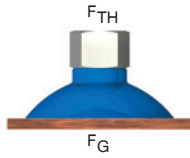


# COMPLETE PROGRAM IN OVERVIEW



## SUCTION CUPS RANGE

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## SUCTION CUPS

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## ADAPTERS

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## ADAPTERS + COMPENSA- TION MODULES

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## COMPENSATION MOD- ULES

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## VACUUM GENERATORS

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## SENSING UNITS

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## HANDLING COMPONENTS

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## MCS MODULAR CON- STRUCTION SYSTEM

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## ACCESORIES

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# SUCTION CUPS RANGE

## SELECT THE RIGHT SUCTION CUPS

CALCULATIONS FOR THE EXAMPLE ARE CARRIED OUT BY FOLLOWING DATA:



■ Suction Plate round

### Work piece

Material: Steel sheet stacked  
 Surface: smooth, plane, dry  
 Dimensions: Length max. 3000 mm  
 Width max. 1000 mm  
 Thickness max. 2.0 mm  
 Weight approx. 47 kg

### Handling system

Implemented system: Portal converter  
 Present compressed-air: 8 bar  
 Control voltage: 24 V DC  
 Process flow: Implement horizontal-horizontal  
 Maximum acceleration: X-, Y-Axis: 5 m/s<sup>2</sup>  
 Z-Axis: 5 m/s<sup>2</sup>  
 Cycle time: 30 s  
 Required time: for suction: <1 s  
 for depositing: <1 s



■ Torus Vacuum Cup

### How much does your work piece weigh?

► For further calculations, it is significant to know which weight [m] your work piece has. You can calculate this by means of following formula:

L = Length [m]  
 B = Width [m]  
 H = Height [m]  
 p = Density [kg/m<sup>3</sup>]

**Mass m [kg]:  $m = L \times B \times H \times p$**

Example:  $m = 3.0 \times 1.0 \times 0.0020 \times 7850$   
 $m = 47.1 \text{ kg}$

### How much load can the vacuum gripper carry?

- ▶ For calculating the holding force we need the weight. Additionally, the vacuum grippers have to apply acceleration forces which must not be neglected in a fully automatic system. To simplify the calculation three important and most frequent existing load cases are represented and described.

### Significant

In the following simplified diagram about load cases I, II, III, the most unfavourable load case with the highest theoretical holding force has to be used or further calculations.



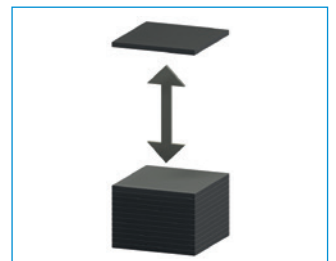
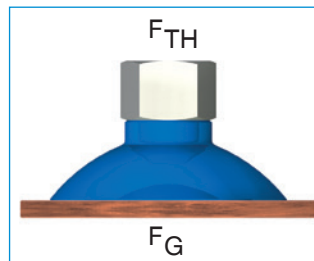
■ Bellows Cup oval

### LOAD CASE I - VACUUM GRIPPER HORIZONTAL, FORCE VERTICAL

- FTH = theoretical holding force [N]
- m = mass [kg]
- g = Gravitational acceleration [9.81 m/s<sup>2</sup>]
- a = Acceleration [m/s<sup>2</sup>] of the plant (Emergency stop!)
- s = Security (minimum value 1.5-fold security, for critical, inhomogeneous or porous material or rough surface 2.0)

$$FTH = m \times (g + a) \times S$$

Example:  $FTH = 47.1 \times (9.81 + 5) \times 1.5$   
 $FTH = 1046 \text{ N}$



Vacuum grippers are horizontally on the top of the work piece which can be lifted.

# SUCTION CUPS RANGE

## SELECT THE RIGHT SUCTION CUPS



■ Suction Plate oval

### LOAD CASE II- VACUUM GRIPPER HORIZONTAL, FORCE HORIZONTAL

- FTH = theoretical holding force [N]
- m = mass [kg]
- g = Gravitational acceleration [9.81 m/s<sup>2</sup>]
- a = Acceleration [m/s<sup>2</sup>] of the plant (Emergency stop!)
- μ = Friction coefficient = 0.1 for oily surfaces
  - = 0.2 ... 0.3 for wet surfaces
  - = 0.5 for wood, metal, glass, stone, ...
  - = 0.6 for rough surfaces

Attention! The indicated friction coefficients are averaged values and have to be checked for each work piece!

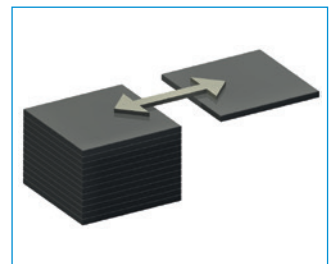
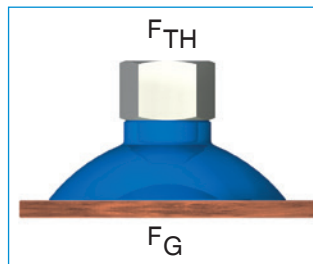
- s = Security (minimum value 1.5-fold security, for critical, inhomogeneous or porous material or rough surface 2.0)



■ Vacuum Cups

$$FTH = m \times (g + a / \mu) \times S$$

Example:  $FTH = 47.1 \times (9.81 + 5 / 0.5) \times 1.5$   
 $FTH = 1400 \text{ N}$



Vacuum grippers are fitted horizontally on a work piece which should be side-moved.

### LOAD CASE III - VACUUM GRIPPER VERTICAL, FORCE VERTICAL

- FTH = theoretical holding force [N]
- m = mass [kg]
- g = Gravitational acceleration [9.81 m/s<sup>2</sup>]
- a = Acceleration [m/s<sup>2</sup>] of the plant (Emergency stop!)
- μ = Friction coefficient = 0.1 for oily surfaces
  - = 0.2 ... 0.3 for wet surfaces
  - = 0.5 for wood, metal, glass, stone, ...
  - = 0.6 for rough surfaces

Attention! The indicated friction coefficients are averaged values and have to be checked for each work piece!

- s = Security (minimum value 2.0-fold security, for critical, inhomogeneous or porous work pieces or rough surfaces 2.0 also higher)

According to the task of the sample calculation, the load case III shouldn't be considered. Metal sheets should only be used horizontally lying.

#### Comparison:

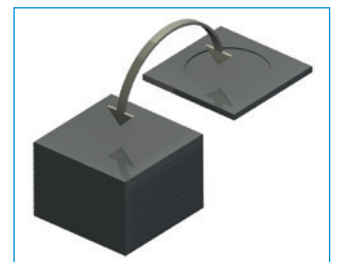
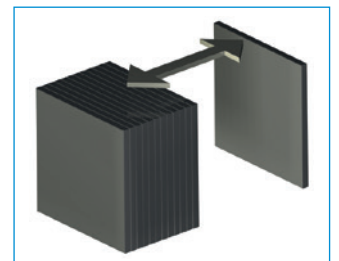
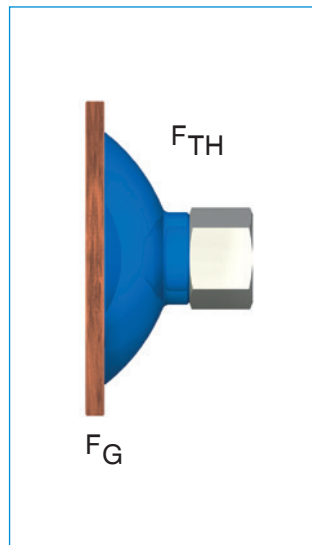
The results of load cases I and II are compared and a maximum value is yielded. Value for FTH = 1400 N from load case II.



■ Knobbed Vacuum Cups

$$F_{TH} = (m / \mu) \times (g + a) \times S$$

Example:  $F_{TH} = (47.1 / 0.5) \times (9.8 + 5) \times 2$   
 $F_{TH} = 2790 \text{ N}$



Vacuum grippers are fitted vertically or horizontally on a work piece which should be moved vertically respectively rotated

# SUCTION CUPS














## OVERVIEW OF SERIES

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1



## ▶ SUCTION CUPS

	Material overview	14
	Fixing types	15
	Series SM - Vacuum Cups	16
	Series HS - Hand-held Vacuum	16
	Series SGF - Vacuum Cups	17
	Series NS - Knobbed Vacuum Cups	18
	Series SFK - Bellows Cup	19
	Series SF - Bellows Cup	20
	Series SFO - Bellows Cup oval	21
	Series OV - Suction cups oval	22
	Series SR/SK - Torus vacuum cup	23
	Series SPO - Suction plate oval	24
	Series SP - Suction plate	25

# SUCTION CUPS

## MATERIAL OVERVIEW

Due to the property table, various suction cups materials can be selected with regard to the customer-specific application. For simplification: features of the material are referred to frequent occurring requirements and are marked according to its suitability.

Abbreviation	▶ Suction cup material					
	NBR	NBR-AS	SI	SI tempered	SI-AS	TPU
Usual name	Nitrile rubber		Caoutchouc silicone			Polyurethan
Resistance to wear	2	2	3	3	3	1
Resistance to oil and grease	1	1	3	3	3	2
Resistance to weathering and ozone	3	3	1	1	1	2
Resistance to fuel	2	2	4	4	4	2
Resistance to Alcohol	1	3	1	2	3	1
Resistance to solvents	3	3	3	3	3	4
Suitability for food use	4	4	2	1	3	4
Low tendency to mark	4	4	1	1	1	2
Specific resistance [ $\Omega \times \text{cm}$ ]	-	$\leq 10^7$	-	-	$\leq 10^7$	-
Operating temperature [ $^{\circ}\text{C}$ ]	-20 - +110	-20 - +110	-55 - +180	-55 - +180	-20 - +150	-30 - +/-90
Shore hardness [A]	65 +/- 3	65 +/- 3	60 +/- 5	60 +/- 5	55 +/- 5	82 +/- 5
Colour / Identifier	black	black	blue	white	black	red

Abbreviation	▶ Material for round cord SP / SPO	
	EPDM	
Usual name	Foam rubber	
Resistance to wear	2	
Resistance to oil and grease	1	
Resistance to weathering and ozone	3	
Resistance to fuel	2	
Resistance to Alcohol	1	
Resistance to solvents	3	
Suitability for food use	4	
Low tendency to mark	4	
Specific resistance [ $\Omega \times \text{cm}$ ]	-	
Operating temperature [ $^{\circ}\text{C}$ ]	-30 - +80	
Shore hardness [A]	15 +/- 5	
Colour / Identifier	black	

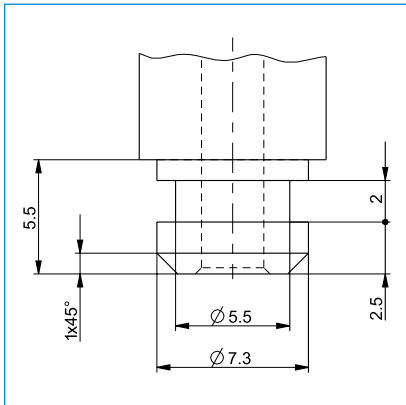
1 - very good  
2 - good  
3 - satisfactory  
4 - adequate



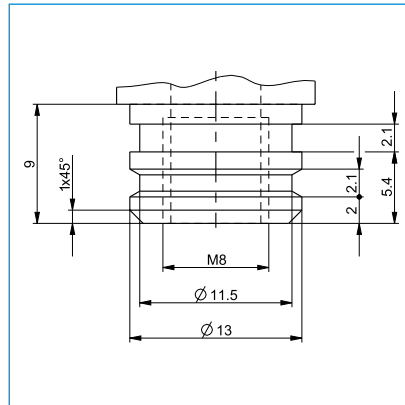
# SUCTION CUPS

## FIXING TYPES

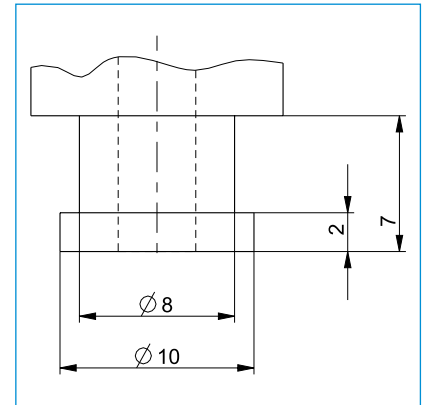
Suction Cups, Adapters and Compensation Modules with the same connection type can be variably combined. Dimensions of each connection type can be taken from drawings given below.



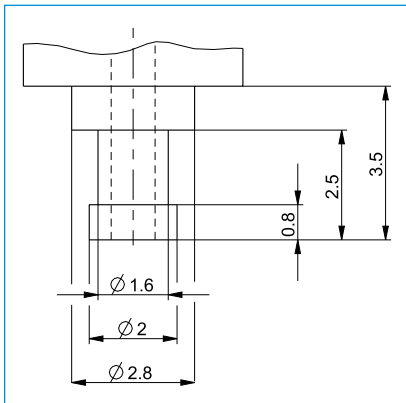
■ Fixing Types 1



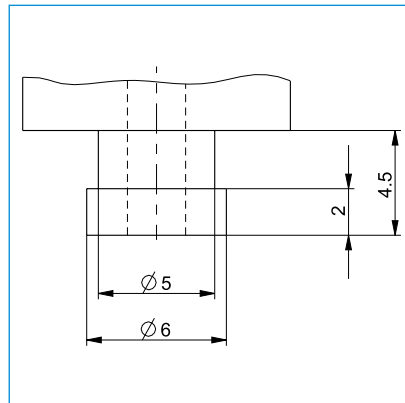
■ Fixing Types 2



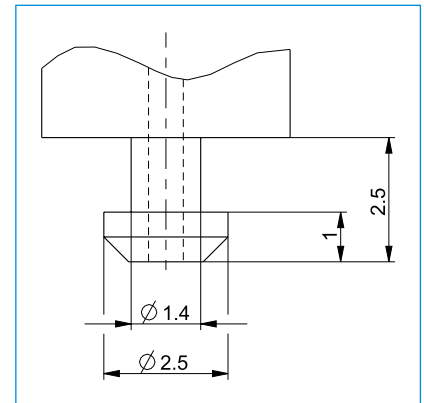
■ Fixing Types 3



■ Fixing Types 4



■ Fixing Types 5



■ Fixing Types 6

# SUCTION CUPS

## SERIES SM / HS / SGF

1

Series SM / HS / SGF / Suction cups

### ► SERIES SM - VACUUM CUPS

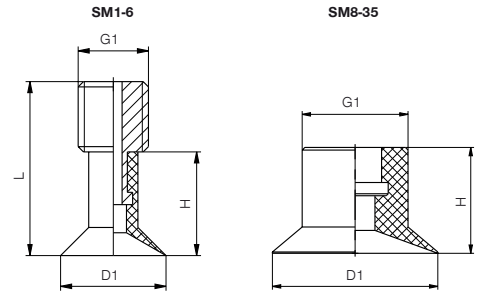


#### ► Range of applications

Flat and slightly curved surfaces

#### ► Special features

Suction diameter from 1 mm



#### ► Technical Data

Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Standard	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	-
Antistatic	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	NA (e.g. SM1NA)
Heat-resistant	Caoutchouc silicone	blue	-55° C bis +180° C	60 +/- 5	SI (e.g. SM1SI)
Food-handling	Caoutchouc silicone	white	-55° C bis +180° C	60 +/- 5	L (e.g. SM1L)
Antistatic	Caoutchouc silicone	black	-20° C bis +150° C	55 +/- 5	SA (e.g. SM1SA)
Low-wear	Polyurethan	red	-20° C bis +150° C	82 +/- 5	on request

