UM□JB30	115.6	175.6	803	784	940
ZP3E-Y125UM□JB50	135.6	195.6	826	807	963

ZP3

ZP3E

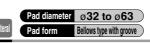
ZP2

ZP2V

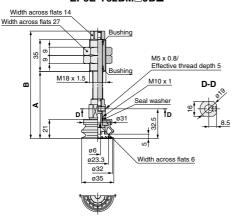
ZΡ

ZPT ZPR XT661

Dimensions/With Buffer: Vacuum Inlet



ZP3E-Y32BM□JB■



ZP3E-Y40BM□JB■ Width across flats 14 Width across flats 27 Bushing 35 M5 x 0.8/ Effective thread depth 5 M18 x 1.5 M10 x 1 D-D Seal washer Ŧь ρŦ Width across flats 6 ø29.4 ø40 ø44

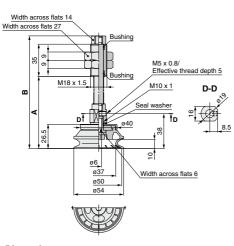
Dimensions

Model	Α	В	Weight [g]/Pad material			
	A	-	N/U/CL	S	F	
ZP3E-Y32BM□JB10	73.1	117.1	194	194	198	
ZP3E-Y32BM□JB30	98.1	142.1	210	210	214	
ZP3E-Y32BM□JB50	118.1	162.1	223	223	227	

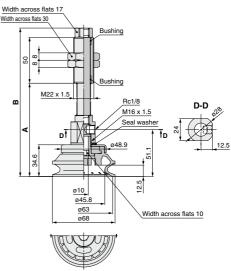
Dimensions

Model		Weight [g]/Pad material			
			N/U/CL	S	F
ZP3E-Y40BM□JB10	75.1	119.1	198	197	206
ZP3E-Y40BM□JB30	100.1	144.1	214	213	220
ZP3E-Y40BM□JB50	120.1	164.1	227	226	233

ZP3E-Y50BM□JB■



ZP3E-Y63BM□JB■



Dimensions

Model	_	В	Weight	[g]/Pad r	material
	Α	-	N/U/CL	S	F
ZP3E-Y50BM□JB10	78.6	122.6	212	211	223
ZP3E-Y50BM□JB30	103.6	147.6	228	227	239
ZP3E-Y50BM□JB50	123.6	167.6	241	240	252

Dimensions

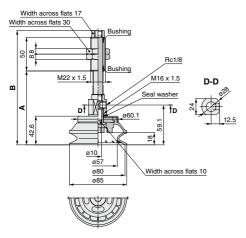
Model	Α	В	Weight [g]/Pad material		
	^	-	N/U/CL	S	F
ZP3E-Y63BM□JB10	101.6	161.6	422	419	442
ZP3E-Y63BM□JB30	126.6	186.6	453	450	474
ZP3E-Y63BM□JB50	146.6	206.6	478	475	499

With Buffer: Vacuum Inlet 2P3E Series





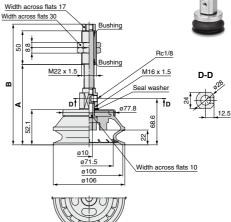
ZP3E-Y80BM□JB■



Dimensions

Model	A	В	Weight [g]/Pad material			
	^		N/U/CL	S	F	
ZP3E-Y80BM□JB10	109.6	169.6	461	456	511	
ZP3E-Y80BM□JB30	134.6	194.6	507	502	542	
ZP3E-Y80BM□JB50	154.6	214.6	532	527	567	

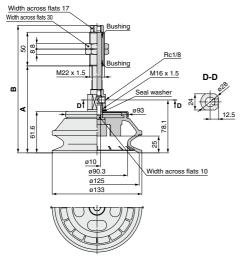
ZP3E-Y100BM□JB■



Dimensions

Model	_	В	Weight	[g]/Pad r	material
Wodei	A B	N/U/CL	S	F	
ZP3E-Y100BM□JB10	119.1	179.1	599	588	671
ZP3E-Y100BM□JB30	144.1	204.1	630	619	702
ZP3E-Y100BM□JB50	164.1	224.1	655	644	727

ZP3E-Y125BM□JB■



Dimensions

Model	Α	В	Weight [g]/Pad material		
Wodel	^	-	N/U/CL	S	F
ZP3E-Y125BM□JB10	128.6	188.6	771	752	908
ZP3E-Y125BM□JB30	153.6	213.6	803	784	940
ZP3F-Y125BM□.IB50	173.6	233.6	827	808	964

ZP3

ZP3E

ZP2V

ZΡ



Vertical vacuum inlet With ball joint adapter ZP3E - T F 32 UM N - AL6

Vacuum inlet direction

| Symbol Direction | T Vertical |

Specification (mechanism)

Pad diameter

Ball joint

Symbol	Pad diameter
32	ø32
40	ø40
50	ø50
63	ø63
80	ø80
100	ø100
125	a125

	Pad form
Symbol	Form
UM	Flat type with groove
BM	Rellows type with groove

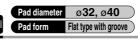
Mounting thread size

		Symbol	Mounting	ø 32	ø 63
		1	Thread size	to ø50	to ø125
ad	For direct mounting For plate connection	AL6	M6 x 1	•	_
皇	mounting	AL12	M12 x 1.25	_	•
ē	For plate	AL14	M14 x 1	•	
≥	connection	AL16	M16 x 1.5	_	•
F	emale	B8	M8 x 1.25	•	_
1	thread	B12	M12 x 1.75	_	•

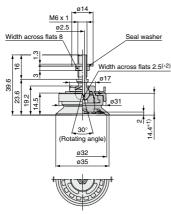
Pad material

Symbol	Material
N	NBR
S	Silicone rubber
U	Urethane rubber
F	FKM
CL	Mark-free NBR

Dimensions/With Ball Joint Adapter: Vacuum Inlet

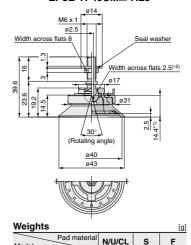


ZP3E-TF32UM□-AL6



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF32UM□-AL6	38.0	37.7	40.5

ZP3E-TF40UM□-AL6



39.1

38.6 42.2

ZP3E-TF40UM□-AL6

- *1) Center of the rotating angle
- *2) Position of the adapter mounting tool

Note) When mounting and removing this product, use a hexagon wrench at the position of the adapter mounting tool shown in the figure (*2).



^{*} Refer to pages 475 and 476 for replacement parts.

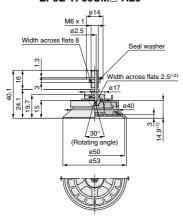
With Ball Joint Adapter: Vacuum Inlet **ZP3E** Series

Dimensions/With Ball Joint Adapter: Vacuum Inlet



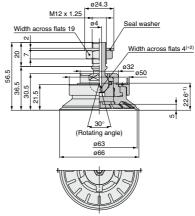


ZP3E-TF50UM□-AL6



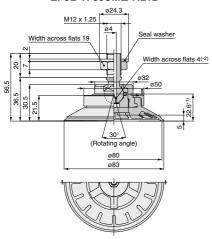
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF50UM□-AL6	57.2	56.4	62.2

ZP3E-TF63UM□-AL12



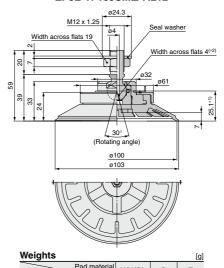
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF63UM□-AL12	146	145	157

ZP3E-TF80UM□-AL12



Weights			[g]
Pad material Model	N/U/CL	S	F
ZP3E-TF80UM□-AL12	154	152	170

ZP3E-TF100UM□-AL12



N/U/CL

192

ZP3E-TF100UM□-AL12

s

189

F

218

Note) When mounting and removing this product, use a hexagon wrench at the position of the adapter mounting tool shown in the figure (*2).



ZP3

ZP3E

ZP2

ZP2V

ZPT ZPT ZPR XT661

^{*1)} Center of the rotating angle

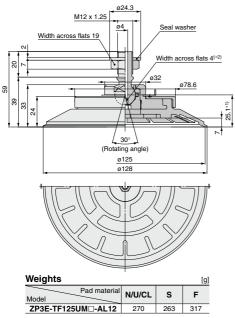
^{*2)} Position of the adapter mounting tool

Dimensions/With Ball Joint Adapter: Vacuum Inlet





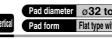
ZP3E-TF125UM□-AL12



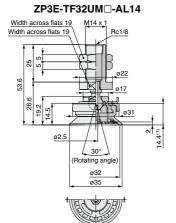
- *1) Center of the rotating angle
- *2) Position of the adapter mounting tool

Note) When mounting and removing this product, use a hexagon wrench at the position of the adapter mounting tool shown in the figure (*2).







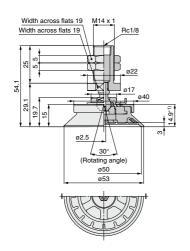


Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF32UM□-AL14	59.0	58.6	61.4

ZP3E-TF40UM□-AL14 Width across flats 19 Rc1/8 25 ø22 53.6 ø17 28.6 19.2 ø31 ø2.5 30° (Rotating angle) ø40 ø43

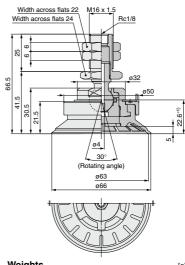
Weights [g] Pad material N/U/CL s F Model ZP3E-TF40UM□-AL14 60.0 59.6 63.1

ZP3E-TF50UM□-AL14



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF50UM□-AL14	78.1	77.3	83.6

ZP3E-TF63UM□-AL16



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF63UM□-AL16	184	183	195

ZP3

ZP3E

ZP2

ZP2V

ZΡ

ZPT ZPR

Dimensions/With Ball Joint Male Thread Adapter: Vacuum Inlet



ZP3E-TF80UM -AL16 Width across flats 22 Width across flats 24 Width across flats 25 Width across flats 24 Width across flats 25 Wid

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF80UM□-AL16	192	190	208

ZP3E-TF100UMD-AL16 Width across flats 22 Width across flats 24 Re1/8 Re1

Pad material

ZP3E-TF100UM□-AL16

Model

N/U/CL

230

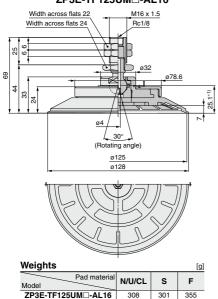
s

227

F

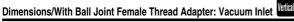
256

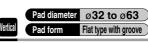
ZP3E-TF125UM□-AL16



^{*1)} Center of the rotating angle

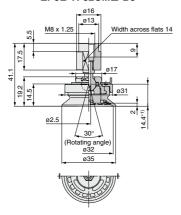
With Ball Joint Adapter: Vacuum Inlet **ZP3E** Series





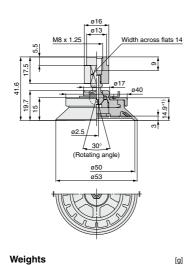






Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF32UM□-B8	40.9	40.5	43.4

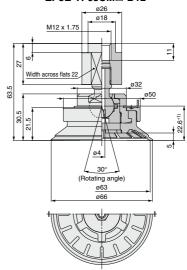
ZP3E-TF50UM□-B8



	ZP3E-TF40UM□-B8	
41.1 192 14.5 14.5 5.5	016 013 Width acro	2.5 14.4.1)

Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF40UM□-B8	41.9	41.5	45.0

ZP3E-TF63UM□-B12



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF63UM□-B12	151	150	162

Model

Pad material

ZP3E-TF50UM□-B8

N/U/CL

60.0

s

59.2

F

65.5

ZP3

ZP3E

ZP2

ZP2V

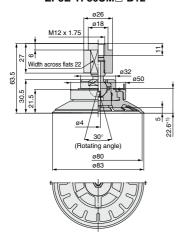
ZΡ

ZPT ZPR XT661

Dimensions/With Ball Joint Female Thread Adapter: Vacuum Inlet

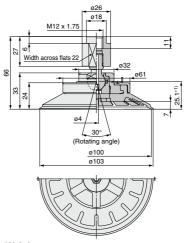


ZP3E-TF80UM□-B12



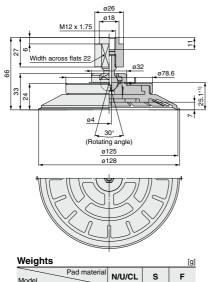
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF80UM□-B12	160	157	175

ZP3E-TF100UM□-B12



Weights			[g:
Pad material Model	N/U/CL	s	F
ZP3E-TF100UM□-B12	198	194	224

ZP3E-TF125UM□-B12



275

269 322

ZP3E-TF125UM□-B12

^{*1)} Center of the rotating angle

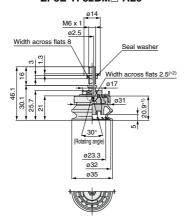
With Ball Joint Adapter: Vacuum Inlet **ZP3E** Series

Dimensions/With Ball Joint Adapter: Vacuum Inlet



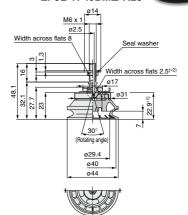


ZP3E-TF32BM□-AL6



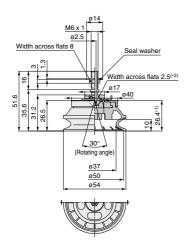
Weights			[g
Pad material Model	N/U/CL	s	F
ZP3E-TF32BM□-AL6	40.0	39.5	43.6

ZP3E-TF40BM□-AL6



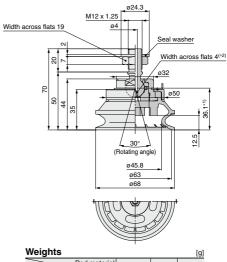
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF40BM□-AL6	44.0	43.1	50.0

ZP3E-TF50BM□-AL6



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF50BM□-AL6	65.6	64.1	76.1

ZP3E-TF63BM□-AL12



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF63BM□-AL12	163	160	183

Note) When mounting and removing this product, use a hexagon wrench at the position of the adapter mounting tool shown in the figure (*2).



