



AIRBEST

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AIRBEST WeChat ID

AIRBEST



Vacuum Solutions Supplier

AIRBEST

Make Smart , Go Together



Company Introduction

AIRBEST was established in 2006, engaged in R&D, production and sales of vacuum gripping products (vacuum generators, vacuum suction cups and vacuum grippers, etc).

Products are used in different industries, mainly including intelligent manufacturing, automotive metal stamping, packaging, woodworking, industrial robots, foods, pharmaceuticals, electronics, etc.

We pay attention to the practical application of products, quality-orientation and innovation first. So far we acquired many patents.

AIRBEST constantly serves customers and makes improvements, contributes our professional technology in vacuum gripping field.

Appreciate your attention and support to AIRBEST.



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A Vacuum Technology

Vacuum level

The difference between standard atmospheric pressure and absolute pressure.

Pressure unit

Positive pressure conversion table

	Pa(N/m ²)	kPa	bar	kg/cm ²	torr	psi(ibf/in ²)	inHg
1 Pa	1	0.001	0.00001	10.1792×10 ⁻⁶	7.50062×10 ⁻³	0.145038×10 ⁻³	0.3×10 ⁻³
1 kPa	1,000	1	0.01	10.1792×10 ⁻³	7.50062	0.145038	0.3
1 bar	100,000	100	1	1.01972	750.062	14.5038	30
1 kg/cm²	98,066.5	98.0665	0.980665	1	735.559	14.2233	29.42
1 torr	133.322	0.133322	1.33322×10 ⁻³	1.35951×10 ⁻³	1	19.3368×10 ⁻³	0.04
1 psi	6,894.76	6.89476	68.9476×10 ⁻³	70.3096×10 ⁻³	51.7149	1	2.07

Negative pressure conversion table

	mbar	kPa	-kPa	%vacuum	torr	-mmHg	-inHg
Atmospheric pressure	1,013	101.3	0	0	760	0	0
	913	91.3	10	9.9	685	75	3
	813	81.3	20	19.7	610	150	6
	713	71.3	30	29.6	535	225	9
	613	61.3	40	39.5	460	300	12
	513	51.3	50	49.3	385	375	15
	413	41.3	60	59.2	310	450	18
	313	31.3	70	69.1	235	525	21
	213	21.3	80	79	160	600	24
	113	11.3	90	89	85	675	27
Absolute vacuum	0	0	101.3	100	0	760	30

Flow

Air volume flows through specified cross section per unit time

Flow conversion table

	m ³ /s	m ³ /h	NL/min	NL/s	ft ³ /min(scfm)
1 m³/s	1	3,600	60,000	1,000	2,118.9
1 m³/h	0.28×10 ⁻³	1	16.6667	0.2778	0.5885
1 NL/min	16.67×10 ⁻⁶	0.06	1	0.0167	0.035
1 NL/s	1×10 ⁻³	3.6	60	1	2.1189
1 ft³/min	0.472×10 ⁻³	1.6992	28.32	0.4720	1

How to produce vacuum

Compressed air flows in high speed, which sucks the air in vacuum chamber, then vacuum chamber has negative pressure

Instructions for suction cups' applications

We separated applications in vacuum applied to sealed and unsealed systems. Sealed systems are all applications where there is no leakage between the suction cup and the substrate

Examples: Handling of glass plates / handling of smooth surface metal plates / Evacuation of containers / Tests of tightness

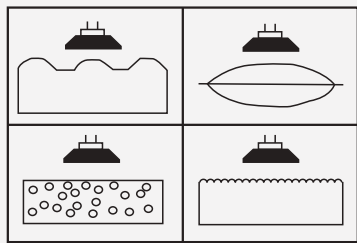


Figure 1.1 types of surface

Unsealed systems applications are that where there is leaking through the suction cup and the substrate, where the product is porous, or through the edge of the pad in the case of rough substrates. There is the possibility of applications where leakage occurs by both ways

Examples: Handling of cardboard box / Handling of foam / Handling of rough ceramic floor

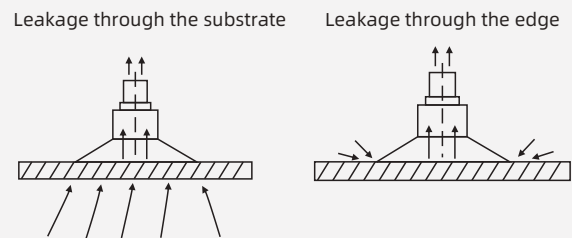


Figure 1.2 Unsealed system

Types of suction cups

Flat suction cups

- Small course of work, suitable for fast gripping
- Good for handling flat objects
- Suitable for horizontal or vertical loads and flip over

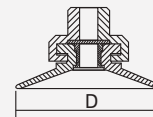


Figure 1.3 Flat suction cups

1.5 Bellows suction cups

- Good for handling objects with uneven surface and curved objects
- Large course of work, compensate for varying workpiece heights
- Suitable for horizontal or vertical loads, slightly flip over

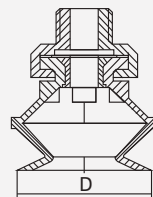


Figure 1.4 1.5 Bellows suction cups

Multiple bellows suction cups

- Large course of work, compensate for varying workpiece heights
- Good for handling objects with uneven surface and curved objects
- Limited load capacity, not suitable for fast gripping and flip over



Figure 1.5 Multiple bellows suction cups

We recommend the ideal vacuum level for suction cups working is -60kPa~-80kPa, because the energy consumption ratio is greatly reduced when the vacuum level beyond -80kPa

Suction force

Suction force means the maximum weight of the object, which can be gripped in vertical lifting; it is proportional to the pressure difference and effective suction area

Calculation formula of suction force: $F = P \times S$

F = Suction force

P = Vacuum level, the difference between atmospheric pressure and internal pressure of suction cups.

S = Effective suction area

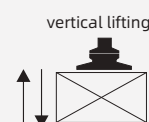


Figure 1.6 Movement

Lateral force

Lateral force means the maximum weight of the object, which can be gripped in lateral lifting; it is related to suction force of suction cups and friction

Calculation formula of lateral force: $F_L = P \times S \times \mu$
 μ = Friction coefficient

Friction coefficient “ μ ” is the ratio of friction and suction force between the suction cups and workpiece, the inner structure of suction cups and surface of workpiece has influence on the friction coefficient. For the same type surface of workpiece, the friction coefficient of suction cups with inner support is larger than the flat suction cups; for the same suction cup, the friction coefficient of workpiece with dry and rough surface is larger than the smooth surface workpiece

Table 1.1 Friction coefficient (reference)

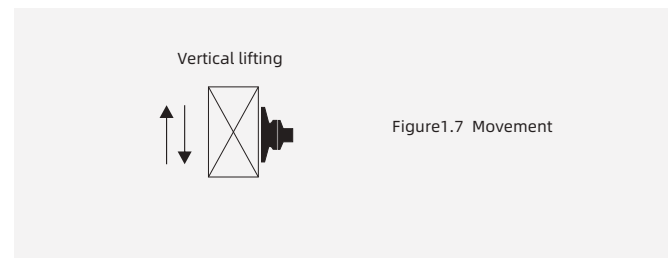
Surface of workpiece	Friction coefficient μ
Wet or oily surface	0.1~0.4
Smooth and flat surface (glass, slate, plastic, metal)	0.5
Rough and flat surface (dry)	1

