

Please note that specifications may change without notice.  
Please refer to our catalog and instruction manual for usage instructions and precautions.  
Please contact our customer support center for delivery dates.

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CONVUM WEB



# ESD protection pad

## ESD<sub>series</sub>



Our unique material Elec-con, which specializes in ESD performance. Prevents damage caused by ESD (electrostatic discharge).



- Developed a unique material "Elec-Con" specialized for ESD performance. Markless, siloxane-free, and can be used with ionizers
- The material provides ESD protection, so there is little fluctuation in surface resistance.
- Surface resistance value is inspected for all items  $1.0 \times 10^6 \sim 9.9 \times 10^9 \Omega$
- Pads are available in flat and bellows types up to  $\phi 30$

CONVUM WEB



CONVUM

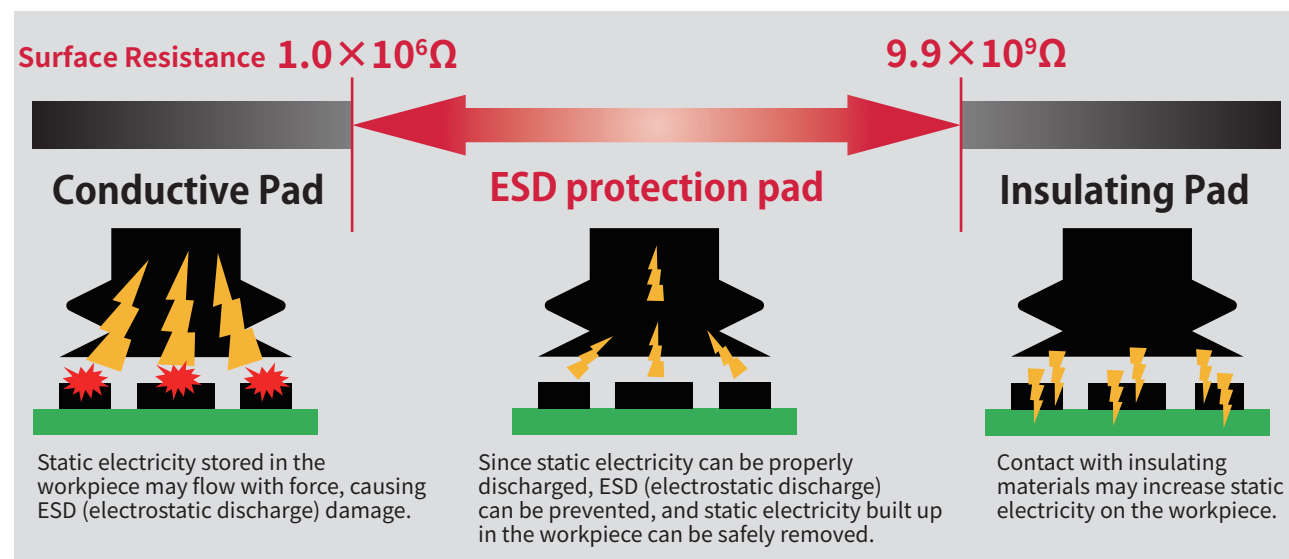


# ESD protection pad

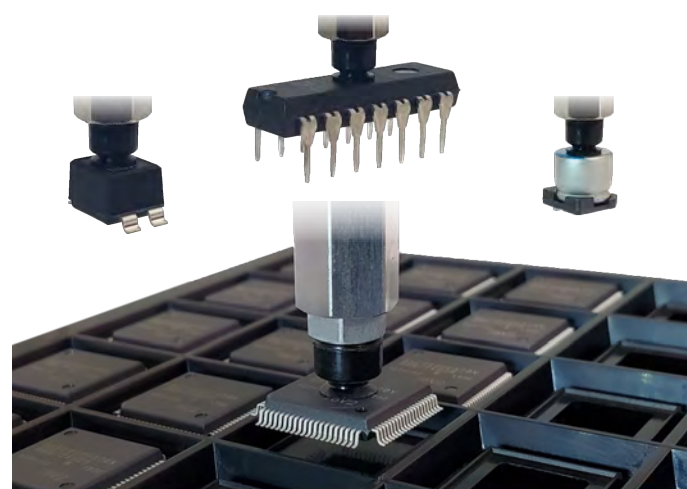
## ESD series



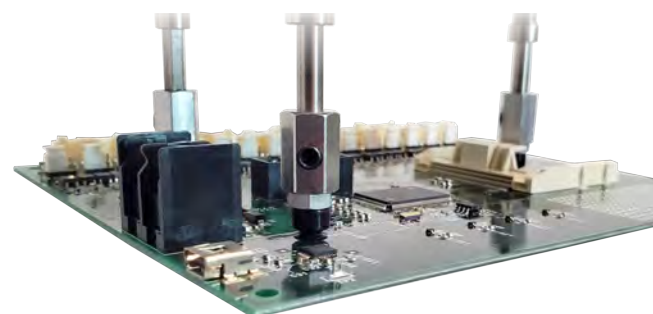
100% surface resistance at  $1.0 \times 10^6$  to  $9.9 \times 10^9 \Omega$   
Prevents damage to electronic components due to ESD (electrostatic discharge)



