

Vacuum Gripper System (Foam Type)



Suitable for the palletizing and depalletizing of corrugated cardboard, etc.

Ejector unit

Combines all functions required for adsorption

Ejector

Supply valve/Release valve

Silencer

Pressure switch

Can be used immediately by simply connecting 1 electrical cable and air piping

Robot mounting flange

M8 connector cable

75 mm*1
to robot mounting flange

Suction plate with foam

400 mm

240 mm

*1 For foam thicknesses of 20 mm

Weight

3.9 kg*2

Reduces the load on robots

*2 For ZGSNPK-400240BS4-RM1C8

CO₂ emissions
(Air consumption)

Max. **15%** reduction
(SMC comparison)

Ejector with new design

227 L/min (ANR) ← 270 L/min (ANR)

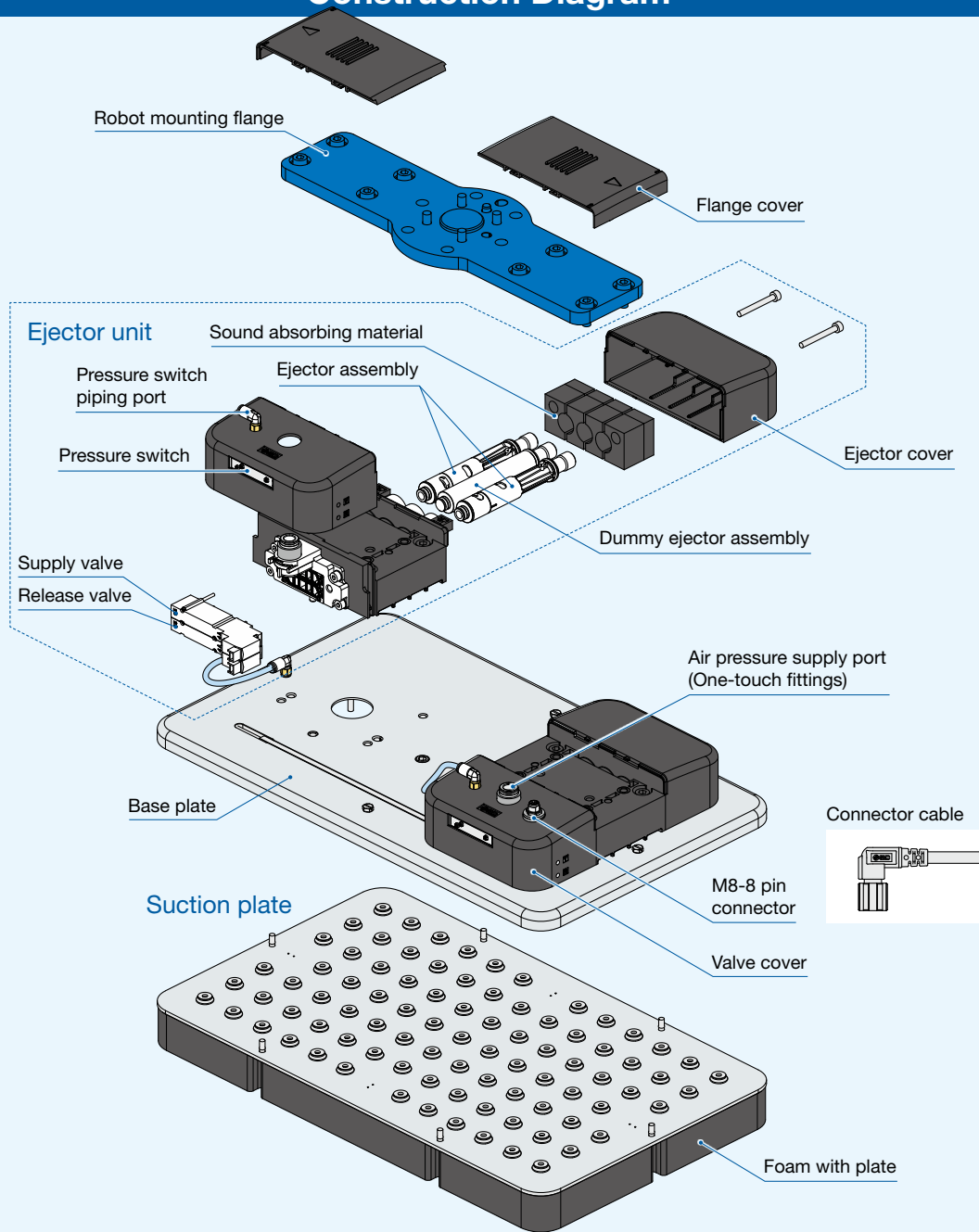
Compared to ZL6H (Supply pressure: 0.6 MPa)