ZP3

ZP3E

ZP2

ZP2V

ZΡ

^{*1)} Center of the rotating angle

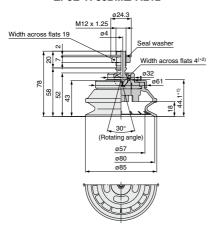
^{*2)} Position of the adapter mounting tool

Dimensions/With Ball Joint Adapter: Vacuum Inlet



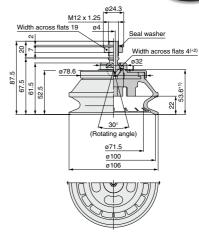


ZP3E-TF80BM□-AL12



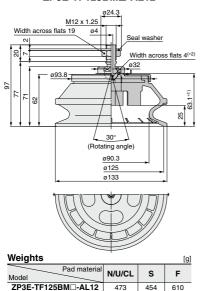
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF80BM□-AL12	208	203	243

ZP3E-TF100BM□-AL12



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF100BM□-AL12	316	305	388

ZP3E-TF125BM□-AL12



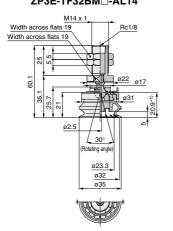
- *1) Center of the rotating angle
- *2) Position of the adapter mounting tool

Note) When mounting and removing this product, use a hexagon wrench at the position of the adapter mounting tool shown in the figure (*2).



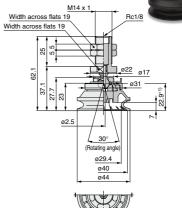






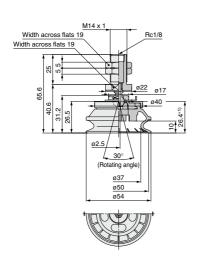
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF32BM□-AL14	60.9	60.4	64.6

ZP3E-TF40BM□-AL14



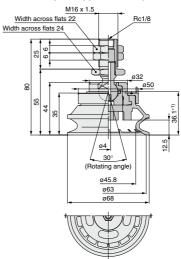
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF40BM□-AL14	64.9	64.1	70.9

ZP3E-TF50BM□-AL14



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF50BM□-AL14	86.6	85.1	97.1

ZP3E-TF63BM□-AL16



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF63BM□-AL16	201	198	221

ZP3

ZP3E

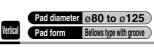
ZP2

ZP2V

ZΡ

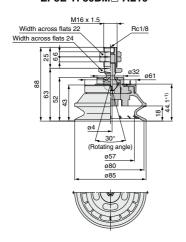
ZPT ZPR

Dimensions/With Ball Joint Male Thread Adapter: Vacuum Inlet



ZP3E-TF100BM□-AL16

ZP3E-TF80BM□-AL16

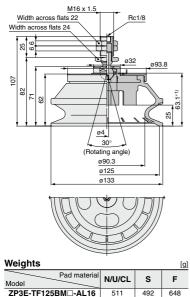


Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF80BM□-AL16	246	241	281

Width across flats 22 Width across flats 24 Width across flats 24 Width across flats 24 Roll B Rol

Pad material N/U/CL S F	Weights			[g]
	Pad material Model	N/U/CL	s	F
ZP3E-TF100BM □- AL16 354 343 426	ZP3E-TF100BM□-AL16	354	343	426

ZP3E-TF125BM□-AL16

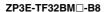


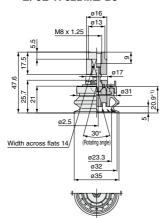
^{*1)} Center of the rotating angle





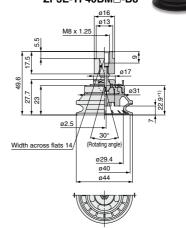






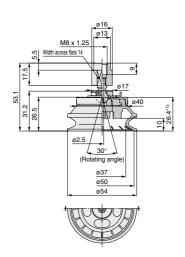
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF32BM□-B8	42.9	42.4	46.5

ZP3E-TF40BM□-B8



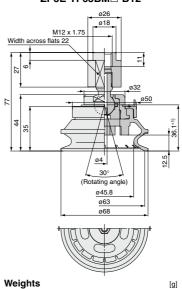
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF40BM□-B8	46.9	46.0	52.9

ZP3E-TF50BM□-B8



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF50BM□-B8	68.5	67.0	79.0

ZP3E-TF63BM□-B12



 ZP3

ZP3E

ZP2

ZP2V

ZΡ

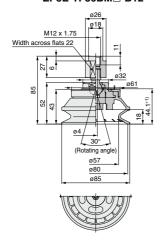
ZPT ZPR

Dimensions/With Ball Joint Female Thread Adapter: Vacuum Inlet



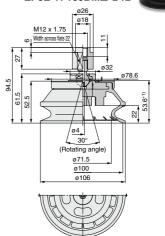


ZP3E-TF80BM□-B12



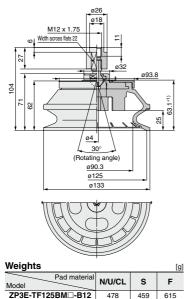
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF80BM□-B12	213	208	248

ZP3E-TF100BM□-B12



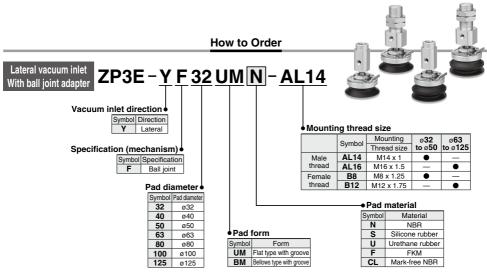
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-TF100BM□-B12	321	310	393

ZP3E-TF125BM□-B12

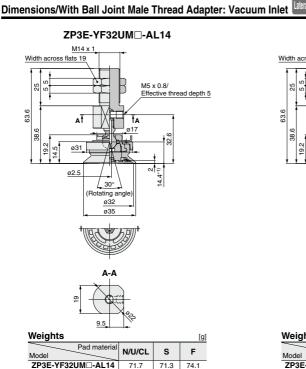


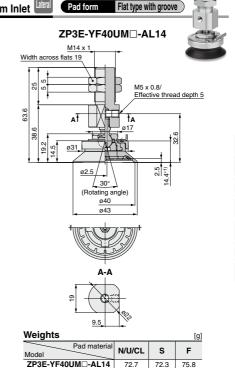
^{*1)} Center of the rotating angle





^{*} Refer to page 477 for replacement parts.





Pad diameter

ø32. ø40

*1) Center of the rotating angle

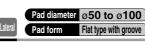
ZP3

ZP3E

ZP2

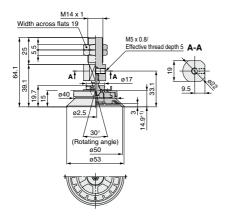
ZP2V ZP

Dimensions/With Ball Joint Male Thread Adapter: Vacuum Inlet



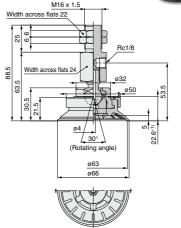


ZP3E-YF50UM□-AL14



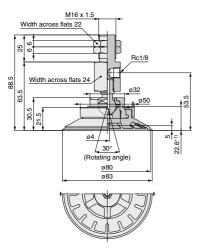
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF50UM□-AL14	90.8	90.0	96.3

ZP3E-YF63UM□-AL16



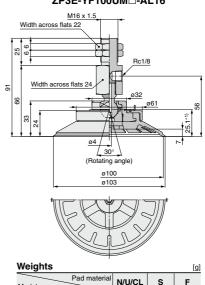
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF63UM□-AL16	291	290	302

ZP3E-YF80UM□-AL16



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF80UM□-AL16	300	297	315

ZP3E-YF100UM□-AL16



334

338

364

ZP3E-YF100UM□-AL16



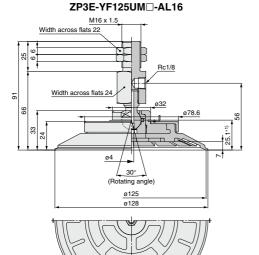
^{*1)} Center of the rotating angle



Dimensions/With Ball Joint Male Thread Adapter: Vacuum Inlet







Weights				[g]
Model	Pad material	N/U/CL	s	F
ZP3E-YF12	25UM□-AL16	415	409	462

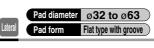
*1) Center of the rotating angle

ZP3 ZP3E ZP2

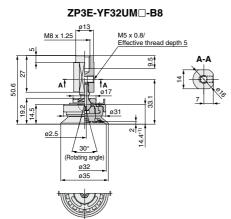
> ZP2V ZΡ

ZPT ZPR

Dimensions/With Ball Joint Female Thread Adapter: Vacuum Inlet

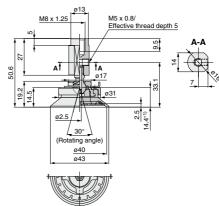






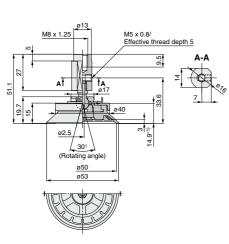
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF32UM□-B8	45.1	44.7	47.5

ZP3E-YF40UM□-B8



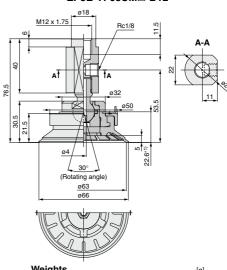
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF40UM□-B8	46.1	45.7	49.2

ZP3E-YF50UM□-B8



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF50UM□-B8	64.2	63.4	69.7

ZP3E-YF63UM□-B12



weights		
N/U/CL	s	F
164	163	175
		N/U/CL S 164 163



^{*1)} Center of the rotating angle

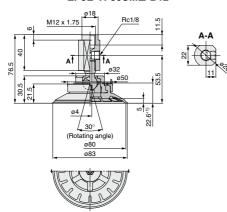
With Ball Joint Adapter: Vacuum Inlet 2P3E Series





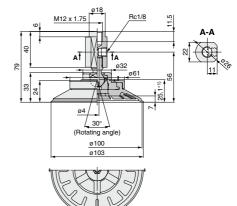


ZP3E-YF80UM□-B12



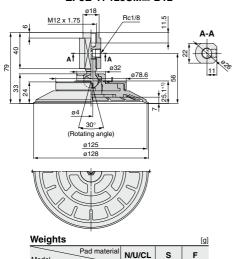
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF80UM□-B12	172	170	188

ZP3E-YF100UM□-B12



Weights			[g:
Pad material Model	N/U/CL	s	F
ZP3E-YF100UM□-B12	210	207	236

ZP3E-YF125UM□-B12



281

335

*1) Center of the rotating angle

ZP3E-YF125UM□-B12

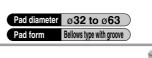
ZP3E ZP2 ZP2V ZΡ

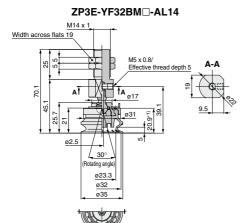
ZP3

Dimensions/With Ball Joint Male Thread Adapter: Vacuum Inlet









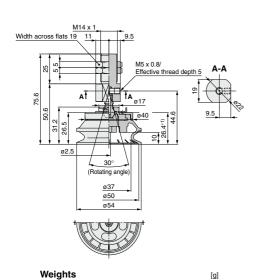
Т			
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF32BM□-AL14	60.9	60.4	64.6

ZP3E-YF40BM□-AL14 Width across flats 19 9.5 M5 x 0.8/ Effective thread depth 5 A-A 25 72.1 27. 30° (Rotating angle) ø29.4 ø40 ø44

Weights [g] Pad material N/U/CL ZP3E-YF40BM□-AL14 64.9 64.1 70.9

ZP3E-YF63BM□-AL16 M16 x 1.5

ZP3E-YF50BM□-AL14



Pad material

ZP3E-YF50BM□-AL14

N/U/CL

86.6

s F

85.1 97.1

Width across flats 22 25 Rc1/8 Width across flats 24 8 1 4 35 36. 12.5 ø4 30 (Rotating angle) ø45.8 α63

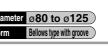
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF63BM□-AL16	201	198	221