Safety factor

The suction force or lateral force is theoretical value, many other important factors should be considered in practical application, such as the size and shape of suction cups, smoothness, hardness and shape of workpiece, handling speed, flip over, etc. The safety factor k should be considered when choose the model of suction cups, $k \geq 2$

Table 1.2 Safety factor (reference)

Type of workpiece or working type	Safety factor k
Smooth and flat workpiece	2
Smooth and flat workpiece with fast movement or flip over	4
Rough or irregular workpiece	4
Carton packages	4
Softbag packages	6



Selection of diameter of the suction cup

According the formulas, we could calculate the approximate diameter of suction cups

Table 1.3 Formulas for diameter for different type of suction cup

D=diameter of suction cup (mm) V=vacuum level (-kPa)
 k=safety factor (refer to table 1.1) m=weight of workpiece (kg)
 n=number of suction cups in the application

Type of suction cups	Formula	Type of suction cups	Formula
1.5 bellow type 	$D = 152 \times \sqrt{\frac{m \times k}{V \times n}}$	Multiple bellows 	$D = (223.5 \sim 558.5) \times \sqrt{\frac{m \times k}{V \times n}}$
Flat type 	$D = 139.5 \times \sqrt{\frac{m \times k}{V \times n}}$	Theoretical (without deformation)	$D = 117 \times \sqrt{\frac{m \times k}{V \times n}}$

Example

Sealed system

Determine the type and number of suction cups for handling an aluminum plate, with smooth and flat surface, size 2000x2000mm, weight 260kg. The manipulation will be done through a pulley in the horizontal direction at low speed

The handling surface is nearly smooth and flat
Safety factor is 2

To ensure the stability of handling and avoid the deformation and bending of aluminum plate under gravity, we use 8pcs suction cups and calculate the result in case of vacuum level -60kPa

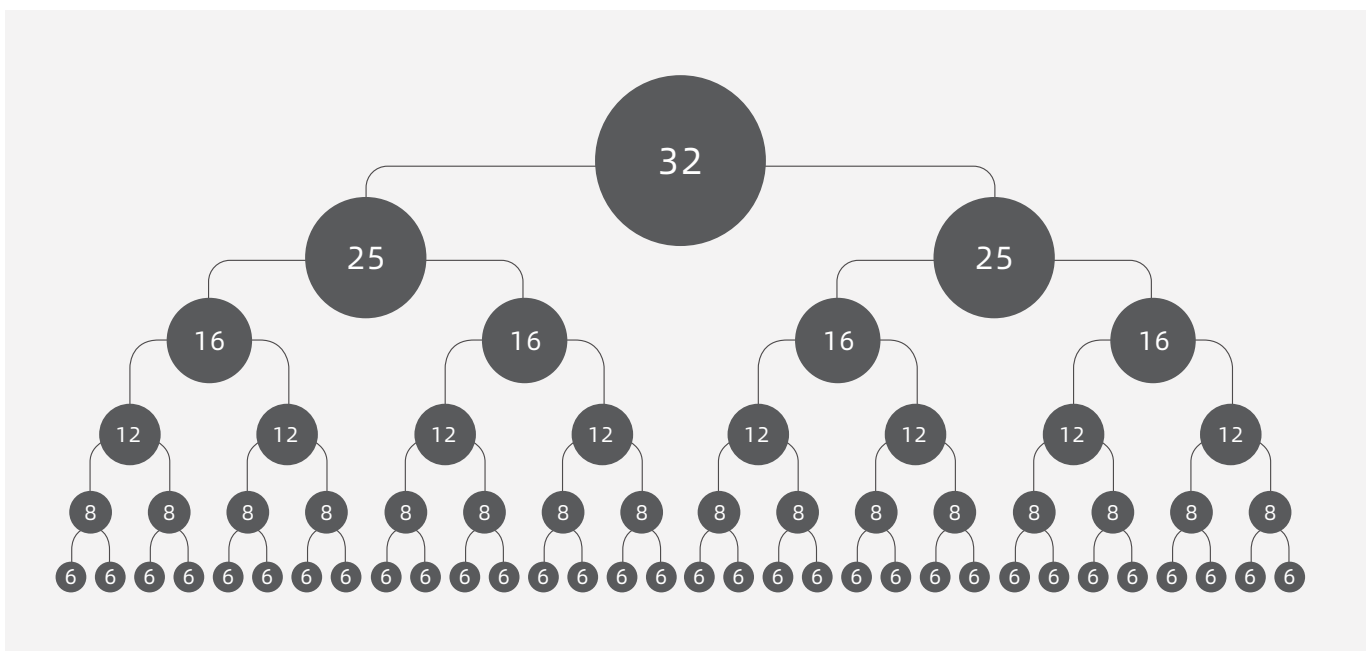
From Table 1.3, we could conclude that:

$$m=260\text{kg} \quad k=2 \quad V=-60\text{kPa} \quad n=8$$

$$D=139.5 \times \sqrt{\frac{m \times k}{V \times n}} \Rightarrow D=139.5 \times \sqrt{\frac{260 \times 2}{60 \times 8}} = 145.19\text{mm} \approx \boxed{150\text{mm}}$$

According to the result, we could choose AIRBEST flat suction cup SPF150 or SF150

Layout of hoses



Common application (for reference):

- ◇ The diameter mentioned above, for hoses dia. ≤ 16mm means outer diameter; dia. > 16mm, means inner diameter
- ◇ The hoses layout above is for reference only, please consider the actual application

Material characteristic

Material	Short time contact temperature(°C) ≤ 30s	Long time contact temperature(°C) > 30s	Wear resistance	Oil resistance	Weather and ozone	Resistivity
N - NBR	- 20 ~ +110	- 10 ~ +80	◎	◎	○	-
S - Silicone	- 40 ~ +250	- 30 ~ +200	×	×	◎	-
CN - Conductive NBR	- 10 ~ +100	- 10 ~ +70	◎	◎	○	10 ⁵ -10 ⁹
CS - Conductive silicone	- 30 ~ +200	- 20 ~ +160	×	×	○	10 ⁵ -10 ⁹
U - Polyurethane	+10 ~ +60	+10 ~ +40	◎	◎	◎	-
F - Fluorine Rubber	- 10 ~ +350	- 5 ~ +300	◎	○	○	-
E - EPDM	- 30 ~ +150	- 20 ~ +120	○	×	◎	-
HS - High temp silicone	- 20 ~ +300	- 50 ~ +250	△	×	◎	-
HD - High temp/mark free material	- 10 ~ +180	- 5 ~ +160	◎	◎	◎	-
NR - Natural rubber	- 20 ~ +80	- 10 ~ +60	◎	×	△	-
NF - Neoprene foam rubber	- 20 ~ +80	- 10 ~ +60	◎	△	◎	-
OF - Geranium foam rubber	- 20 ~ +80	- 10 ~ +60	◎	×	×	-