ZGS Series

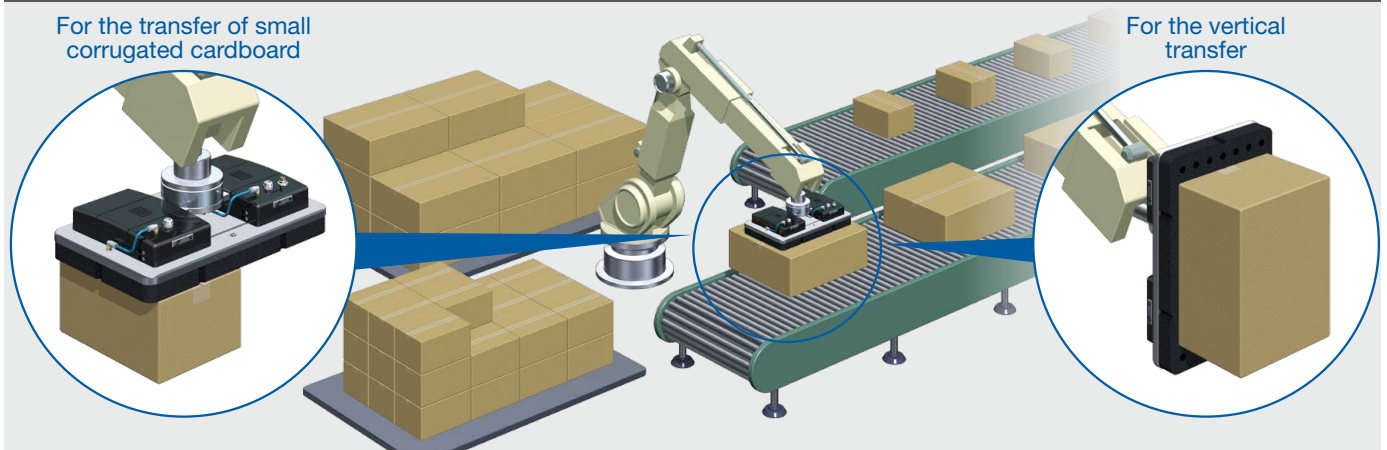


CAT.ES100-169A

Construction Diagram



Application Examples



Ejector Unit

Newly designed ejector for the Vacuum Gripper System

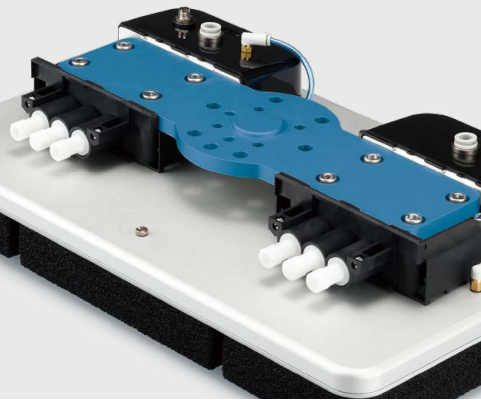
• Number of ejector assemblies (2 pcs, 4 pcs, 6 pcs) can be selected.

• Energy-saving (Air consumption reduced by up to 15% compared to ZL6H)

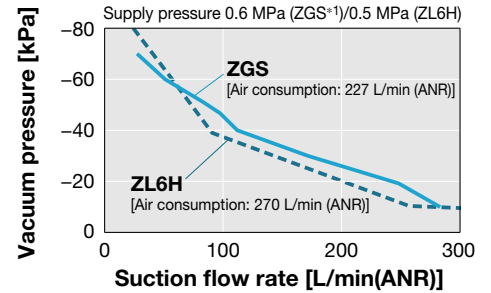
Flow rate characteristics improvement in the practical range below -50 kPa

Number of ejector assemblies	Max. suction flow rate [L/min(ANR)]
2 pcs.	322
4 pcs.	646
6 pcs.	1022

* Refer to page 6 for details.



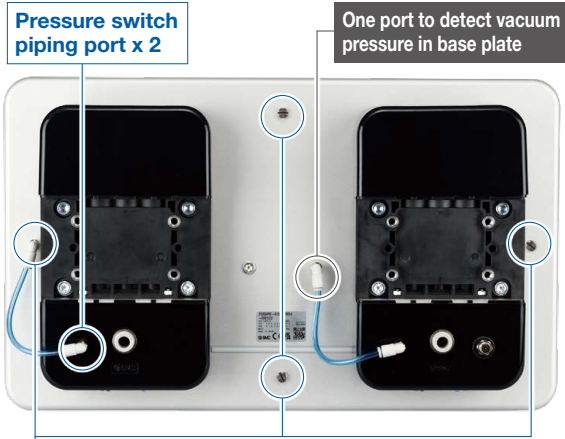
Flow Rate Characteristics Comparison



*1 The flow rate characteristics for the single ejector unit when the ejector assembly is 4 pcs.

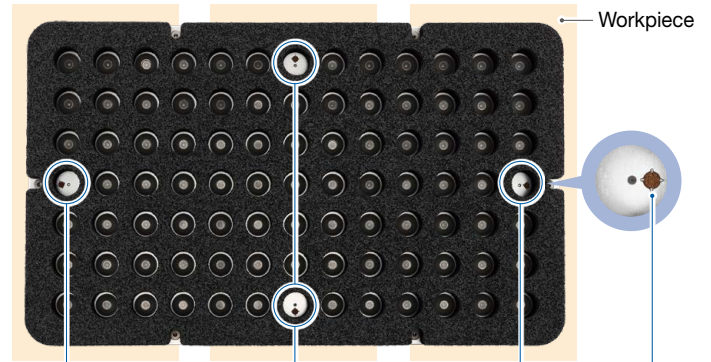
Built-in pressure switch. Pressure in a foam can be detected.

With ø4 One-touch fittings and polyurethane tubing



4 selectable ports to detect vacuum pressure in a foam hole

The pressure detection port can be selected according to the workpiece suction position. (Refer to the operation manual for the change method.)



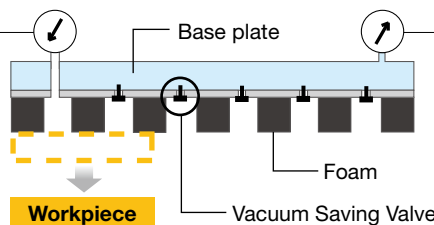
Location of the pressure detection port in of a foam hole (4 locations)

Pressure detection port in a foam hole

Usage example of the pressure detection port in a foam hole

Pressure detection port in a foam hole

Example Pressure in a foam hole: 0 kPa
Detects the workpiece drop



Pressure detection port in base plate

Example Pressure in base plate -50 kPa

When workpiece drop occurs, the vacuum saving valves are closed and the vacuum pressure in base plate increases. It may not detect the workpiece drop with pressure in base plate.

LED indicator for supply and release valve operation.



Suction Plate

■ 2 suction plates can be selected according to the workpiece size.