Our surface resistance measurements are based on ANSI/ESD STM11.13. The standard specifies that the electrostatic dissipative range is  $1.0 \times 10^4$  to  $1.0 \times 10^{11} \Omega$ , but we manage our surface resistance to a stricter range than the standard,  $1.0 \times 10^6$  to  $9.9 \times 10^9 \Omega$ , and inspect all products before shipping. (Inspection report included)

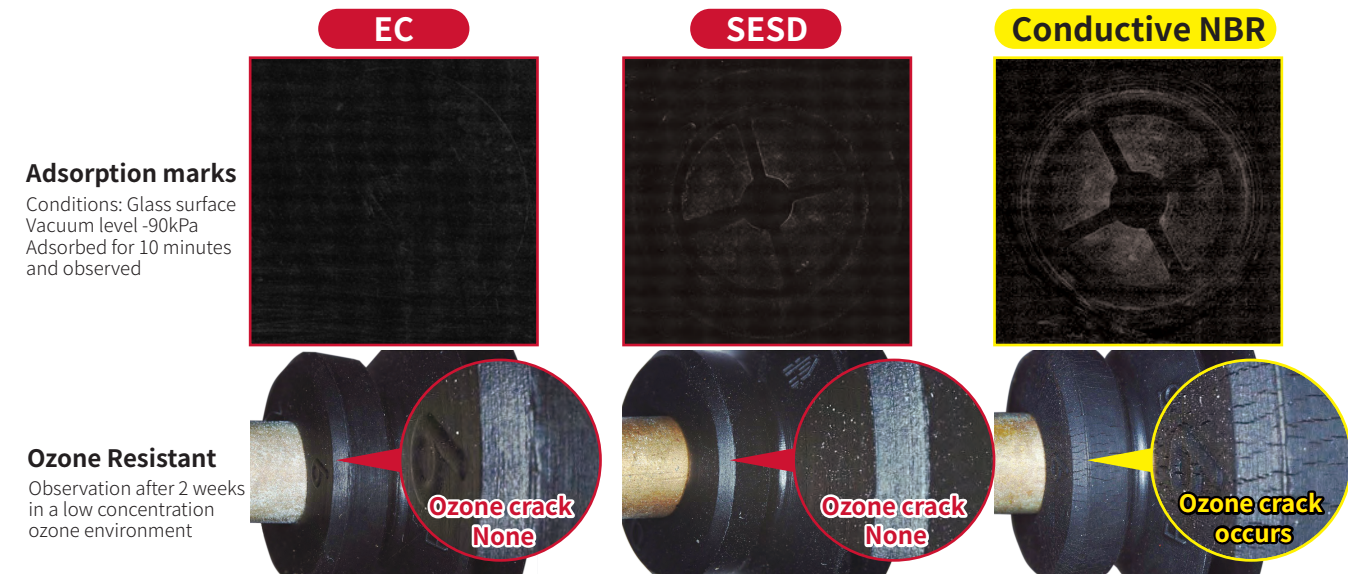


○ Electronic component pickup



○ Adsorption of electronic circuit boards

Our unique material called "Elec-Con" that is specialized for ESD performance. It is markless, siloxane-free, ozone-resistant, and can be used in with an ionizer.



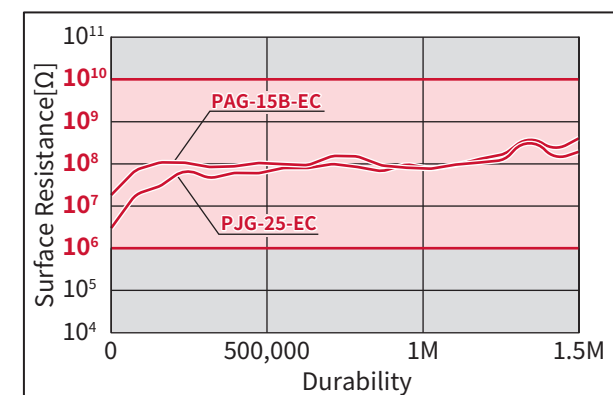
### Simple physical properties comparison table

Material Symbol	Material	Hardness	Wear resistance	Heat Resistance Temperature	Siloxane	Suction mark	Ozone resistance	Oil	Alcohol-based	Acid	Alkaline	Water
EC	Elec-Con <sup>Note 1)</sup>	A 60	○	0~100°C	Free	○	○	×	○	○	○	○
SESD	Silicone Rubber	A 40	×	-60~200°C	Contains <sup>note 2)</sup>	×	○	×	○	○	○	○

Note 1) Elec-Con is a newly developed rubber with our own proprietary compound as an ESD protection rubber. It is mainly composed of SBR, does not contain siloxane, is ozone resistant, and achieves the same markless performance as conventional ESD pads that have been treated with RA.      ○: Good    ×: Bad

Note 2) We remove low molecular weight siloxanes that cause contact failures during the secondary vulcanization process.

The material itself provides ESD protection, so there is little fluctuation in surface resistance.



Unlike ESD countermeasures using coatings, conductivity is controlled by the composition of the material itself, so fluctuations in surface resistance are stable.