#### ► Technical Data

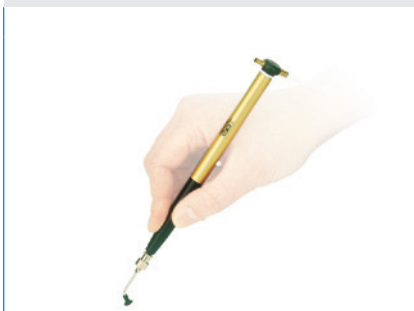
Order no.	SM1	SM2	SM3	SM4	SM5	SM6	SM8	SM10
Vacuum force theoretical [N]*	<0.1	0.3	0.6	1	1.6	2.3	4	6
Volume [cm³]	0.01	0.01	0.01	0.01	0.02	0.03	0.1	0.2
Fixing types	4/6	4/6	4/6	4/6	4/6	4/6	5	5
G1	M4	M4	M4	M4	M4	M4		
Dimension D1 [mm]	1	2	3	4	5	6	8	10
Dimension D2 [mm]							10	10
Dimension H [mm]	6	6	6	6	6	6	10	10
Dimension L [mm]		10	10	10	10	10		

#### ► Technical Data

Order no.	SM12	SM15	SM18	SM20	SM25	SM30	SM35
Vacuum force theoretical [N]*	9	14	20	25	39	57	77
Volume [cm³]	0.2	0.4	0.5	0.6	1.3	1.8	2.6
Fixing types	5	1	1	1	3	3	3
G1							
Dimension D1 [mm]	12	15	18	20	25	30	35
Dimension D2 [mm]	10	12	12	12	16	16	16
Dimension H [mm]	10	12.5	12.5	12.5	16	16	16
Dimension L [mm]							

\*at 0.8 bar Vacuum

### ► SERIES HS - HAND-HELD VACUUM



#### ► Special features

Integrated ventur nozzle as vacuum generator, vacuum can be applied or removed by hand

Possible to combine with suction cups SM1 bis SM6

#### ► Technical Data

Order no.	HS10
Air consumption per min. [l norm]	13

► **SERIES SGF - VACUUM CUPS**

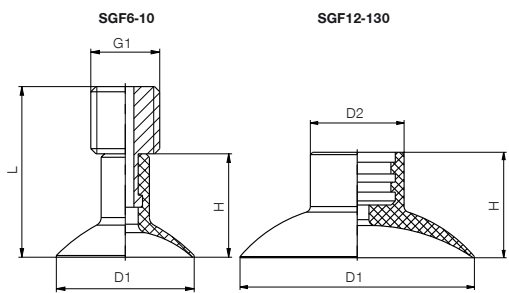


► **Range of applications**

Flat and slightly curved surfaces

► **Special features**

Suction diameter from 6 mm



► **Technical Data**

Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Standard	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	-
Antistatic	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	NA (e.g. SGF6NA)
Heat-resistant	Caoutchouc silicone	blue	-55° C bis +180° C	60 +/- 5	SI (e.g. SGF6SI)
Food-handling	Caoutchouc silicone	white	-55° C bis +180° C	60 +/- 5	L (e.g. SGF6L)
Antistatic	Caoutchouc silicone	black	-20° C bis +150° C	55 +/- 5	SA (e.g. SGF6SA)
Low-wear	Polyurethan	red	-20° C bis +150° C	82 +/- 5	on request

► **Technical Data**

Order no.	SGF6	SGF8	SGF10	SGF12	SGF15	SGF18	SGF22
Vacuum force theoretical [N]*	2	4	6	9	13	19	29
Volume [cm³]	0.02	0.05	0.07	0.3	0.4	0.6	1.0
Fixing types	4/6	4/6	4/6	1	1	1	1
G1	M4	M4	M4				
Dimension D1 [mm]	6	8	10	12	15	18	22
Dimension D2 [mm]				10	10	10	10
Dimension H [mm]	6	6	6	11	11	12	12
Dimension L [mm]	10	10	10				

► **Technical Data**

Order no.	SGF25	SGF30	SGF35	SGF40	SGF60	SGF85	SGF130
Vacuum force theoretical [N]*	38	55	75	99	217	441	1042
Volume [cm³]	2	2.5	3.2	4.8	9.5	30	89
Fixing types	2	2	2	2	2	2	2
G1							
Dimension D1 [mm]	25	30	35	40	60	85	130
Dimension D2 [mm]	16	16	16	16	16	24.5	24.5
Dimension H [mm]	15	15	15	18	23	28	35
Dimension L [mm]							

\*at 0.8 bar Vacuum

# SUCTION CUPS

## SERIES NS / SFK

1

Series NS / SFK / Suction cups

### ► SERIES NS - KNOBBED VACUUM CUPS



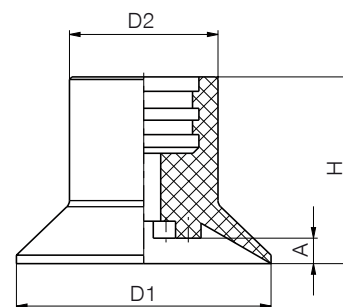
#### ► Range of applications

Flat and unstable surfaces

#### ► Special features

Knobs prevent thin material being sucked in

High stability



► Technical Data	
Versions	Material Color Heat Resistant Shore hardness Add to part no.
Standard	Nitrile rubber black -20° C - +110° C 65 +/- 3 -
Antistatic	Nitrile rubber black -20° C - +110° C 65 +/- 3 NA (e.g. NS10NA)
Heat-resistant	Caoutchouc silicone blue -55° C bis +180° C 60 +/- 5 SI (e.g. NS10SI)
Food-handling	Caoutchouc silicone white -55° C bis +180° C 60 +/- 5 L (e.g. NS10L)
Antistatic	Caoutchouc silicone black -20° C bis +150° C 55 +/- 5 SA (e.g. NS10SA)
Low-wear	Polyurethan red -20° C bis +150° C 82 +/- 5 on request

Order no.	► Technical Data					
	NS10	NS15	NS18	NS24	NS30	NS40
Vacuum force theoretical [N]*	6	14	20	36	57	101
Volume [cm³]	0.3	0.4	0.5	2.2	3	5.2
Fixing types	1	1	1	2	2	2
Dimension A [mm]	1	1.5	0.8	3.5	3	3.5
Dimension D1 [mm]	10	15	18	24	30	40
Dimension D2 [mm]	10	10	10	16	17.5	18
Dimension H [mm]	12	12	12	22	22	22

Order no.	► Technical Data				
	NS50	NS60	NS70	NS85	NS100
Vacuum force theoretical [N]*	157	226	3.8	454	628
Volume [cm³]	8.4	12	20.5	30	41
Fixing types	2	2	2	2	2
Dimension A [mm]	3.5	3.5	3.5	3.5	3.5
Dimension D1 [mm]	50	60	70	85	100
Dimension D2 [mm]	19	19	19	19	19
Dimension H [mm]	22	22	22	22	22

\*at 0.8 bar Vacuum

► **SERIES SFK - BELLOWS CUP**



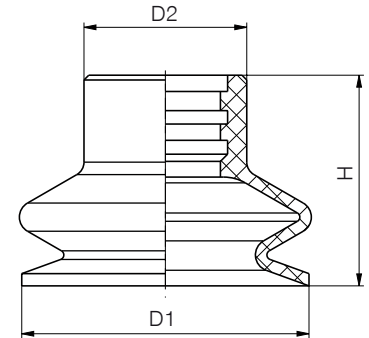
► **Range of applications**

Slightly curved, inclined and uneven surfaces

► **Special features**

Compensates differences in height

The suction process creates a lifting effect



Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Standard	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	-
Antistatic	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	NA (e.g. SFK24NA)
Heat-resistant	Caoutchouc silicone	blue	-55° C bis +180° C	60 +/- 5	SI (e.g. SFK24SI)
Food-handling	Caoutchouc silicone	white	-55° C bis +180° C	60 +/- 5	L (e.g. SFK24L)
Antistatic	Caoutchouc silicone	black	-20° C bis +150° C	55 +/- 5	SA (e.g. SFK24SA)
Low-wear	Polyurethan	red	-20° C bis +150° C	82 +/- 5	on request

Order no.	► Technical Data		
	SFK24	SFK30	SFK40
Vacuum force theoretical [N]*	36	57	101
Lifting force [N]	11	14.5	28
Volume [cm³]	3.8	5.8	10.4
Fixing types	2	2	2
Dimension D1 [mm]	24	30	40
Dimension D2 [mm]	17	17	17
Dimension H min. [mm]	13	15	20
Dimension H max. [mm]	19	22	27

\*at 0.8 bar Vacuum

# SUCTION CUPS

## SERIES SF / SFO

1

### ► SERIES SF - BELLOWS CUP



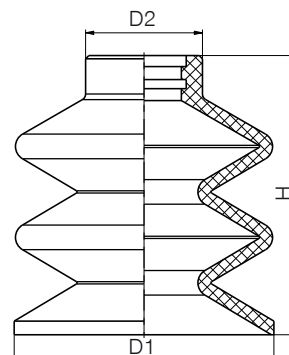
#### ► Range of applications

Slightly curved, inclined and uneven surfaces

#### ► Special features

Compensates differences in height

The suction process creates a lifting effect



#### ► Technical Data

Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Standard	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	-
Antistatic	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	NA (e.g. SF10NA)
Heat-resistant	Caoutchouc silicone	blue	-55° C bis +180° C	60 +/- 5	SI (e.g. SF10SI)
Food-handling	Caoutchouc silicone	white	-55° C bis +180° C	60 +/- 5	L (e.g. SF10L)
Antistatic	Caoutchouc silicone	black	-20° C bis +150° C	55 +/- 5	SA (e.g. SF10SA)
Low-wear	Polyurethan	red	-20° C bis +150° C	82 +/- 5	on request

#### ► Technical Data

Order no.	SF10	SF15	SF18	SF24	SF30	SF40
Vacuum force theoretical [N]*	6	12	20	35	55	97
Lifting force [N]	2.2	4	6	9.5	13	25
Volume [cm <sup>3</sup> ]	0.5	1.1	1.8	4.5	8.9	19.5
Fixing types	1	1	1	2	2	2
Dimension D1 [mm]	10	15	18	24	30	40
Dimension D2 [mm]	10	10.2	12	16.5	17	18
Dimension H min. [mm]	10	10	11	18	22	27
Dimension H max. [mm]	14	15.5	18.7	26	35	43

#### ► Technical Data

Order no.	SF50	SF60	SF85
Vacuum force theoretical [N]*	157	225	443
Lifting force [N]	42	54	90
Volume [cm <sup>3</sup> ]	32	62	166
Fixing types	2	2	2
Dimension D1 [mm]	50	60	85
Dimension D2 [mm]	20	20	24.5
Dimension H min. [mm]	30	35	50
Dimension H max. [mm]	48	58	76

\*at 0.8 bar Vacuum

**► SERIES SFO - BELLOWS CUP OVAL**



**► Range of applications**

Long, narrow and slightly uneven surfaces

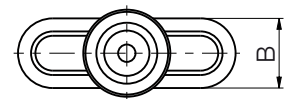
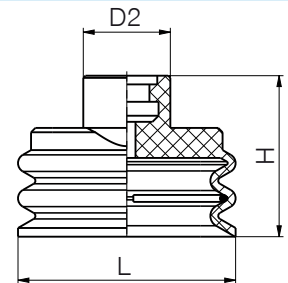
**► Special features**

Compensates differences in height

The suction process creates a lifting effect

Ear clamp to prevent rotation, supplied with product

Internal stainless steel spring to stabilize and maintain shape of suction cup



**► Technical Data**

Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Standard	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	-
Antistatic	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	NA (e.g. SFO8-25NA)
Heat-resistant	Caoutchouc silicone	blue	-55° C bis +180° C	60 +/- 5	SI (e.g. SFO8-25SI)
Food-handling	Caoutchouc silicone	white	-55° C bis +180° C	60 +/- 5	L (e.g. SFO8-25L)
Antistatic	Caoutchouc silicone	black	-20° C bis +150° C	55 +/- 5	SA (e.g. SFO8-25SA)
Low-wear	Polyurethan	red	-20° C bis +150° C	82 +/- 5	on request

**► Technical Data**

Order no.	SFO8-25	SFO15-45	SFO25-75
Vacuum force theoretical [N]*	15	49	139
Lifting force [N]	3.5	10	35
Volume [cm³]	0.9	6.1	20.4
Fixing types	1	2	2
Dimension B [mm]	8	15	25
Dimension D2 [mm]	10	17.5	17.5
Dimension H min. [mm]	14.5	19	22
Dimension H max. [mm]	18.5	28.5	34.5
Dimension L min. [mm]	25	45	75

\*at 0.8 bar Vacuum

# SUCTION CUPS

## SERIES OV / SR/SK

1

### ► SERIES OV - SUCTION CUPS OVAL



#### ► Range of applications

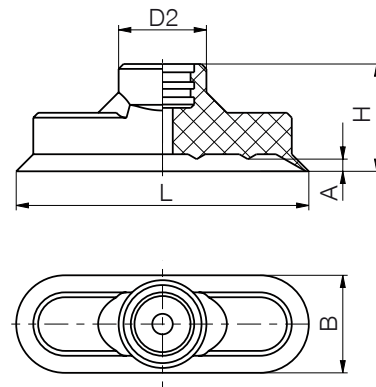
Long, narrow and slightly uneven surfaces

#### ► Special features

Depending on type, metallic base plate

Flexible seal lips

Ear clamp to prevent rotation, supplied with product



#### ► Technical Data

Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Standard	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	-
Antistatic	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	NA (e.g. OV3x10NA)
Heat-resistant	Caoutchouc silicone	blue	-55° C bis +180° C	60 +/- 5	SI (e.g. OV3x10SI)
Food-handling	Caoutchouc silicone	white	-55° C bis +180° C	60 +/- 5	L (e.g. OV3x10L)
Antistatic	Caoutchouc silicone	black	-20° C bis +150° C	55 +/- 5	SA (e.g. OV3x10SA)
Low-wear	Polyurethan	red	-20° C bis +150° C	82 +/- 5	on request

#### ► Technical Data

Order no.	OV3-10	OV5-15	OV6-18	OV8-24	OV10-30	OV12-36
Vacuum force theoretical [N]*	2	5	6	12	16	29
Volume [cm³]	0.2	0.2	0.3	0.4	0.6	0.8
Fixing types	1	1	1	1	1	1
Dimension A [mm]	0.4	0.6	1	1.6	1.2	1
Dimension B [mm]	3	5	6	8	10	12
Dimension D2 [mm]	9.5	8.5	8.5	12.3	12	12.5
Dimension H [mm]	12	12	12	12	12	12
Dimension L [mm]	10	15	18	24	30	36

#### ► Technical Data

Order no.	OV15-45	OV20-60	OV25-75	OV28-85	OV35-100
Vacuum force theoretical [N]*	45	82	125	161	240
Volume [cm³]	2.3	3.4	5.6	8.1	11.8
Fixing types	2	2	2	2	2
Dimension A [mm]	2	2.5	3	3	3
Dimension B [mm]	15	20	25	28	35
Dimension D2 [mm]	16.5	18	18	18	19
Dimension H [mm]	22	22	22	22	22
Dimension L [mm]	45	60	75	85	100