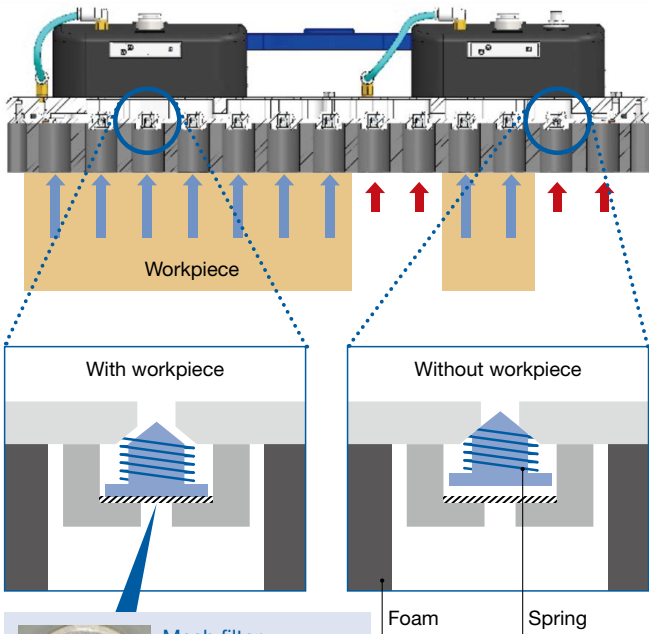
Refer to the suction plate selection guide on page 4.

Vacuum saving valve type



Significantly suppresses vacuum pressure drop when used with multiple workpieces or when workpiece is smaller than the suction plate.

➔ Various-sized workpieces can be adsorbed by 1 unit.



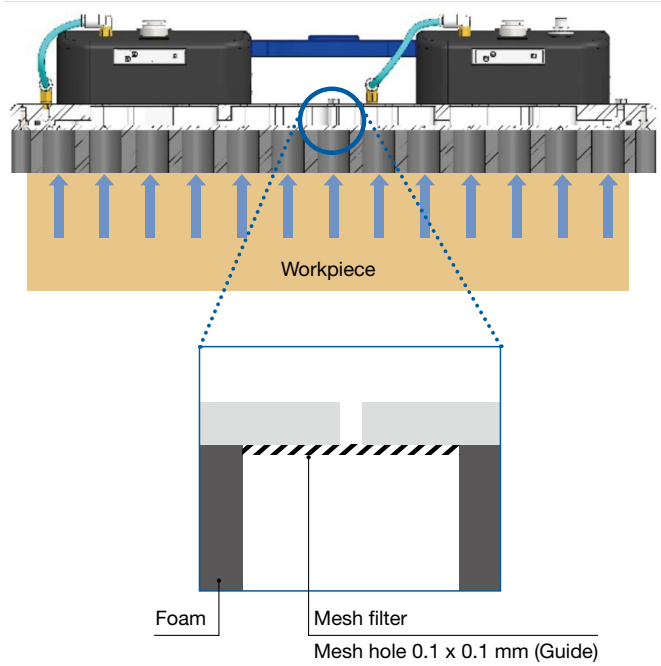
Mesh filter
Measures against dust
Mesh size $\phi 0.2$ mm
(Guide)
No restrictions on orientation during the adsorption
Vertical transfer is possible.

Fixed orifice type



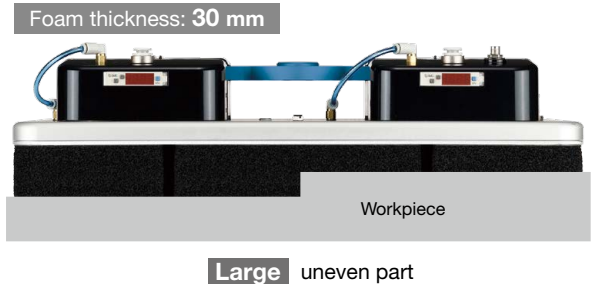
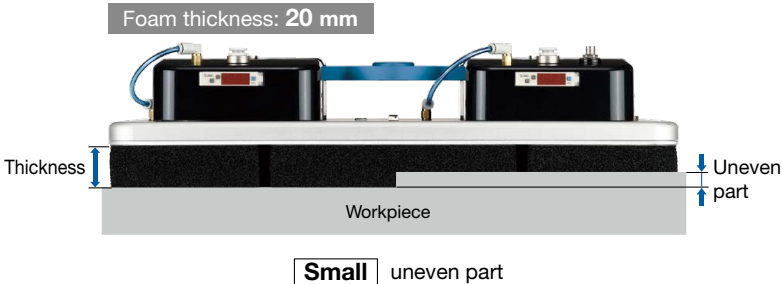
Suitable for use with workpiece that is approximately same size as suction plate

Suppresses vacuum pressure drop



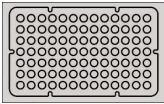
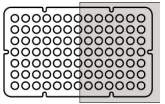
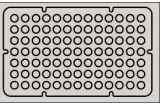
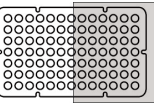
* The above illustration is only for reference and differs from the actual construction.

■ 2 foam thicknesses can be selected according to the workpiece surface shape.



Suction Plate

Suction Plate Selection Guide

Suction Plate Selection Guide			Vacuum saving valve type		Fixed orifice type		
Number of ejector assemblies	Standard supply pressure* ³ [MPa]	Suction area [%]* ⁴	100%	Approx. 50%	100%	Approx. 50%	
		Number of suction holes [pcs]	91/91	42/91	91/91	42/91	
		Workpiece: Acrylic plate					
2 pcs.	0.58	Vacuum pressure [kPa]* ¹	-75.0	-3.6	-75.0	-11.1	
		Theoretical lifting force [N]* ²	2144	48	2144	146	
		Lifting force considering safety factor [N]	Horizontal lifting (Safety factor: 4)	536	11	536	36
			Vertical lifting (Safety factor: 8)	268	5	268	18
4 pcs.	0.6	Vacuum pressure [kPa]* ¹	-75.0	-57.0	-75.0	-27.6	
		Theoretical lifting force [N]* ²	2144	752	2144	364	
		Lifting force considering safety factor [N]	Horizontal lifting (Safety factor: 4)	536	188	536	91
			Vertical lifting (Safety factor: 8)	268	94	268	45
6 pcs.	0.6	Vacuum pressure [kPa]* ¹	-75.0	-61.2	-75.0	-33.6	
		Theoretical lifting force [N]* ²	2144	808	2144	443	
		Lifting force considering safety factor [N]	Horizontal lifting (Safety factor: 4)	536	201	536	110
			Vertical lifting (Safety factor: 8)	268	100	268	55

- *1 The vacuum pressure is the actual measured value when non-leakage workpiece (acrylic plate) is suctioned at the standard supply pressure. It is not guaranteed values.
- *2 Theoretical lift force is a calculated value based on vacuum pressure and total foam hole area. It is necessary to judge the suitability for the workpiece with actual condition of use.
- *3 It is affected by air supply capacity, pipe size, air consumption of other equipment operating simultaneously, etc.
During vacuum generation, the pressure immediately before the air pressure supply (P) port of the vacuum gripper system may fall below the standard supply pressure.
- *4 Vacuum saving valve may not be activated when suction area is small.