Test conditions

Vacuum pressure -60kPa  
Weight of workpiece: 16g for pad diameter φ10 or more, 3.5g for pad diameter less than φ10 Suction tact time 2 seconds, 24 hours continuous use (approximately 40,000 uses per day)  
Note) Fluctuations in surface resistance are not guaranteed.

Pads are available in flat and bellows types up to φ30



○ Flat Pad PFGseries

○ Thin Lip Pad PAGseries

○ Two-stage bellows PJGseries

○ Three-stage bellows PCGseries

# ESD Series

## ESD protection pad

### Model Number



### PFG-5A-EC

① ② ③

① Suction pad series Note 1)

② Pad Diameter Note 1)

Note 1) Please note that compatibility may vary depending on the suction pad series and pad diameter, so please select from the model number list below.

③ Material

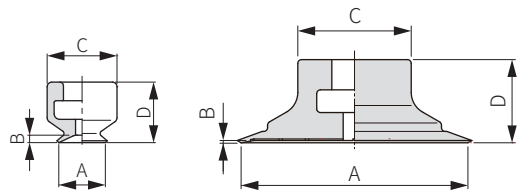
Code	Material	Hardness	Color (Laser Printing)	Temperature	Surface Resistance <small>Note 3)</small>
EC	Elec-Con <small>Note 2)</small>	A 60	Black (EC)	0~100°C	1.0×10 <sup>6</sup> ~9.9×10 <sup>9</sup> [Ω]
SESD	ESD Silicone Rubber	A 40	Black (SE 6-9)	-60~200°C	

Note 2) Elec-Con is a newly developed rubber with our own proprietary compound as an ESD protection rubber. It is mainly composed of SBR, does not contain siloxane, is ozone resistant, and achieves the same markless performance as conventional ESD pads that have been treated with RA.

Note 3) Surface resistance values are measured in our measurement environment and under our measurement conditions. 23°C 50% humidity environment, 100V applied



### Flat Pad Model Number List



CODE	Model Number	A	B	C	D	Weight
300100831	PAG-5B-EC	φ5	0.3	φ4	4	0.1g
300100830	PAG-10B-EC	φ10	0.3	φ8.5	7.5	0.3g
300100829	PAG-15B-EC	φ15	0.5	φ8.5	7.5	0.3g
300100832	PAG-20B-EC	φ20	0.8	φ8.5	7.5	0.6g
300100833	PAG-30B-EC	φ30	0.3	φ15	9	2.8g
300700875	PFG-2A-EC	φ2	0.4	φ4	4	0.1g
300700872	PFG-3.5A-EC	φ3.5	0.5	φ4	4	0.1g
300700869	PFG-5A-EC	φ5	0.8	φ7.5	6.5	0.2g
300700871	PFG-6A-EC	φ6	0.8	φ7.5	6.5	0.2g
300700870	PFG-8A-EC	φ8	1.2	φ8	7	0.2g
300700874	PFG-10A-EC	φ10	1.5	φ8.5	7.5	0.3g
300700873	PFG-15A-EC	φ15	2.0	φ9	8	0.4g

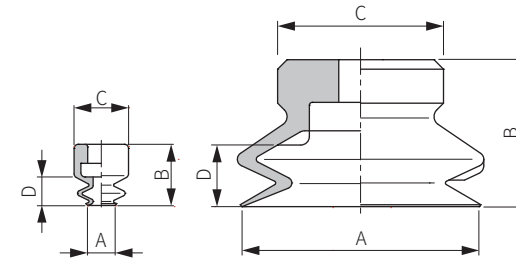
CODE	Model Number	A	B	C	D	Weight
300100797	PAG-5B-SESD	φ5	0.3	φ4	4	0.1g
300100803	PAG-10B-SESD	φ10	0.3	φ8.5	7.5	0.3g
300100809	PAG-15B-SESD	φ15	0.5	φ8.5	7.5	0.3g
300100815	PAG-20B-SESD	φ20	0.8	φ8.5	9	0.6g
300100818	PAG-30B-SESD	φ30	0.3	φ15	11	2.8g
300700823	PFG-2A-SESD	φ2	0.4	φ4	4	0.1g
300700826	PFG-3.5A-SESD	φ3.5	0.5	φ4	4	0.1g
300700829	PFG-5A-SESD	φ5	0.8	φ7.5	6.5	0.2g
300700832	PFG-6A-SESD	φ6	0.8	φ7.5	6.5	0.2g
300700835	PFG-8A-SESD	φ8	1.2	φ8	7	0.2g
300700838	PFG-10A-SESD	φ10	1.5	φ8.5	7.5	0.3g
300700844	PFG-15A-SESD	φ15	2.0	φ9	8	0.4g

Compatible set screw list

PAD	CODE	Miter screw type number	Screw Size	Weight
PAG-5B	318100026	TN-PS-2A-M3	M3×0.5	1.2g
	318100027	TN-PS-2A-M3F	M3×0.5 Female	0.8g
	318100240	TN-PS-2A-M5	M5×0.8	0.5g
PAG-10B	318100024	TN-PS-10-M5	M5×0.8	0.8g
	318100025	TN-PS-10-M5F	M5×0.8 Female	1.1g
PAG-15B	300700823	TN-PS-10-M5	M5×0.8	0.8g
	300700826	TN-PS-10-M5F	M5×0.8 Female	1.1g
PAG-20B	300700823	TN-PS-10-M5	M5×0.8	0.8g
	300700826	TN-PS-10-M5F	M5×0.8 Female	1.1g
PAG-30B	318100028	TN-PA-30-M6	M6×1.0	8.6g