Mode

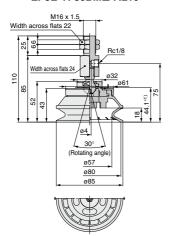
^{*1)} Center of the rotating angle





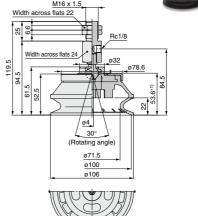


ZP3E-YF80BM□-AL16



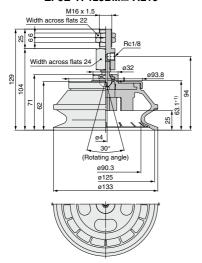
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF80BM□-AL16	246	241	281

ZP3E-YF100BM□-AL16



Weights				[9]
Model	Pad material	N/U/CL	s	F
7D2E_VE10	ORM - ALIG	354	3/13	126

ZP3E-YF125BM□-AL16



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF125BM□-AL16	511	492	648

*1) Center of the rotating angle



ZP3

ZP3E

ZP2 ZP2V

ZΡ

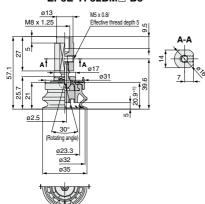
ZPT ZPR XT661

Dimensions/With Ball Joint Female Thread Adapter: Vacuum Inlet



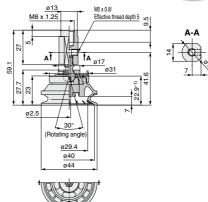


ZP3E-YF32BM□-B8



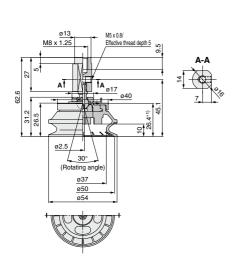
1			
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF32BM□-B8	42.9	42.4	46.5

ZP3E-YF40BM□-B8



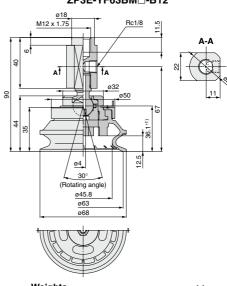
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF40BM□-B8	46.9	46.0	52.9

ZP3E-YF50BM□-B8



Weights				
Pad material Model	N/U/CL	s	F	
ZP3E-YF50BM□-B8	68.5	67.0	79.0	

ZP3E-YF63BM□-B12



weights				
Pad material Model	N/U/CL	s	F	
ZP3E-YF63BM□-B12	168	165	188	

^{*1)} Center of the rotating angle

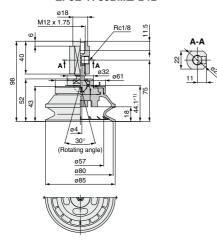
With Ball Joint Adapter: Vacuum Inlet 2P3E Series





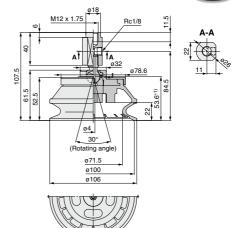


ZP3E-YF80BM□-B12



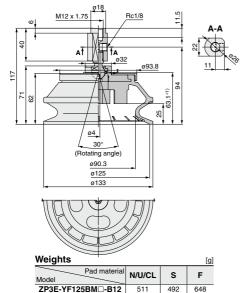
Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF80BM□-B12	213	208	248

ZP3E-YF100BM□-B12



Weights			[g]
Pad material Model	N/U/CL	s	F
ZP3E-YF100BM□-B12	354	343	426

ZP3E-YF125BM□-B12



*1) Center of the rotating angle

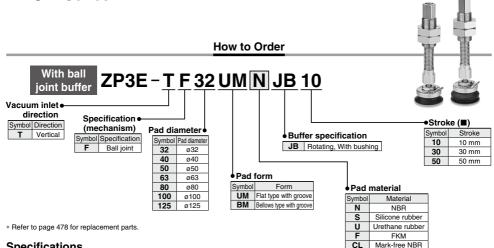
SMC

ZP3E ZP2

ZP3

ZP2V ZP

ZPT ZPR XT661



Specifications

Buffer specification	Pad diameter	Mounting	Tightening torque [N·m]	Stroke [mm]		at full stroke		
				10	5	6.5		
	ø32 to ø50	M18 x 1.5	28 to 32	30	5	8.5		
Rotating						50	5	10.5
Rotating				10	10	11.5		
	ø63 to ø125	M22 x 1.5	45 to 50	30	10	13.5		
				50	10	15.5		

Dimensions/With Ball Joint Buffer: Vacuum Inlet



Rc1/8

Bushing

M₁₈ x 1.5

Width across flats 14

Width across flats 27

14.5

Width across flats 14

<u>ø2</u>.5

ZP3E-TF32UM□JB■ Width across flats 14 Rc1/8 Bushing 33 σ Bushing α Width across flats 27 M18 x 1.5 Width across flats 14 14.5 <u>ø2</u>.5 _ ∠30° (Rotating angle ø32 ø35

Dimensions

Model	А В		Α	Weight	[g]/Pad r	material
Model	_ ^	Р	N/U/CL	S	F	
ZP3E-TF32UM□JB10	71.1	123.1	204	204	207	
ZP3E-TF32UM□JB30	96.1	148.1	219	218	221	
ZP3E-TF32UM□JB50	116.1	168.1	230	230	233	

Dimensions

32

m

Model	АВ		Weight	[g]/Pad ı	material
Model	A	N/U/CL	S	F	
ZP3E-TF40UM□JB10	71.1	123.1	205	205	208
ZP3E-TF40UM□JB30	96.1	148.1	220	219	223
ZP3E-TF40UM□JB50	116.1	168.1	231	231	234

(Rotating angle)

ø40

a43



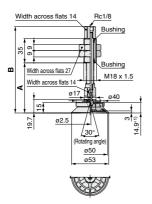
^{*1)} Center of the rotating angle

A 458





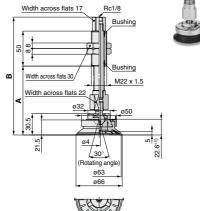
ZP3E-TF50UM□JB■



Dimensions

Model	Α	В	Weight [g]/Pad material			
Wodel		N/U/CL	S	F		
ZP3E-TF50UM□JB10	71.6	123.6	223	222	229	
ZP3E-TF50UM□JB30	96.6	148.6	238	237	243	
ZP3E-TF50UM□JB50	116.6	168.6	249	249	255	

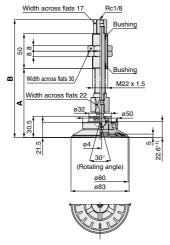
ZP3E-TF63UM□JB■



Dimensions

Model	Madel A B Weight				[g]/Pad material	
Wodel	Α .	В	N/U/CL	S	F	
ZP3E-TF63UM□JB10	98.5	168.5	434	433	445	
ZP3E-TF63UM□JB30	123.5	193.5	464	462	474	
ZP3E-TF63UM□JB50	143.5	213.5	487	485	497	

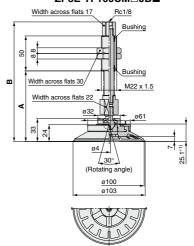
ZP3E-TF80UM□JB■



Dimensions

Model	_		Weight [g]/Pad material		
Model	^		N/U/CL	S	F
ZP3E-TF80UM□JB10	98.5	168.5	443	441	458
ZP3E-TF80UM□JB30	123.5	193.5	472	470	487
ZP3E-TF80UM□JB50	143.5	213.5	495	493	510

ZP3E-TF100UM□JB■



Dimensions

Model	АВ	Weight [g]/Pad material			
Model	_ ^		N/U/CL	S	F
ZP3E-TF100UM□JB10	101	171	481	477	507
ZP3E-TF100UM□JB30	126	196	510	506	536
ZP3E-TF100UM□JB50	146	216	533	529	559

*1) Center of the rotating angle

ZP3

ZP3E

ZP2

ZP2V

ZΡ

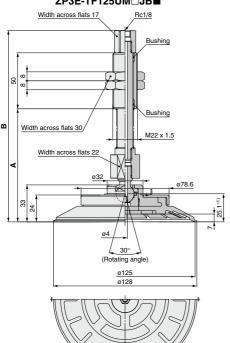
ZPT ZPR

Dimensions/With Ball Joint Buffer: Vacuum Inlet





ZP3E-TF125UM□JB■





Dimensions

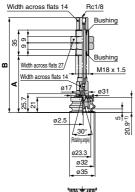
Model	Α	В	Weight	[g]/Pad r	material
Model	_ ^	-	N/U/CL	S	F
ZP3E-TF125UM□JB10	101	171	558	552	605
ZP3E-TF125UM□JB30	126	196	588	581	634
ZP3E-TF125UM□JB50	146	216	610	604	657

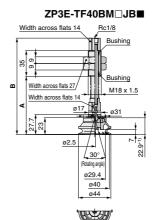
*1) Center of the rotating angle





ZP3E-TF32BM□JB■





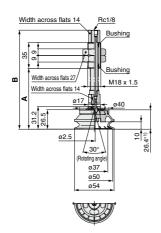
Dimensions

Model	Α	В	Weight [g]/Pad material		
Model	^	129.6 2	N/U/CL	S	F
ZP3E-TF32BM□JB10	77.6	129.6	206	206	210
ZP3E-TF32BM□JB30	102.6	154.6	221	220	224
ZP3E-TF32BM□JB50	122.6	174.6	232	232	236

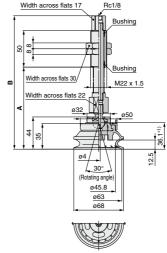
Dimensions

Model	_	В	Weight	[g]/Pad r	material
Model		-	N/U/CL	S	F
ZP3E-TF40BM□JB10	79.6	131.6	210	209	216
ZP3E-TF40BM□JB30	104.6	156.6	225	224	231
ZP3E-TF40BM□JB50	124.6	176.6	236	235	242

ZP3E-TF50BM□JB■



ZP3E-TF63BM□JB■



Dimensions

Model	A E	B N/U/C	Weight [g]/Pad material		
Model	^		N/U/CL	S	F
ZP3E-TF50BM□JB10	83.1	135.1	232	230	242
ZP3E-TF50BM□JB30	108.1	160.1	246	245	257
7D2E TEEODM IDEO	1001	180 1	250	256	260

Dimensions

Model	A B	Weight [g]/Pad material			
Model	_ ^		N/U/CL	S	F
ZP3E-TF63BM□JB10	112	182	451	448	471
ZP3E-TF63BM□JB30	137	207	480	477	501
ZP3E-TF63BM□JB50	157	227	503	500	523

ZP3

ZP3E

ZP2

ZP2V

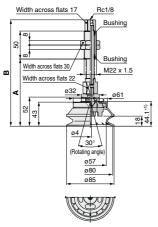
ZΡ

^{*1)} Center of the rotating angle

Dimensions/With Ball Joint Buffer: Vacuum Inlet



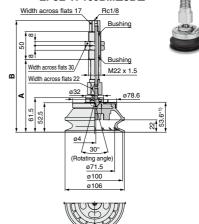
ZP3E-TF80BM□JB■



Dimensions

Model	Α	В	[g]/Pad material		
Model	Α.	_	N/U/CL	S	F
ZP3E-TF80BM□JB10	120	190	496	491	531
ZP3E-TF80BM□JB30	145	215	525	520	561
ZP3E-TF80BM□JB50	165	235	548	543	583

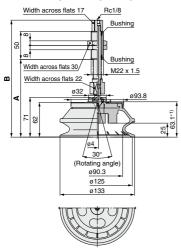
ZP3E-TF100BM□JB■



Dimensions

Model	Α	в	Weight [g]/Pad material			
Woder	_ A	-	N/U/CL	S	F	
ZP3E-TF100BM□JB10	129.5	199.5	604	593	676	
ZP3E-TF100BM□JB30	154.5	224.5	633	622	705	
ZP3E-TF100BM□JB50	174.5	244.5	656	645	728	

ZP3E-TF125BM□JB■

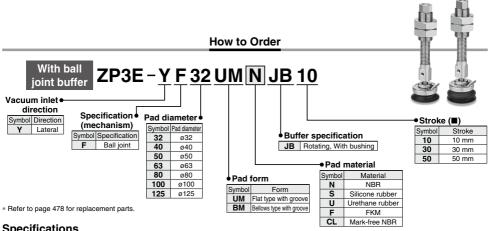


Dimensions

Model	A	В	Weight	[g]/Pad ı	material
Wodel	A	В	N/U/CL	S	F
ZP3E-TF125BM□JB10	139	209	761	742	898
ZP3E-TF125BM□JB30	164	234	790	771	927
ZP3E-TF125BM□JB50	184	254	813	794	950

^{*1)} Center of the rotating angle

With Ball Joint Buffer: Vacuum Inlet 2P3E Series

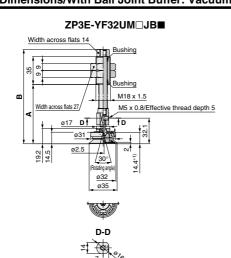


Specifications

Buffer	Pad	Mounting	Tightening torque	Stroke	Spring reactive force [N]		
specification	diameter	iviounting	[N·m]		At 0 stroke	At full stroke	
	ø32 to ø50 M18 x 1.5 ø63 to ø125 M22 x 1.5			10	5	6.5	
		M18 x 1.5	28 to 32	30	5	8.5	
Rotating				50	5	10.5	
Hotating			10	10	11.5		
		45 to 50	30	10	13.5		
				50	10	15.5	