\*at 0.8 bar Vacuum



**► SERIES SR/SK - TORUS VACUUM CUP**



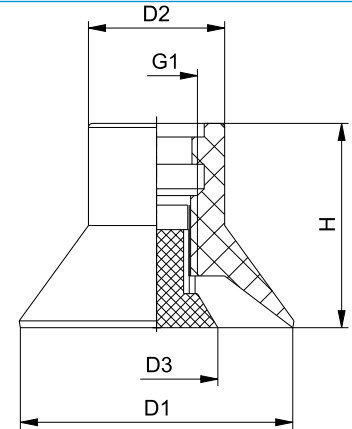
**► Range of applications**

Even, slightly curved and open surfaces

**► Special features**

Inner core allows suction to act on perforated surfaces

Recommended perforation diameter max. 70% of inner core



**► Technical Data**

Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Standard	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	-
Antistatic	Nitrile rubber	black	-20° C - +110° C	65 +/- 3	NA (e.g. SR12NA+SK6NA)
Heat-resistant	Caoutchouc silicone	blue	-55° C bis +180° C	60 +/- 5	SI (e.g. SR12SI+SK6SI)
Food-handling	Caoutchouc silicone	white	-55° C bis +180° C	60 +/- 5	L (e.g. SR12L+SK6L)
Antistatic	Caoutchouc silicone	black	-20° C bis +150° C	55 +/- 5	SA (e.g. SR12SA+SK6SA)
Low-wear	Polyurethan	red	-20° C bis +150° C	82 +/- 5	on request

**► Technical Data**

Order no.	SR12+SK6	SR12+SK9	SR15+SK6	SR15+SK9	SR20+SK6	SR20+SK9	SR20+SK13
Vacuum force theoretical [N]*	7	4	12	9	23	20	15
Volume [cm³]	3	2.6	4.6	4.2	7.7	7.2	5.9
Fixing types	1	1	1	1	1	1	1
G1	M6	M6	M6	M6	M6	M6	M6
Dimension D1 [mm]	12	12	15	15	20	20	20
Dimension D2 [mm]	10	10	10	10	10	10	10
Dimension D3 [mm]	6	9	6	9	6	9	13
Dimension H [mm]	15	15	15	15	15	15	15

**► Technical Data**

Order no.	SR25+SK11	SR25+SK19	SR30+SK11	SR30+SK19	SR35+SK11	SR35+SK19	SR35+SK25
Vacuum force theoretical [N]*	30	15	49	34	69	54	37
Volume [cm³]	19.6	16.4	24.0	20.8	34	31	25
Fixing types	2	2	2	2	2	2	2
G1	M8	M8	M8	M8	M8	M8	M8
Dimension D1 [mm]	25	25	30	30	35	35	35
Dimension D2 [mm]	18	18	19	19	19	19	19
Dimension D3 [mm]	11	19	11	19	11	19	25
Dimension H [mm]	22	22	22	22	22	22	22

**► Technical Data**

Order no.	SR40+SK11	SR40+SK19	SR40+SK25	SR50+SK11	SR50+SK19	SR50+SK25
Vacuum force theoretical [N]*	93	76	61	143	128	112
Volume [cm³]	45	41	36	71	68	63
Fixing types	2	2	2	2	2	2
G1	M8	M8	M8	M8	M8	M8
Dimension D1 [mm]	25	25	30	30	35	35
Dimension D2 [mm]	18	18	19	19	19	19
Dimension D3 [mm]	11	19	25	19	19	25
Dimension H [mm]	22	22	22	22	22	22

\*at 0.8 bar Vacuum

# SUCTION CUPS

## SERIES SPO / SP

1

Series SPO / SP / Suction cups

### ► SERIES SPO - SUCTION PLATE OVAL



#### ► Range of applications

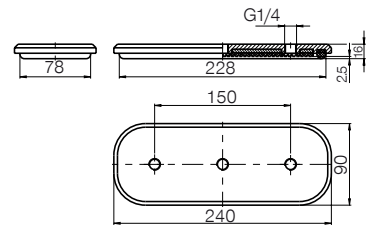
Rough, highly textured surfaces, such as corrugated metal and wood, etc...

#### ► Special features

Highly adjustable sealing face

Robust and strong with aluminium carrier plate

NBR knobbed surface to absorb lateral forces



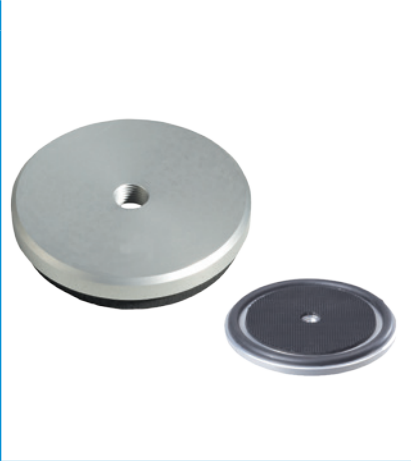
#### ► Technical Data

Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Foam rubber	EPDM	black	-30° C bis +80° C	15 +/- 5	EPDM (e.g. SPO230-80-10EPDM)

#### ► Technical Data

Order no.	SPO230-80-10EPDM
Vacuum force theoretical [N]	1318
Volume [cm³]	221

► **SERIES SP - SUCTION PLATE**



► **Range of applications**

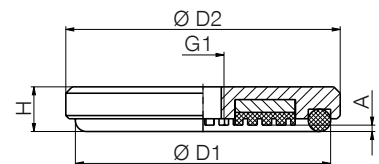
Rough, highly textured surfaces, such as corrugated metal and wood, etc...

► **Special features**

Highly adjustable sealing face

Robust and strong with aluminium carrier plate

NBR knobby surface to absorb lateral forces

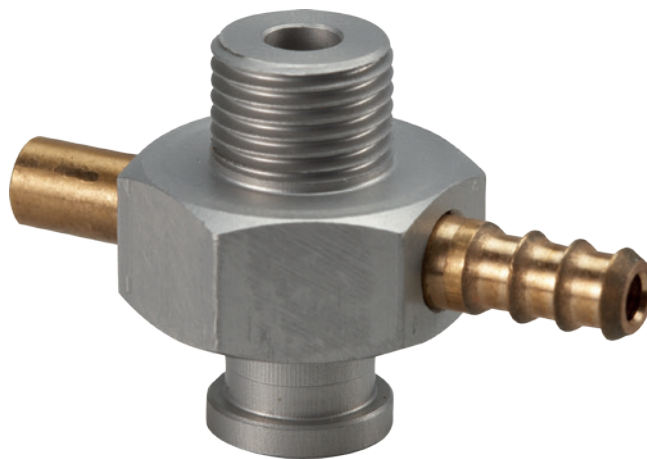


► **Technical Data**

Versions	Material	Color	Heat Resistant	Shore hardness	Add to part no.
Foam rubber	EPDM	black	-30° C bis +80° C	15 +/- 5	EPDM (e.g. SP80-7EPDM)

► **Technical Data**

Order no.	SP80-7EPDM	SP120-10EPDM	SP160-10EPDM
Vacuum force theoretical [N]	274	628	1232
Volume [cm <sup>3</sup> ]	55	131	277
G1	G1/4"	G1/4"	G1/4"
Dimension A [mm]	2.5	2.5	2.5
Dimension D1 [mm]	80	120	160
Dimension D2 [mm]	86	128	168
Dimension H [mm]	14	15	16



## ▶ ADAPTERS



Series SI - Adapter

28



Series SAM/SA - Adapter

28



Series SAVM/SAV/VGS-M - Adapter

29

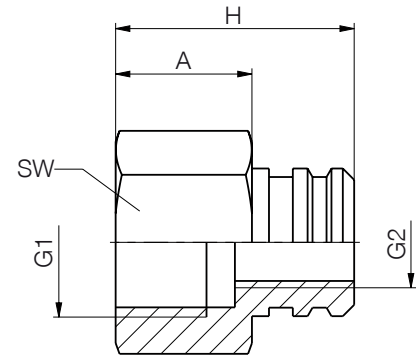
# ADAPTERS

## SERIES S

### ► SERIES SI - ADAPTER



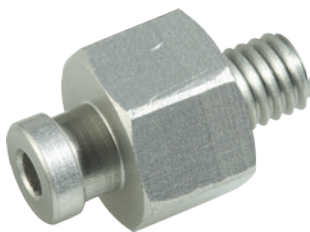
- **Special features**
- Internal thread
  - Vacuum connection



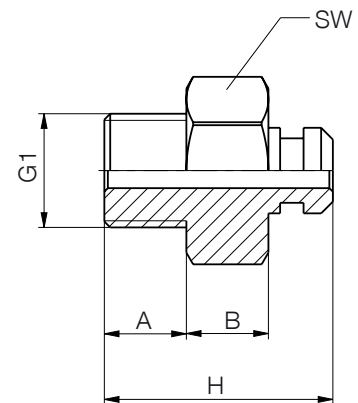
#### ► Technical Data

Order no.	SI1-8	SI1-4
Fixing types	1	2
G1	G1/8"	G1/4"
G2		M8
Dimension A [mm]	10	12
Dimension H [mm]	15.5	21
SW [mm]	14	17

### ► SERIES SAM/SA - ADAPTER



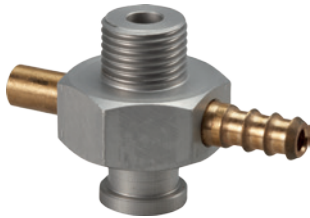
- **Special features**
- External thread
  - Vacuum connection



#### ► Technical Data

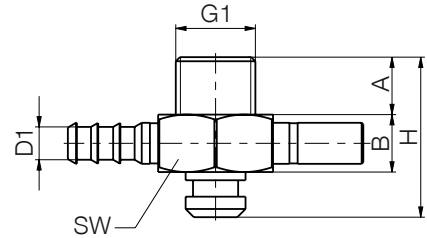
Order no.	SAM5	SAM5-01	SA1-8	SA1-8-06	SA1-4
Fixing types	4	5	1	3	2
G1	7	7	7	8	8
G2	M5	M5	G1/8"	G1/8"	G1/4"
Dimension A [mm]	5	5	7	7	8
Dimension H [mm]	15.5	16.5	19.5	22	25
SW [mm]	10	10	14	17	17

## ► SERIES SAVM/SAV/VGS-M - ADAPTER



### ► Special features

- External thread
- Integrated vacuum generator
- Compressed air connection



### ► Technical Data

Order no.	SAVM5	SAVM5-01	SAV1-8	SAV1-8-03	SAV1-4	VGS-M
Fixing types	4	5	1	3	2	6
Vacuum [bar]	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Vacuum level [%]	81	81	78	78	82	83
Max. suction capacity [l/min]	4	4	3.5	3.5	11.5	1
Air consumption suction [l/min]	13	12	14.5	14.5	27	11
Operating pressure [bar]	6	6	6	6	6	6
Weight [g]	10	15.5	16.8	16.8	30.4	18.8
G1	M5	M5	G1/8"	G1/8"	G1/4"	M8
Dimension A [mm]	5	5	7	7	8	8
Dimension B [mm]	7	7	7	8	8	17.5
Dimension D1 [mm]	3	3	4	4	4	4
Dimension H [mm]	15.5	16.5	19.5	22	25	28
SW [mm]	10	10	14	17	17	13



▶ ADAPTERS + COMPENSATION MODULES



Series F - Compensation Modules

32



Series FV - Compensation Modules

33

# ADAPTERS + COMPENSATION MODULES

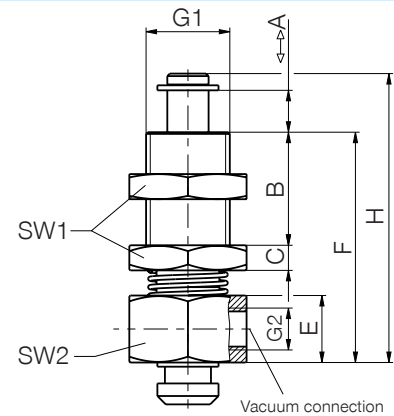
## SERIES F

### ► SERIES F - COMPENSATION MODULES



#### ► Special features

- External thread
- Spring loaded compensator
- Vacuum connection
- Rotation prevention available



#### ► Technical Data

Order no.	FA	FB	FC	FD	FE
Fixing types	4	5	1	3	2
G1	M5	M8x1	M10x1	M12x1	M12x1
G2	M5	M5	M5	M5	M5
Dimension A [mm]	4	4	5	10	10
Dimension B [mm]	8	10	13.5	13	13
Dimension C [mm]	3	3	3	4	4
Dimension E [mm]	7	8	8	8	8
Dimension F [mm]	21	24.2	27.5	29	29
Dimension H [mm]	27	30	34.5	41	41
SW1 [mm]	8	10	14	17	17
SW2 [mm]	10	10	14	17	17

### ► ROTATION PREVENTION

#### ► Technical Data

Order no.	FA1	FB1	FC1	FD1
Suitable for	FA	FB	FC	FD/FE

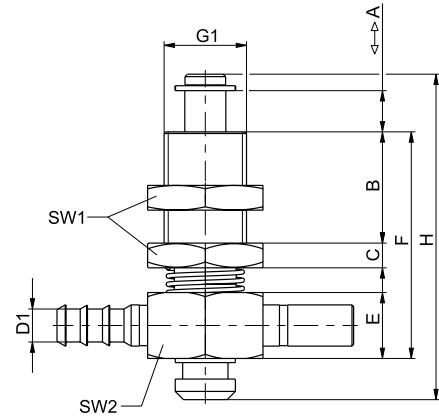


## ► SERIES FV - COMPENSATION MODULES WITH VACUUM GENERATORS



### ► Special features

- External thread
- Spring loaded compensator
- Integrated vacuum generators
- Rotation prevention available



### ► Technical Data

Order no.	FAV	FBV	FCV	FDV	FEV
Fixing types	4	5	1	3	2
Air consumption per min. [l norm]	13	13	13	13	13
G1	M5	M8x1	M10x1	M12x1	M12x1
Dimension A [mm]	4	4	5	10	10
Dimension B [mm]	8	10	13.5	13	13
Dimension C [mm]	3	3	3	4	4
Dimension D1 [mm]	2.8	2.8	4	4	4
Dimension E [mm]	7	8	8	8	8
Dimension F [mm]	21	24.2	27.5	29	29.1
Dimension H [mm]	27	30	34.5	41	41
SW1 [mm]	8	10	14	17	17
SW2 [mm]	10	10	14	17	17

## ► ROTATION PREVENTION

### ► Technical Data

Order no.	FA1	FB1	FC1	FD1
Suitable for	FAV	FBV	FCV	FDV/FEV

# COMPENSATION MODULES

## OVERVIEW OF SERIES

---

The ideal situation of suction application is a flat surface. In many cases this doesn't exist in practice. To adjust the suction cups axially and radially to the conditions of the suction process, axial adjustment elements are needed. Those elements assure an optimal fit of the suction cups even at work pieces with free formed surfaces. So, the highest possible suction power is reacted.






Suction cups being equipped with a sprung compensating element have the advantage that the suction cups touch the work piece advanced, before the handling device reaches its end position. This allows a higher cycle time due to the fact that the vacuum can be generated before the end position is reached. Furthermore, spring plungers are damping the fitted joints and are compensating differences in level which can arise from indefinable depositing positions respectively collecting positions. If suction cups with a not rotation-symmetrically shape are used, spring plungers with rotation protection devices are preferred.

In combination with ball joints, spring plungers can compensate additional angle errors. Such a combination is applied if pliable work pieces are dealt with. In such cases, the ball joints prevent that the suction cups tears before or after lifting the hanging work piece. A further application are the work pieces with inclined plane where the ball joints guarantee the ideal alignment of the suction cups. If the work piece has to be additionally adjusted after the suction process, an element has to be applied SAG. This angular alignment readjusts automatically into its starting position by using a rubber-metal unit as a joint.