Variations

Foam specifications				Suction plate		Number of ejector assemblies (Max. suction flow rate)	
Size	Number of holes	Thickness					
400 mm x 240 mm	91	Workpiece surface	20 mm	Workpiece size	Vacuum saving valve type	Air leakage from a workpiece	Each 1 pc. x 2 = 2 pcs. (322 L/min(ANR))
		Even		Small		Low	
		Uneven	Large	High			
		or	30 mm	or	Fixed orifice type		Each 2 pcs. x 2 = 4 pcs. (646 L/min(ANR))
		or					
							Each 3 pcs. x 2 = 6 pcs. (1022 L/min(ANR))

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Vacuum Gripper System (Foam Type)

ZGS Series



How to Order

ZGS **NP** **K** - **400240** **B** **S** **4** - **R** **M** **1** **C8**

①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩

① Compatible robot

Symbol		Robot manufacturer	Supported model	Switch output	
Identification symbol	Output type			Valve polarity	
N	P	—	General purpose	PNP	-COM
	N			NPN	+COM
011	P	UNIVERSAL ROBOTS	UR10e	PNP	-COM
012			UR16e		
			UR20		
043	P	YASKAWA Electric	MOTOMAN-HC10(S)DTP	PNP	-COM
			MOTOMAN-HC20(S)DTP		
	N		MOTOMAN-HC10(S)DTP	NPN	+COM
			MOTOMAN-HC20(S)DTP		
051	P	FANUC	CRX-10iA(L)	PNP	-COM
			CRX-20iA		
			CRX-25iA		

② Supply valve/Release valve

Symbol	Supply valve	Release valve
B	N.O.	N.C.
K	N.C.	N.C.
Nil	None	None

③ Foam size

400240	400 mm x 240 mm
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④ Foam

A	Thickness 20 mm (Number of holes: 91)
B	Thickness 30 mm (Number of holes: 91)

⑤ Suction plate

S	Vacuum saving valve type
M	Fixed orifice type

⑥ Number of ejector assemblies

2	2 pcs.
4	4 pcs.
6	6 pcs.

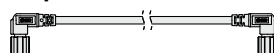
* Total number of 2 ejector units
Refer to page 6 for the flow rate characteristics.

⑦ Connector cable for compatible robot (Refer to page 11.)

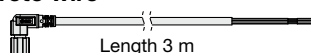
Nil	With connector cable (For compatible models)
R	With connector cable (Discrete wire)
N	Without cable

* When "Identification symbol: N" is selected in ① Compatible robot, "Nil: With cable (For compatible models)" cannot be selected.

For compatible robot



Discrete wire



⑧ Pressure switch unit specifications

Symbol	Switch unit
C	With unit switching function
M	SI unit only

* Under the New Measurement Act, switches with the unit switching function are not permitted for use in Japan.
(Only Symbol: M can be selected in Japan.)

⑨ Robot mounting flange (Refer to page 11.)

Nil	Without robot mounting flange
1	Basic type (Conforming to ISO 9409-1-50-4-M6)

⑩ Air pressure supply (P) port

C8	Metric	ø8 One-touch fitting
C10		ø10 One-touch fitting
N9	Inch	ø5/16" One-touch fitting
N11		ø3/8" One-touch fitting

Vacuum Gripper System Specifications

Number of ejector assemblies		2	4	6
Fluid		Air		
Operating pressure range [MPa]		0.3 to 0.7		
Operating temperature range [°C]		5 to 50		
Standard supply pressure [MPa]		0.58	0.6	0.6
Max. vacuum pressure [kPa]		-75		
Flow rate consumption [L/min(ANR)]		228	454	661
Suction flow rate [L/min(ANR)]	At -50 kPa	80	172	250
	Maximum*1	322	646	1022
Weight [kg]*2		3.9		
Power supply voltage [V]		24 VDC ±10%		
Power consumption [W]		2.7		
Exhaust noise [dB(A)]*3		70		
Supply valve/Release valve		Equivalent to JSY3140-5MOZ-□		
Vacuum pressure switch		Equivalent to ZSE10-00-□		

*1 The maximum suction flow rate is an estimated value based on actual measurements under our measurement conditions (not a guaranteed value)

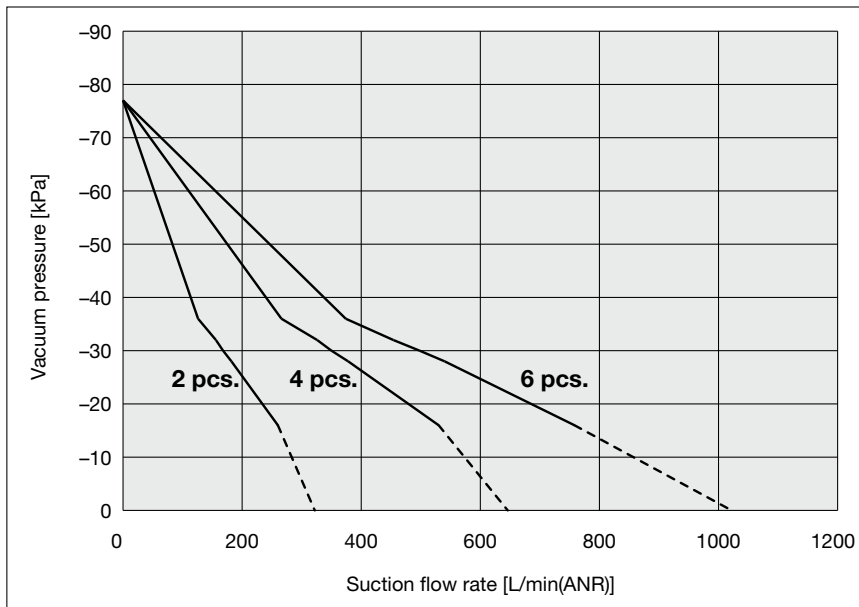
*2 For ZGSNPK-400240BS4-RM1C8

*3 Actual values under SMC's measurement conditions (Not guaranteed values)

Refer to the JSY3000 series **Web Catalog** for the specifications of the supply valve and release valve.
Refer to the ZSE10 series **Web Catalog** for pressure switch specifications.