Dimensions Weight [g]/Pad material Model В N/U/CL s ZP3E-YF32UM□JB10 74.1 118.1 202 202 204 ZP3E-YF32UM□JB30 99.1 143.1 218 221 218 ZP3E-YF32UM□JB50 119.1 163.1 231 230 233

Bushing 33 Bushing œ M18 x 1.5 M5 x 0.8/Effective thread depth 5 ø31 <u>ø2.5</u> 19.2 /30° (Rotating angle ø40

Dimensions

Model	A						В	Weight	[g]/Pad r	material
Model		ь	N/U/CL	S	F					
ZP3E-YF40UM□JB10	74.1	118.1	203	203	206					
ZP3E-YF40UM□JB30	99.1	143.1	219	219	222					
ZP3E-YF40UM□JB50	119.1	163.1	232	231	235					

ZP3

ZP3E ZP2

ZP2V

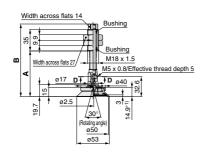
ZΡ

^{*1)} Center of the rotating angle

Dimensions/With Ball Joint Buffer: Vacuum Inlet



ZP3E-YF50UM□JB■

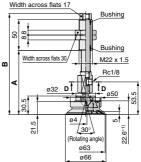




Dimensions

Madal	Model A		Weight [g]/Pad material			
Model	A	В	N/U/CL	S	F	
ZP3E-YF50UM□JB10	74.6	118.6	221	220	227	
ZP3E-YF50UM□JB30	99.6	143.6	237	236	243	
ZP3E-YF50UM□JB50	119.6	163.6	250	249	255	

ZP3E-YF63UM□JB■

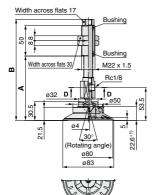




Dimensions

Model	Α	В	Weight [g]/Pad material		
Woder	_ A	-	N/U/CL	S	F
ZP3E-YF63UM□JB10	105	165	436	434	446
ZP3E-YF63UM□JB30	130	190	467	465	477
ZP3E-YF63UM□JB50	150	210	492	490	502

ZP3E-YF80UM□JB■



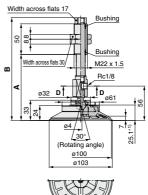


Model		Weight [g]/Pad material						
Model		•	N/U/CL	S	F			
ZP3E-YF80UM□JB10	105	165	444	442	459			
ZP3E-YF80UM□JB30	130	190	475	473	490			
ZP3E-YF80UM□JB50	150	210	500	498	515			

*1) Center of the rotating angle

Dimensions

ZP3E-YF100UM□JB■



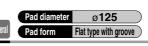


Dimensions

Model	AE	AB	.			Λ.	ь .	Weight	[g]/Pad ı	material
Model		В	N/U/CL	S	F					
ZP3E-YF100UM□JB10	107.5	167.5	482	478	508					
ZP3E-YF100UM□JB30	132.5	192.5	513	509	539					
ZP3E-YF100UM□JB50	152.5	212.5	538	534	564					

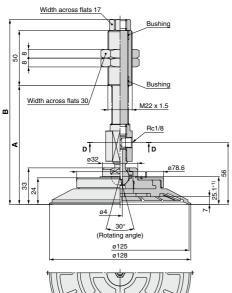


Dimensions/With Ball Joint Buffer: Vacuum Inlet





ZP3E-YF125UM□JB■







Dimensions

Model		Weight	[g]/Pad i	material	
Model	^	В	N/U/CL	S	F
ZP3E-YF125UM□JB10	107.5	167.5	559	553	606
ZP3E-YF125UM□JB30	132.5	192.5	591	584	637
ZP3E-YF125UM□JB50	152.5	212.5	616	609	662

*1) Center of the rotating angle

ZP3

ZP3E

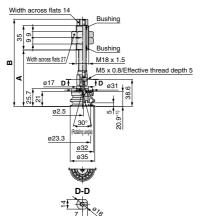
ZP2

ZP2V ZΡ

Dimensions/With Ball Joint Buffer: Vacuum Inlet



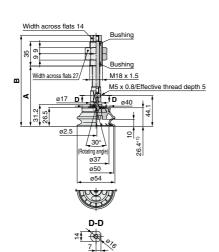
ZP3E-YF32BM□JB■



Dimensions

Model	A		В	Weight	[g]/Pad r	ad material	
Model		В	N/U/CL	S	F		
ZP3E-YF32BM□JB10	80.6	124.6	204	203	208		
ZP3E-YF32BM□JB30	105.6	149.6	220	220	224		
ZP3F-YF32BM□JB50	125.6	169 6	233	232	236		

ZP3E-YF50BM□JB■

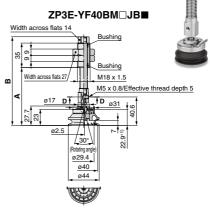


Dimensions

Model	А	В	Weight [g]/Pad material			
Model	A	В	N/U/CL	S	F	
ZP3E-YF50BM□JB10	86.1	130.1	230	228	240	
ZP3E-YF50BM□JB30	111.1	155.1	246	244	256	
ZP3E-YF50BM□JB50	131.1	175.1	258	257	269	

^{*1)} Center of the rotating angle

A 466



Weight [g]/Pad material Model В N/U/CL ZP3E-YF40BM□JB10 82.6 126.6 208 ZP3E-YF40BM□JB30 107.6 151.6 224

ZP3E-YF40BM□JB50 127.6 171.6

Dimensions

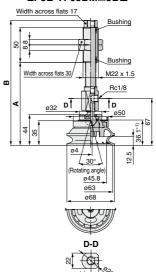
ZP3E-YF63BM□JB■

207

214

230

243 236



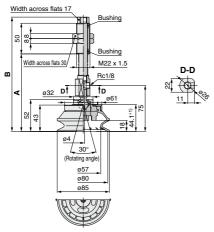
Dimensions

Model	Model A		Weight [g]/Pad material			
Model	A	В	N/U/CL	S	F	
ZP3E-YF63BM□JB10	118.5	178.5	452	449	472	
ZP3E-YF63BM□JB30	143.5	203.5	483	480	504	
ZP3E-YF63BM□JB50	163.5	223.5	508	505	529	





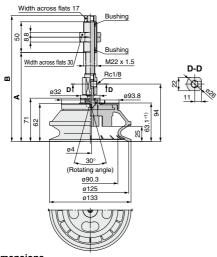
ZP3E-YF80BM□JB■



Dimensions

Model	A		Weight	[g]/Pad r	naterial
Model			N/U/CL	S	F
ZP3E-YF80BM□JB10	126.5	186.5	497	492	532
ZP3E-YF80BM□JB30	151.5	211.5	529	524	564
ZP3E-YF80BM□JB50	171.5	231.5	553	548	589

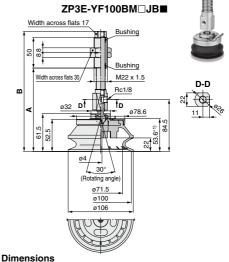
ZP3E-YF125UM□JB■



Dimensions

Model	А В		Weight [g]/Pad materia		
Woder	Α.		N/U/CL	S	F
ZP3E-YF125BM□JB10	145.5	205.5	762	743	899
ZP3E-YF125BM□JB30	170.5	230.5	793	774	930
ZP3E-YF125BM□JB50	190.5	250.5	818	799	955

*1) Center of the rotating angle



Model	Α	В	Weight [g]/Pad material				
Model	_ ^	-	N/U/CL	S	F		
ZP3E-YF100BM□JB10	136	196	605	594	677		
ZP3E-YF100BM□JB30	161	221	636	625	708		
ZP3E-YF100BM□JB50	181	241	661	661 650			

ZP3

ZP3E

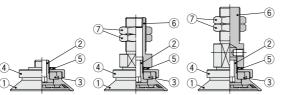
ZP2 ZP2V

ZP

ZP3E Series Construction

Pad with Adapter

Male thread

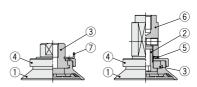


With set screw

With male thread adapter (Vacuum inlet: Vertical)

With male thread adapter (Vacuum inlet: Lateral)

Female thread



With female thread plate (Vacuum inlet: Vertical)

With female thread adapter (Vacuum inlet: Lateral)

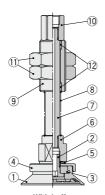
Component Parts (Male thread)

No.	Description	Material (Surface treatment)	Note
1	Vacuum pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Pad form: Flat type with groove, Bellows type with groove
2	Vacuum pad Set screw Plate Holder Seal washer Adapter Nut	Brass (Electroless nickel plating)	
3	Plate	Aluminum alloy (Clear anodized)	
4	Holder	Aluminum alloy (Clear anodized)	Pad diameter: ø32 to ø50
4	noider	Structural steel (Electroless nickel plating)	Pad diameter: ø63 to ø125
5	Seal washer	Steel strip/NBR	
6	Adamtas	Aluminum alloy (Clear anodized)	Pad diameter: ø32 to ø50
0	Adapter	Brass (Electroless nickel plating)	Pad diameter: ø63 to ø125
7	Nina	Brass (Electroless nickel plating)	Pad diameter: ø32 to ø50
′	Nut	Structural steel (Nickel plating)	Pad diameter: ø63 to ø125
* (2) to	(7) are used for bot	h the flat type with groove and th	e bellows type with groove.

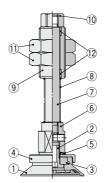
Component Parts (Female thread)

No.	Description	Material (Surface treatment)	Note
1	Vacuum pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Pad form: Flat type with groove, Bellows type with groove
2	Set screw	Brass (Electroless nickel plating)	
3	Plate	Aluminum alloy (Clear anodized)	
4	Holder	Aluminum alloy (Clear anodized)	With female thread plate: Pad diameter: ø32 to ø125 With female thread adapter: Pad diameter: ø32 to ø50
		Structural steel (Electroless nickel plating)	 With female thread adapter: Pad diameter: ø63 to ø125
-5	Seal washer	Steel strip/NBR	
6	Adapter	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
<u> </u>	оторро.	Ctairiodo otoor	

Pad with Buffer



With buffer (Vacuum inlet: Vertical)



With buffer (Vacuum inlet: Lateral)

mnonent Parts

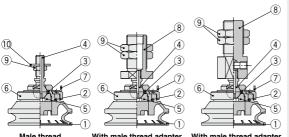
Con	iponeni Paris		
No.	Description	Material (Surface treatment)	Note
1	Vacuum pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Pad form: Flat type with groove, Bellows type with groove
2	Set screw	Brass (Electroless nickel plating)	
3	Plate	Aluminum alloy (Clear anodized)	
4	Holder	Aluminum alloy (Clear anodized)	Pad diameter: ø32 to ø50
-	Holdel	Structural steel (Electroless nickel plating)	Pad diameter: ø63 to ø125
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)	
12	Bushing	=	

^{*} ② to ② are used for both the flat type with groove and the bellows type with groove.



Pad with Ball Joint Adapter

ø32 to ø50 Male thread

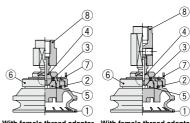


Male thread (for direct mounting)

With male thread adapter (Vacuum inlet: Vertical)

With male thread adapter (Vacuum inlet: Lateral)

Female thread



With female thread adapter (Vacuum inlet: Vertical)

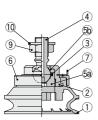
With female thread adapter (Vacuum inlet: Lateral)

Component Parts

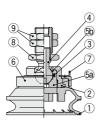
No.	Description	Material (Surface treatment)	Note
1	Vacuum pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Pad form: Flat type with groove, Bellows type with groove
2	Plate	Stainless steel	
3	O-ring	FKM	
4	Shaft	Stainless steel	
5	Shaft ring	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Adapter	Aluminum alloy (Clear anodized)	
9	Nut	Brass (Electroless nickel plating)	
10	Seal washer	Soft iron/NBR (Zinc chromated)	

^{*} 2 to 10 are used for both the flat type with groove and the bellows type with groove.

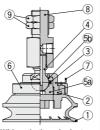
ø63 to ø125 Male thread



Male thread (for direct mounting)

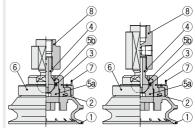


With male thread adapter With male thread adapter (Vacuum inlet: Vertical)



(Vacuum inlet: Lateral)

Female thread



With female thread adapter (Vacuum inlet: Vertical)

With female thread adapter (Vacuum inlet: Lateral)

Component Parts (Male thread)

No.	Description	Material (Surface treatment)	Note
1	Vacuum pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Pad form: Flat type with groove, Bellows type with groove
2	Plate	Aluminum alloy (Clear anodized)	
3	O-ring	FKM	
4	Shaft	Stainless steel	
5a	Shaft ring A	Stainless steel	
5b	Shaft ring B	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Adapter	Brass (Electroless nickel plating)	
9	Nut	Structural steel (Nickel plating)	Male thread adapter
9	Nut	Structural steel (Zinc chromated)	Male thread (for direct mounting) adapter
10	Seal washer	Soft iron/NBR (Zinc chromated)	

* 2 to 10 are used for both the flat type with groove and the bellows type with groove.