**► COMPENSATION MODULES**

	Series FS - Compensation Modules	36
	Series FSV - Compensation Modules	36
	Series SAG - Compensation Modules	37
	Series SAK - Compensation Modules	37
	Series KG - Ball Joints	39

# COMPENSATION MODULES

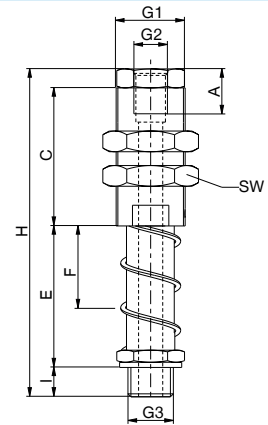
## SERIES FS / SA

### ► SERIES FS - COMPENSATION MODULES



#### ► Special features

- Spring plunger with damping spring
- High-strength plunger rod
- Smooth compensation of height differences



#### ► Technical Data

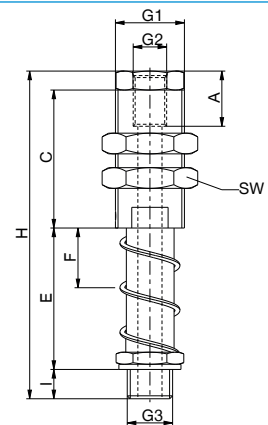
Order no.	FS14A-25	FS18A-15
G1	M20x1,5	M16x1
G2	G1/8"	G1/8"
G3	G1/4"	G1/8"
Dimension A [mm]	13	8
Dimension C [mm]	40	30
Dimension E [mm]	40.5	29.5
Dimension F [mm]	25	15
Dimension H [mm]	86	73.5
Dimension I [mm]	8.5	6.5
SW [mm]	24	22

### ► SERIES FSV - COMPENSATION MODULES - ROTATION PREVENTED



#### ► Special features

- Spring plunger with damping spring
- High-strength plunger rod
- Smooth compensation of height differences



#### ► Technical Data

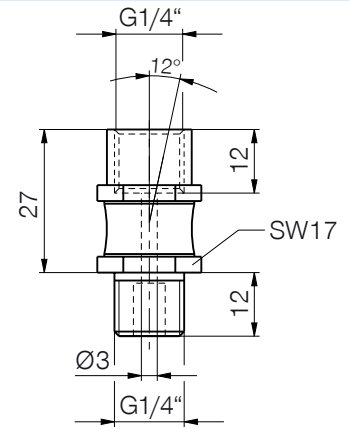
Order no.	FS14A-25V	FS18A-15V
G1	M20x1,5	M16x1
G2	G1/8"	G1/8"
G3	G1/4"	G1/8"
Dimension A [mm]	13	8
Dimension C [mm]	40	30
Dimension E [mm]	40.5	28.5
Dimension F [mm]	25	15
Dimension H [mm]	86	73.5
Dimension I [mm]	8.5	6.5
SW [mm]	24	22

## ► SERIES SAG - COMPENSATION MODULES



### ► Special features

- Mounting jointed on all sides
- Rubber/metal combination as joint
- Very strong material combination
- Automatic return to neutral starting position



### ► Technical Data

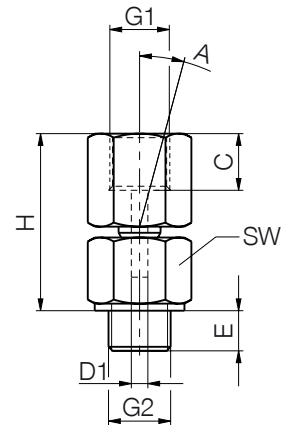
Order no.	SAG14AI
Fixing thread	G1/4"
Compensation stroke max. [°]	12
SW [mm]	17

## ► SERIES SAK - COMPENSATION MODULES



### ► Special features

- Mounting jointed on all sides for suction grippers and suction plates
- Suction grippers and suction plates
- Low rotation point on suction gripper

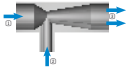








### ► Technical Data

Order no.	SAK14AI	SAK18AI
Compensation stroke max. [°]	15	15
G1	G1/4"	G1/8"
G2	G1/4"	G1/8"
Dimension C [mm]	12	8.5
Dimension D1 [mm]	3.5	2
Dimension E [mm]	10	7
Dimension H [mm]	37.5	26.5
SW [mm]	19	14



## ▶ VACUUM GENERATORS

	Compact ejectors	42
	Series KEM10 - Compact ejectors	44
	Series KE15 - Compact ejectors	46
	Series KE25 - Compact ejectors	48
	Series VGM - Vacuum generators	50
	Series VG - Vacuum generators	50
	Series VIP - Vacuum generators	51

# VACUUM GENERATORS

## COMPACT EJECTORS

The units of the series KEM and KE are equipped with an integrated valve technology. They possess beside the normally open suck valve [1] also a normally closed exhaust valve [2] which guarantees a process secure releasing of the suction cups from the work piece.

Furthermore, the process security is increased while using integrated vacuum switches [3], which have an optional electronic (NOE) or digital design (NOD). This switch serves for controlling the vacuum and can also contribute in combination with the automatic air saver to reduce significantly operating expenses.

The filter unit [5] prevents the intrusion of foreign particles into the ejector and therefore, increases the service life of the unit.

The muffler [4] serves for noise reduction of the compact ejectors. It is especially advisable if several ejectors are used. They can be mounted parallelly on an adapter plate which also is available optionally.

The exact selection of an appropriate vacuum generator for your specific application depends on various factors. The amount and size of the suction cups as well as the features and conditions play a vital role of the handling work piece.

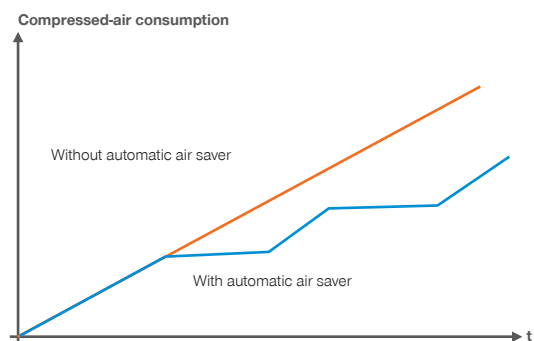


The following table makes it easier to select the suitable ejector and it shows the required suction capability depending on the suction diameter. The specified values are applied per suction cups and for smooth, vacuum sealed material. For porous, coarsely porous or rough surfaces generally tests should be carried out to determine the suction capability.

► Pumping speed vs diameter of the suction cup

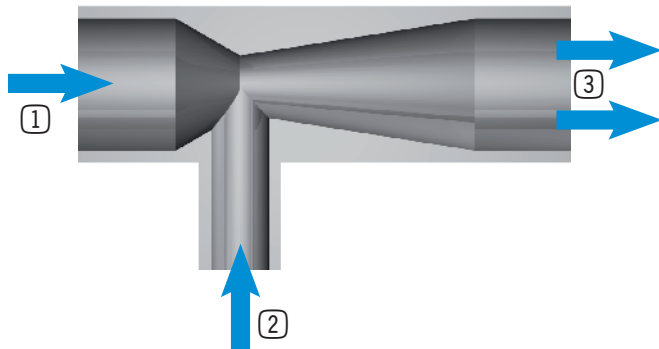
Suction cup Ø	Pumping speed Vs	
up to 60 mm	0,5 m <sup>3</sup> /h	8,3 l/min
up to 120 mm	1,0 m <sup>3</sup> /h	16,6 l/min

The ejectors of the series KE allow the application of the optional available automatic air saver. In connection with the vacuum switch, which is installed in the ejector, a customer-specific defined vacuum range (hysteresis) is controlled and regulated. This control allows a reduction of the air to a multiple compared to conventional-controlled ejectors (see graph). Due to the fact that the ejector does not permanently generate vacuum, but only if the pre-set threshold is under-run.



# VACUUM GENERATORS

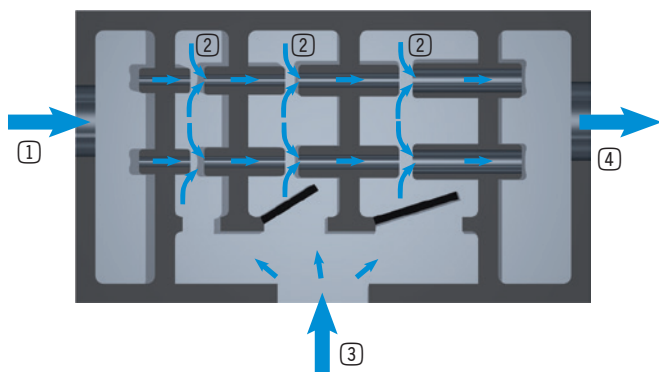
## VENTURI NOZZLE AND MULTI-STAGE EJECTORS



### VENTURI NOZZLE

The venturi principle cannot only be found in compact ejectors but also in in-line vacuum generators VGM and VG as well as in the adapter series SAV and FV.

According to the venturi principle, the fitted nozzle [1] in the ejector aims to conduct compressed air. With the reduction of the diameter in the interior the streaming air accelerates. Thus, a vacuum arises at the die exit [2]. Compressed air and sucked back ambient air are released via the exhaust air [3]. The generated vacuum is in relation to the used compressed air.



### MULTI-STAGE EJECTORS

In addition to the single-stage venturi principle, multi-stage ejectors are implemented for vacuum generators of the series VIP. In this option, multiple venturi nozzles are connected in series. With the connection [1,] compressed air is conducted into the ejector and streams through the fitted nozzles [2]. The arising vacuum sucks air via the vacuum connection [3]. The vacuum capacity of single nozzles is added in this way. The result is a much higher pumping speed compared to single-stage ejectors. Compressed air and sucked ambient air are released via the exhaust air [4].



# VACUUM GENERATORS

## COMPACT EJECTORS - SERIES KEM10

### ▶ PRODUCT SPECIFICATIONS

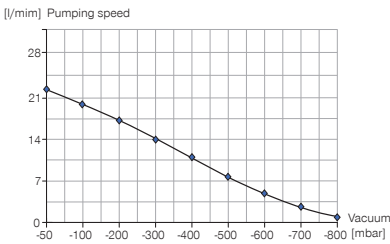


#### ▶ Special features

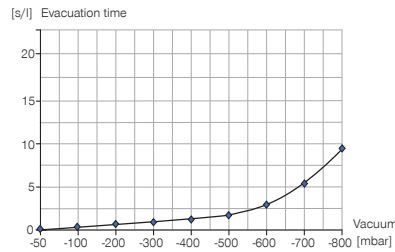
- Complete solution for easiest installation
- Minimum installation size, low weight
- Integrated valve technology and vacuum monitoring
- Wide range of outputs
- Normally open suction valve

### ▶ EJECTORS/VACUUM GENERATORS

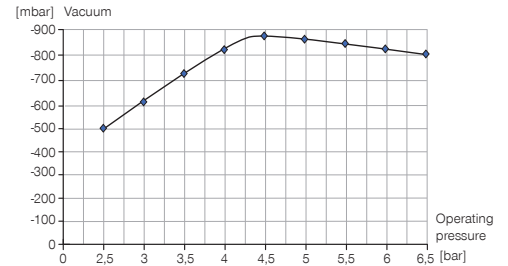
Pumping speed at different vacuum levels



Evacuation time for different vacuum levels



Reachable vacuum of different operating pressure



### ▶ RECOMMENDED ACCESSORIES



Straight Fittings - Quick Connect Style

GVM5



Plug-in connector Straight Cable 5m - Socket M8 (female)

KAG500B4



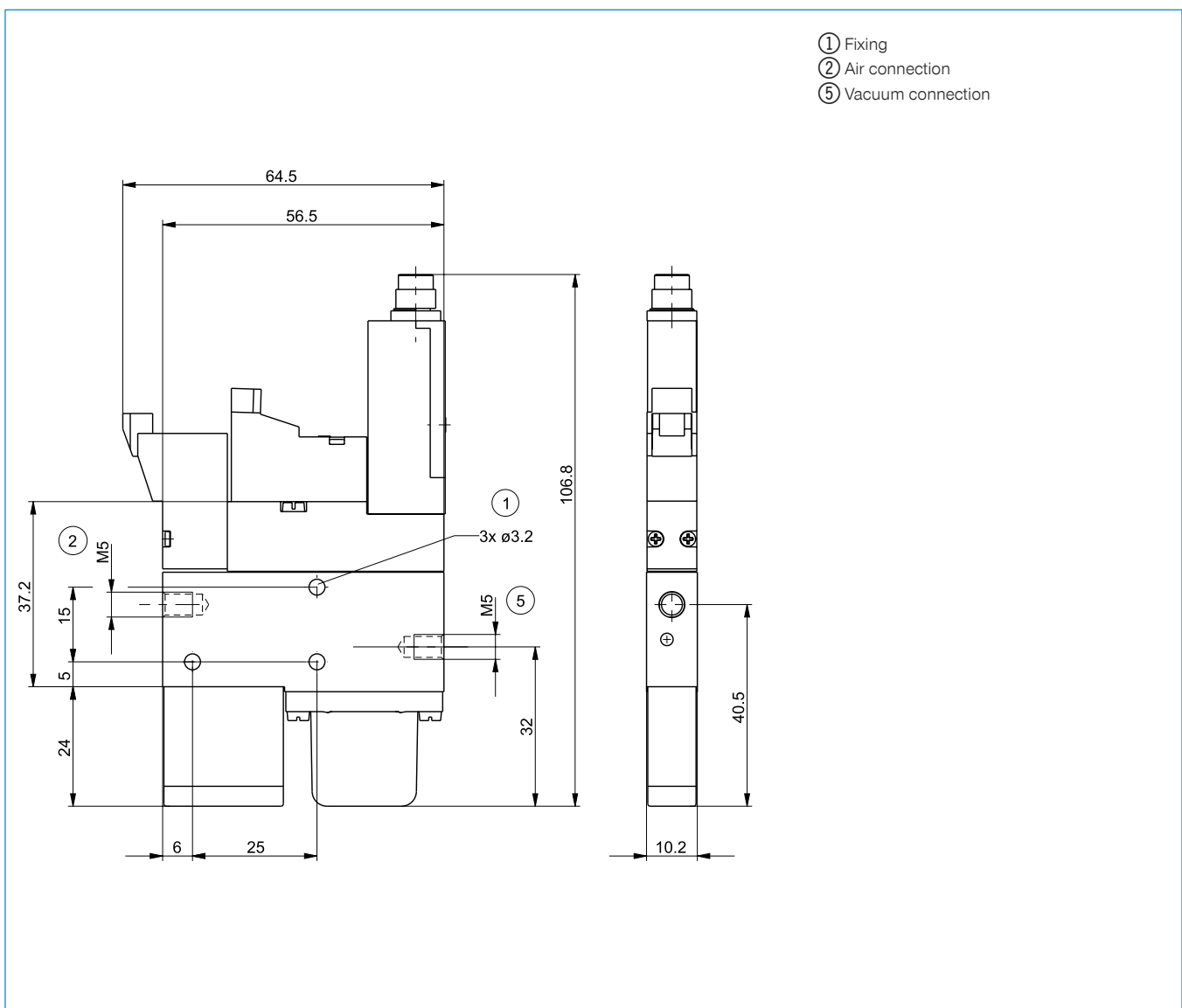
Connecting cable

ZUB0040

Order no.	Technical Data
	<b>KEM10NOE</b>
Nozzle diameter [mm]	1
Vacuum level [%]	85
Max. suction capacity [l/min]	23
Max. suction capacity [m <sup>3</sup> /h]	1.4
Air consumption suction [l/min]*	46
Air consumption suction [m <sup>3</sup> /h]*	2.8
Air consumption blowing [l/min]	26
Noise level (suction) [db(A)]	73
Noise level (free-running) [db(A)]	76
Operating pressure [bar]	4.5
Recommended inner hose Ø compressed air [mm]**	2.0
Recommended inner hose Ø vacuum [mm]**	4.0
Operating temperature [°C]	0 ... +45
Weight [kg]	0.08