Ejector Flow Rate Characteristics (Representative value)

* Flow rate characteristics are values at standard supply pressure.

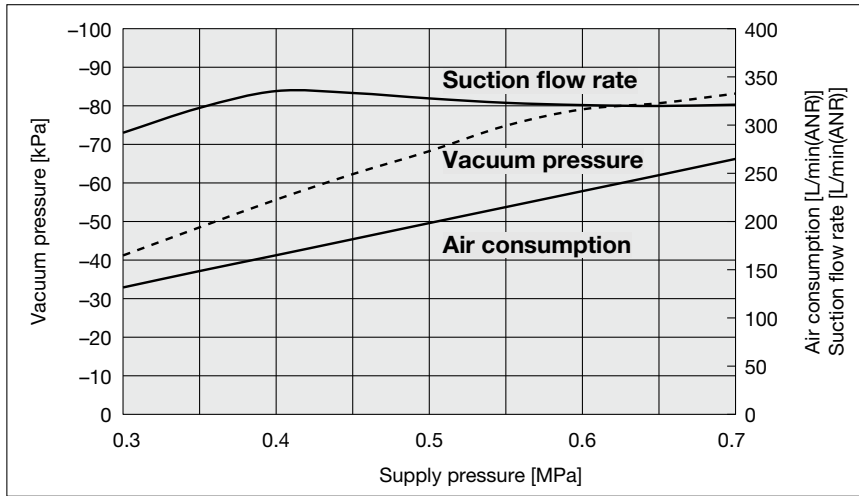


Air consumption/suction flow rate for each number of ejector assemblies

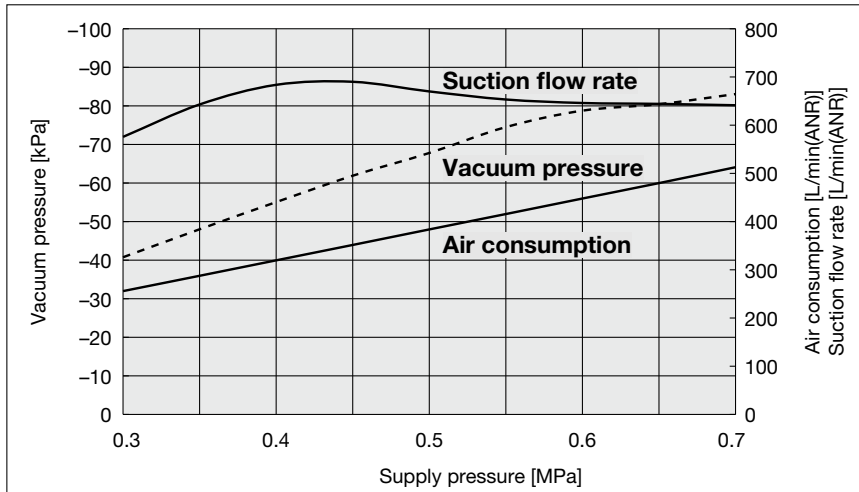
Number of ejector assemblies	Supply pressure [MPa]	Air consumption [L/min(ANR)]	Suction flow rate [L/min (ANR)] for each vacuum pressure [kPa]								Max. vacuum pressure [kPa]
			0	-10	-20	-30	-40	-50	-60	-70	
2 pcs.	0.58	228	322	286	238	168	110	80	46	22	-75
4 pcs.	0.6	454	646	574	490	350	222	172	104	54	
6 pcs.	0.6	661	1022	864	706	498	338	250	144	66	

Ejector Exhaust Characteristics (Representative value)