Component Parts (Female thread)

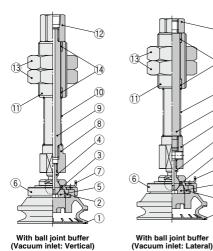
•••		io (i cimalo ameda)	
No.	Description	Material (Surface treatment)	Note
1	Vacuum pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Pad form: Flat type with groove, Bellows type with groove
2	Plate	Aluminum alloy (Clear anodized)	
3	O-ring	FKM	
4	Shaft	Stainless steel	
5a	Shaft ring A	Stainless steel	
5b	Shaft ring B	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Adapter	Aluminum alloy (Clear anodized)	

ZP3 ZP3E ZP2 ZP2V

ZΡ

Pad with Ball Joint Buffer

ø32 to ø50



Component Parts

(10)

9

(8)

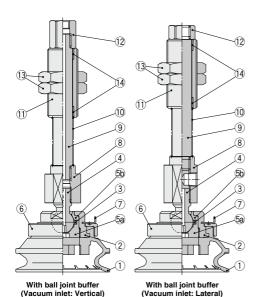
(4)

(3)

INO.	Description	iviateriai (Suriace treatment)	Note
1	Vacuum pad	NBR, Silicone rubber, Urethane rubber, FKM.	Pad form: Flat type with groove, Bellows
		Mark-free NBR	type with 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)	
9	Piston rod	Structural steel (Hard chrome 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)	
14	Bushing	_	

* $\ \ \,$ $\ \ \,$ $\ \ \,$ $\ \$ $\$ $\ \$ $\$ $\$ $\ \$ $\$ $\$ $\$ $\$ $\ \$ $\$ $\$ $\$ $\$ $\ \$ $\$ $\$ $\$ $\$ $\ \$ $\$

ø63 to ø125



Component Parts

No.	Description	Material (Surface treatment)	Note
1	Vacuum pad	NBR, Silicone rubber, Urethane rubber, FKM, Mark-free NBR	Pad form: Flat type with groove, Bellows type with groove
2	Plate	Aluminum alloy (Clear anodized)	
3	O-ring	FKM	
4	Shaft	Stainless steel	
5a	Shaft ring A	Stainless steel	
5b	Shaft ring B	Stainless steel	
6	Holder	Aluminum alloy (Clear anodized)	
7	Stopper	Stainless steel	
8	Adapter	Aluminum alloy (Clear anodized)	
9	Piston rod	Structural steel (Hard chromated)	
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)	
14	Bushing		

^{*} ② to 4 are used for both the flat type with groove and the bellows type with groove.

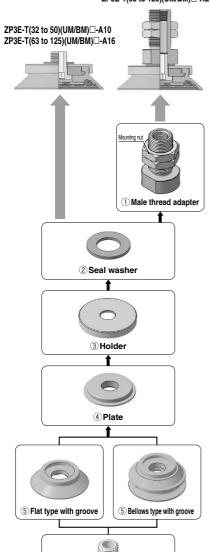


Component Part No.

With Set Screw/With Male Thread Adapter: Vacuum Inlet



ZP3E-T(32 to 50)(UM/BM)□-AL14 ZP3E-T(63 to 125)(UM/BM) □-AL16



6 Set screw

1) Male thread adapter (With 2 mounting nuts)

-		•							•		•				
	Form/Diameter														
Part no.		32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E	A-TAL14	•	•	•	-	_	_	-	•	•	•	_	_	_	_
ZP3E	A-TAL16	_	_	_	•	•	•	•	_	_	_	•	•	•	•

2 Seal washer (Sales unit: 5 pcs.)

Part no.	Mounting thread size	Applicable set screw (6)
ZP3EA-SW10	M10 x 1	ZP3EA-A10
ZP3EA-SW16	M16 x 1.5	ZP3EA-A16

(3) Holder

Form/Diameter	Fla	Flat type with groove (UM)						Bellows type with groove (BM)								
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125		
ZP3EA-H1A	•	•	_	_	_	_	_	•	•	_	_	_	_	_		
ZP3EA-H2A	-	_	•	_	_	_	_	_	_	•	_	_	_	_		
ZP3EA-H3A	 -	-	_	•	•	_	_	_	_	_	•	_	_	_		
ZP3EA-H4A	_	_	_	_	_	•	_	_	-	_	_	•	_	_		
ZP3EA-H5A	-	_	_	_	_	_	•	_	_	_	_	_	•	_		
ZP3EA-H6A	_	_	_	_	_	_	_	_	_	_	_	_	_	•		

(4) Plate

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	ows	type	with	groc	ove (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-P1	•	•	_	_	-	_	_	•	•	_	_	_	_	_
ZP3EA-P2	_	_	•	_	_	_	_	_	-	•	_	_	_	-
ZP3EA-P3	_	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EA-P4	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-P5	_	-	-	_	-	-	•	_	-	_	_	-	•	\Box
ZP3EA-P6	_	_	_	_	_	_		_	_	_	_	_	_	

(5) Pad

								_						
Form/Diameter							M)							
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E-▲UM□	•	•	•	•	•	•	•	_	_	_	_	_	_	
ZP3E-▲BM□	_	l	_	_		_	_	•	•	•	•	•	•	•

Note 1) ▲ in the table indicates the pad diameter. Note 2) \square in the table indicates the pad material.

6 Set screw

© 001 001 011														
Form/Diameter													ove (I	
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-A10	•	•	•	_	_	_	_	•	•	•	_	_	_	_
ZP3EA-A16	_	_	_	•	•	•	•	-	_	_	•	•	•	•

(·	caree arma re p	.,
Part no.	Mounting thread size	Applicable male thread adapter (1)
ZPNA-M14	M14 x 1	ZP3EA-TAL14
ZPNA-M16	M16 x 1.5	ZP3EA-TAL16

Mounting nut (Sales unit: 10 pcs.)

ZP3

ZP3E ZP2

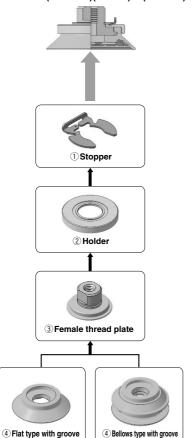
ZP2V

ZΡ

With Female Thread Adapter: Vacuum Inlet



ZP3E-T(32 to 50)(UM/BM) -(B8/B10) ZP3E-T(63 to 125)(UM/BM)□-(B12/B18)



1) Stopper

Form/Diameter		at typ												
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-S1	•	•	•	_	-	_	_	•	•	•	_	_	-	_
ZP3EA-S2	_	_	_	•	•	•	•	_	_	_	•	•	•	•

2 Holder

Form/Diameter						e (U					with			
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-H1B	•	•	_	_	_	_	-	•	•	_	_	_	_	_
ZP3EA-H2B	_	_	•	_	_	_	_	_	_	•	_	_	_	_
ZP3EA-H3B	_	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EA-H4B	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-H5B	_	_	_	_	_	_	•	_	_	_	_	_	•	_
ZP3EA-H6B	_	_	_	_	_	_	ı	_	_	-	_	_	_	•

3 Female thread plate

							Pad t	orm	/diar	nete	r				
		Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	ows	type	with	groc	ve (l	BM)
Part no.	Mounting thread size	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-PT1-B8	M8	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EA-PT1-B10	M10	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EA-PT2-B8	M8	_	-	•	_	-	_	_	_	_	•	_	_	_	_
ZP3EA-PT2-B10	M10	_	_	•	_	_	_	_	_	_	•	_	_		—
ZP3EA-PT3-B12	M12	_	_	_	•	•	_	_	_	_	_	•	_	_	
ZP3EA-PT3-B18	M18	_	-	_	•	•	_	_	-	_	_	•	_	_	_
ZP3EA-PT4-B12	M12	_	_	_	_	_	•	_	_	_	_	_	•		_
ZP3EA-PT4-B18	M18	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-PT5-B12	M12	_	-	_	_	-	_	•	-	_	_	-	_	•	_
ZP3EA-PT5-B18	M18	_	_	_	_	_	_	•	_	_	_	_	_	•	_
ZP3EA-PT6-B12	M12		_	_	_	_	_	_	_	_	_	_	_	_	•
ZP3EA-PT6-B18	M18	_	-	_	_	-	_	_	-	_	_	_	_	_	•

(4) Pad

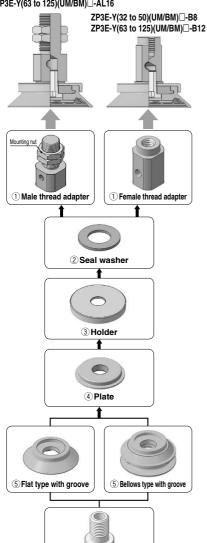
Form/Diameter						e (U								BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E-▲UM□	•	•	•	•	•	•	•	_	_	_	_	_	_	_
ZP3E-▲BM□	_	_	_	_	_	_	_	•	•	•	•	•	•	•

Note 1) ▲ in the table indicates the pad diameter. Note 2) \Box in the table indicates the pad material.

With Male Thread Adapter/With Female Thread Adapter: Vacuum Inlet



ZP3E-Y(32 to 50)(UM/BM)□-AL14 ZP3E-Y(63 to 125)(UM/BM)□-AL16



6 Set screw

1 Male thread adapter (With 2 mounting nuts)

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groc	ove (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-YAL14	•	•	•	—	_	_	_	•	•	•	-	_	—	_
ZP3EA-YAL16	_	_	_	•	•	•	•	_	_	_	•	•	•	•

① Female thread adapter

Form/Diameter						e (U								
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-YB8	•	•	•	_	_	<u> </u>	-	•	•	•	_	_	-	-
ZP3EA-YB12	_	_	_		•	•	•	_	_	_	•	•		•

2 Seal washer (Sales unit: 5 pcs.)

Part no.	Mounting thread size	Applicable set screw (6)
ZP3EA-SW10	M10 x 1	ZP3EA-A10
ZP3EA-SW16	M16 x 1.5	ZP3EA-A16

3 Holder

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groc	ve (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-H1A	•	•	_	_	_	_	_	•	•	_	_	_	_	-
ZP3EA-H2A	_	_	•	_	_	_	_	_	_	•	_	_	_	-
ZP3EA-H3A	 —	_	-	•	•	_	_	_	_	_	•	_	_	_
ZP3EA-H4A	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-H5A	 -	_	_	_	_	_	•	_	_	_	_	_	•	-
ZP3EA-H6A	_	_	_	_	_	_	_	_	_	_	_	_	_	•

4) Plate

Form/Diameter	Fla	at typ	pe w	ith g	roov	e (U	M)	Bell	lows	type	with	groo	ove (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-P1	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EA-P2	_	_	•	_	_	_	_	_	_	•	_	_	_	_
ZP3EA-P3	_	_	—	•	•	_	_	_	_	_	•	_	 - 	_
ZP3EA-P4	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-P5	_	_	_	-	_	_	•	_	-	_	_	-	•	_
ZP3EA-P6	 -	_	_	_	_	_	_	_	_	 -	_	_	-	•
		•	•		•	•		•			•			

(5) Pad

O														
Form/Diameter		at typ												3M)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E-▲UM□	•	•	•	•	•	•	•	_	_	_	_	_	_	-
ZP3E-▲BM□	_	_	_	_	-	_	_	•	•	•	•	•	•	•

Note 1) \blacktriangle in the table indicates the pad diameter.

Note 2) \square in the table indicates the pad material.

6 Set screw

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groc	ve (l	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-A10	•	•	•	_	_	_	_	•	•	•	_	_	_	_
ZP3EA-A16	_	_	_	•	•	•	•	_	_	_	•	•	•	•

Refer to page 471 for the products that contain ② to ⑥.