\*at 5 bar operating pressure

\*\*at max. 2m Length



# VACUUM GENERATORS

## COMPACT EJECTORS - SERIES KE15

### ▶ PRODUCT SPECIFICATIONS



#### ▶ Special features

Air consumption optimized by finely adjustable suction capacity

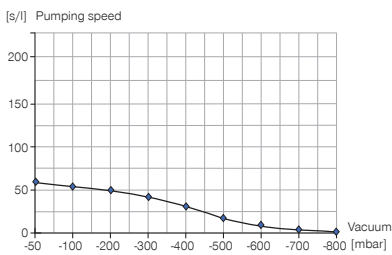
Electronic vacuum switch (KE15NOE)

Digital vacuum switch (KE15NOD)

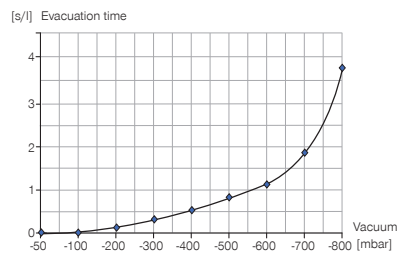
Significantly reduced compressed air consumption using optional air saving technology

### ▶ EJECTORS/VACUUM GENERATORS

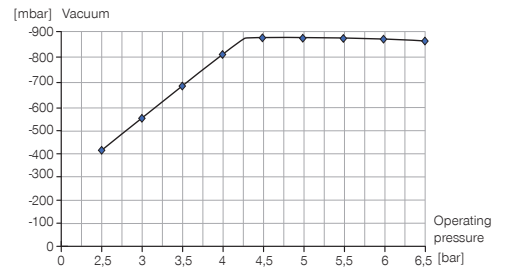
Pumping speed at different vacuum levels



Evacuation time for different vacuum levels



Reachable vacuum of different operating pressure



### ▶ RECOMMENDED ACCESSORIES



Straight Fittings - Quick Connect Style

GV1-8X6



Straight Fittings - Quick Connect Style

GV1-8X8



Plug-in connector Straight Cable 5m - Socket M8 (female)

KAG500B4



Connecting cable

ZUB0040



Air Saving Function

ZUB0005



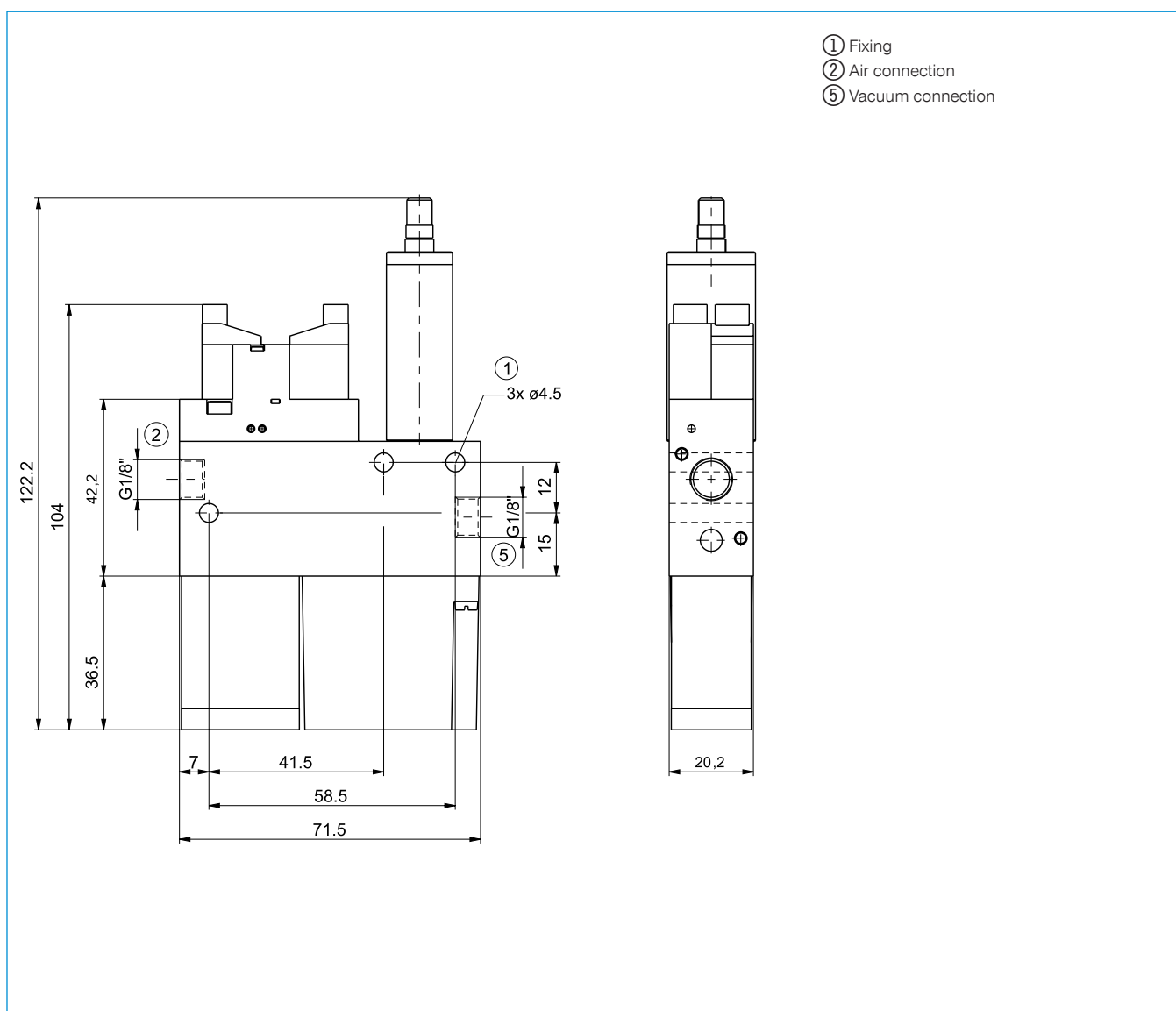
Air Connection 4-Connections

ZUB0008

Order no.	Technical Data	
	KE15NOD	KE15NOE
Nozzle diameter [mm]	1.5	1.5
Vacuum level [%]	85	85
Max. suction capacity [l/min]	65	65
Max. suction capacity [m <sup>3</sup> /h]	3.9	3.9
Air consumption suction [l/min]*	117	117
Air consumption suction [m <sup>3</sup> /h]*	7	7
Air consumption blowing [l/min]	200	200
Noise level (suction) [db(A)]	68	68
Noise level (free-running) [db(A)]	68	68
Operating pressure [bar]	5	5
Recommended inner hose Ø compressed air [mm]**	4	4
Recommended inner hose Ø vacuum [mm]**	6	6
Operating temperature [°C]	0 ... +45	0 ... +45
Weight [kg]	0.275	0.275

\*at 5 bar operating pressure

\*\*at max. 2m Length



# VACUUM GENERATORS

## COMPACT EJECTORS - SERIES KE25

### ▶ PRODUCT SPECIFICATIONS

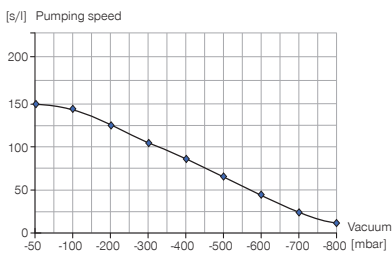


#### ▶ Special features

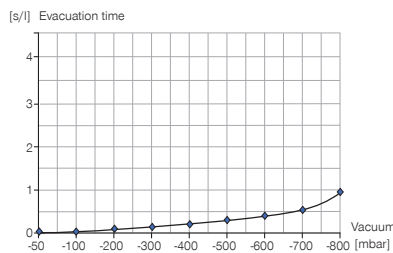
- Air consumption optimized by finely adjustable suction capacity
- Electronic vacuum switch (KE25NOE)
- Digital vacuum switch (KE25NOD)
- Significantly reduced compressed air consumption using optional air saving technology

### ▶ EJECTORS/VACUUM GENERATORS

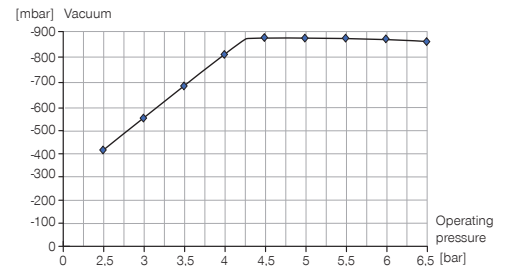
Pumping speed at different vacuum levels



Evacuation time for different vacuum levels



Reachable vacuum of different operating pressure



### ▶ RECOMMENDED ACCESSORIES



Straight Fittings - Quick Connect Style

GV1-4X8



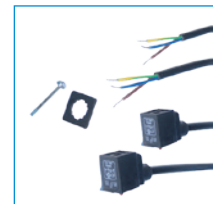
Straight Fittings - Barb Style Connection

GV3-8X13ID



Plug-in connector Straight Cable 5m - Socket M8 (female)

KAG500B4



Connecting cable

ZUB0041



Air Saving Function

ZUB0006



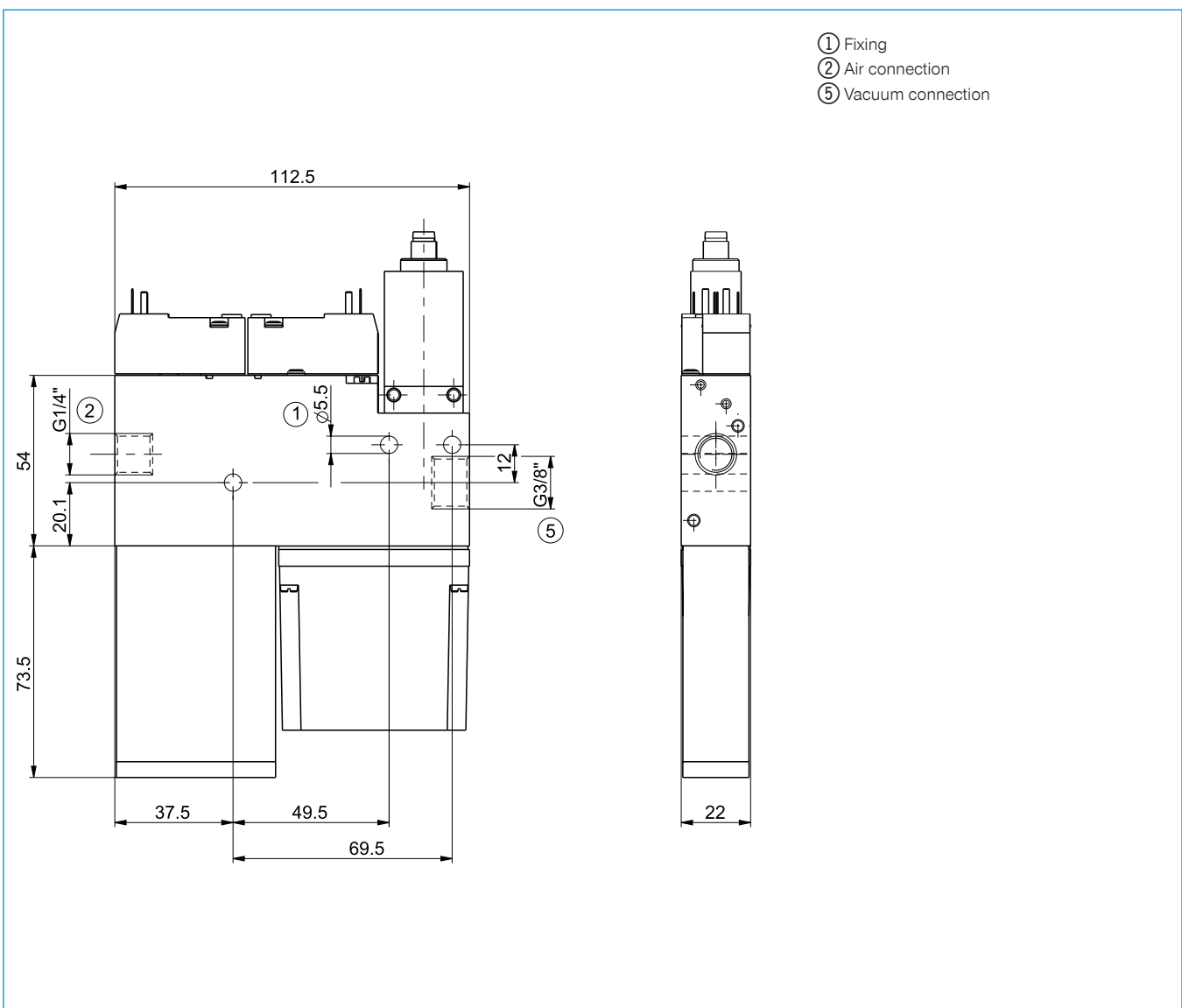
Air Connection 4-Connections

ZUB0011

Order no.	Technical Data	
	KE25NOD	KE25NOE
Nozzle diameter [mm]	2.5	2.5
Vacuum level [%]	85	85
Max. suction capacity [l/min]	161	161
Max. suction capacity [m³/h]	9.7	9.7
Air consumption suction [l/min]*	310	310
Air consumption suction [m³/h]*	18.6	18.6
Air consumption blowing [l/min]	200	200
Noise level (suction) [db(A)]	72	72
Noise level (free-running) [db(A)]	82	82
Operating pressure [bar]	5 ... 6	5 ... 6
Recommended inner hose Ø compressed air [mm]**	6	6
Recommended inner hose Ø vacuum [mm]**	9	9
Operating temperature [°C]	0 ... +45	0 ... +45
Weight [kg]	0.485	0.485

\*at 5 bar operating pressure

\*\*at max. 2m Length



# VACUUM GENERATORS

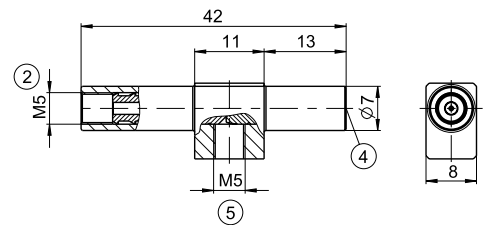
## SERIES VGM / VG / VIP

### ► SERIES VGM



#### ► Special features

- Integrated vacuum connection ⑤
- Compressed air connection ②
- Exhaust air ④



#### ► Technical Data

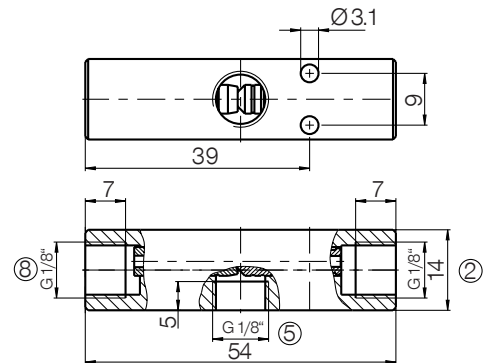
<b>Order no.</b>	<b>VGM5</b>
Vacuum [bar]	-0.8
Air consumption per min. [l norm]	63
Fixing thread	M5

### ► SERIES VG



#### ► Special features

- Integrated vacuum connection ⑤
- Compressed air connection ②
- Connection for silencer Order no. SD18KS ⑧



#### ► Technical Data

<b>Order no.</b>	<b>VG1-8</b>
Vacuum [bar]	-0.8
Air consumption per min. [l norm]	63
Fixing thread	G1/8"