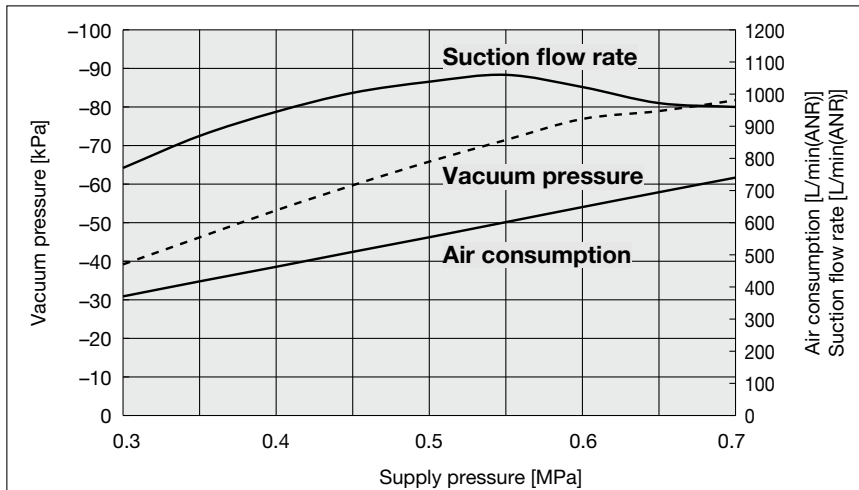
Number of ejector assemblies: 2



Number of ejector assemblies: 4

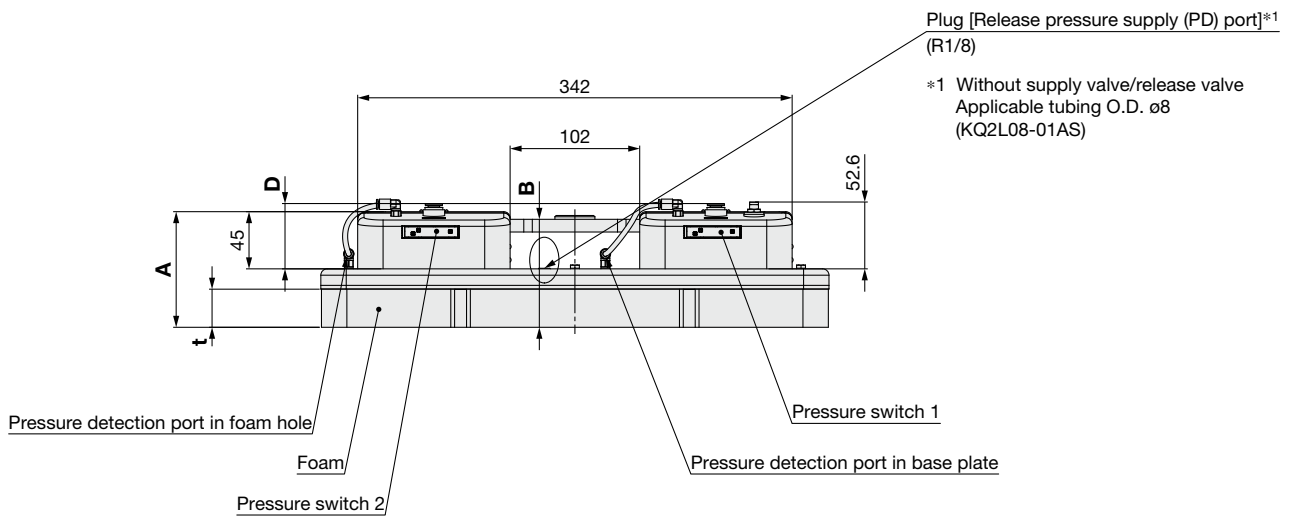
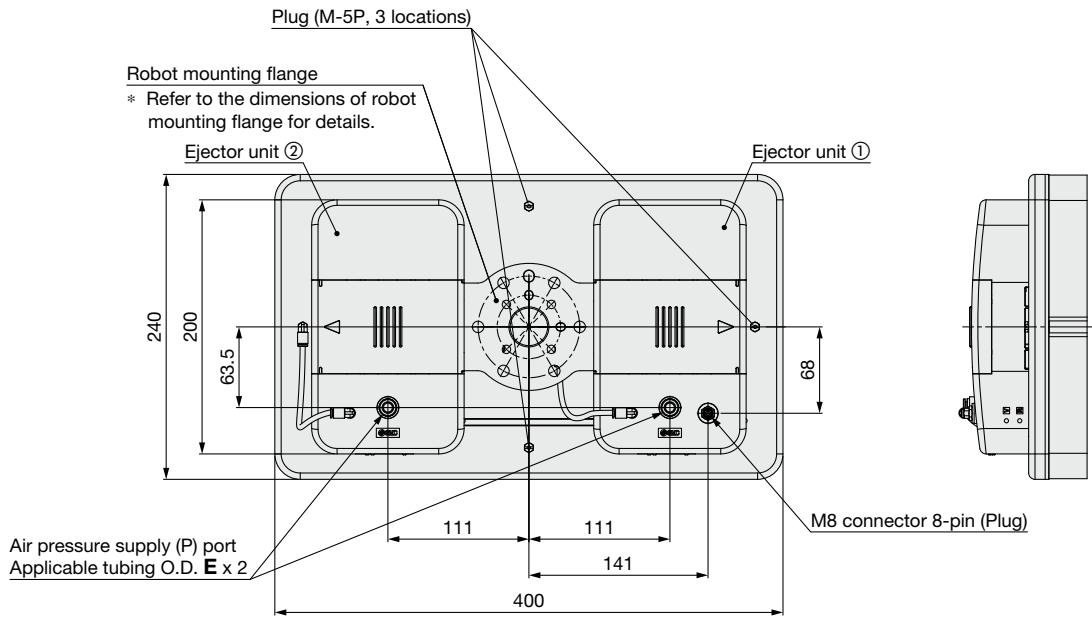


Number of ejector assemblies: 6



Dimensions

Robot mounting flange: Basic type



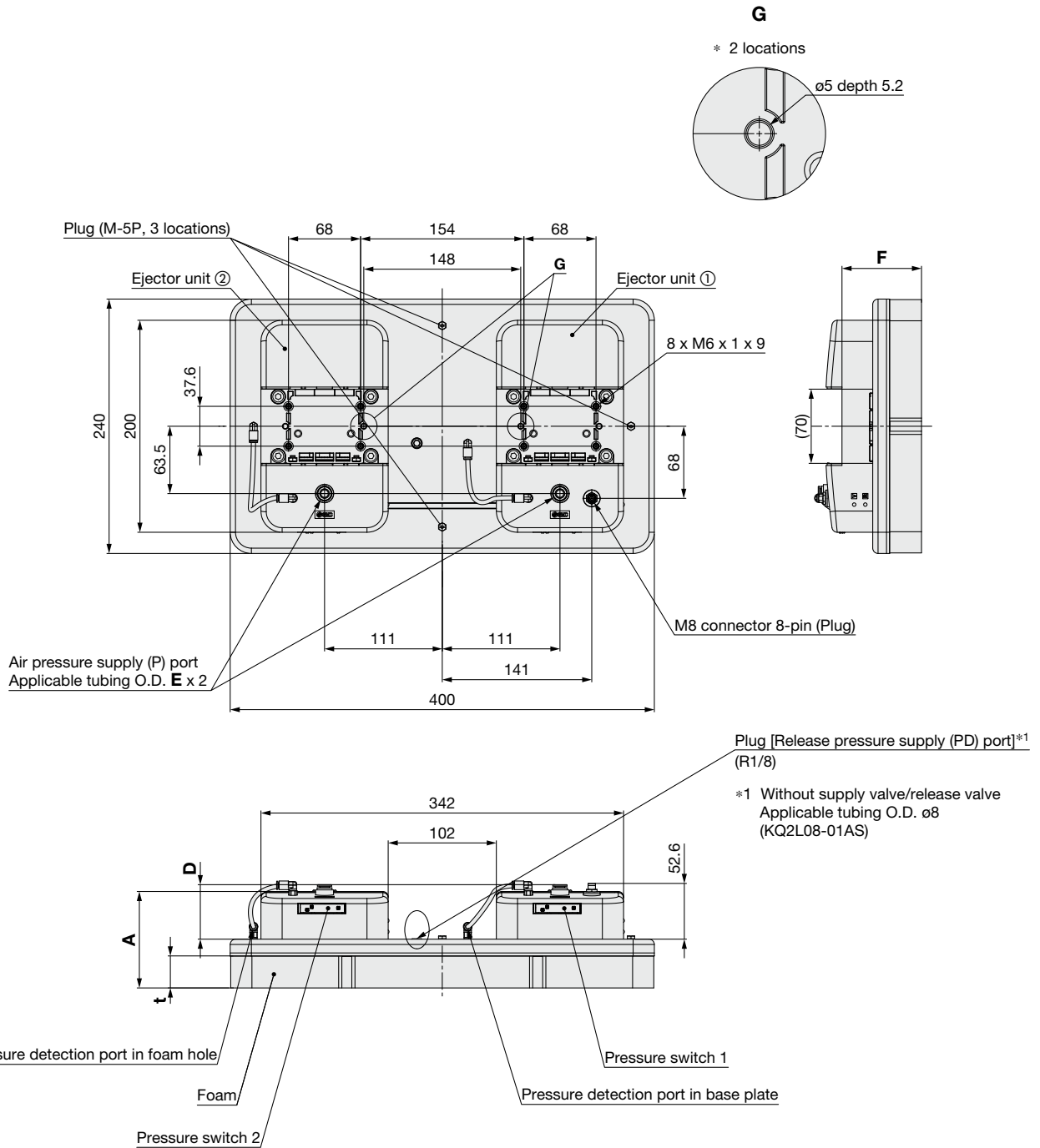
Part no.	t	A	B
ZGS□□-400240A□□□-□□□□	20	81	75
ZGS□□-400240B□□□-□□□□	30	91	85