Mounting nut (Sales unit: 10 pcs.)

	ourse urmin re p	.,
Part no.	Mounting thread size	Applicable male thread adapter (1)
ZPNA-M14	M14 x 1	ZP3EA-YAL14
7DNA-M16	M16 v 1 5	7P3FΔ-VΔI 16

ZP3

ZP2 ZP2V ZP

With Buffer: Vacuum Inlet Vertical



Vacuum inlet: Vertical Vacuum inlet: Lateral (10/30/50)(10/30/50)Mounting nut 1 Buffer assembly 1 Buffer assembly (Vertical) (Lateral) 2 Seal washer 3 Holder 4 Plate 5 Flat type with groove (5) Bellows type with groove

6 Set screw

1) Buffer assembly (With 2 mounting nuts)

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groo	ove (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EB-(T/Y)1JB10	•	•	•	—	_	_	_	•	•	•	-	_	—	_
ZP3EB (T/Y)1JB30	•	•	•	-	_	_	-	•	•	•	_	-	_	-
ZP3EB-(T/Y)1JB50	•	•	•	_	_	_	_	•	•	•	_	_	_	_
ZP3EB-(T/Y)2JB10	_	_	_	•	•	•	•	_	_	_	•	•	•	•
ZP3EB-(T/Y)2JB30	_	_	_	•	•	•	•	_	_	_	•	•	•	•
ZP3EB-(T/Y)2JB50	_	_	_	•	•	•	•	_	_	_	•	•	•	•

* Select "T" when selecting a T type buffer assembly. Example) ZP3EB-T1JB10

2 Seal washer (Sales unit: 5 pcs.)

Part no.	Mounting thread size	Applicable set screw (6)
ZP3EA-SW10	M10 x 1	ZP3EA-A10
ZP3EA-SW16	M16 x 1.5	ZP3EA-A16

(3) Holder

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groc	ve (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-H1A	•	•	_	_	_	_	_	•	•	_	_	_	_	-
ZP3EA-H2A	_	_	•	_	_	_	_	_	_	•	_	_	_	-
ZP3EA-H3A	_	_	-	•	•	_	_	_	_	—	•	_	_	-
ZP3EA-H4A	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-H5A	_	_	_	_	_	_	•	_	_	_	_	_	•	-
ZP3EA-H6A	_	_	_	_	-	_	_	_	_	_	_	_	_	•

4) Plate

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groc	ove (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-P1	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EA-P2	 —	_	•	_	_	_	_	_	_	•	-	_	—	_
ZP3EA-P3	_	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EA-P4	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-P5	_	_	_	_	_	_	•	_	_	_	_	_	•	_
ZP3EA-P6	_	_	_	_	_	_	_	_	_	_	_	_	_	•

(5) Pad

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groc	ove (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E-▲UM□	•	•	•	•	•	•	•	_	_	_	-	_	—	_
ZP3E-▲BM□	_	_	_	_	-	_	_	•	•	•	•	•	•	•

Note 1) \blacktriangle in the table indicates the pad diameter. Note 2)
in the table indicates the pad material.

6 Set screw

Form/Diameter Part no.	Applicable buffer assembly (1)
ZP3EA-A10	ZP3EB-(T/Y)1JB (10/30/50)
ZP3EA-A16	ZP3EB-(T/Y)2JB (10/30/50)

Refer to page 471 for the products that contain ② to ⑥.

Mounting nut (Sales unit: 10 pcs.)

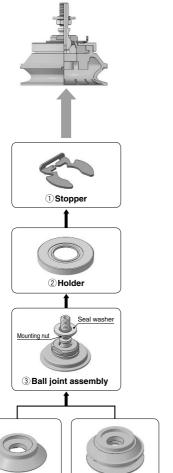
,		
Part no.	Mounting thread size	Applicable buffer assembly (1)
ZPNA-M18	M18 x 1.5	ZP3EB-(T/Y)1JB (10/30/50)
ZPNA-M22	M22 x 1.5	ZP3EB-(T/Y)2JB (10/30/50)



With Ball Joint Adapter (for Direct Mounting): Vacuum Inlet



ZP3E-TF(32 to 125)(UM/BM) □-(AL6/AL12)



4 Bellows type with groove

4 Flat type with groove

1) Stopper

Form/Diameter						e (U								
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-S1	•	•	•	-	_	_	-	•	•	•	_	_	_	-
ZP3EA-S2	_	_	_	•	•	•	•	_	_	_	•	•	•	•

2 Holder

Form/Diameter			oe w								with			
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-H1B	•	•	_	_	_	_	_	•	•	_	_	_	_	-
ZP3EA-H2B	_	_	•	_	_	_	_	_	_	•	_	_	_	_
ZP3EA-H3B	_	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EA-H4B	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-H5B	_	_	_	_	_	_	•	_	_	_	_	_	•	_
ZP3EA-H6B	_	_	_	_	_	_	_	_	_	_	_	_	_	•

3 Ball joint assembly (Seal washer and mounting nut: 1 pc. each)

Form/Diameter			pe w								with			
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-F1-AL6	•	•	—	_	_	_	_	•	•	_	_	_	_	_
ZP3EA-F2-AL6	-	_	•	_	_	_	_	_	_	•	-	_	_	-
ZP3EA-F3-AL12	 -	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EA-F4-AL12	 -	_	—	_	_	•	_	_	_	_	_	•	_	_
ZP3EA-F5-AL12	-	_	_	_	_	-	•	-	_	_	-	_	•	-
ZP3EA-F6-AL12	_	_	_	_	_	_	_	_	_	_	_	_	_	•

4 Pad

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	ows	type	with	groo	ove (I	3M)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E-▲UM□	•	•	•	•	•	•	•	_	_	_	_	_	_	_
ZP3E-▲BM□	_	_	_	_	_	_	_	•	•	•	•	•	•	•

Note 1) ▲ in the table indicates the pad diameter.

Note 2)
in the table indicates the pad material.

Seal washer (Sales unit: 5 pcs.)

Part no.	Mounting thread size	Applicable ball joint assembly (3)
ZP3EA-SW6	M6 x 1	ZP3EA-F(1/2)-AL6
ZP3EA-SW12	M12 x 1.25	ZP3EA-F(3/4/5/6)-AL12

Mounting nut (Sales unit: 10 pcs.)

<u> </u>		
Part no.	Mounting thread size	Applicable ball joint assembly (3)
ZPNA-M6	M6 x 1	ZP3EA-F(1/2)-AL6
ZPNA-M12	M12 x 1.25	ZP3EA-F(3/4/5/6)-AL12

ZP3

ZP3E

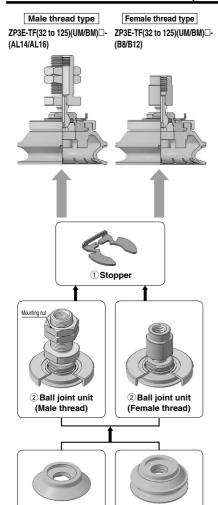
ZP2

ZP2V

ZΡ

With Ball Joint Female Thread Adapter: Vacuum Inlet





1) Stopper

	Form/Diameter		at typ												
Part no.		32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3	EA-S1	•	•	•	-	_	_	_	•	•	•	_	-	-	_
ZP3	EA-S2	_	_	_	•	•	•	•	_	_	_	•	•		•

2 Ball joint unit (Male thread) (With 2 mounting nuts)

Form/Diameter			oe w								with			
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EU-F1-TAL14	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EU-F2-TAL14	_	_	•	_	_	_	_	_	_	•	_	_	_	_
ZP3EU-F3-TAL16	_	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EU-F4-TAL16	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EU-F5-TAL16	_	_	_	_	_	_	•	_	_	_	_	_	•	_
ZP3EU-F6-TAL16	_	-	_	_	-	_	_	ı	_	_	_	ı	_	•

2 Ball joint unit (Female thread)

Form/Diameter			oe w								with			
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EU-F1-TB8	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EU-F2-TB8	-	_	•	_	_	_	_	_	_	•	-	_	_	-
ZP3EU-F3-TB12	 -	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EU-F4-TB12	 -	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EU-F5-TB12	-	_	-	_	_	-	•	_	_	_		_	•	
ZP3EU-F6-TB12	_	_	_	_	_	_	_	_	_	_	_	_	_	•

③ Pad

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groc	ve (I	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E-▲UM□	•	•	•	•	•	•		_	_	_	_	_	_	-
ZP3E-▲BM□	_	-	_	_	_	_	_	•	•	•	•	•	•	•

Note 1) ▲ in the table indicates the pad diameter. Note 2)
in the table indicates the pad material.

Mounting nut (Sales unit: 10 pcs.)

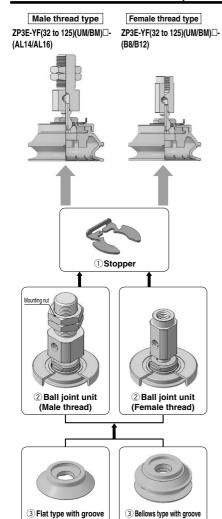
Part no.	Mounting thread size	Applicable ball joint unit (Male thread) (2)
ZPNA-M14	M14 x 1	ZP3EU-F(1/2)-TAL14
ZPNA-M16	M16 x 1.5	ZP3EU-F(3/4/5/6)-TAL16

3 Flat type with groove

3 Bellows type with groove

With Ball Joint Male Thread Adapter/Female Thread Adapter: Vacuum Inlet





1) Stopper

- 11														
Form/Diameter												groc		
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-S1	•	•	•	-	_	_	-	•	•	•	_	_	_	_
ZP3EA-S2	_	_	_	•	•	•	•	_	_	_	•	•	•	•

2 Ball joint unit (Male thread) (With 2 mounting nuts)

Form/Diameter			oe w								with			
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EU-F1-YAL14	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EU-F2-YAL14	_	_	•	_	_	_	_	_	_	•	_	_	_	_
ZP3EU-F3-YAL16	_	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EU-F4-YAL16	_	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EU-F5-YAL16	_	_	_	_	_	_	•	_	_	_	_	_	•	_
ZP3EU-F6-YAL16	_	_	_	_	_	_	_	_	_	_	_	_	_	•

2 Ball joint unit (Female thread)

Form/Diameter								Bellows type with groove (BM)						
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EU-F1-YB8	•	•	_	_	_	_	_	•	•	_	_	_	_	_
ZP3EU-F2-YB8	 —	_	•	_	_	_	_	_	_	•	_	_	_	_
ZP3EU-F3-YB12	_	_	_	•	•	_	_	_	_	_	•	_	_	_
ZP3EU-F4-YB12	 -	_	_	_	_	•	_	_	_	_	_	•	_	_
ZP3EU-F5-YB12	-	_	-	_	_	-	•	_	_	_		_	•	
ZP3EU-F6-YB12	_	_	_	_	_	_	_	_	_	_	_	_	_	•

③ Pad

Form/Diameter	Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	lows	type	with	groc	ve (l	BM)
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E-▲UM□	•	•	•	•	•	•	•	_	_	_	_	_	_	_
ZP3E-▲BM□	_	_	_	_	_	_	_	•	•	•	•	•	•	•

Note 1) ▲ in the table indicates the pad diameter.

Note 2)
in the table indicates the pad material.

founting put (Sales unit: 10 pcs)

Mounting nut (nounting nut (Sales unit. 10 pcs.)								
Part no.	Mounting thread size	Applicable ball joint unit (Male thread) (2)							
ZPNA-M14	M14 x 1	ZP3EU-F(1/2)-YAL14							
7PNΔ-M16	M16 x 1 5	7P3FU-F(3/4/5/6)-YAL14							

ZP3

ZP3E

ZP2 ZP2V

ZΡ

With Ball Joint Buffer: Vacuum Inlet

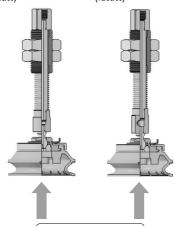




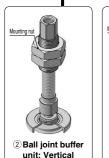
Vacuum inlet: Lateral Type Y

ZP3E-TF(32 to 125)(UM/BM)□JB (10/30/50)

ZP3E-YF(32 to 125)(UM/BM)□JB (10/30/50)

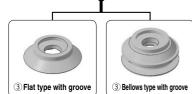








unit: Lateral



1) Stopper

Form/Diameter							Bellows type with groove (BM							
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EA-S1	•	•	•	-	_	_	-	•	•	•	_	_	_	_
ZP3EA-S2	_	_	_	•	•	•	•	_	_	_	•	•	•	•

2 Ball joint buffer unit (With 2 mounting nuts)

						F	ad t	form	/diar	nete	r				
		Fla	at typ	oe w	ith g	roov	e (U	M)	Bell	ows	type	with	groc	ve (I	BM)
Part no.	Stroke	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3EU-(T/Y)F1JB10	10														
ZP3EU-(T/Y)F1JB30	30	•	•	_	 —	_	_	 —	•	•	 —	_	 —	 —	_
ZP3EU-(T/Y)F1JB50	50														
ZP3EU-(T/Y)F2JB10	10														
ZP3EU-(T/Y)F2JB30	30	 —	 —	•	-	_	_	-	_	_		 —	 —	-	_
ZP3EU-(T/Y)F2JB50	50														
ZP3EU-(T/Y)F3JB10	10														
ZP3EU-(T/Y)F3JB30	30	-	_	_	•		_	-	_	_	-	•	 —	-	_
ZP3EU-(T/Y)F3JB50	50														
ZP3EU-(T/Y)F4JB10	10														
ZP3EU-(T/Y)F4JB30	30	-	_	_	-	_	•	-	_	_	-	_	•	-	_
ZP3EU-(T/Y)F4JB50	50														
ZP3EU-(T/Y)F5JB10	10														
ZP3EU-(T/Y)F5JB30	30	 —	 —	—	l —	_	_	•	_	_	 —	_	 —	•	_
ZP3EU-(T/Y)F5JB50	50														
ZP3EU-(T/Y)F6JB10	10														
ZP3EU-(T/Y)F6JB30	30	-	_	-	-	_	_	-	_	_	-	_	-	-	•
ZP3EU-(T/Y)F6JB50	50														
Select "T" when selecting a T type huffer unit															

^{*} Select "T" when selecting a T type buffer unit Example) ZP3EU-TF1JB10

${\small \ \, {\small \textbf{\tiny 3}Pad}}$

Form/Diameter								Bellows type with groove (BM)						
Part no.	32	40	50	63	80	100	125	32	40	50	63	80	100	125
ZP3E-▲UM□	•	•	•	•	•	•	•	_	_	-	_	_	-	_
ZP3E-▲BM□	_	_	_	_	_	_	_	•	•	•	•	•	•	•

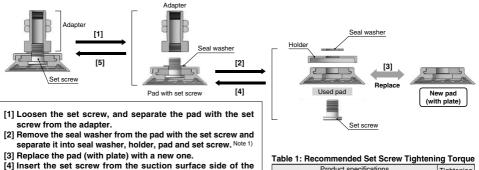
Note 1) \blacktriangle in the table indicates the pad diameter. Note 2) \Box in the table indicates the pad material.