PAD	CODE	Miter screw type number	Screw Size	Weight
PFG-2A	318100026	TN-PS-2A-M3	M3×0.5	1.2g
	318100027	TN-PS-2A-M3F	M3×0.5 Female	0.8g
	318100240	TN-PS-2A-M5	M5×0.8	0.5g
PFG-3.5A	318100026	TN-PS-2A-M3	M3×0.5	1.2g
	318100027	TN-PS-2A-M3F	M3×0.5 Female	0.8g
	318100240	TN-PS-2A-M5	M5×0.8	0.5g
PFG-5A	318100024	TN-PS-10-M5	M5×0.8	1.1g
	318100025	TN-PS-10-M5F	M5×0.8 Female	0.8g
PFG-6A	300700823	TN-PS-10-M5	M5×0.8	1.1g
	300700826	TN-PS-10-M5F	M5×0.8 Female	0.8g
PFG-8A	300700823	TN-PS-10-M5	M5×0.8	1.1g
	300700826	TN-PS-10-M5F	M5×0.8 Female	0.8g
PFG-10A	300700823	TN-PS-10-M5	M5×0.8	1.1g
	300700826	TN-PS-10-M5F	M5×0.8 Female	0.8g
PFG-15A	300700823	TN-PS-10-M5	M5×0.8	1.1g
	300700826	TN-PS-10-M5F	M5×0.8 Female	0.8g

### Double-stage bellows pad model number list



Two-stage bellows pad PFGseries

CODE	Model Number	A	B	C	D	Weight
301000351	PJG-2-EC	φ2	4.5	φ4	-	0.1g
301000352	PJG-4-EC	φ4	5.5	φ4	-	0.1g
301000353	PJG-6-EC	φ6	9	φ7.5	4.2	0.2g
301000350	PJG-8-EC	φ8	9	φ8	4	0.2g
301000348	PJG-10-EC	φ10	9.5	φ11	3	0.5g
301000354	PJG-15-EC	φ15	11	φ12	3.3	0.7g
301000355	PJG-20-EC	φ20	13	φ15	5.5	1.4g
301000356	PJG-25-EC	φ25	15.5	φ17.5	6.5	2.4g
301000349	PJG-30-EC	φ30	18	φ20	7	4.5g

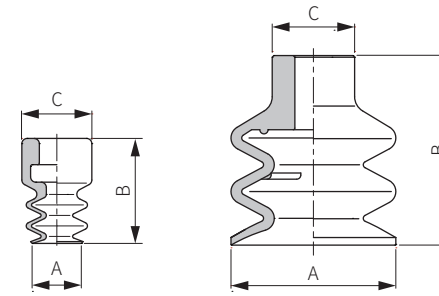
CODE	Model Number	A	B	C	D	Weight
301000315	PJG-2-SESD	φ2	4.5	φ4	-	0.1g
301000318	PJG-4-SESD	φ4	5.5	φ4	-	0.1g
301000321	PJG-6-SESD	φ6	9	φ7.5	4.2	0.2g
301000324	PJG-8-SESD	φ8	9	φ8	4	0.2g
301000327	PJG-10-SESD	φ10	9.5	φ11	3	0.5g
301000330	PJG-15-SESD	φ15	11	φ12	3.3	0.7g
301000333	PJG-20-SESD	φ20	13	φ15	5.5	1.4g
301000336	PJG-25-SESD	φ25	15.5	φ17.5	6.5	2.4g
301000339	PJG-30-SESD	φ30	18	φ20	7	4.5g

Compatible set screw list

PAD	CODE	Miter screw type number	Screw Size	Weight
PJG-2	318100026	TN-PS-2A-M3	M3×0.5	1.2g
	318100027	TN-PS-2A-M3F	M3×0.5 Female	0.8g
	318100240	TN-PS-2A-M5	M5×0.8	0.5g
PJG-4	318100026	TN-PS-2A-M3	M3×0.5	1.2g
	318100027	TN-PS-2A-M3F	M3×0.5 Female	0.8g
	318100240	TN-PS-2A-M5	M5×0.8	0.5g
PJG-6	318100024	TN-PS-10-M5	M5×0.8	0.8g
	318100025	TN-PS-10-M5F	M5×0.8 Female	1.1g
PJG-8	318100024	TN-PS-10-M5	M5×0.8	0.8g
	318100025	TN-PS-10-M5F	M5×0.8 Female	1.1g

PAD	CODE	Miter screw type number	Screw Size	Weight
PJG-10	318100013	TN-PF-15-M5	M5×0.8	1.4g
PJG-15	318100013	TN-PF-15-M5	M5×0.8	1.4g
PJG-20	318100014	TN-PF-20-M5	M5×0.8	2.3g
PJG-25	318100014	TN-PF-20-M5	M5×0.8	2.3g
PJG-30	318100015	TN-PF-25-M6	M6×1.0	3.3g