Part no.	D	E
ZGS□□-400240□□□□-□□□□C8	51.4	$\phi 8$
ZGS□□-400240□□□□-□□□□C10	52	$\phi 10$
ZGS□□-400240□□□□-□□□□N9	51.4	$\phi 5/16"$
ZGS□□-400240□□□□-□□□□N11	51.9	$\phi 3/8"$

ZGS Series

Dimensions

Without robot mounting flange

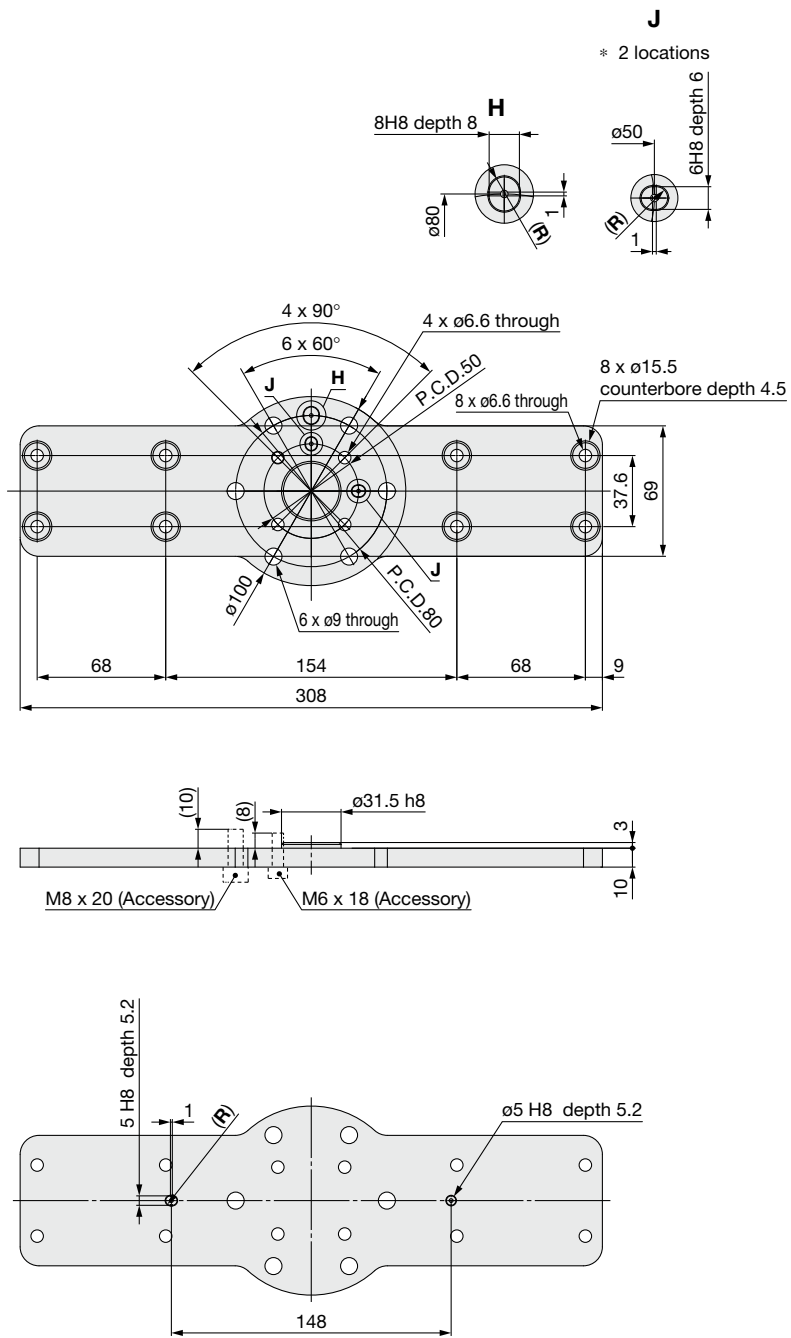


Part no.	t	A	F
ZGS□□-400240A□□-□□□□	20	81	65
ZGS□□-400240B□□-□□□□	30	91	75

Part no.	D	E
ZGS□□-400240□□□-□□□C8	51.4	ø8
ZGS□□-400240□□□-□□□C10	52	ø10
ZGS□□-400240□□□-□□□N9	51.4	ø5/16"
ZGS□□-400240□□□-□□□N11	51.9	ø3/8"