◎: Excellent ○: Good △: Fair ×: Unsuitable

Suction cups storage instruction

Temperature

The suitable temperature for suction cups storage is 15°C~25°C (59°F~77°F)

Humidity

The relative humidity of storage environment should be less than 65% and without condensation, avoid extremely wet or dry storage environment

Lights

Please store in dark environment, avoid direct sunlight or strong UV

Radiation

Keep away from ionizing radiation

Ozone

Ozone will cause harm to the products

Deformation

The products should be stored in a loose space to avoid being squeezed

Stock turnover

Follow "First In First Out" for the stocks

Color and hardness of suction cup

Examples

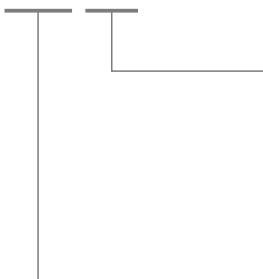
S - Silicone		Color is red, calibration hardness is 50°
WS - White silicone		Color is white, calibration hardness is 50°
CS - Conductive silicone		Color is black, there is red dot on surface ,calibration hardness is 55°

Suction cup's color, hardness are shown as above icon for your reference. Besides, slight color difference caused by catalogue printing and difference between calibration hardness of material and actual hardness of suction cup are normal. (Generally within ±5°)

UI	Industry	Description	Recommendation		Applicable Suction cups
			Vacuum generator	Suction cup	
	PACKAGING (Carton)	Mainly for handling, logistics, stacking, storage of carton and soon. The features are that the workpiece is easy to deform, porous, medium weight, various sizes, and has high requirement for wear resistance of the suction cup	Vacuum gripper, multi stage vacuum pump, etc take advantage of flow to compensate leakage loss	NBR, PU, etc. Excellent wear resistance, recommend bellows suction cups	TXC, TXM SB, SPC
	PACKAGING (Plastic Bag)	Mainly for gripping, destacking, handling of plastic bag, purchasing bag, cat food bag and dog food bag. The features are that the workpiece can be both soft and hard and has wrinkles, and has high requirement for deformation and adaptability of suction cup itself	Select vacuum generator according to weight and characteristic of workpiece	Silicone, soft and flexible, recommend multiple bellows suction cups	SBL, SBLP STP, SPJ SFA
	GLASS	Mainly for handling, gripping of universal glass, industry glass, float glass and so on. The features are that workpiece is heavy, flat, smooth, hard and it has requirement of powerful lateral gripping force	Select vacuum generator according to weight and characteristic of workpiece	NBR, excellent wear resistance, recommend flat suction cups	SFG, SF
	METAL SHEET (Sheet Metal)	Metal sheet industry, mainly for handling, fixing and processing of metal plate. The features are that the workpiece is easy to deform, with oily surface, curved metal plate, heavy weight and has high requirement for big internal support, anti slip, anti deformation of suction cup	Select vacuum generator according to weight and characteristic of workpiece	NBR, PU etc. excellent wear resistance, recommend flat or 1.5 bellows suction cups	SFF, SFM STC, SBF SOF, SOB SDM, SOM
	META SHEET (Thick Metal Plate)	Metal sheet industry, mainly for handling, fixing and processing of metal plate. The features are that the workpiece is, with oily surface, heavy weight and has high requirement for large internal support, slip resistance, anti deformation of suction cup	Select vacuum generator according to weight and characteristic of workpiece	NBR, PU, etc. excellent wear resistance, recommend flat suction cups	SFF, SFM SDM, SOF SFK
	AUTOMOTIVE	Automotive industry, mainly for glass, curved metal plate, tyre and so on. The features are that metal plate is with uneven and curved surface, glass is smooth and with heavy weight, and has high requirement for slip resistance	Select vacuum generator according to weight and characteristic of workpiece	NBR, PU etc. excellent wear resistance and good oil resistance	SBF, SFG SFF, SFM STC, SBF SOF, SOB
	WOOD	Wood industry, mainly for handling of wood plate, fiberboard, wooden handicraft and so on. The features are uneven surface, porous, heavy weight, good sealness and large internal support for suction cup	Multistage vacuum generator AM/AL, etc. Take advantage of flow to compensate the flow loss between suction cup and workpiece	NBR, excellent wear resistance	SF, SPF SFU, SFD SOM
	FABRIC	Fabric industry, mainly for handling of cloth, gauze and so on. The features are workpiece is easy to deform, porous, light weight, overlap, and has requirement of large vacuum flow for suction cup	Select vacuum generator according to weight and characteristic of workpiece	POM material special gripper, which is with suction cup, recommend flow gripper	SLP, SLB
	COMPOSITE MATERIAL	Mainly for handling leather, fiber plate, the features are that the workpieces are porous, light, and overlapping and has requirement of large vacuum flow for suction cup	Select vacuum generator according to weight and characteristic of workpiece	Select suction cup according to actual condition	SLB
	STONE	Stone industry, mainly for handling marble, bricks, and so on. The features are that workpiece is with uneven surface and has requirement for large deformation of suction cup	Multistage vacuum generator AM/AL, etc. Take advantage of flow to compensate the flow loss between suction cup and workpiece	NF-Neoprene foam rubber OF-Geranium foam rubber large deformation and good tightness, recommend foam rubber suction cup	SOP, SNP
	INJECTION MOLDING	Plastic industry, mainly for handling in latter procedure of plastic injection molding. The features are high temperature resistance, workpiece with curved surface, and has high requirement for high temperature	Select vacuum generator according to weight and characteristics of workpiece	Silicone, HD high temp material, recommend high temp material suction cup	Silicone, HD high temp material, other special custom-made products
	ROBOT	Robot terminal components, supporting robot to grip and handle. The features are that it requires fast response, combined type saving pipes, system with high safety factor.	Select vacuum generator according to weight and characteristics of workpiece	Select suction cup according to workpiece	--
	MACHINE	Machine terminal components, supporting intelligent manufacture equipment to grip and handle. The features are that they are small size, light weight, compact and most of them are metal products	Select vacuum generator according to weight and characteristics of workpiece	Select suction cup according to workpiece	--
	ELECTRONICS (Screen)	Handling of the screen of mobilephone, tablet PC, etc. The features are mark free, without deformation, slip resistance, small and light, etc.	Select vacuum generator according to weight and characteristics of workpiece	Flat suction cup, mark free suction cup which is HD material, halogenation, and teflon tape	SNT, SZU SZC, SZB SPC, SLP SP3, etc.
	ELECTRONICS (PCB Board)	Electronics industry, mainly for handling electronic components. The features are that workpiece is with small surface, light weight, without mark, and has high requirement for conductivity of suction cup	Select vacuum generator according to weight and characteristics of workpiece	Materials like NBR, Si or conductive NBR, Conductive Si, etc are soft, wear resistant and conductive. Recommend flat, or 1.5 bellows suction cups	SZU, SZC SZB, SAN SAO, SLB TXC, SP3, etc.
	PHARMACEUTICALS	Pharmaceuticals industry, mainly for handling of medical kits, medical devices, etc. The features are that there is alcohol, chemical reagent on the surface of workpiece, and it has high requirement for chemical resistance of suction cup	Select vacuum generator according to working environment and characteristic	Special plastic material, corrosion resistance, alcohol resistance, wear resistance, weather resistance	SBOF
	FOOD	Food industry, mainly for handling of bread, chocolate, milk, etc. The features are irregular shape of surface of workpiece, light weight, plastic bag package, and it has high requirement for material of suction cup	Select vacuum generator according to weight and characteristics of workpiece	FDA silicone, soft seal or FDA POM suction cup	SBL, SBLP SNT, SBS
	NEW ENERGY (Photovoltaic)	New energy industry, mainly for handling of solar cell, circuit board. The features are that the workpiece is porous, fragile and require soft contact and large vacuum flow and average air flow	Air flow is well distributed, smoothly gripping	Wafer gripper	SLW
	NEW ENERGY (Li Battery)	New energy li battery industry, mainly for handling of battery pack, battery. The features are corrosion resistant, explosion proof of soft package gripping, safe and reliable	Select vacuum generator according to weight and characteristics of workpiece	Suction cup with corrosion resistant material, such as EPDM, fluorine rubber	SLB, SF SB, etc.