### 3-stage bellows pad model number list



Three-stage bellows pad PCGseries

CODE	Model Number	A	B	C	D	Weight
300400262	PCG-7-EC	φ7	10	φ7.5	6	0.2g
300400263	PCG-10-EC	φ9	15	φ9	8	0.5g

CODE	Model Number	A	B	C	D	Weight
300400250	PCG-7-SESD	φ7	10	φ7.5	6	0.2g
300400251	PCG-10-SESD	φ9	15	φ9	8	0.5g
300400252	PCG-15-SESD	φ15.2	23	φ10	14	1.4g
300400257	PCG-20-SESD	φ20	23	φ10	14	2.3g

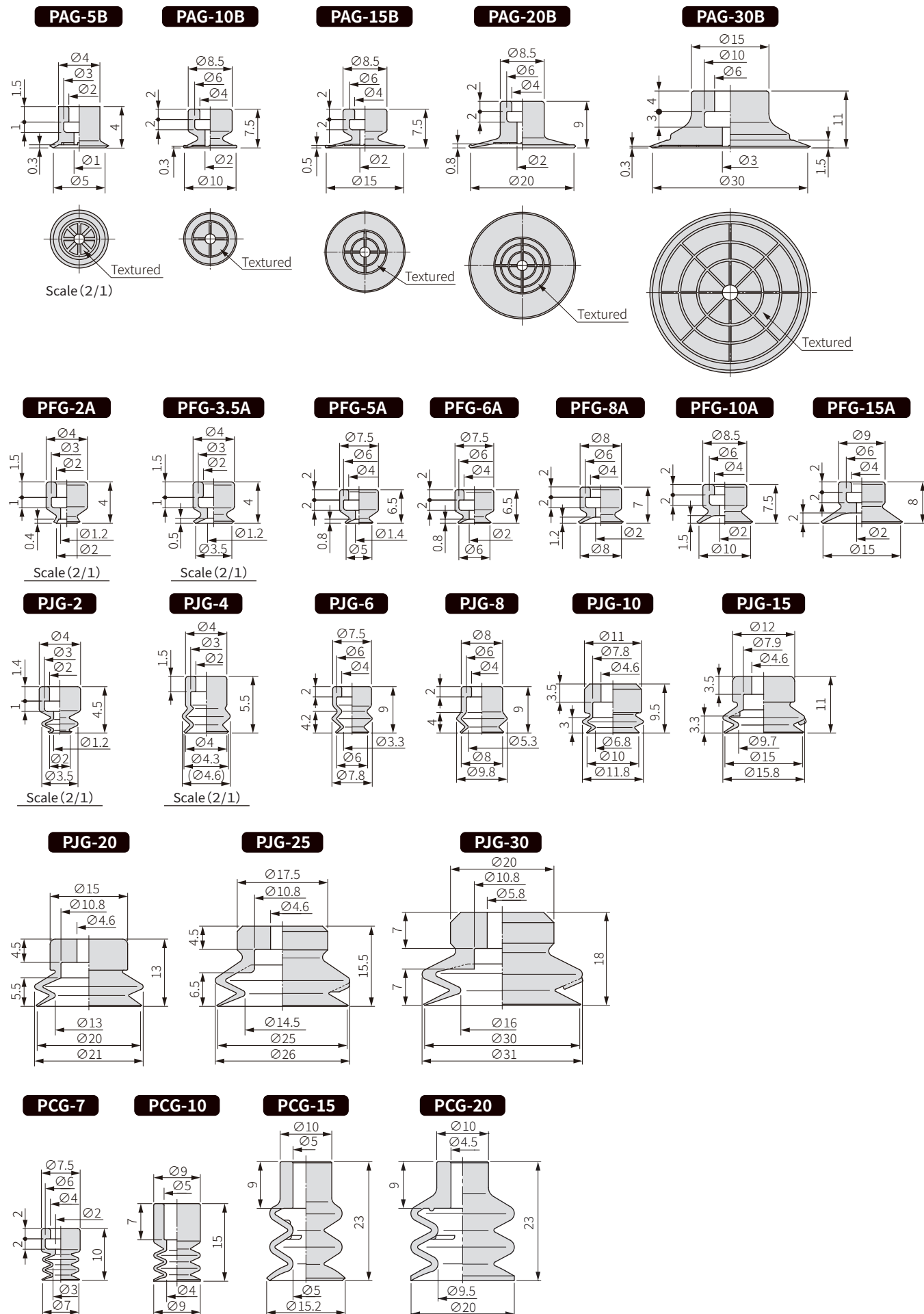
Compatible set screw list

PAD	CODE	Miter screw type number	Screw Size	Weight
PCG-7	318100024	TN-PS-10-M5	M5×0.8	0.8g
	318100025	TN-PS-10-M5F	M5×0.8 Female	1.1g
PCG-10	318100009	TN-PC-10-M5	M5×0.8	3.9g
PCG-15	318100009	TN-PC-10-M5	M5×0.8	3.9g
PCG-20	318100009	TN-PC-10-M5	M5×0.8	3.9g