Dimensions

Robot mounting flange



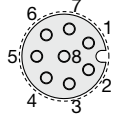
ZGS Series

Options

Connector cable for compatible robot

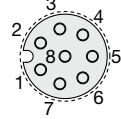
RMH-A00-11-A
Compatible robot:
For 011P, 043(P/N), 051P

A (Pin no.) (5 : 1)



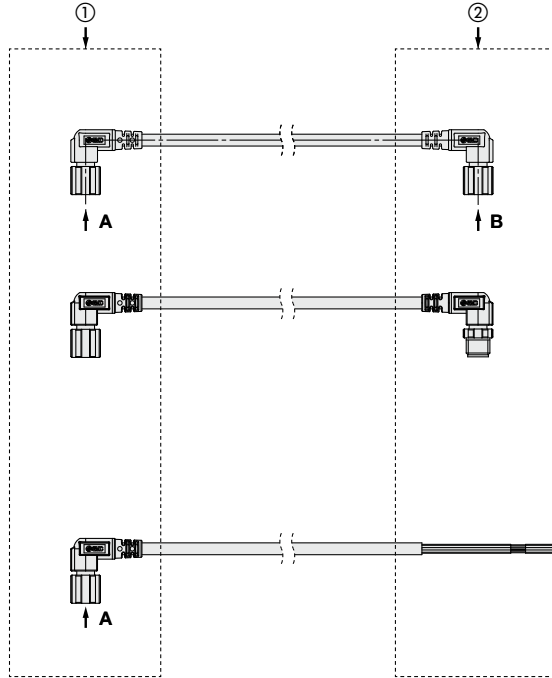
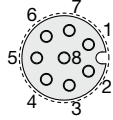
RMH-A00-11-B
Compatible robot:
For 012P

B (Pin no.) (5 : 1)



RMH-A00-18A

A (Pin no.) (5 : 1)



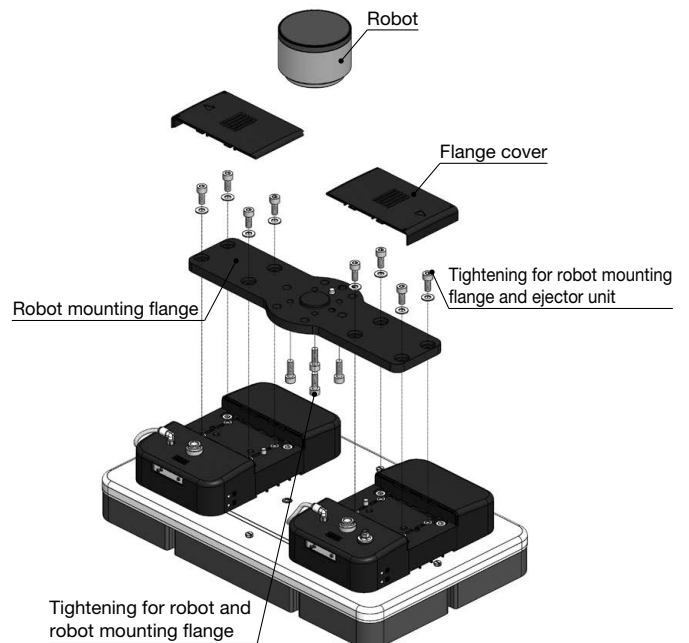
Robot manufacturer	① Vacuum gripper system side	② Robot side	Part no.
UNIVERSAL ROBOTS	M8 8-pin connector (Socket)	M8 8-pin connector (Socket)	RMH-A00-11-A
YASKAWA Electric		M8 8-pin connector (Plug)	RMH-A00-11-B
FANUC	M8 8-pin connector (Socket)	M8 8-pin connector (Socket)	RMH-A00-11-A
—		Discrete wire	RMH-A00-18A

Robot mounting flange

Robot mounting flange	Part no.
Basic type (Conforming to ISO 9409-1-50-4-M6)	ZGS-PL3-1-A

Accessories

Description	Quantity	Note
Flange cover	2	—
Parallel pin (ø6 x 10)	1	Tightening for robot and robot flange
Hexagon socket head cap screw (M6 x 18)	4	
Parallel pin (ø8 x 15)	1	—
Hexagon socket head cap screw (M8 x 20)	6	—
Parallel pin (ø5 x 10)	2	Tightening for robot flange and ejector unit
Hexagon socket head cap screw (M6 x 14)	8	
Flat washer (M6)	8	—





ZGS Series

Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For vacuum equipment precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website.

Handling

Warning

When the foam comes into contact with a workpiece, do not put a finger between the foam and the workpiece; it can be caught during suction.

Caution

- 1. Strictly observe the precautions on vacuum equipment and safety when using the product.**
Take safety measures so that any accident, such as the dropping of a workpiece, does not occur during adsorption transfer.
- 2. Use the product within the specification range.**
Use exceeding the voltage may result in serious damage due to reduced product performance.
- 3. Exhaust air is released from the opening in the product.**
Therefore, this exhaust air opening must not be blocked or restricted.
- 4. Before suction, press the foam onto the workpiece so that the foam adapts to the unevenness of the workpiece surface in order to avoid the suction failure.**
It is recommended that the foam is compressed to approximately 50% of its original thickness.
- 5. Do not pressurize the product with the ejector cover removed; ejector assembly may jump out.**

Environment

Warning

This product is not designed to be explosion proof, dustproof, or drip proof.

Do not use in an environment where flammable gas or explosive gas is present.

Caution

If liquids such as water, oil, or chemicals are adsorbed, it may accumulate inside the product causing damage and reducing the performance. Therefore, this product cannot be used in an environment where liquids such as water, oil content, or chemicals are present.

In addition, if the product adsorbs a workpiece that is adhered to such liquids, it will reduce the product life and require early maintenance. Do not use the product in a place where static electricity is a problem. Otherwise, failure or malfunction of the system can result.

Design

Warning

Design the equipment with safety in mind, taking into account a vacuum pressure drop caused by a power or air supply failure.

Provide preventive measures against the fall of workpieces where this may cause danger.

Maintenance


Warning


Perform maintenance inspection according to the procedures indicated in the operation manual.


If handled improperly, malfunction or damage of the product may occur.

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

 **Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.

Use in non-manufacturing industries is not covered.

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.

SMC Corporation