UI	Characteristic	Description	Applicable suction cups
	Porous	Suitable for porous workpiece, main features are that vacuum generator with low vacuum level and large vacuum flow(usually use flow gripper)is through flow to compensate air permeability loss to create vacuum to grip workpiece	SLB, SLP
	Curved surface	Suitable for workpiece with curved surface or certain slope surface. Usually adopt bellows suction cups to compensate the plane.	All bellows suction cups
	Slip resistance	For workpiece with smooth surface and prevent it from side slip when grip. Generally adopt flat with ribs or flat with pattern suction cup	All flat with ribs suction cups and flat with pattern suction cups
	Rough surface	Mainly for workpiece with rough surface such as wood plate, stone. In order to prevent air leakage, usually adopt sponge suction cup to compensate the micro space to grip the workpiece	SNP, SOP
	Heavy load	For gripping workpiece with heavy load, generally adopt heavy load suction cups and mounting parts	Flat suction cup with big diameter PSPH heavy load level compensator.
	Non-rotating	Mainly for workpiece having precise positioning and direction requirement.It needs non-rotating function	Non-rotating level compensator etc.
	FDA	For workpiece requiring safety certificate in food industry of medical industry, usually adopt food grade white silicone of POM suction cups with FDA	WS material suction cup, SNT-P series
	Tube shaped object	Adopt special concave suction cups for tube shaped or stick shaped workpieces	SOG
	Long and narrow object	Adopt oval suction cups special for long and narrow workpiece	SOB, SOF
	Corrosion resistance	Adopt fluorine rubber or EPDM suction cups for requirements of corrosion resistance, (such as battery liquid, chemical environment)	F/E material suction cups
	Long life time	Adopt suction cups with special material for high weariness occasion which is longer than average life	V/U material suction cups
	Spherical objects	Adopt deep taper suction cup to grip spherical objects	SZD, SBS
	Water resistance Oil resistance	Adopt special suction cups with oil resistant material and design	SFM, SBF, STC, SFF, etc.
	Composite product	Composite product integrated with vacuum generator and suction cups, save space,easy to assemble and wide usage	SLB, SLW, SLP, SNT, SLF, etc.
	Anti-deformation	Select different suction cups for different workpieces and conditions to grip workpiece without deformation	SF, SFF, SFT, SFA, etc.
	Temperature resistance up to 180°C	Adopt suction cups with high temperature resistant material for gripping workpiece with high temperature 180°C	HD suction cup, Silicone suction cup
	Temperature resistance up to 400°C	Gripping workpiece with high temperature 400°C	SHT

M5 M



Thread

M	Male thread
F	Female thread

Types of thread

M	Metric thread
G	British standard pipe thread
T	NPT thread
N	NPSF thread
R	British conical pipe thread

Example

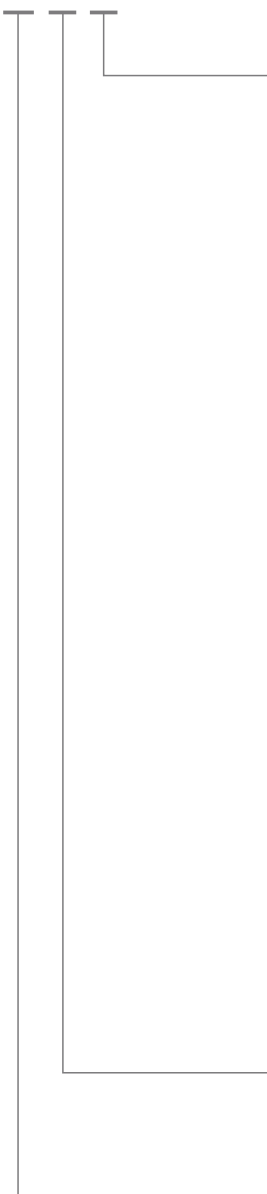
Types of thread	Size	
M	5	M5: M5
G	1	G1: G1/8
T	4	T4: NPT1/2
N	8	N8: NPSF1"
R	12	R12: R1"1/2
...	...	

Connection thread instruction

G1M	G1/8 Male thread	G6F	G3/4 Female thread
G2M	G1/4 Male thread	G8F	G1" Female thread
G3M	G3/8 Male thread	G12F	G1"1/2 Female thread
G4F	G1/2 Female thread		

Note: Thread pitch which is not indicated in the catalogue, is considered as national standard coarse thread specification.

P J S - ***



Categories of connector

S	Universal inserted fitting for suction cup
T	Adapter
F	Locking fitting
B	Ball joint
H	Universal holder
E	Flexible joint
P	One-touch fitting
Q	Pagoda fitting

Product code for connector

J	Connector
----------	-----------

Product code for mounting parts

P	Mounting parts
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Mounting Parts for Universal Suction Cup -Locking Fitting Selection Instruction

Series	Size range	Suction cup connection				
		M5F	M8F	G1F	G2F	G3F
SB	5-15	●				
	17-40			●		
	50				●	●
	75				●	
SBA	11-25	●				
	33-78				●	
SBF	All sizes				●	●
SBOF	All sizes				●	
SFT	15-24	●		●		
	30-40				●	
SBL	15	●				
	20-40			●		
	50				●	●
SBLP	30				●	
	40					●
SF	15	●				
	20-40			●		
	50				●	●
SU	2-8	●				
	20-40			●		
	50				●	●
SUF	All sizes	●				
STC	All sizes				●	
SFF	All sizes				●	
SFM	50-120				●	
SOB	All sizes				●	
SOF	All sizes				●	
SOG	15×40	●				
	35×100				●	
SFP	All sizes			●		
SBP	10-15	●				
	20-40			●		
	50				●	●
	70					●
SXP	20-40			●		
	50				●	●
	70					●

Mounting Parts for Universal Suction Cup -Locking Fitting Selection Instruction

Series	Size range	Suction cup connection				
		M5F	M8F	G1F	G2F	G3F
SGP	25-45			●		
	55				●	●
SAN	All sizes	●				
SAO	All sizes					
SPA	10-20	●				
	30B	●				
	25-50		●			
SPC	5-7	●				
	10-20	●				
	30-60					
	90					
SPF	2-3.5					
	5-8	●				
	10-15	●				
	20	●				
	25-40	●				
	50					
	60-95					
	120-300					
SPJ	4					
	6-8	●				
	10-15	●				
	20-25	●				
	30-40	●				
	50					
	60-80					