Mounting nut (Sales unit: 10 pcs.)

Part no.	Mounting thread size	Applicable ball joint buffer unit (2)
ZPNA-M18	M18 x 1.5	ZP3EU-(T/Y)F(1/2)JB(10/30/50)
ZPNA-M22	M22 x 1.5	ZP3EU-(T/Y)F(3/4/5/6)JB(10/30/50)

How to Replace the Pad

With Set Screw



	Product specifications		Tightening
Pad diameter	Product part no.	Mounting thread size	torque [N·m]
	ZP3E-(32 to 50)UM□□ ZP3E-(32 to 50)BM□□	M10 x 1	8 to 10
	ZP3E-(63 to 125)UM□□ ZP3E-(63 to 125)BM□□	M16 x 1.5	13 to 15

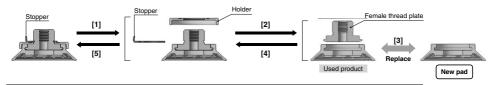
Specified

new pad, and mount the holder and seal washer in order.

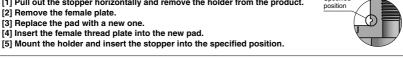
Note 1) When mounting and removing the seal washer, rotate the set screw while the seal washer is being held.

[5] Mount the adapter onto the set screw. Note 2)

With Stopper (with Female Thread Plate/with Ball Joint Unit)



- [1] Pull out the stopper horizontally and remove the holder from the product.



^{*} 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.



ZP3

ZP3E

ZP2

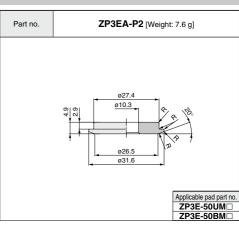
ZP2V

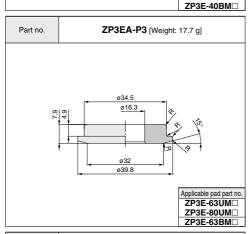
ZΡ

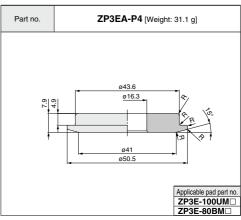
Note 2) Refer to the tightening torque shown in Table 1 for adapter mounting. * Refer to "Pad Unit with Plate" shown below for the replacement method for pads with plate.

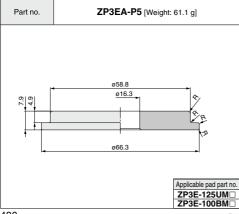
Component Parts: Dimensions

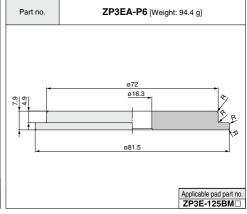
Plate **ZP3EA-P1** [Weight: 3.7 g] Part no. ø20.3 ø10.3 ø19.5 ø23.5 Applicable pad part no. ZP3E-32UM□ ZP3E-40UM□ ZP3E-32BM□

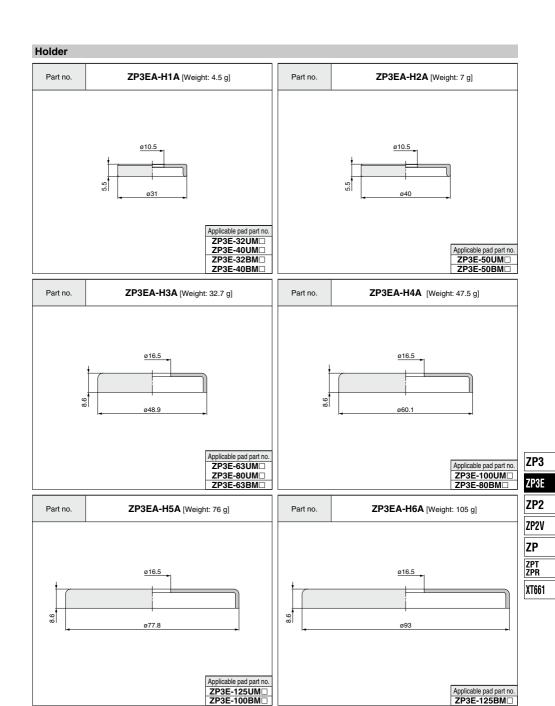






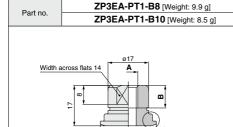






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Female Thread Plate



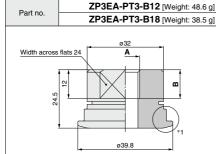
ø23.5

Dimensions

Part no.	Α	В
ZP3EA-PT1-B8	M8 x 1.25	9.5
ZP3EA-PT1-B10	M10 x 1.5	13

Applicable pad part no. ZP3E-32UM□ ZP3E-40UM□ ZP3E-32BM□ ZP3E-40BM□

Part no.		ZP3EA	\-PT2	-B8 [Weigh	nt: 14 g]
Part no.		ZP3EA	\-PT2	-B10 [Wei	ght: 12.6 g]
	17	ss flats 14	ø17 A ø31.6	*1	
Dimensions	•				
Part no.		Α	В		Applicable pad part no.
ZP3EA-PT2-E	_	M8 x 1.25	9.5		ZP3E-50UM□
ZP3EA-PT2-E	310	M10 x 1.5	13		ZP3E-50BM



Dimensions	
Part no.	Α

Part no.	A	В
ZP3EA-PT3-B12	M12 x 1.75	12
ZP3EA-PT3-B18	M18 x 1.5	18

Applicable pad part no.
ZP3E-63UM□
ZP3E-80UM□
ZDOE CODM

Applicable pad part no.

ZP3E-125UM□ ZP3E-100BM□

Part no.		ZP3E/	A-P I	1-B12 [W	eight: 62 g]	
ranno.		ZP3E	A-PT	4-B18 [W	/eight: 52 g]	
Width across flats 24 A Ø32 M Ø50.5						
Dimensions	;					
Part no.		Α	В		Applicable pad part no.	
ZP3EA-PT4-E		M12 x 1.75	12		ZP3E-100UM	
ZP3EA-PT4-E	318	M18 x 1.5	18		ZP3E-80BM	

Part no.	ZP3E	A-PT5	5-B12	[Weight: 92.4 g]
raitilo.	ZP3E	A-PT5	5-B18	[Weight: 82.4 g]
Width across	1	ø32 A ø66.3		m +1
Part no.	Α	В		Analizable and a

12

Part no.	ZP3EA	-PT6	-B12	[Wei	ght: 12	!6 g]
Tarrio.	ZP3EA	-PT6	-B18	[Wei	ght: 11	6 g]
Width across fla	its 24	ø32 A		-		m *1
		ø81.5				
Dimensions						
Part no.	Α	В				
ZP3EA-PT6-B12	M12 x 1.75	12		ſ	Annlical	ble pad part no.
ZP3EA-PT6-B18	M18 x 1.5	18		ł		-125BM
					21°3E	- 1230101

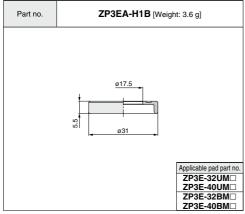
ZP3EA-PT5-B12 M12 x 1.75

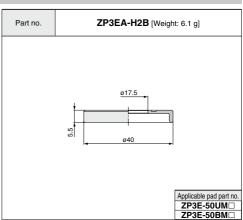
ZP3EA-PT5-B18 M18 x 1.5

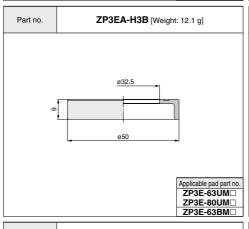
A 482

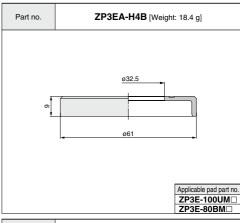
^{*1} Refer to page 480 for detailed dimensions.

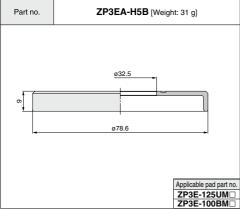
Holder (for Female thread plate/Ball joint)

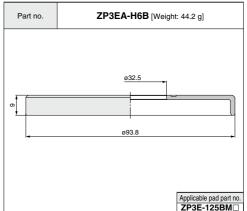












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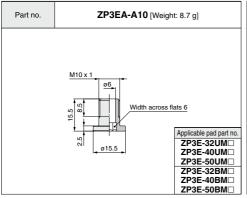
ZP3

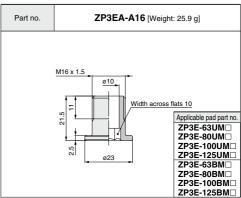
ZP3E

ZP2

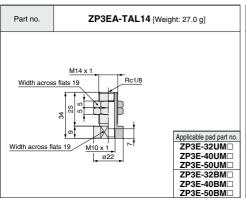
ZP2V ZP

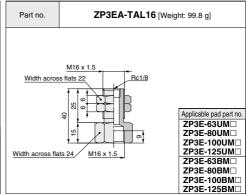
Set Screw



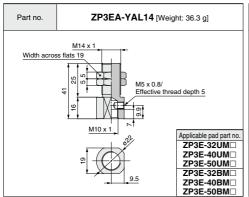


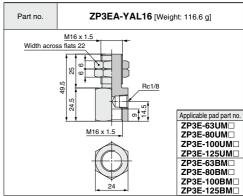
Male Thread Adapter (Vacuum inlet: Vertical)



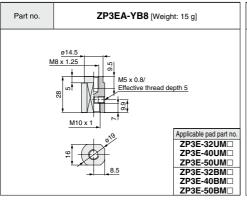


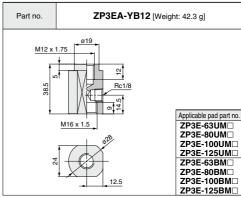
Male Thread Adapter (Vacuum inlet: Lateral)



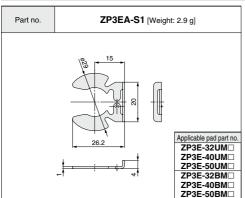


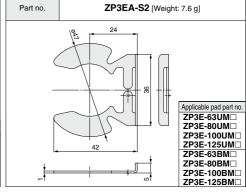
Female Thread Adapter (Vacuum inlet: Lateral)





Stopper





Soal Wacher

ZP3EA-SW10

ZP3EA-SW12

ZP3EA-SW16

1.6 15.5

2 24.3

2 28

Seal Washel						
		ZP	23EA-SW6 [Weight: 1.0 g]			
Dort an		ZP	P3EA-SW10 [Weight: 1.1 g]			
Part no.	ZP3EA-SW12 [Weight: 4.2 g]					
		ZP	23EA-SW16 [Weight: 5.2 g]			
Core sheet (Sales unit: 5 pcs						
Dimensions		Seal	Material: Core sheet—Rolled str Seal — NBR	eel		
Part no.	t	D	Applicable thread size			
ZP3EA-SW6	1.3	14	M6 x 1			

M10 x 1

M12 x 1.25

M16 x 1.5

Mounting Nut

	ZPNA-M6 [Weight: 0.7 g]
	ZPNA-M12 [Weight: 8.0 g]
Part no.	ZPNA-M14 [Weight: 6.6 g]
Part no.	ZPNA-M16 [Weight: 10.1 g]
	ZPNA-M18 [Weight: 26.4 g]
	ZPNA-M22 [Weight: 24.7 g]

D :.		ารเด	
DII	mer	isio	ns

Part no.	d	В	Н	Sales unit	9
ZPNA-M6	M6 x 1	8	3		
ZPNA-M12	M12 x 1.25	19	7	10 pcs.	
ZPNA-M14	M14 x 1	19	5		
ZPNA-M16	M16 x 1.5	22	6		
ZPNA-M18	M18 x 1.5	27	9	2 pcs.	
ZPNA-M22	M22 x 1.5	30	8		



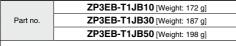
SMC

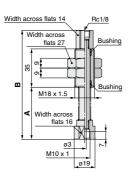
ZP3

ZP3E

ZP2V
ZP2V
ZPT
ZPT
ZPT
ZPT
ZPT

Buffer Assembly (Vacuum inlet: Vertical)





Dimensions					
Part no.	Α	В			
ZP3EB-T1JB10	47.5	99.5			

ZP3EB-T1JB30

ZP3EB-T1JB50

Applicable pad part no.