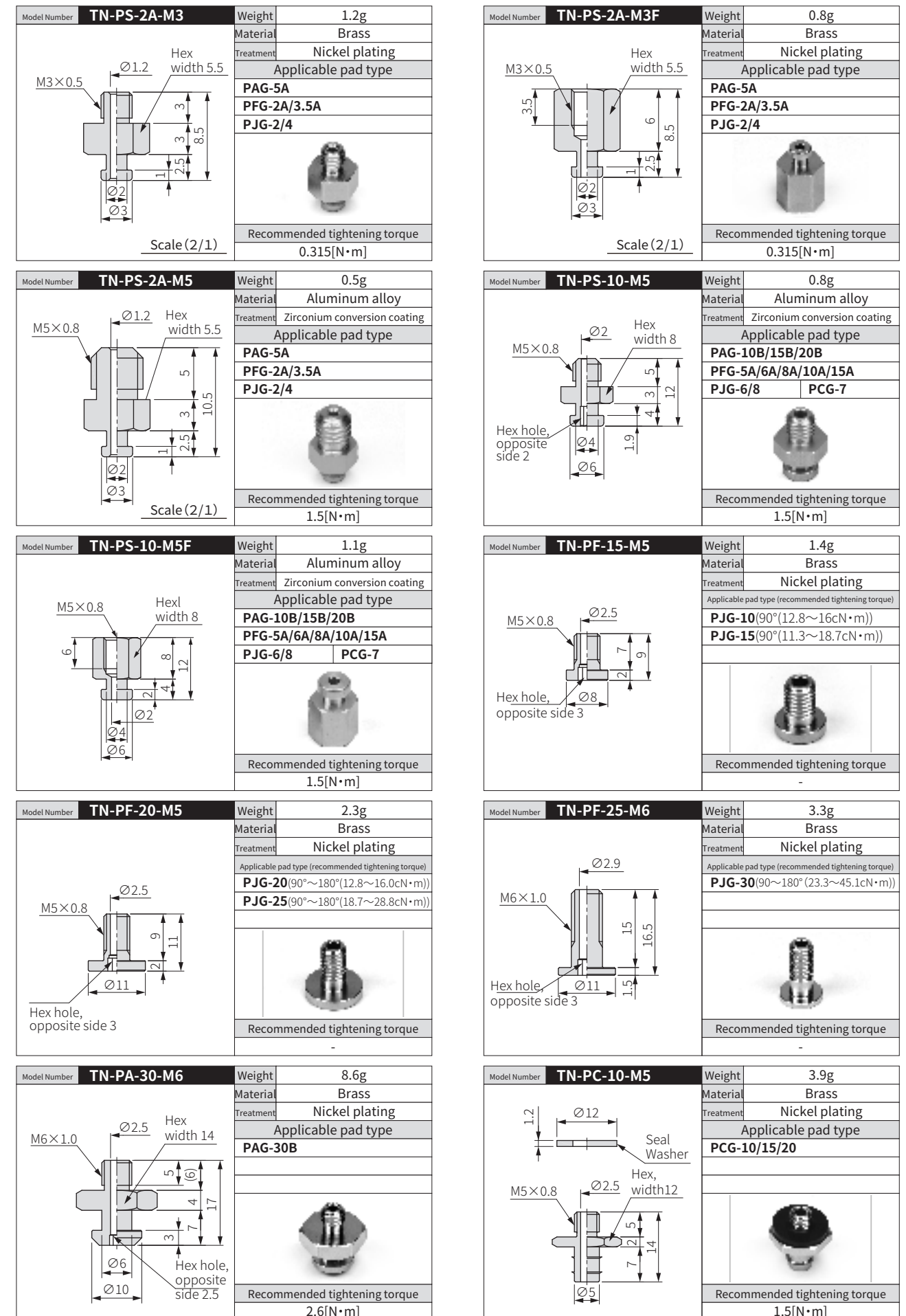
ESD Series ESD protection pad

Dimensions



Setscrew outline drawing

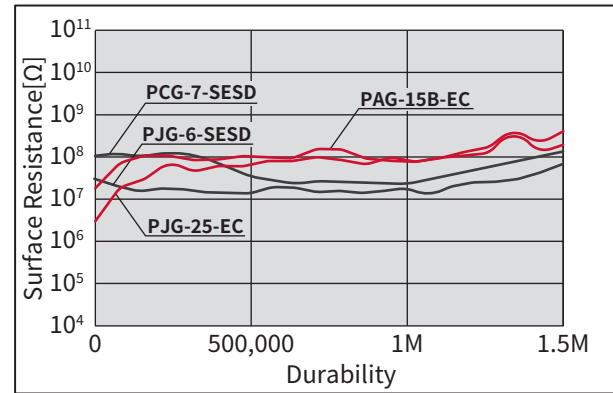
All set screws shown below are energized.





# ESD Series ESD protection pad

## Durability test results



Test conditions  
 Vacuum pressure -60kPa  
 Suction work weight: Pad diameter φ10 or more is 16g, less than φ10 is 3.5g  
 Suction tact time 2 seconds, 24 hours continuous use (approximately 40,000 uses per day)

Note) The data are actual measurements taken under our own conditions and are not specifications. Please use them as a reference when selecting or using the product. We do not guarantee any fluctuations in surface resistance values.