## ► SERIES VIP

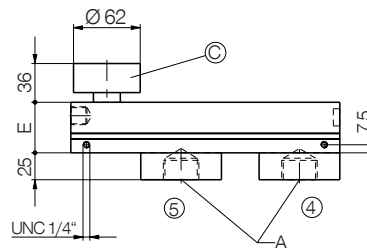
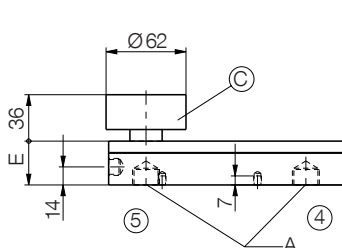
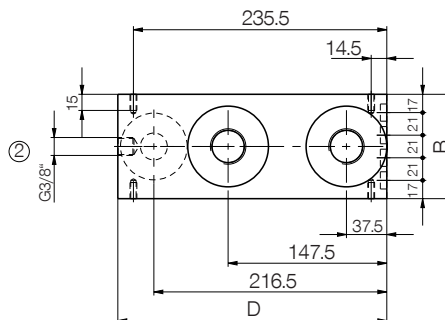
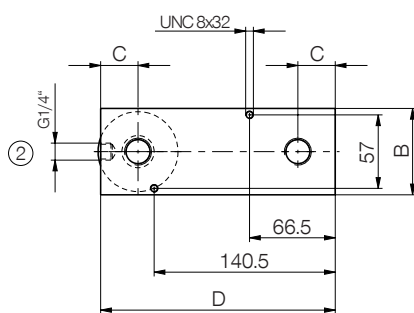


### ► Note

Manometer order no. VM62, suitable for VIP4 to VILP16, is not supplied with product

### ► Technical Data

Order no.	VIP4	VIP8	VIP12	VILP16
Vacuum output at 4 bar [%]	90	90	90	90
Air consumption per min. [l norm]	63	126	240	240
Vacuum volume [l norm/min.]	165	320	590	350
Operating pressure [bar]	4 ... 7	4 ... 7	4 ... 7	4 ... 7
Noise level (free-running) [db(A)]	65	65	65	75
Noise level (suction) [db(A)]	50	50	50	55
Operating temperature [°C]	-20 ... +80	-20 ... +80	-20 ... +80	-10 ... +100
A	G1/2"	G1/2"	G1/2"	G1,5"
Dimension B [mm]	67	67	67	97
Dimension C [mm]	29	29	29	
Dimension D [mm]	182	182	182	250
Dimension E [mm]	34	34	52	47
Weight [kg]	0.67	0.7	0.92	2.5



- ② Air connection
- ④ Exhaust air
- ⑤ Vacuum connection
- Ⓒ Manometer is not supplied with product  
Order no. VM62



# SENSING UNITS

## OVERVIEW OF SERIES

---

To guarantee a secure operation of the vacuum circuit, measuring equipment and control devices are inevitable. These components have to meet highest quality requirements so that ejectors and suction cups fulfil their tasks perfectly. Thus, vacuum switches and vacuum controllers play an essential role.



Components for system monitoring can be found in all areas of automated handling processes. No matter if automotive or plastics industry or other applications where process reliability needs to be increased, sensing units are required.

Due to their high switching accuracy and switching frequencies, electronic vacuum switches suit applications where a long life-time and high precision is the priority. Further benefits of the electronic switch are their small size and increased ease of use. Different parameters can be programmed and evaluated via plastic foil keyboard and LCD display. Vacuum switches can be used within a measuring range of -1 to 0 bar.








With mechanic adapters of series SAV / SAM it is possible to integrate a compact and simple work piece identification. Via a plunger and a proximity switch the work piece availability can be monitored.





▶ SENSING UNITS

	Series SAM	54
	Series SAVM	54
	Series VS001	55
	Series VS003E	56
	Series VS003D	57

# SENSING UNITS

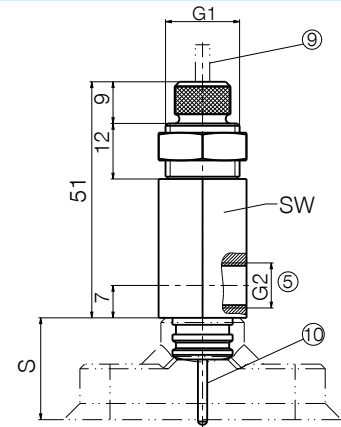
## SERIES SAM / SAVM / VS

### ► SERIES SAM



#### ► Special features

- External thread
- Vacuum connection ⑤
- Matches proximity switch NJ3-E2 ⑨
- Integrated plunger to detect workpiece ⑩



#### ► Technical Data

Order no.	SAM14X1	SAM16X1
Fixing types	1	1
G1	M14x1	M16x1
G2	M5	G1/8"
S [mm]*	12	21
SW [mm]	17	19

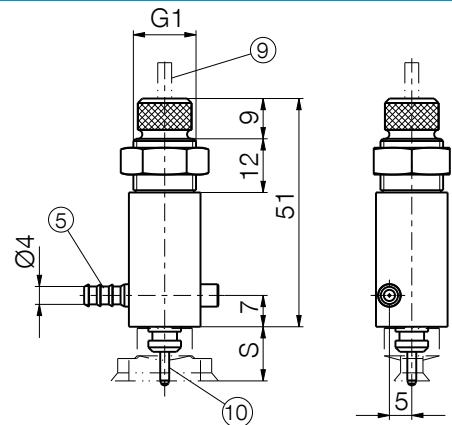
\*consider Dimension „S“ (maximal distance of suction cup to assure an accurate sensing result)

### ► SERIES SAVM



#### ► Special features

- External thread
- Integrated vacuum generator
- Compressed air connection ⑤
- Matches proximity switch NJ3-E2 ⑨
- Integrated plunger to detect workpiece ⑩



#### ► Technical Data

Order no.	SAVM14X1	SAVM16X1
Vacuum [bar]	-0.8	-0.8
Fixing types	1	2
Air consumption suction [l norm]	12	14
Max. suction capacity [l/min]	3	2
Vacuum level [%]	80	78
Operating pressure [bar]	6	6
G1	M14x1	M16x1
S [mm]*	12	21

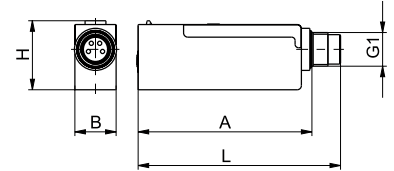
\*consider Dimension „S“ (maximal distance of suction cup to assure an accurate sensing result)

## ► SERIES VS001



### ► Special features

- Switching points adjustable via teach button
- Two digital switching outputs
- Vertical or horizontal fixing
- Electronic vacuum sensor
- 200 mA switching circuit



### ► Technical Data

Order no.	VS001EL-E2	VS001ES-E2
Measuring medium	non-aggressive gases; dry, oil-free air	non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1...0	-1...0
Max. safe overpressure [bar]	5	5
Repetition accuracy [%]	+/- 1% from measuring range	+/- 1% from measuring range
Hysteresis fest [mbar]	20	20
Output signal	2 digital	2 digital
Switching capacity [mA]	200	200
Status indication	LED	LED
Electrical connection	Connector M8, 4-pole	Connector M8, 4-pole
Voltage [V DC]	10-30	10-30
Current consumption [mA]	20	20
Degree of protection [IP]	40	40
Temperature deviation	+/- 3% from measuring range	+/- 3% from measuring range
Allowable ambient temperature [°C]	0...60	0...60
Type	horizontal	vertical
G1	M8	M8
Dimension A [mm]	41.2	36.2
Dimension B [mm]	10	10
Dimension H [mm]	16.4	17.5
Dimension L [mm]	48	43
Weight [kg]	6	6

# SENSING UNITS

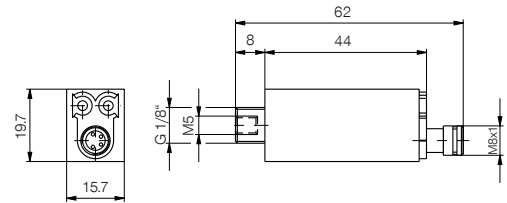
## SERIES VS

### ► SERIES VS003E



#### ► Special features

- Electronic vacuum switch
- Switching point and hysteresis adjustable
- Analog and digital outputs



#### ► Technical Data

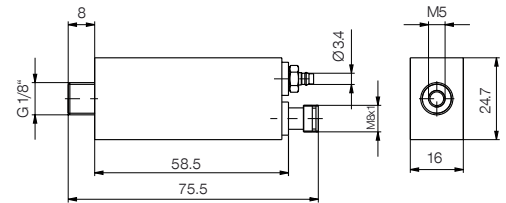
Order no.	VS003E-E2
Measuring medium	non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1...0
Max. safe overpressure [bar]	5
Repetition accuracy [%]	+/- 1% from measuring range
Hysteresis	Adjustable: 3-25% of the set value
Output signal	1 analog 1..5V / 1 digital
Switching capacity [mA]	125
Response time [ms]	5.0
Status indication	LED
Electrical connection	Connector M8, 4-pole
Connection media	G1/8" -AG + M5-IG
Voltage [V DC]	10.8-30
Current consumption [mA]	30
Degree of protection [IP]	40/65 (with tube)
Temperature deviation	+/- 3% from measuring range
Allowable ambient temperature [°C]	0...50
Weight [kg]	18

## ► SERIES VS003D



### ► Special features

- Electronic vacuum switch with digital display
- Switching point and hysteresis freely programmable
- Special programmable functions
- Two separately programmable digital outputs



### ► Technical Data

Order no.	VS003D-E2
Measuring medium	non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1...0
Max. safe overpressure [bar]	5
Repetition accuracy [%]	+/- 1% from measuring range
Hysteresis	adjustable: 0-100% of the set value/comparator mode
Output signal	2 digital
Switching capacity [mA]	180
Status indication	2xLED
Display resolution	0.01 bar, 5 mmHg, 0.2 inHg, 1 kPa
Displayed units	bar, mmHg, inHg, kPa
Displayed value	3-digital 7-segment LED
Electrical connection	Connector M8, 4-pole
Connection media	G1/8" -AG + M5-IG
Voltage [V DC]	10.8-30
Current consumption [mA]	30
Degree of protection [IP]	40/65 (with tube)
Temperature deviation	+/- 3% from measuring range 0-50°C
Allowable ambient temperature [°C]	0...50
Weight [kg]	25

# HANDLING COMPONENTS

## OVERVIEW OF SERIES

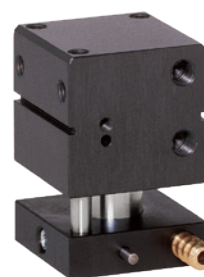
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In vacuum handling applications, not only the suction cups which touch the work piece play an important role, but also the downstream handling components. With the combination of these standardized products, suction cups can be used more efficiently. Thus, they increase the value added in the process.

With the short stroke cylinders of the SH and SHD series, a linear movement of the suction cup is possible, which even can be sensed at the final position. With the integrated venturi nozzle and the simple connection of the suction cups of connection type 1 and 2, the short stroke cylinders can be integrated into the application with a great benefit at little costs. The corresponding nozzles are available as accessory.

Retractable axes of the series SWM were developed for removal handling. An increased torque at the end positions guarantees highest process security while removal of the work pieces. The end position of a 90° tilting can be detected / monitored via magnetic field sensors.

To enhance the rationality of expensive production machines, a flexible production process has to be ensured. This can be realized by the tool changers of the series HWR with an integrated fluid. They guarantee a fast and low-cost changing of various vacuum grippers without any additional tool. Optionally available energy elements allow additionally the transmission of electrical signals.



# MCS MODULAR CONSTRUCTION SYSTEM

## OVERVIEW OF SERIES

With the modular construction system MCS (Modular Construction System), a specific work piece solution can be found without any additional design effort. This can be done by the compatible single components. So, you can find profiles [2], compensating elements [5], and suction cups holders [6] in our product portfolio as well as gripper fingers [1] which are guaranteeing a firm grip of the work piece during the transportation.

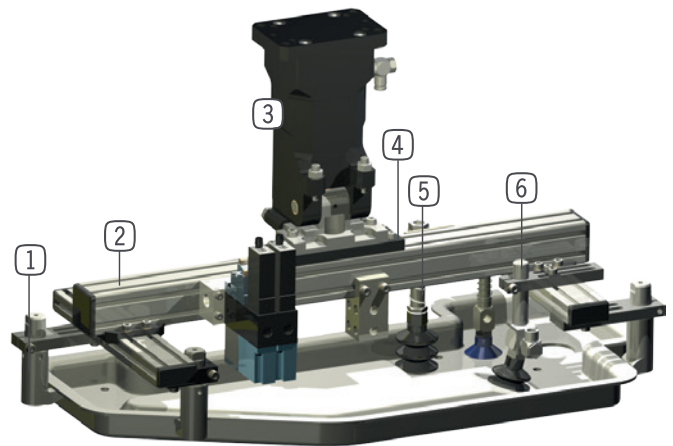
The MCS is applied, where a low-cost but robust solution is required. The special feature of the system is its low weight compared to a conventional steel construction. So, a complex system can be designed or assembled at the workbench with no trouble.

In short, the more complex a work piece, the more benefits the MCS offers with regard to the cost incurred.

The MCS can be applied to various areas of handling components. The MCS is used for robot solutions which focus mainly to the load of robots as well as for pick and place applications and removal handling.





















For the tool changers HWR and the angle pivot units SWM [8], standardized adapter plates [4] are available which enable a simple and low-cost connection to the MCS.

Particularly this combination with other Sommer-automatic components makes the modular construction system so attractive and utmost flexible.





## ► MCS MODULAR CONSTRUCTION SYSTEM

	Profile 10x20	114
	Profile 20x20	114
	Profile 20x40	115
	Profile 40x40	115
	Cover Cap	116
	Cross Clamp	116
	Angle fixing	117
	Slot Nut Pivoting	117
	Slot nut with ball	118
	Clamp	118
	Clamp adjustable	119
	Angle piece	119
	Joint angle piece	120
	Suction finger spring-loaded	121
	Suction finger	122
	Suction finger rotatable	123
	Suction finger rotatable	124
	Air Distributor 4-Connections	124
	Air Distributor 2x4-Connections	125
	Gripper fingers	125

# MODULAR CONSTRUCTION SYSTEM

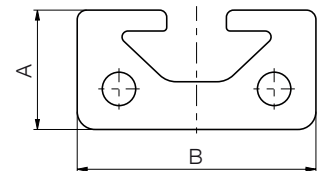
## SERIES MCS

### ► PROFILE 10X20



#### ► Special features

- Groove width 5mm
- Standard length 2000 mm
- Other lengths available on request



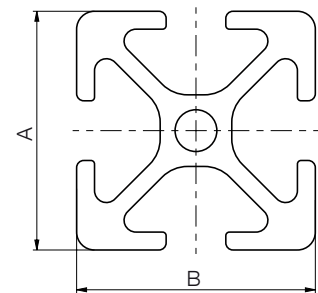
► Technical Data	
<b>Order no.</b>	<b>SO-10102000</b>
Dimension A [mm]	10
Dimension B [mm]	20
Dimension L [mm]	2000
Weight [g/m]	350

### ► PROFILE 20X20



#### ► Special features

- Groove width 5mm
- Standard length 2000 mm
- Other lengths available on request



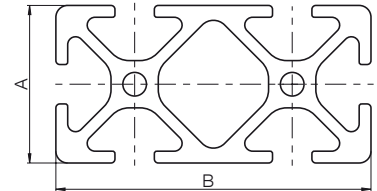
► Technical Data	
<b>Order no.</b>	<b>SO-10402000</b>
Dimension A [mm]	20
Dimension B [mm]	20
Dimension L [mm]	2000
Weight [g/m]	490

## ► PROFILE 20X40



### ► Special features

- Groove width 5mm
- Standard length 2000 mm
- Other lengths available on request