Adapter Selection Instruction

Thread(1)	Thread(2)											
	M5F	M5M	M8F	M8M	G1F	G1M	G2F	G2M	G3F	G3M	G4F	G4M
M5F	●											
M5M		●	●	●								
M8F		●	●									
M8M				●	●	●						
G1F				●	●							
G1M						●	●	●				
G2F						●	●					
G2M								●	●	●		
G3F								●	●			
G3M										●	●	●

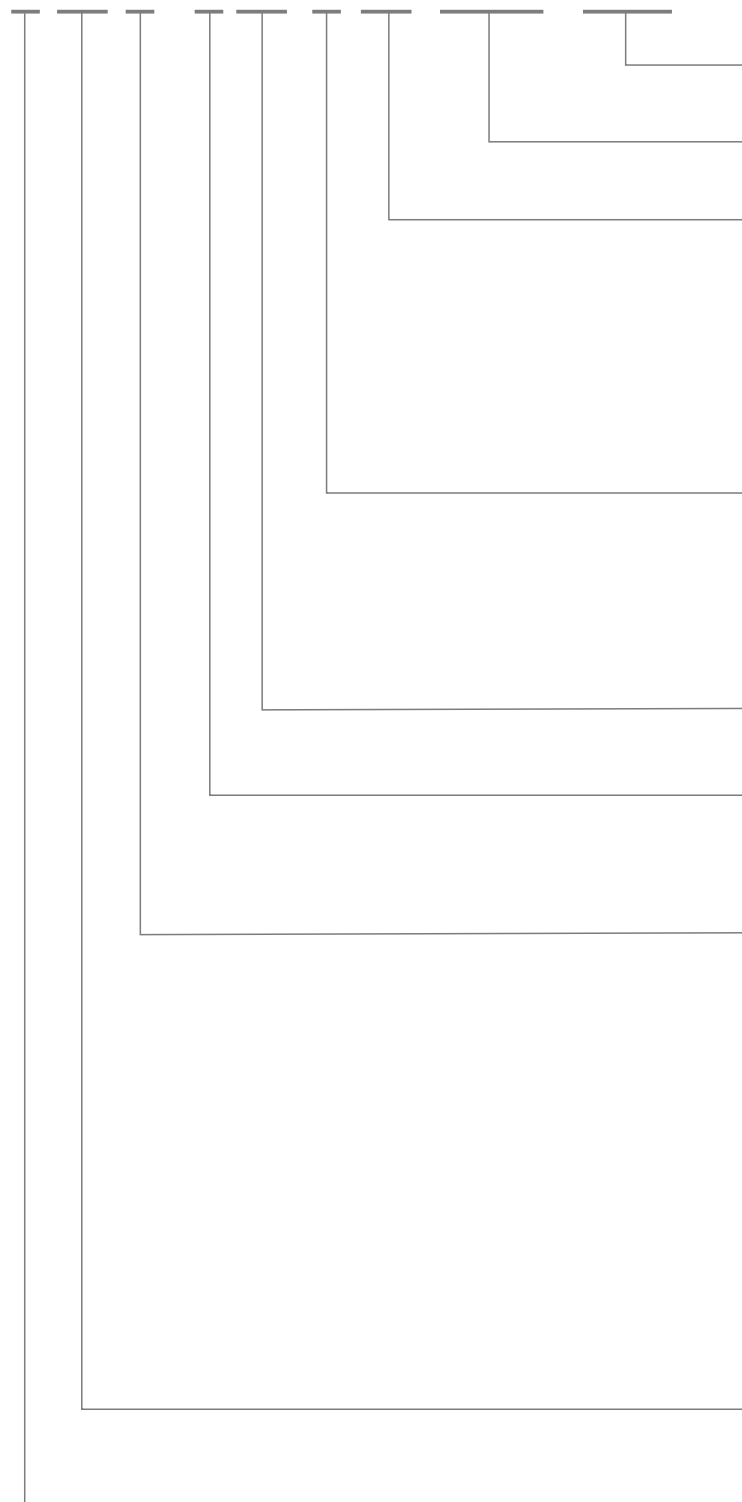
Example: PJT-M5M-M8F

◇ Note: For detailed sizes of adapter, please refer to PJT series on page 413-414

Level compensator selection instruction

Series	Applicable industry	Description
PSPE	Electronics industry for light and small load	Small and light level compensator, port specifications are M5 male thread and SC type
PSPT	All industries	Conventional level compensator Port specification is M8, G1/8, G1/4, G3/8 male thread and G1/8, G1/4 female thread
PSPH	Metal sheet, automotive, machinery, etc. for heavy load	Heavy-duty level compensator, connection thread on suction cup side is G3/8, G1/2 male thread
PSPF	All industries, mainly used with suction cup SPA series, SPJ series, SPF series	Compact external level compensator, port specification is M5, M8 female thread, M10 male thread
PSPD	Metal sheet, automotive, machinery, glass, packaging, etc. For heavy load	Double spring heavy-duty level compensator, can balance the deformation of the workpiece and the mounting plate of the level compensator
PSPL	For light or small size load, such as electronics industry	Retraction type level compensator, thread of connection port is M5 female thread

P SP E - I 20 L A4 M5M - M10



Mounting thread

Suction cup connection

Lateral vacuum port connection

Nil	Non-lateral vacuum port connection
A	One-touch fitting, example: A4, $\phi 4$ one-touch fitting
B	Pagoda fitting, example: B4, $\phi 4$ pagoda fitting
M	Metric thread fitting, example: M5, M5 male thread fitting
R	Taper pipe thread connection, example: R1, Rc 1/8 taper pipe fitting

Rotary type

Nil	Vertical rotating
R	Vertical non-rotating
L	Lateral rotating
B	Lateral non-rotating

Buffer stroke

Buffer style

I	Built-in spring
E	External spring

Categories of level compensator

E	Small and light level compensator
T	Standard level compensator
H	Heavy-duty level compensator
F	Compact level compensator with external spring
D	Double spring heavy-duty level compensator
L	Retraction type level compensator

Product code for level compensator

SP	Level compensator
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Product code for mounting parts

P	Mounting parts
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Level Compensator Selection Instruction

Series	Vacuum port	Mounting connection	Buffer stroke (mm)											Vacuum port+rotary type						
			6	10	15	20	25	30	40	50	60	75	90	110	Nil Vertical rotating	R Vertical non-rotating	L Lateral rotating	B Lateral non-rotating		
PSPE	M5M	M8	●	●	●		●											●	●	
	M5M	M10		●		●		●	●	●								●	●	
	M5F	M10		●		●		●	●	●										
	M8M M8F	M14		●		●		●		●								●		
PSPT	M8M M8F	M14		●		●		●		●								●		
	G1/8M	M16		●		●		●		●								●		
	G1/8F	M16		●		●		●		●										
	G1/4M	M18		●		●		●		●								●	●	
											●	●	●	●				●		
	G1/4F	M18		●		●		●		●								●		
	G3/8M	M18		●		●		●		●									●	●
											●	●	●	●				●		
PSPH	G3/8M	M30					●			●		●	●					●		
	G1/2M	M30					●			●		●	●					●		
PSPD	G1/4M	M20					●			●								●	●	
	G3/8M	M30					●			●			●					●	●	
	G1/2M	M30					●			●			●					●	●	
PSPL	M5F	M10		●	●	●												●		