## Physical properties and chemical resistance

Material		Elec-Con <sup>Note 2)</sup>	ESD protection silicone rubber	
Our specs	Symbol	EC	SESD	
	Color/Identification	Black Laser-printed "EC"	Black Laser printed "SE 6-9"	
Mechanical characteristics	Hardness	JIS K6253/K7311	60	40
	Specific gravity	JIS K6268/Z8807	1.07	1.08
	Tensile strength	JIS K6251/K7311	○	×
	Stretch	JIS K6251/K7311	○	○
	Tear strength	JIS K6252/K7311	○	×
	Abrasion resistance	JIS K6264-2/K7311	○	△
	Stickiness	In-house measurement method	○	○
Physical properties	Maximum operating temp (°C)	-	100	200
	Embrittlement Temperature (°C)	-	0	-60
	Weather resistance (UV rays)	-	○	○
	Ozone resistance	-	○	○
Electrical Characteristics	Volume resistivity (Ω·cm)	In-house measurement method 23°C·50%rh	10 <sup>5</sup> ~10 <sup>8</sup>	10 <sup>5</sup> ~10 <sup>8</sup>
	Surface Resistance (Ω)	In-house measurement method 23°C·100V Apply	1.0×10 <sup>6</sup> ~9.9×10 <sup>9</sup>	1.0×10 <sup>6</sup> ~9.9×10 <sup>9</sup>
Oil and chemical resistance	Kerosene		×	×
	Alcohol	Ethanol	○	○
		IPA	○	○
	Acid	Hydrochloric acid (10%)	○	○
		Sulfuric acid (10%)	○	○
	Alkali	Calcium hydroxide solution	○	○
		Ammonia water	○	○
		Sodium hypochlorite (5%)	○	○
Water		○	○	

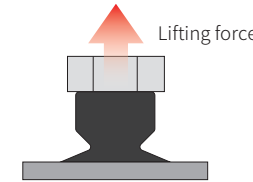
Note 1) This table shows the general characteristics of our rubber. The values listed are for reference only and are not guaranteed values. Rubber characteristics decrease significantly near the maximum/minimum operating temperatures. Even within the operating temperature range, characteristics may change depending on the pad shape and duration of use, Please be sure to thoroughly check and verify.

Note 2) Elec-Con is a newly developed rubber with our own proprietary compound as an ESD protection rubber. It is mainly composed of SBR, does not contain siloxane, is ozone resistant, and achieves the same markless performance as conventional ESD pads that have been treated with RA.

## Lifting force

Suction pad	Maximum lifting force[N]				
	Vacuum Pressure[kPa]				
	-50	-60	-70	-80	-90
PAG-5B	0.9	1.2	1.3	1.5	1.7
PAG-10B	3.1	3.5	4.0	4.6	5.2
PAG-15B	4.2	4.7	5.1	5.5	5.8
PAG-20B	11.0	13.0	14.8	16.5	18.2
PAG-30B	30.7	35.7	40.6	45.3	50.1
PFG-2A	0.1	0.2	0.2	0.3	0.3
PFG-3.5A	0.4	0.5	0.6	0.7	0.7
PFG-5A	0.9	1.0	1.2	1.3	1.5
PFG-6A	1.2	1.5	1.7	1.9	2.1
PFG-8A	2.1	2.5	2.9	3.2	3.7
PFG-10A	3.3	3.3	3.9	4.3	4.9
PFG-15A	7.1	8.4	9.6	10.9	12.0
PJG-2	0.14	0.16	0.19	0.20	0.21
PJG-4	0.5	0.6	0.6	0.7	0.7
PJG-6	1.2	1.4	1.6	1.8	2.1
PJG-8	2.0	2.4	2.7	3.1	3.5
PJG-10	3.2	3.8	4.4	5.0	5.6
PJG-15	6.9	8.2	9.3	10.4	11.3
PJG-20	12.0	13.9	15.8	17.3	18.8
PJG-25	18.1	20.6	23.1	25.4	27.6
PJG-30	23.9	27.6	30.9	34.0	37.0
PCG-7	1.4	1.7	1.9	2.1	2.2
PCG-10	2.1	2.5	2.9	3.2	3.4
PCG-15	6.3	7.4	8.4	9.6	10.9
PCG-20	12.2	14.5	16.6	18.3	18.8

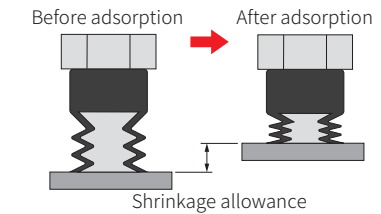
Note) The data is not a specification, but an actual measurement based on our own conditions. Please use it as a reference value when selecting or using. The lifting force condition is the maximum lifting force when a fixed flat plate is adsorbed and peeled off. Please design with a safety factor in mind. Under actual conditions, performance will vary depending on the material and shape of the work, so please test using the actual machine.