ZP3E-32UM□

ZP3E-40UM□

ZP3E-50UM□

ZP3E-32BM□

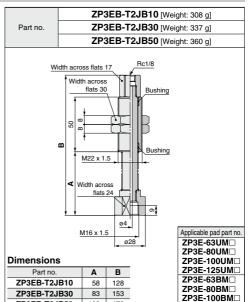
ZP3E-40BM□

ZP3E-50BM□

ZP3EB-T2JB50

103 173

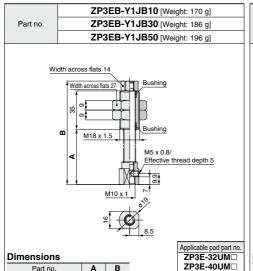
ZP3E-125BM□

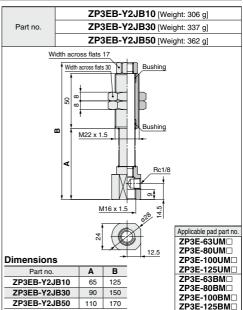


Buffer Assembly (Vacuum inlet: Lateral)

92.5 144.5

72.5





ZP3EB-Y1JB10

ZP3EB-Y1JB30

ZP3EB-Y1JB50

50.5 94.5

75.5 119.5

95.5 139.5

ZP3E-50UM□

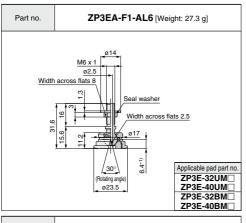
ZP3E-32BM□

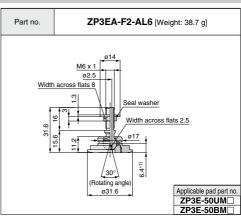
ZP3E-40BM□

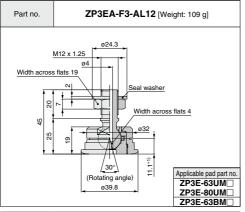
ZP3E-50BM□

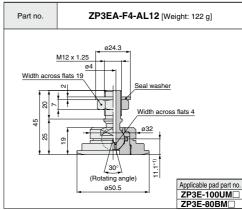
Ball Joint Assembly/Unit Part No.

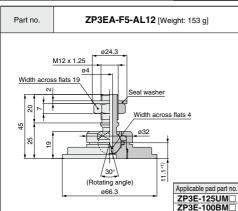
Ball Joint Assembly

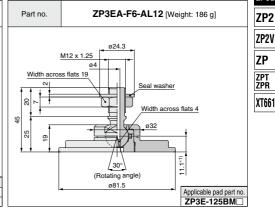










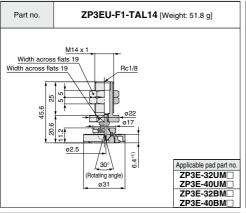


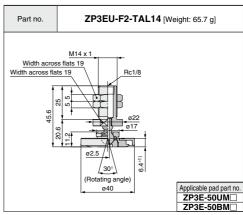
ZP3

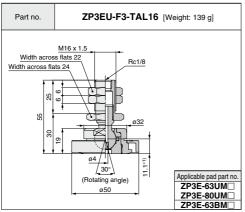
ZP3E

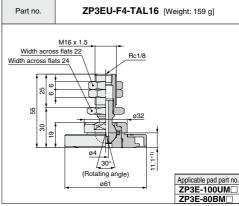
^{*1)} Center of the rotating angle

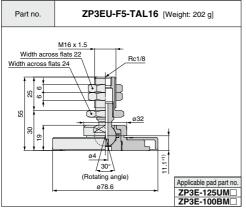
Ball Joint Unit: Male Thread (Vacuum inlet: Vertical)

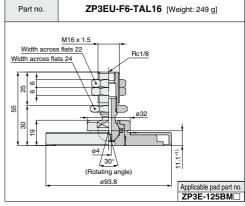








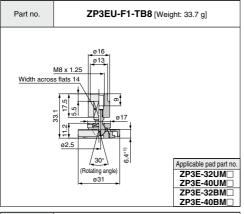


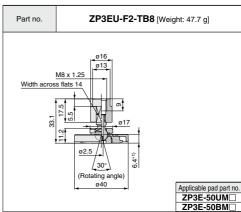


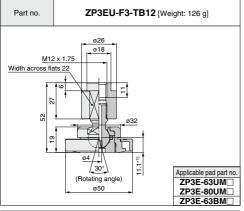
^{*1)} Center of the rotating angle

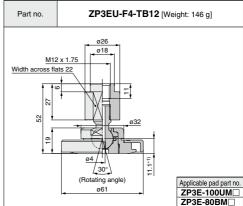
^{® 488}

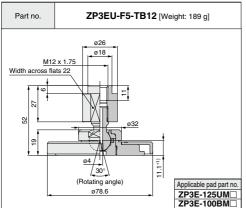
Ball Joint Unit: Female Thread (Vacuum inlet: Vertical)

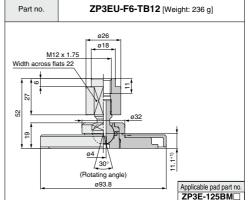












ZP3

ZP3E

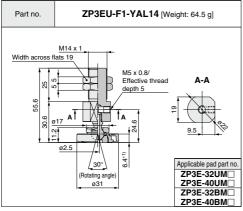
ZP2 ZP2V

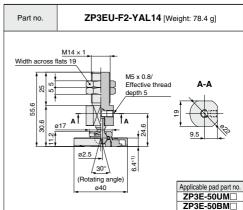
ZΡ

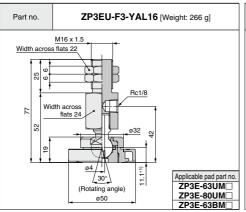
ZPT ZPR

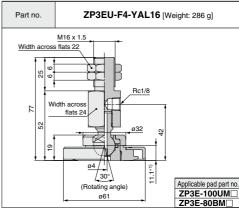
^{*1)} Center of the rotating angle

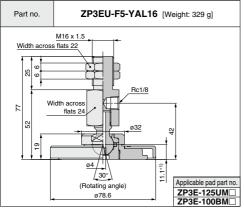
Ball Joint Unit: Male Thread (Vacuum inlet: Lateral)

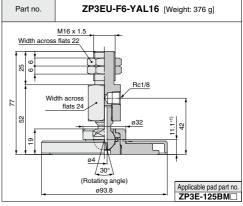








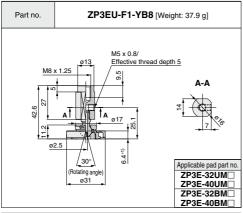


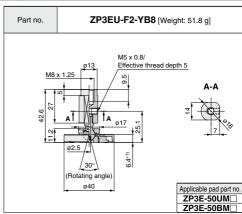


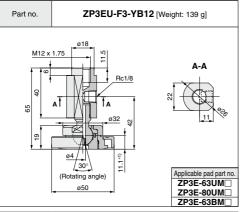
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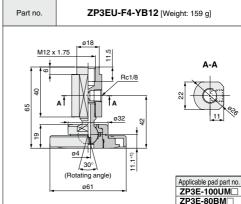
^{*1)} Center of the rotating angle

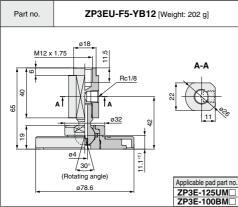
Ball Joint Unit: Female Thread (Vacuum inlet: Lateral)

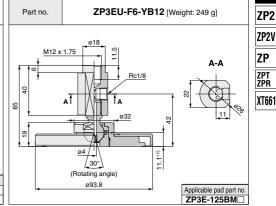












*1) Center of the rotating angle

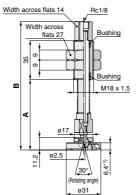
ZP3

ZP3E

Ball Joint Buffer Unit Part No.

Ball Joint Buffer Unit (Vacuum inlet: Vertical)





Applicable pad part no.

ZP3E-32UM

ZP3E-40UM

ZP3E-32BM

ZP3E-40BM

Dimensions Part no. A B ZP3EU-TF1JB10 63.1 115.1

Part no.	A	В
ZP3EU-TF1JB10	63.1	115.1
ZP3EU-TF1JB30	88.1	140.1
ZP3EU-TF1JB50	108.1	160.1

Part no.	ZP3EU-1F2JB30 [Weight: 225 g]					
	ZP3EU-TF2JB50 [Weight: 237 g]					
	Width across flats 14 Width across flats 27 Bushing M18 x 1.5 Q17 Q2.5 (Rotating angle) 940					

ZP3EU-TF2JB10 [Weight: 211 g]

Dillielisiolis		
Part no.	Α	В
ZP3EU-TF2JB10	63.1	115.1
ZP3EU-TF2JB30	88.1	140.1
ZP3EU-TF2JB50	108.1	160.1

ZP3E-50UM
ZP3E-50BM

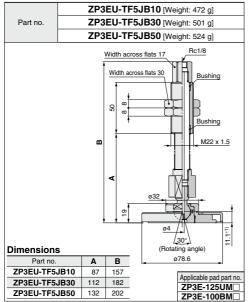
					LI OL TODIN			
		ZP3	EU-TF	3JB10) [Weight: 409 g]			
Part no.	ZP3EU-TF3JB30 [Weight: 438 g]							
	ZP3EU-TF3JB50 [Weight: 461 g]							
	Width across flats 17 Rc1/8							
	Width across flats 30 Bushing M22 x 1.5							
Dimensions (Rotating angle)								
Part no.		Α	В	4	ø50			
ZP3EU-TF3J	B10	87	157		Applicable pad part no			
ZP3EU-TF3J		112	182		ZP3E-63UM			
ZP3EU-TF3J	B50	132	202		ZP3E-80UM ZP3E-63BM			

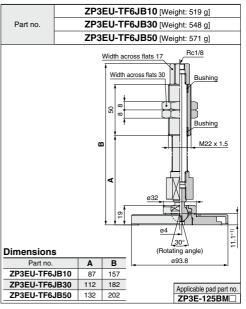
<u> </u>			10 = 10 [110.g.m. 120 g]			
Part no.	ZP3EU-TF4JB30 [Weight: 458 g]					
	ZP3EU-TF4JB50 [Weight: 481 g]					
Dimensions	B 8	th across	NI L			
Part no.	Α	В	- 501			
ZP3EU-TF4J		157	Applicable pad part no.			
ZP3EU-TF4J		182	ZP3E-100UM□			
ZP3EU-TF4J	B50 132	202	ZP3E-80BM□			

ZP3EU-TF4JB10 [Weight: 429 g]

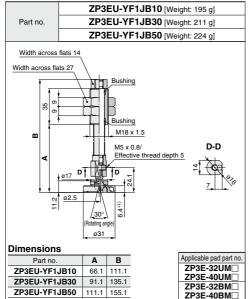
^{*1)} Center of the rotating angle

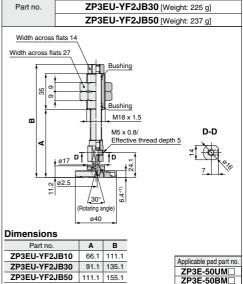
Ball Joint Buffer Unit (Vacuum inlet: Vertical)





Ball Joint Buffer Unit (Vacuum inlet: Lateral)





ZP3EU-YF2JB10 [Weight: 209 g]

*1) Center of the rotating angle

ZP3

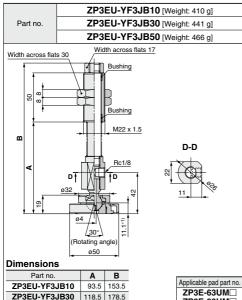
ZP3E

ZP2

ZP2V

ZΡ

Ball Joint Buffer Unit (Vacuum inlet: Lateral)



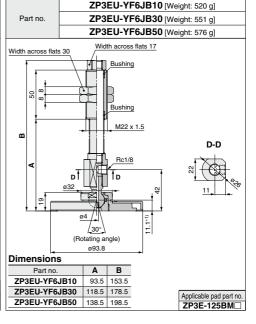
118.5 178.5

138.5 198.5

ZP3EU-YF3JB50

	ZP3EU-YF4JB10 [Weight: 430 g]				
Part no.	ZP3EU-YF4JB30 [Weight: 461 g]				
	ZP3EU-YF4JB50 [Weight: 486 g]				
Width across flats 3	Width across flats 17				
8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Bushing Bushing M22 x 1.5 D-D Rc1/8 P 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
Part no.	A B				
ZP3EU-YF4JB10	93.5 153.5 Applicable pad part no.				
ZP3EU-YF4JB30	718.5 178.5 ZP3E-100UM				
ZP3EU-YF4JB50	138.5 198.5 ZP3E-80BM □				

	ZP3	EU-YF	5JB10 [W	/eight: 473 g]		
Part no. ZP3EU-YF5JB30 [Weight: 504 g]						
ZP3EU-YF5JB50 [Weight: 529 g]						
<u>ø3</u>	Wi	Bushing M22 x	flats 17	D-D		
Ø4 So (Rotating angle) Ø78.6						
Part no.	A	В				
ZP3EU-YF5JB1	0 93.5	153.5		Applicable and part as		
ZP3EU-YF5JB3	0 118.5	178.5		Applicable pad part no.		
ZP3EU-YF5JB5	0 138.5	198.5		ZP3E-125UM		



ZP3E-80UM

ZP3E-63BM

^{*1)} Center of the rotating angle