#### Order no.

#### ► Technical Data

**SO-10502000**

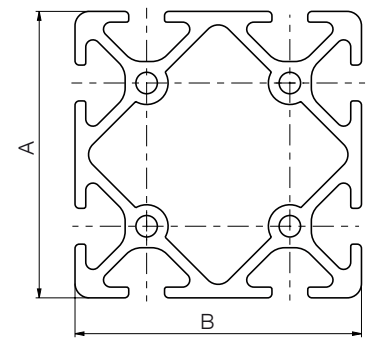
Dimension A [mm]	20
Dimension B [mm]	40
Dimension L [mm]	2000
Weight [g/m]	950

## ► PROFILE 40X40



### ► Special features

- Groove width 5mm
- Standard length 2000 mm
- Other lengths available on request



#### ► Technical Data

**SO-10802000**

Order no.	<b>SO-10802000</b>
Dimension A [mm]	40
Dimension B [mm]	40
Dimension L [mm]	2000
Weight [g/m]	1810

# MODULAR CONSTRUCTION SYSTEM

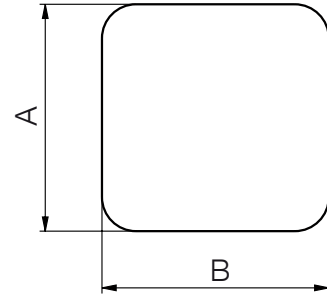
## SERIES MCS

### ► COVER CAP



#### ► Special features

To cover the profile section ends



#### ► Technical Data

Order no.	SO-11110020	SO-11120020	SO-11120040	SO-11140040
Dimension A [mm]	10	20	20	40
Dimension B [mm]	20	20	40	40

### ► CROSS CLAMP

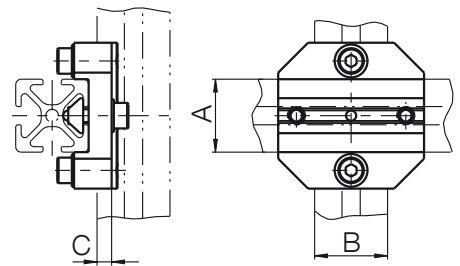


#### ► Special features

On both sides, the profiles are inserted into a groove. So a very high angle stability is ensured

Releasing the fixing on one profile side, the profile can be moved parallelly and set

The profile may be shifted in parallel and adjusted by loosening the mount on one side of the profile



#### ► Technical Data

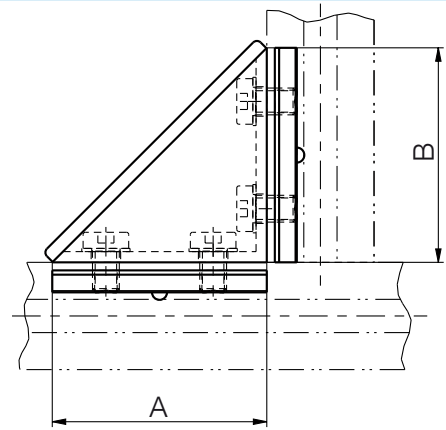
Order no.	SO-13120020	SO-13120040	SO-13140040
Dimension A [mm]	20	20	40
Dimension B [mm]	20	40	40
Dimension C [mm]	4	4	4
Weight [g]	48	73	109

## ▶ ANGLE FIXING



### ▶ Special features

For simple 90° angle fixing with low stresses



### ▶ Technical Data

Order no.	SO-13420020	SO-13440040
Dimension A [mm]	20	40
Dimension B [mm]	20	40
Weight [g]	25	60

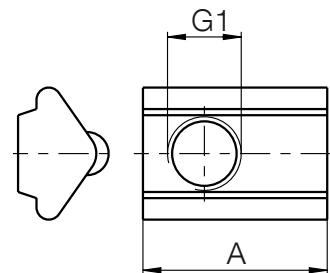
## ▶ SLOT NUT PIVOTING



### ▶ Special features

All Slot nuts made of galvanised steel with strip for centering

Can be pivoted into any section of profile groove for normal fixing



### ▶ Technical Data

Order no.	SO-14104000	SO-14105000
G1	M4	M5
Dimension A [mm]	12	12
Weight [g]	2	2

# MODULAR CONSTRUCTION SYSTEM

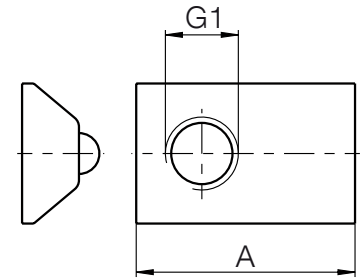
## SERIES MCS

### ▶ SLOT NUT WITH BALL



#### ▶ Special features

All Slot nuts made of galvanised steel with wide profile guiding  
 Inserted into the profile slot from the side for high stresses



#### Order no.

#### ▶ Technical Data

**SO-14305000**

G1

M5

Dimension A [mm]

15

Weight [g]

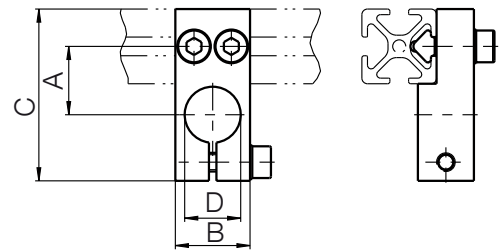
4

### ▶ CLAMP



#### ▶ Special features

Rigid clamp for fixing to all profiles  
 Standard with pivoting Slot nut and screws



#### ▶ Technical Data

#### Order no.

**SO-23110017**

**SO-23115019**

**SO-23120022**

Dimension A [mm]

17

19

22

Dimension B [mm]

16

20

25

Dimension C [mm]

39

46

51

Dimension D [mm]

10

15

20

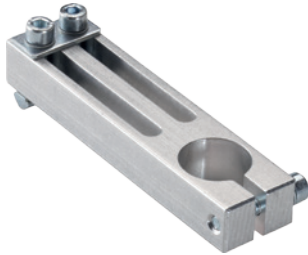
Weight [g]

20

27

46

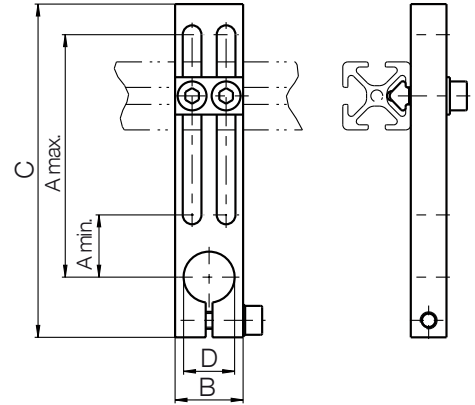
## ▶ CLAMP ADJUSTABLE



### ▶ Special features

Adjustable clamps for fixing to all profiles

Standard with pivoting Slot nut and screws



### ▶ Technical Data

Order no.	SO-23210057	SO-23215070	SO-23220072
Dimension A min. [mm]	17	19	22
Dimension A max. [mm]	57	70	72
Dimension B [mm]	16	20	25
Dimension C [mm]	81	98	103
Dimension D [mm]	10	15	20
Weight [g]	47	53	85

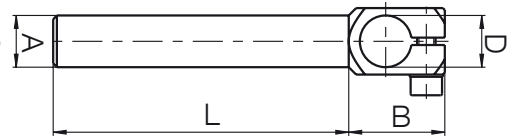
## ▶ ANGLE PIECE



### ▶ Special features

For adapting the following elements to right-angled surfaces

Suitable for jointed angle pieces, suction fingers and tongs



### ▶ Technical Data

Order no.	SO-25110030	SO-25110060	SO-25110090	SO-25115045	SO-25115090
Dimension A [mm]	10	10	10	15	15
Dimension B [mm]	20	20	20	27	27
Dimension D [mm]	10	10	10	15	15
Dimension L [mm]	30	60	90	45	90
Weight [g]	15	19	23	35	47

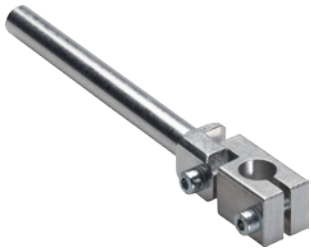
### ▶ Technical Data

Order no.	SO-25115130	SO-25120045	SO-25120090	SO-25120130
Dimension A [mm]	15	20	20	20
Dimension B [mm]	27	33	33	33
Dimension D [mm]	15	20	20	20
Dimension L [mm]	130	45	90	130
Weight [g]	55	68	90	114

# MODULAR CONSTRUCTION SYSTEM

## SERIES MCS

### ▶ JOINT ANGLE PIECE

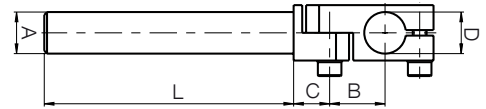


#### ▶ Special features

For adapting the following elements to inclined surfaces

Suitable for angle pieces and suction fingers

Joint swivels through 180°



#### ▶ Technical Data

Order no.	SO-26110030	SO-26110060	SO-26110090	SO-26115045	SO-26115090
Dimension A [mm]	10	10	10	15	15
Dimension B [mm]	16	16	16	22	22
Dimension C [mm]	11	11	11	14	14
Dimension D [mm]	10	10	10	15	15
Dimension L [mm]	30	60	90	45	90
Weight [g]	26	32	39	60	70

#### ▶ Technical Data

Order no.	SO-26115130	SO-26120045	SO-26120090	SO-26120130
Dimension A [mm]	15	20	20	20
Dimension B [mm]	22	26	26	26
Dimension C [mm]	14	16	16	16
Dimension D [mm]	15	20	20	20
Dimension L [mm]	130	45	90	130
Weight [g]	78	118	144	168



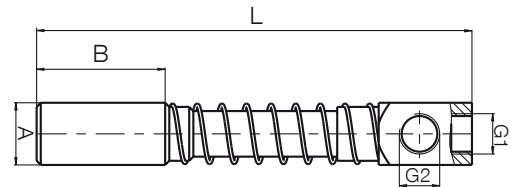
## ▶ SUCTION FINGER SPRING-LOADED



### ▶ Special features

Spring-loaded suction cups for contact surfaces at right angles to suction cup

Suitable for mini and bellows cups



### ▶ Technical Data

Order no.	SO-30311010	SO-30311020	SO-30322015	SO-30322035	SO-30323015
G1	M5	M5	G1/8"	G1/8"	G1/4"
G2	M5	M5	G1/8"	G1/8"	G1/8"
Dimension A [mm]	10	10	15	15	15
Dimension B [mm]	26	26	32	32	32
Dimension L min. [mm]	48	56	65	70	67
Dimension L max. [mm]	58	76	80	105	82
Weight [g]	12	14	32	35	39

### ▶ Technical Data

Order no.	SO-30323035	SO-30332020	SO-30332040	SO-30333020	SO-30333040
G1	G1/4"	G1/8"	G1/8"	G1/4"	G1/4"
G2	G1/8"	G1/8"	G1/8"	G1/4"	G1/4"
Dimension A [mm]	15	20	20	20	20
Dimension B [mm]	32	53	53	53	53
Dimension L min. [mm]	72	89	95	93	99
Dimension L max. [mm]	107	109	135	103	139
Weight [g]	42	74	90	61	77

# MODULAR CONSTRUCTION SYSTEM

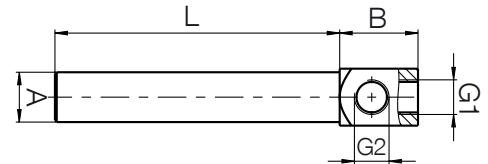
## SERIES MCS

### ► SUCTION FINGER



#### ► Special features

Rigid suction finger for rectangular contact surfaces to suction cup  
 Suitable for mini and bellows cups



	► Technical Data				
Order no.	SO-30111030	SO-30111060	SO-30111090	SO-30122045	SO-30122090
G1	M5	M5	M5	G1/8"	G1/8"
G2	M5	M5	M5	G1/8"	G1/8"
Dimension A [mm]	10	10	10	15	15
Dimension B [mm]	14	14	14	20	20
Dimension L [mm]	30	60	90	45	90
Weight [g]	9	14	21	26	38

	► Technical Data				
Order no.	SO-30122130	SO-30123045	SO-30123090	SO-30123130	SO-30132045
G1	G1/8"	G1/4"	G1/4"	G1/4"	G1/8"
G2	G1/8"	G1/8"	G1/8"	G1/8"	G1/8"
Dimension A [mm]	15	15	15	15	20
Dimension B [mm]	20	24	24	24	24
Dimension L [mm]	130	45	90	130	45
Weight [g]	49	30	42	50	57

	► Technical Data				
Order no.	SO-30132090	SO-30132130	SO-30133045	SO-30133090	SO-30133130
G1	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"
G2	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"
Dimension A [mm]	20	20	20	20	20
Dimension B [mm]	24	24	28	28	28
Dimension L [mm]	90	130	45	90	130
Weight [g]	83	109	52	79	105

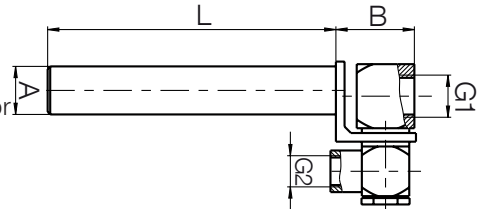
## ▶ SUCTION FINGER ROTATABLE



### ▶ Special features

Suction fingers with swivel head for inclined surfaces to suction cup, suitable for mini and bellows cups

The suction cup can be adjusted for inclined surfaces up to 45°



### ▶ Technical Data

Order no.	SO-30211030	SO-30211060	SO-30211090	SO-30222045	SO-30222090
G1	M5	M5	M5	G1/8"	G1/8"
G2	M5	M5	M5	G1/8"	G1/8"
Dimension A [mm]	10	10	10	15	15
Dimension B [mm]	16	16	16	24	24
Dimension L [mm]	30	60	90	45	90
Weight [g]	17	21	26	61	73

### ▶ Technical Data

Order no.	SO-30222130	SO-30223045	SO-30223090	SO-30223130	SO-30232045
G1	G1/8"	G1/4"	G1/4"	G1/4"	G1/8"
G2	G1/8"	G1/8"	G1/8"	G1/8"	G1/8"
Dimension A [mm]	15	15	15	15	20
Dimension B [mm]	24	25	25	25	30
Dimension L [mm]	130	45	90	130	45
Weight [g]	83	65	78	88	81

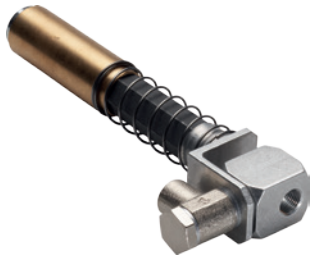
### ▶ Technical Data

Order no.	SO-30232090	SO-30232130	SO-30233045	SO-30233090	SO-30233130
G1	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"
G2	G1/8"	G1/8"	G1/4"	G1/4"	G1/4"
Dimension A [mm]	20	20	20	20	20
Dimension B [mm]	30	30	30	30	30
Dimension L [mm]	90	130	45	90	130
Weight [g]	116	138	104	139	161

# MODULAR CONSTRUCTION SYSTEM

## SERIES MCS

### ► SUCTION FINGER ROTATABLE



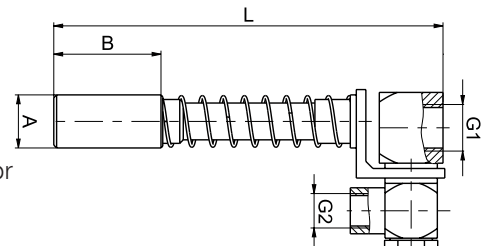
#### ► Special features

Spring-loaded suction finger with swivel head for contact inclined surfaces to suction cup