## Bellows pad shrinkage allowance

Suction pad	Shrinkage allowance [mm]				
	Vacuum Pressure [kPa]				
	-50	-60	-70	-80	-90
PJG-2	0.6	0.6	0.7	0.7	0.7
PJG-4	0.8	1.0	1.2	1.3	1.3
PJG-6	0.9	1.4	2.1	2.2	2.2
PJG-8	2.1	2.2	2.3	2.3	2.3
PJG-10	1.6	1.6	1.7	1.8	1.8
PJG-15	2.5	2.5	2.6	2.6	2.7
PJG-20	3.5	3.5	3.7	3.7	3.7
PJG-25	4.7	4.8	4.9	5.0	5.1
PJG-30	4.1	4.3	4.3	4.3	4.3
PCG-7	2.7	2.7	2.7	2.7	2.7
PCG-10	3.1	3.1	3.2	3.3	3.3
PCG-15	8.2	8.3	8.4	8.4	8.5
PCG-20	8.3	8.4	8.6	8.7	8.7


Note) The data is actual measurements based on our own conditions and is not a specification. Please use it as a reference value when selecting or using the product. The condition is the shrinkage (stroke) of the bellows when adsorbing a flat plate.





## Safety Instructions

Please also read the general precautions, individual precautions for each series, and product instruction manuals.

The precautions listed here are intended to ensure the safe and correct use of our products and to prevent injury or damage. The precautions are divided into three categories, [Danger], [Warning], and [Caution], to indicate the degree of risk and urgency of injury to persons or damage to property that may result from improper handling. All of these contain important safety information and must be observed.

 **Danger** When incorrect handling is anticipated to result in imminent danger of death or serious injury to a person.

 **Warning** When incorrect handling is anticipated, there is a risk of death or serious injury to persons.

 **Caution** When handling is incorrect, there is a risk of personal injury or damage to property.

Be sure to also observe JIS B8370※1 or ISO 4414※2, the Industrial Safety and Health Act, the High Pressure Gas Safety Act, and other safety regulations.

※1 JIS B8370: General rules for pneumatic systems

※2 ISO 4414: Pneumatic fluid power-Recommendations for the application of equipment to transmission and control systems

Note that even matters described in "Caution" may lead to serious consequences depending on the situation.

All of these contain important information, so be sure to observe them.

### Warning

● Vacuum and pneumatic equipment should be selected correctly. The suitability of vacuum and pneumatic equipment should be determined by the designer or person responsible for determining the specifications of the pneumatic system. Due to the wide variety of conditions under which the products listed here are used, their suitability for the system should be determined by the vacuum and pneumatic system designer or person responsible for determining the specifications, after analysis and testing as necessary. Assurance of the desired performance and safety of the system is the responsibility of the person who has determined the suitability of the system. Please continue to review all specifications and configure the system according to the latest product catalogs and documentation, taking into account the circumstances regarding the possibility of equipment failure.

● Handle the equipment only by persons with sufficient knowledge and experience. Improper handling of compressed air can cause personal injury or property damage. Vacuum and pneumatic equipment are designed as parts for industrial machinery, and assembly, operation, and maintenance of machinery and equipment using them should be performed by persons with sufficient knowledge and experience.

● Never handle the machinery or equipment or remove the equipment until safety is confirmed. When inspecting or servicing equipment or devices, make sure that measures have been taken to prevent the actuator from falling or running out of control. When removing equipment, make sure that measures have been taken to prevent falling or runaway, shut off the power supply to the system, and exhaust the compressed air in the system before removing the equipment. When restarting a machine or equipment, make sure that measures have been taken to prevent it from jumping out of the machine or equipment, and then do so with caution.

● The products listed here are mainly intended for general industrial use. If the products are to be used under the following conditions or in the following environments, please take safety measures and consult with us in advance. Use under conditions or in environments other than those specified, or use outdoors. Use in safety equipment such as nuclear power plants, railroads, aircraft, vehicles, ships, medical equipment, equipment that comes in contact with beverages or food, entertainment equipment, emergency cutoff circuits, and clutch and brake circuits for presses. Use in applications requiring special safety requirements where significant injury or damage to persons or property is expected. When there is an imminent danger of death or serious injury to persons if the product is mishandled.

### Warranties and Disclaimers

#### 1. Warranty

(1) If a failure occurs during the warranty period due to our responsibility, we will provide a replacement product or necessary replacement parts free of charge, or repair the product at our company free of charge.

(2) The warranty period for our products is one year from the start of use or one year and six months after delivery, whichever comes first. However, some products may have a specified number of endurance cycles or sliding distance, etc. For details, please contact our Customer Service Center (Customer Support Center).

(3) Since the vacuum pad is a consumable part, the warranty period of one year from the start of use is not applicable, and the warranty period is one year after delivery. However, even within the warranty period, the warranty does not apply if the deterioration of the rubber material or wear caused by the use of the vacuum pad is the cause.

#### 2. Disclaimer

(1) The following items are excluded from the warranty coverage. The product is used outside the scope of the specifications described in the catalog or specification sheet. The failure is caused by reasons other than the product in question. The failure is caused by modification or repair that is not our responsibility. The failure is caused by reasons that cannot be foreseen with the technical knowledge at the time of delivery. When it is caused by reasons that are not our responsibility, such as natural disasters, calamities, acts by a third party, or intentional

Please note that specifications may change without notice.  
Please refer to our catalog and instruction manual for usage instructions and precautions.  
Please contact our customer support center for delivery dates.

<https://convum.co.jp/en>

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Customer Support Center

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