Series	Vacuum port	Mounting connection	Buffer stroke (mm)					Vacuum port+rotary type		
			4	6	10	15	30	Nil Vertical rotating	L Lateral rotating	
PSPF	M5F	M11	●			●			●	●
		M14			●		●		●	●
	M8F	M14			●		●		●	●
	M10M	M16				●			●	●

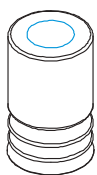
◇ Note: "●" - standard type, contact with sales if need customized one

Suction cup(without fitting)+PJS series fitting for suction cup

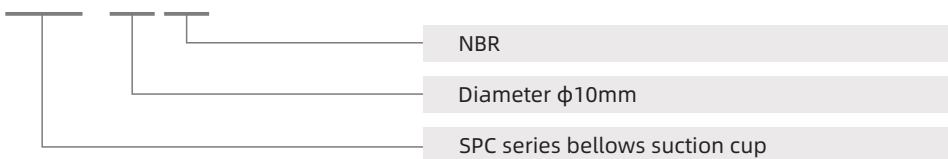
Item	Model	Applicable suction cup
Fitting for suction cup	PJS-M5M-ST2	SPC5、7
	PJS-M5M-SPC10	SPC10
	PJS-M5M-SPC20	SPC15、18、20

◇ The above table is from page 304

Suction cup(without fitting)

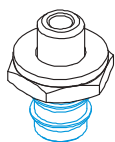


SPC 10 N

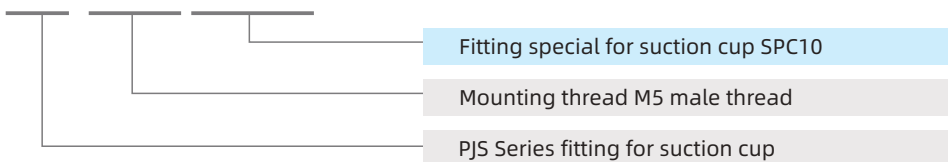


Remark: For suction cup connection, please refer to mounting parts of SPC 10

PJS series fitting for suction cup

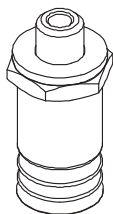


PJS-M5M-SPC10

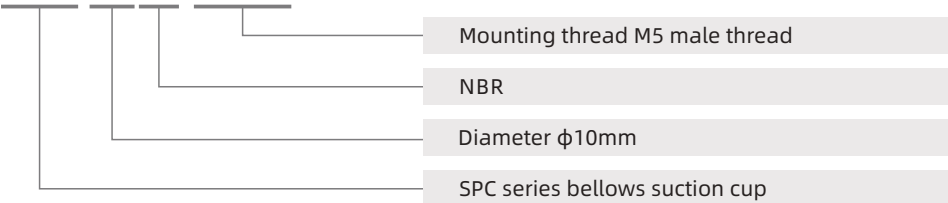


vacuum pad connection port specifications are matching

Suction cup + PJS series fitting for suction cup

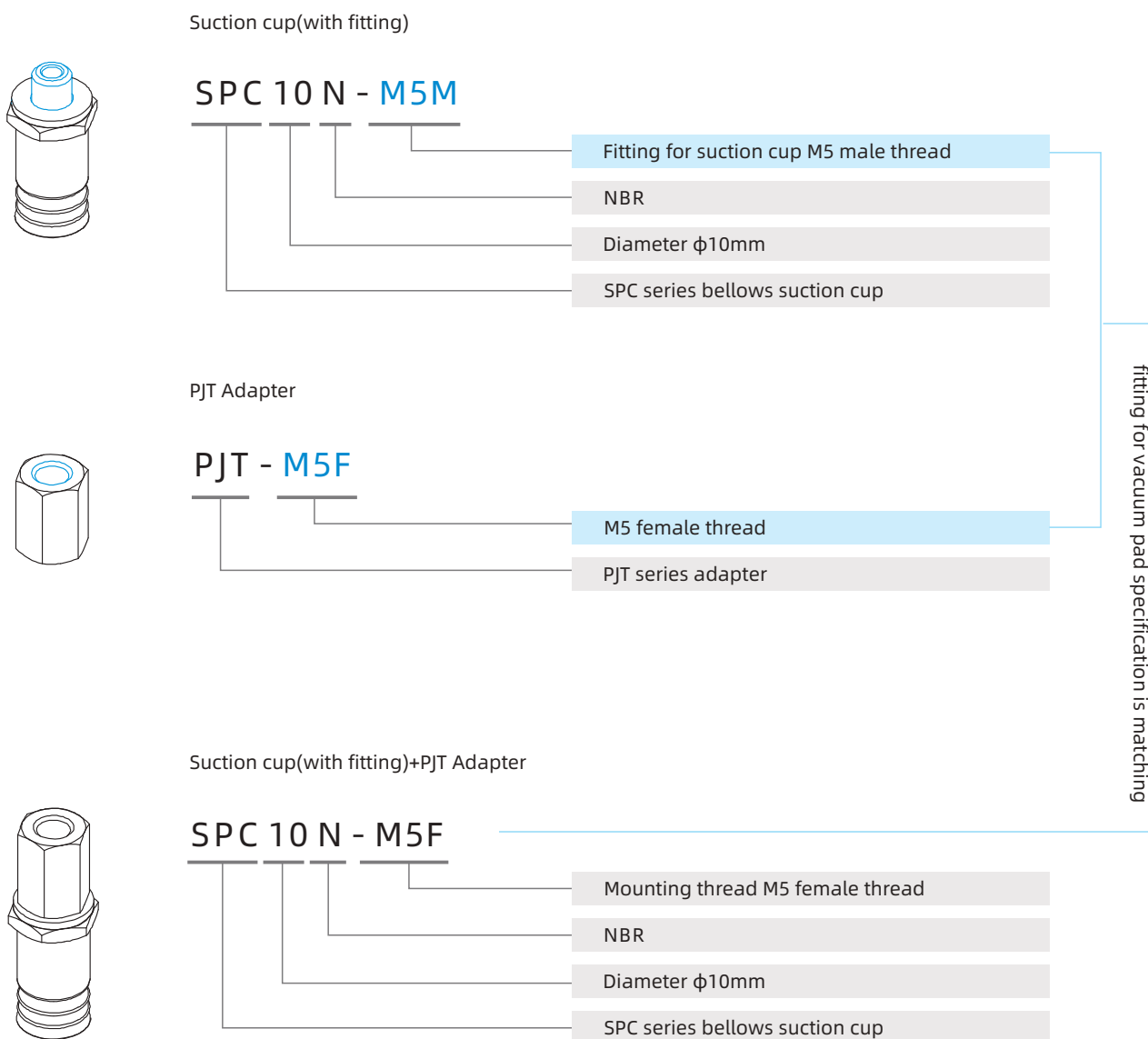


SPC 10 N - M5M



- Note:1. For description of shape of fitting for suction cup which is non-integrated vulcanized with fitting(it means that suction cup can be changed separately), please refer to PJS series fitting for suction cup on page 10-11 or parts selection of each series of suction cups. For actual dimensions of fitting, please refer to PJS series 409-412
2. All of fitting for non-integrated vulcanized suction cup can be found in instruction of each series, which is easy for customers to select model