Suitable for mini and bellows cups

The suction cup can be adjusted for inclined surfaces up to 45°

Secured against rotation



#### ► Technical Data

Order no.	SO-30411010	SO-30411020	SO-30422015	SO-30422035	SO-30423015
G1	M5	M5	G1/8"	G1/8"	G1/4"
G2	M5	M5	G1/8"	G1/8"	G1/8"
Dimension A [mm]	10	10	15	15	15
Dimension B [mm]	26	26	32	32	32
Dimension L min. [mm]	52	60	70	75	72
Dimension L max. [mm]	62	80	85	110	87
Weight [g]	29	30	76	77	81

#### ► Technical Data

Order no.	SO-30423035	SO-30432020	SO-30432040	SO-30433020	SO-30433040
G1	G1/4"	G1/8"	G1/8"	G1/4"	G1/4"
G2	G1/8"	G1/8"	G1/8"	G1/4"	G1/4"
Dimension A [mm]	15	20	20	20	20
Dimension B [mm]	32	53	53	53	53
Dimension L min. [mm]	77	97	103	99	105
Dimension L max. [mm]	112	117	143	119	145
Weight [g]	82	145	146	168	169

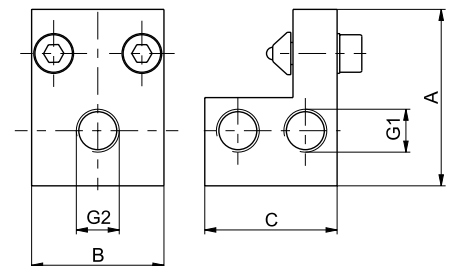
### ► AIR DISTRIBUTOR 4-CONNECTIONS



#### ► Special features

1 air cycle, 4 connections

To distribute compressed air and vacuum



#### ► Technical Data

Order no.	SO-35101004
G1	G1/8"
G2	G1/8"
Dimension A [mm]	40
Dimension B [mm]	30
Dimension C [mm]	30
Weight [g]	86

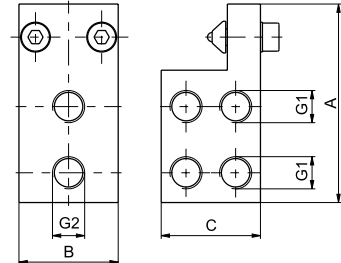
## ► AIR DISTRIBUTOR 2X4-CONNECTIONS



### ► Special features

2 air cycle, 2x4 connections

To distribute compressed air and vacuum



### Order no.

### ► Technical Data

**SO-35102004**

G1	G1/8"
G2	G1/8"
Dimension A [mm]	60
Dimension B [mm]	30
Dimension C [mm]	30
Weight [g]	133

## ► GRIPPER FINGERS

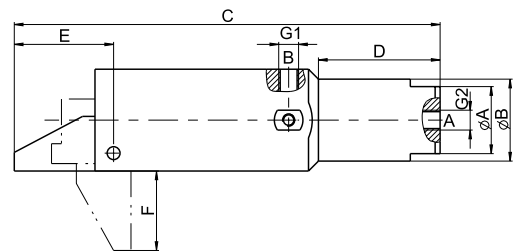


### ► Special features

Swivel angle 90°

Torque 90 Ncm

- Ⓐ Closing/Gripping
- Ⓑ Opening



### Order no.










### ► Technical Data

**SO-43120090**

G1	M5
G2	M5
Dimension A [mm]	20
Dimension B [mm]	25
Dimension C [mm]	105
Dimension D [mm]	30
Dimension E [mm]	24
Dimension F [mm]	19
Weight [g]	130



## ▶ ACCESSORIES

	Series IF - Filters	128
	Series SV - Flow control valve	129
	Series SD - Silencer	130
	Series GV - Straight fittings - barb style connection	130
	Series GV - Straight fittings - quick style connection	131
	Series WV - Angled fittings - quick style connection	131
	Seal	132
	Connection plate	132
	Cover plate	133
	Clamping tongs	133

# ACCESORIES

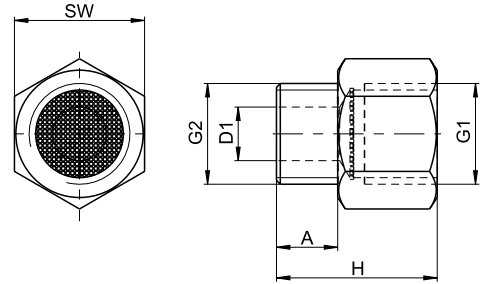
## SERIES IF / SV

### ► SERIES IF - FILTERS



#### ► Special features

Coarse particle inline filter  
Easy to fit



#### ► Technical Data

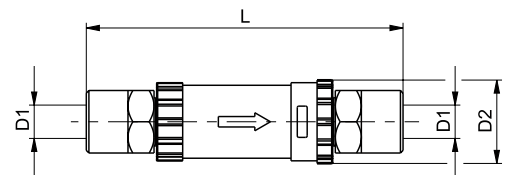
Order no.	IF1-4	IF1-8
G1	G1/4"	G1/8"
G2	G1/4"	G1/8"
Dimension A [mm]	8	6
Dimension D1 [mm]	7	5
Dimension H [mm]	21	16
SW [mm]	17	14

### ► SERIES IF - FILTERS



#### ► Special features

Easy tube fitting  
Degree of pollution can be seen through transparent housing



#### ► Technical Data

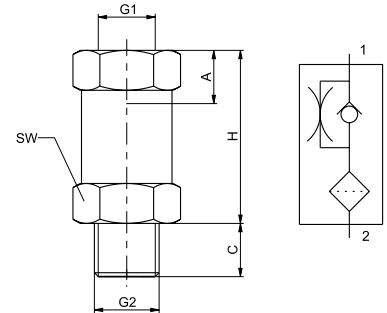
Order no.	IF6-4	IF8-6
Dimension D1 [mm]	6	8
Dimension D2 [mm]	16	23
Dimension L [mm]	61	68

## ► SERIES SV - FLOW CONTROL VALVE



### ► Special features

- Version with internal thread on top
- Response characteristics depend on flow rate
- Closes vacuum line for suction grippers not in use
- Maintains system vacuum



### ► Technical Data

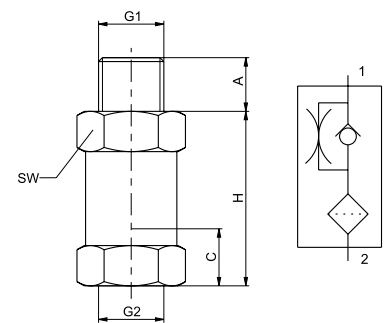
Order no.	SV14AI	SV18AI
G1	G1/4"	G1/8"
G2	G1/4"	G1/8"
Dimension A [mm]	11	8.5
Dimension C [mm]	10	8
Dimension H [mm]	26	26
SW [mm]	17	14

## ► SERIES SV - FLOW CONTROL VALVE



### ► Special features

- Version with internal thread on top
- Response characteristics depend on flow rate
- Closes vacuum line for suction grippers not in use
- Maintains system vacuum



### ► Technical Data

Order no.	SV14IA	SV18IA
G1	G1/4"	G1/8"
G2	G1/4"	G1/8"
Dimension A [mm]	10	8
Dimension C [mm]	11	8.5
Dimension H [mm]	26	26
SW [mm]	17	14



# ACCESORIES

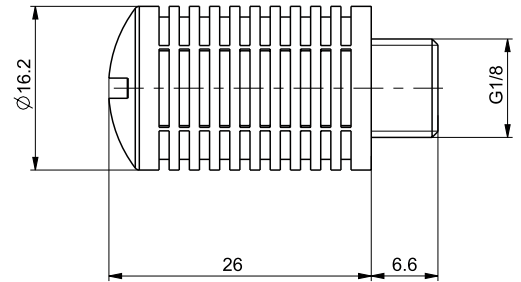
## SERIES SD / GV / WV

### ► SERIES SD - SILENCER



#### ► Special features

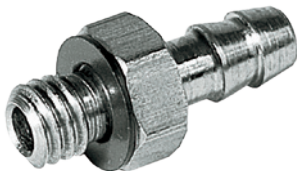
To reduce noise  
For VG1/8 vacuum generator



#### ► Technical Data

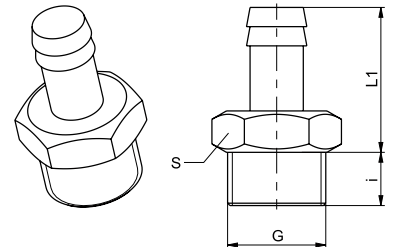
<b>Order no.</b>	<b>SD18KS</b>
Fixing thread	G1/8"

### ► SERIES GV - STRAIGHT FITTINGS - BARB-STYLE CONNECTION



#### ► Special features

For assembling with hose clips  
Straight version



#### ► Technical Data

<b>Order no.</b>	<b>GVM3</b>	<b>GV1-8X5ID</b>	<b>GV1-8X6ID</b>	<b>GV1-8X8ID</b>	<b>GV1-4X8ID</b>
Fixing thread	M3	G1/8"	G1/8"	G1/8"	G1/4"
Inside-Ø for hose [mm]	3	5	6	8	8
Dimension i [mm]	2.7	6	6	6	8
Dimension L1 [mm]	7.2	24	24	24	24.5
S [mm]	4.5	13	13	13	17

#### ► Technical Data

<b>Order no.</b>	<b>GV1-4X10ID</b>	<b>GV3-8X13ID</b>	<b>GV1-2X13ID</b>	<b>GV1-2X16ID</b>
Fixing thread	G1/4"	G3/8"	G1/2"	G1/2"
Inside-Ø for hose [mm]	10	13	13	16
Dimension i [mm]	8	9	10	10
Dimension L1 [mm]	24.5	24.5	25	29.5
S [mm]	17	19	24	24

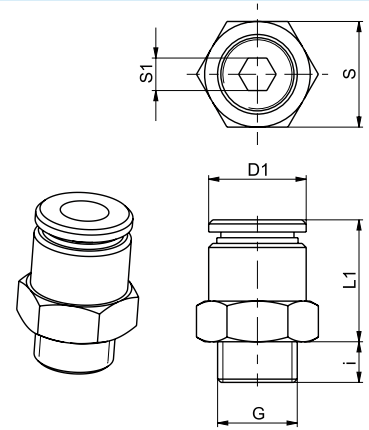
## ► SERIES GV - STRAIGHT FITTINGS - QUICK CONNECT STYLE



### ► Special features

Cost reduction through quick assembly and disassembly

Straight version



### ► Technical Data

Order no.	GVM5	GV1-8X4	GV1-8X6	GV1-8X8	GV1-4X6	GV1-4X8
Fixing thread	M5	G1/8"	G1/8"	G1/8"	G1/4"	G1/4"
Outside-Ø for hose [mm]	4	4	6	8	6	8
Dimension D1 [mm]	8	10	12	14	12	14
Dimension i [mm]	3.5	5	5	5	7	7
Dimension L1 [mm]	16.5	14	15	20	14.5	16
S [mm]	8	13	13	14	17	17
S1 [mm]	2.5	3	4	5	4	6

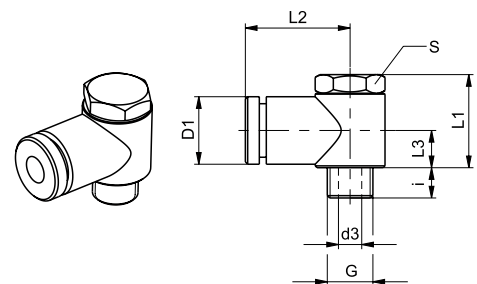
## ► WV SERIES - ANGLED FITTINGS- QUICK CONNECT STYLE



### ► Special features

Cost reduction through quick assembly and disassembly

Angled and swivel-mounted



### ► Technical Data

Order no.	WVM5	WV1-8X4	WV1-8X6	WV1-8X8	WV1-4X6	WV1-4X8
Fixing thread	M5	G1/8"	G1/8"	G1/8"	G1/4"	G1/4"
Outside-Ø for hose [mm]	4	4	6	8	6	8
Dimension D1 [mm]	8	10	12	14	12	14
Dimension d3 [mm]	2	5	5	5	7	7
Dimension i [mm]	4	6.5	6.5	6.5	8	8
Dimension L1 [mm]	14	20	20	20	21	21
Dimension L2 [mm]	17	20.5	21.5	23.5	23.5	25.5
Dimension L3 [mm]	5.3	8	8	8	8	8
S [mm]	8	14	14	14	17	17
S4 [mm]	9	14	14	14	18	18

# ACCESORIES

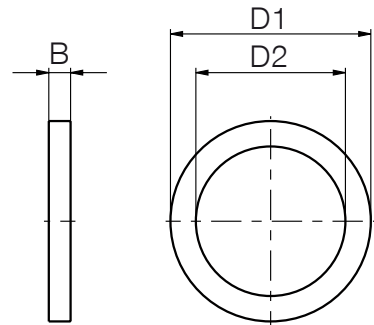
## SERIES ZUB

### ► SEAL



#### ► Special features

Material: polyamide  
To 90°C



#### ► Technical Data

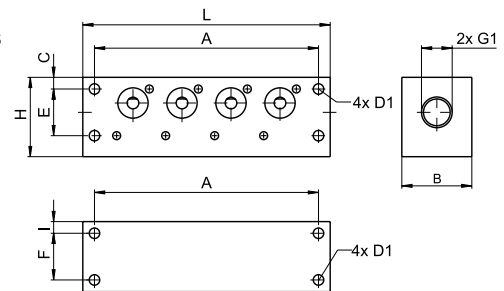
Order no.	ZUB0034	ZUB0035	ZUB0036
Dimension B [mm]	1	1.5	1.5
Dimension D1 [mm]	8	13.8	17
Dimension D2 [mm]	5.1	10.3	13.5

### ► AIR CONNECTION



#### ► Special features

To create compact ejector blocks  
Central compressed air feed



#### ► Technical Data

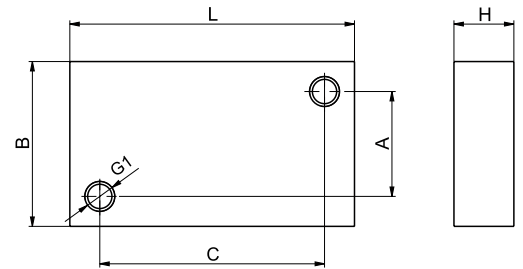
Order no.	ZUB0007	ZUB0008	ZUB0010	ZUB0011
G1	G1/4"-IG	G1/4"-IG	G1/2"-IG	G1/2"-IG
Dimension A [mm]	54	96	62	108
Dimension B [mm]	30	30	38	38
Dimension C [mm]	5	5	8	8
Dimension D1 [mm]	4.5	4.5	7	7
Dimension E [mm]	20	20	34	34
Dimension F [mm]	20	20		
Dimension H [mm]	34	34	49.5	49.5
Dimension I [mm]	5	5	7	7
Dimension L [mm]	64	106	78	124
No. of outlets [Pice]	2	4	2	4
Weight [g]	180	281	375	595
compatible with	2xKE15	4xKE15	2xKE25	4xKE25

## ▶ COVER PLATE



### ▶ Special features

To close connections not used by ejectors



### ▶ Technical Data

Order no.	ZUB0009	ZUB0012
G1	M3	M4
Dimension A [mm]	14	14
Dimension B [mm]	20	22
Dimension C [mm]	20	30
Dimension H [mm]	6	8
Dimension L [mm]	26	38
compatible with	ZUB0007-ZUB0008	ZUB0010-ZUB0011

## ▶ CLAMPING TONGS ZUB0033



### ▶ Special features

Clamping tongs with side cutters for use where space is limited  
Suitable for ear clamps in OV, SFO and SF suction cup Series