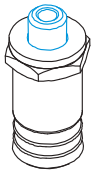
Suction cup(with fitting)+PJT adapter



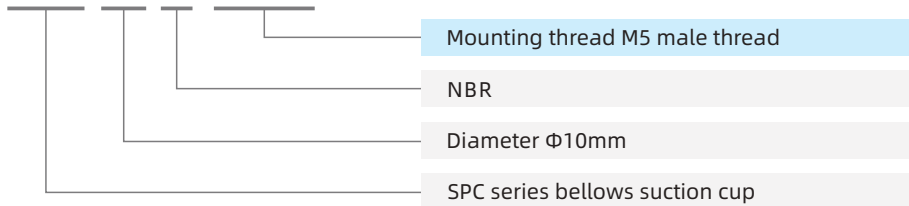
Note:1. The above example is fitting for suction cup changing from M5M to M5F
 2. Please refer to convertible specifications of PJT adapter on page 14, and real dimensions on page 413-414

Suction cup(with fitting)+PJF locking fitting

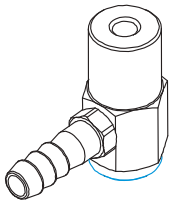
Suction cup(with fitting)



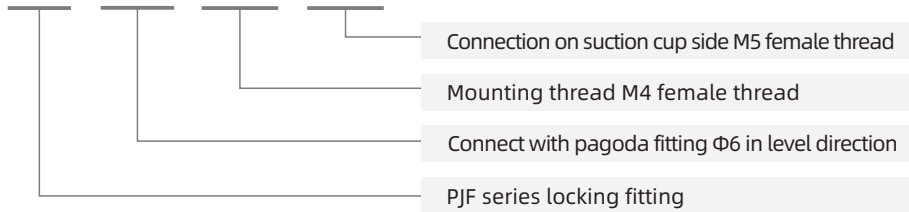
SPC 10 N - M5M



PJF Locking fitting

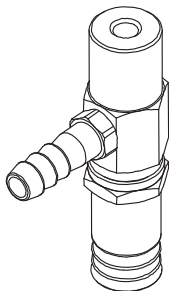


PJF - LB6 - M4F - M5F

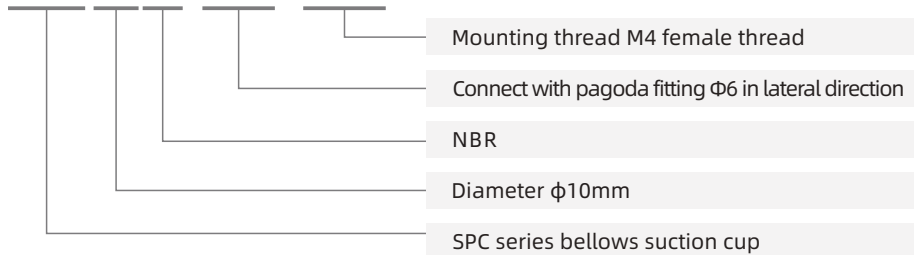


The specifications of fitting for suction cup matches

Suction cup(with fitting)+PJF Locking fitting



SPC 10 N - LB6 - M4F

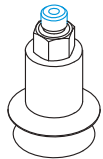


Note: 1. The above example is suction cup SPC10N with locking fitting PJF-LB6-M4F-M5F
 2. Please refer to detailed specifications of PJF adapter on page 415-416

Suction cup(with fitting)+adapter+level compensator(standard)

model /connection	M5M
SB5 - 15	●
SB17 - 40	-
SB50	-

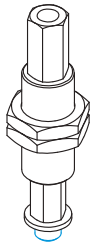
◇ The above table is from page 259



Suction cup (with fitting)

SB 15 N - M5M

- M5 male thread
- NBR
- Diameter ϕ 15 mm
- SB series 1.5 bellows suction cup



Level compensator(E type)

PSP E - I 10 R M5M - M10

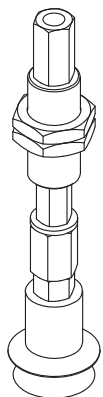
- Mounting nut M10
- M5 female thread connection
- Non-rotating type
- Buffer stroke 10 mm
- Buffer style: built-in spring
- Level compensator E type
- Fixed serial number of level compensator



Adapter (PJT series)

PJT - M5F

- M5 female thread
- T series universal mounting parts-adapter



Suction cup+Adapter+Level compensator

SB 15 N - E I 10 R - M10

- Mounting nut M10
- Non-rotating
- Buffer stroke 10 mm
- Buffer style: built-in
- Level compensator E type
- NBR
- Diameter ϕ 15 mm
- SB series bellows suction cup

Not match

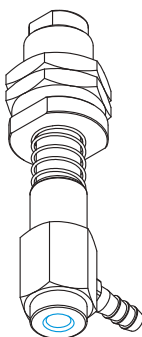
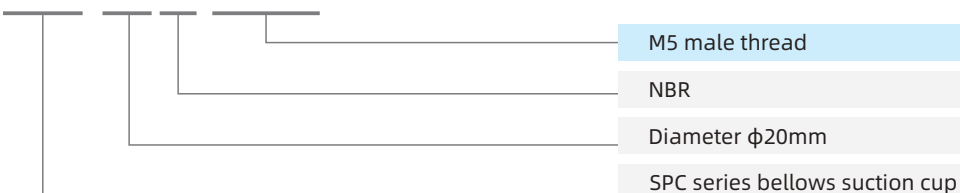
Switch

Suction cup(with fitting)+ Level compensator



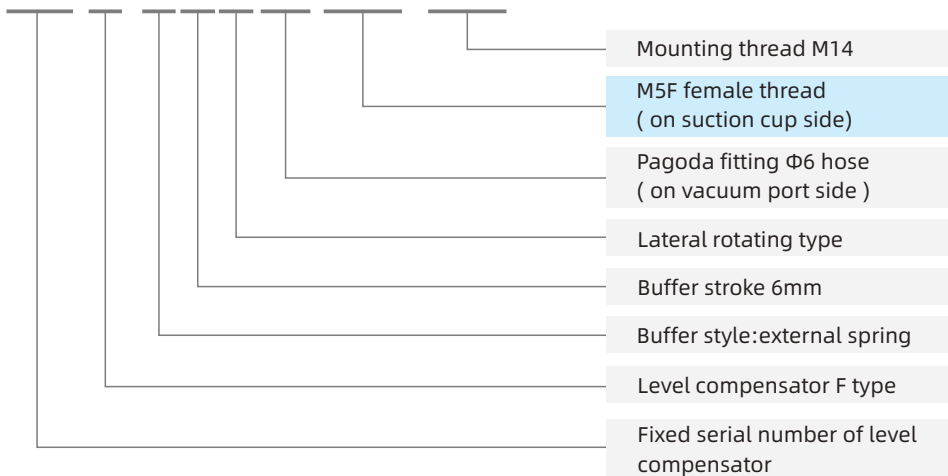
Suction cup (with fitting)

SPC 20 N - M5M

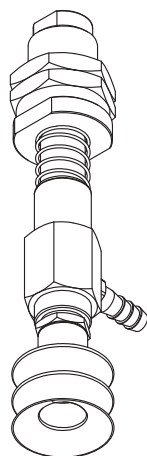


PSPF Level compensator

PSP F - E 6 L B6 M5F - M14

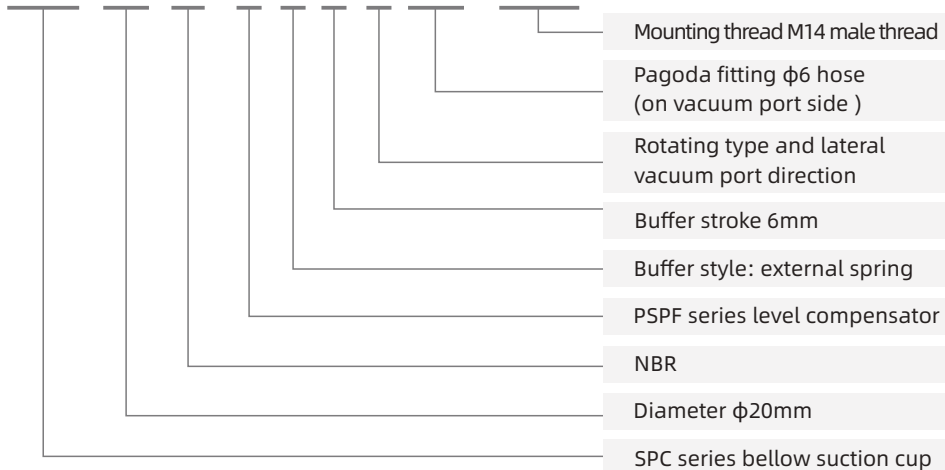


Specifications of fitting for suction cup matches



Suction cup(with fitting) +PSPF Level compensator

SPC 20 N - F E 6 L B6 - M14



Note: 1. The above example is suction cup SPC20N-M5M with level compensator PSPF-E6LB6M5F-M14
 2. Please refer to PSPF level compensator on page 406-408

Selection Instruction for Suction Cup +Level Compensator

Recommend applicable level compensators according to suction cups



Series	Size range	Recommend level compensator (AIRBEST standard)				
		PSPE	PSPT	PSPH	PSPF	PSPD
SB	5-15	●				
	17-75		●			
	110-150			●		
SBA	11-25	●				
	33-78		●			
SBB	All sizes			●		●
SBF	All sizes		●			
SBOF	All sizes		●			
SFT	15-24	●	●			
	30-40		●			
SFA	All sizes	●				
STP	All sizes		●			
SBL	15	●				
	20-50		●			
SBLP	30		●			
	40-50 *					
SF	15	●				
	20-75		●			
	110-200			●		●
	300*					●
SU	2-8	●				
	20-80		●			
SUF	All sizes	●				
SFG	All sizes			●		●
SFU	All sizes			●		●
STC	All sizes		●			
SFF	All sizes		●			
SFM	All sizes		●			
SDM	All sizes		●			
SHT	All sizes		●			
SOB	All sizes		●			
SOF	All sizes		●			
SOG	15x40	●				
	35x100		●			
SFP	All sizes		●			

Series	Size range	Recommend level compensator (AIRBEST standard)			
		PSPE	PSPT	PSPH	PSPF
SBP	10-15	●			
	20-70		●		
SXP	All sizes		●		
SGP	All sizes		●		
SDL	All sizes		●		
SZD	10-25	●			
	40	●	●		
SH	All sizes		●		
SHB	All sizes		●		
SZC	10-32	●			
	40-50	●	●		
SZU	2-32	●			
	40-50	●	●		
SZB	6-32	●			
	40-50	●	●		
SAN	All sizes	●			
SAO	All sizes	●			
SPA	All sizes				●
SPC	5-60				●
	90		●		
SPF	2-95				●
	120-200*				
SPJ	4-50				●
	60-80		●		●
SPU	10-50				●
	60-100		●		
SNP	50-75		●		
	68		●	●	
	140			●	
SOP	40-64		●		
	92		●	●	
	127-220			●	

Note:1. "●" means that selected suction cup directly matches the recommended level compensator
 2. "*" means that there is no level compensator directly for this item

Working Environment

Warning

1. Protection measures must be provided to ensure safety, if there is risk of falling
2. Because the connector of the vacuum device is not explosion-proof, the pressure in vacuum pipe which is 0.1MPa or more for a long time is not safe, please note
3. When there are two pieces or more suction cups connected to one vacuum generator, the workpiece may fall off if one of the suction cups failure
4. Do not use the products in the environment with corrosive gas, flammable gas, explosive gas, chemicals, seawater or steam, which are not allowed enter into the vacuum system
5. Don't block the ports of vacuum generators or increase the exhaust resistance, will otherwise it cause flow loss or vacuum reduction
6. Protective cover should be added when the equipment is exposed in sunlight directly
7. Avoid using the equipment in environment of excessive vibration, which may cause failure

Maintenance

Warning

1. Elements of silencer and filter elements should be maintained and examined regularly. Block in elements will reduce the performance or cause products damage
2. Need to study the components of vacuum generator before replacement.
3. Do not wash or spray equipment with water or solvents
4. In vacuum system, do not use lubricator in the front pipe of vacuum generator, dirties will be blocked in the nozzle and affect the performance of vacuum generator
5. Do not use PTFE tape for connection use (especially the fittings), this tape would fall off easily and block the pipe, affecting the performance of vacuum generator

Design/Setting

Note

1. Please pay attention to the vacuum level drop, it may be caused by the unstable air supply or power supply failure, and the workpiece may fall. Protective measures must be made
2. Check the mark of each port on vacuum generator, wrong connection to the vacuum system will damage the equipments
3. The supplied air to vacuum generator should be clean, and lubricant should not be used in the supplied air. Impurities or oil in compressed air will cause failure and reduce the performance
4. If there is leakage from workpiece or pipes, the vacuum flow will not be enough to hold the workpiece. If the connection pipe is too long or thick, the action time will be longer as the volume of pipe is increased
5. The effective sectional area of pipe for vacuum port should be selected according to the maximum vacuum flow of the vacuum generator. The effective sectional area of pipe for air supply port should be selected according to the maximum air consumption of the vacuum generator

Installation

Warning

1. Don't block the ports of vacuum generators or increase the exhaust resistance, otherwise is will cause flow loss or vacuum reduction
2. Do not remove the shell, the shell will be damaged or leaking if it's forced to shake or rotate
3. Do not use the equipment in the flammable or explosive environment, which may cause fire or explosion